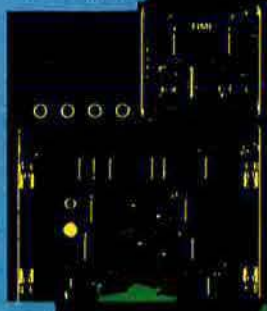
DECEMBER 1982 / $3

AIR FORCE

PUBLISHED BY THE AIR FOR TION

MAGAZINE



The Military Balance 1982/83

The GE technology edge: durable fighter turbofans with turbojet characteristics.

General Electric's new supersonic fighter turbofans benefit from technology that is *five years more advanced than any competitive engine.* And these advances are proven by endurance testing far more severe than previous standards. Accelerated Mission Testing (AMT), for example, subjects an engine to over 30 times the number of full throttle cycles and 12 times as many afterburner lights as traditional 150-hour qualification tests.

The F404 is a 16,000 lb. thrust engine in production for the U.S. Navy F/A-18 multi-mission aircraft. It has also been selected for the Canadian CF-18, the Australian F/A-18, the Swedish JAS aircraft, and is being offered in several other fighter competitions. The F404 has also been selected for the new Tigershark intermediate fighter and DARPA's Grumman X-29 demonstrator aircraft.

The F101 DFE, a derivative of the F101 developed for the U.S. Air Force B-1, is in the 26-29,000 lb. thrust class. It has been funded by the USAF and USN in a development and flight test program to provide competitive production alternatives in the large fighter engine thrust class. The engine has met all its fixed price contract requirements, completed its flight clearance tests, and conducted outstandingly successful flight test programs in both the USAF F-16 and USN F-14.

F101 DFE-powered General Dynamics F-16 — Flight Test

General Electric is truly setting *new standards* for fighter turbofans:

• **OPERABILITY:** Exceptionally stall-free engine operation and stable afterburner operation through the entire fighter envelope, with no throttle restrictions. Pilots report that F404 and F101 DFE turbofans behave like General Electric's famed J79 fighter turbojet. As one pilot said, "I can really fly the aircraft up to its capabilities." Said another, "Amazing response for a turbofan — as good as a turbojet."

• **DURABILITY AND RELIABILITY:** Proven by record-breaking AMT tests on both engines. Hot section lives equivalent to 2,000 mission hours of the toughest fighter operation were demonstrated on the F101 DFE without significant distress — and the parts will be put back in engines for more testing. With their preeminent hot section technology, GE engines offer *twice* the hot section life of any other engine in service.

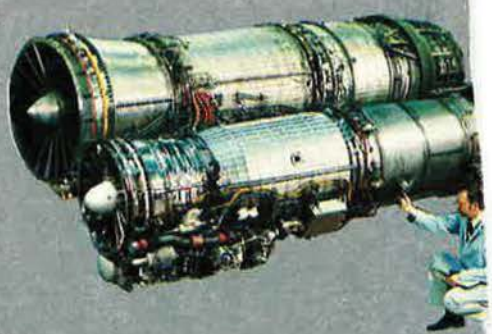
F404-powered McDonnell Douglas F/A-18 — Production

• **OPERATING COSTS:** From simpler design through advanced technology. For example, GE engines feature single-stage turbines, machined ring combustors, mixed flow afterburners, and thousands of fewer parts than other engines. Simplicity *plus* durability provide low maintenance costs. This is a direct result of low engine removal rates, where General Electric's engines have a preeminent record: The J79 removal rate in the F-4 is three per 1,000 flight hours. The TF34 in the A-10 is under two per 1,000. And the F404 and F101 DFE are on track for two per 1,000. Truly new industry standards!

F101 DFE-powered Grumman F-14 — Flight Test

When you need advanced fighter capability, GE gives you the technology edge . . . durable turbofan with turbojet characteristics.

Great Engines From General Electric's Advanced Technology



GENERAL ELECTRIC

OR THE AIR COMBAT ARENA OF THE 1990's!

$$\int_{\text{CEPT}}^{\text{SYSTEM}} \left[\left(\begin{array}{c}\text{Flight control}\\ \text{technology}\end{array} \right) + \left(\begin{array}{c}\text{Innovative}\\ \text{application}\end{array} \right) + \left(\begin{array}{c}\text{Quality}\\ \text{awareness}\end{array} \right) \right] dt = \left\{ \begin{array}{c}\text{Mission success}\\ \text{Survivability}\\ \text{Flight safety}\\ \text{Affordability}\end{array} \right\}$$

CHECKLIST FOR THE 90's

Technology	*Our status*
Digital fly by wire	✓
1750 processor	*in progress*
J73/ADA software	*in progress*
Fault tolerant architecture	
– in hardware	✓
– in software	✓
Direct drive actuation	*in progress*
VHSIC/VLSI	*in progress*
Fiber optics	*in progress*
Multivariable control	✓
Active control	✓

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Seawolf, the close-range shipborn point-defence system, proved outstandingl effective against aircraft attacking at hig speed and sea-skimming heights and virtuall without radar warning. Its speed of respons and deadly accuracy at very close ranges wer evident in the fact that, despite many dete mined attempts, only one Seawolf-armed shi suffered even minor damage.

AIM9L British Aerospace Dynamics Group is responsible for the UK contribution to the Europe

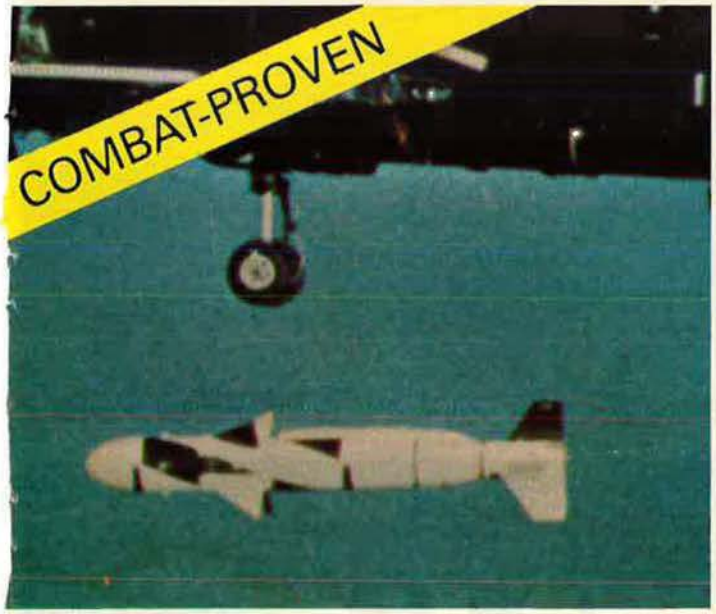
BRITISH AEROSPACE

unequalled in its range of operationally proven aerospace produc

n addition to the outstanding success of the Sea Harrier, four British Aerospace missile systems combined to give the British Task Force in the South Atlantic defence in depth against continued and determined air attacks, extracting an unacceptable toll of attrition on attacking aircraft, and against small surface vessels. No other missile systems in production today have been proven in combat under such arduous climatic and operational conditions.

No other combination of weapon systems could have provided such comprehensive and effective defence cover for amphibious forces operating in very fluid and confusing combat conditions thousands of miles from base.

No other single missile manufacturer can back its claims for its weapon systems with the ultimate proof of combat experience, in such demanding conditions.



the South Atlantic

Sea Skua, the only helicopter-launched sea-skimming anti-ship missile system in operational use, proved its effectiveness by sinking one ship and crippling others in operations under appalling weather conditions, including a strike by night, in a storm and with a high sea state.

Sea Dart, the long-range ship-mounted area-defence system, denied the enemy the use of high-level reconnaissance and high-level air attack. It imposed upon enemy aircraft the use of patterns of approach and strike which significantly increased their vulnerability to the close-range systems and enabled these systems to account for large numbers of attacking aircraft.

anufacture of AIM9L and is participating in the highly successful Sea Harrier missile integration programmes.

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This Month

DECEMBER 1982 • VOLUME 65, NUMBER 12

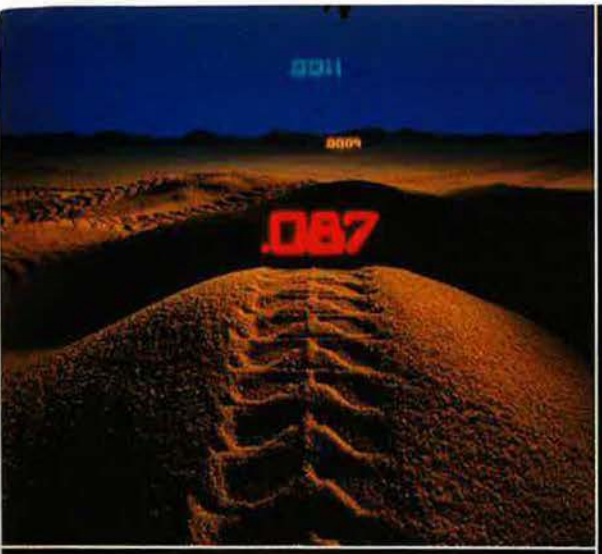
The Military Balance 1982/83

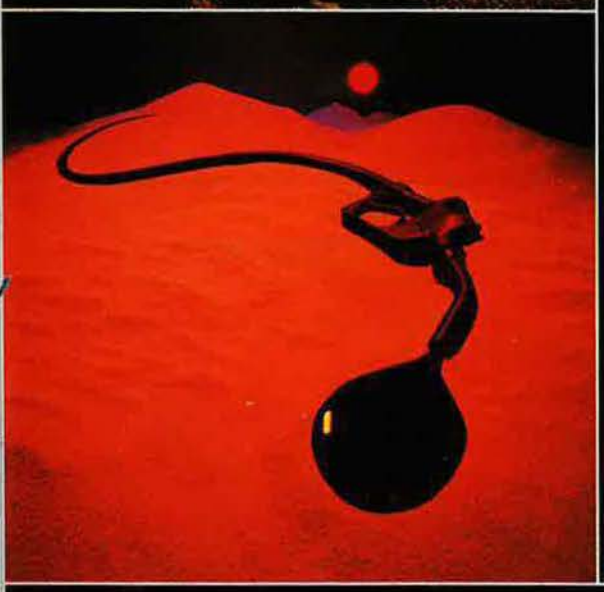
A Publication of The International Institute for Strategic Studies, London

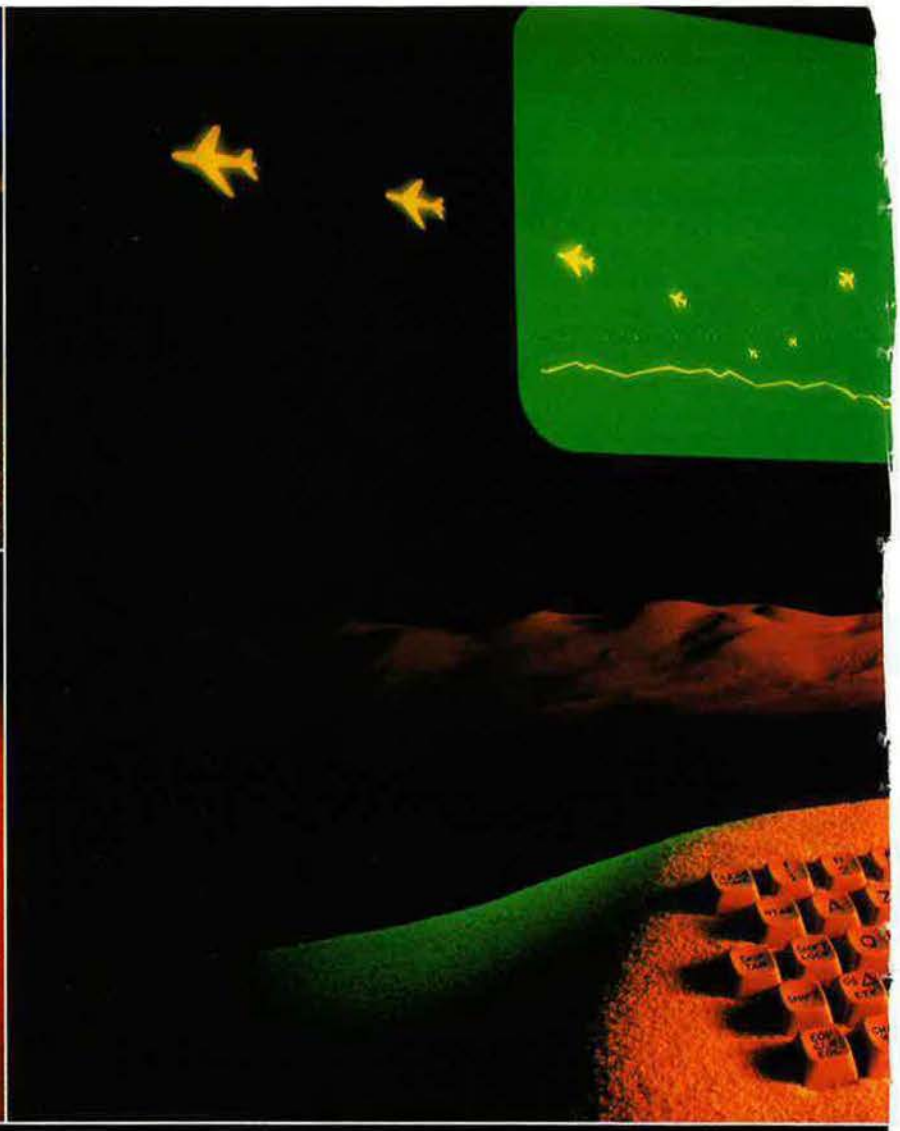
ABOUT THE COVER

This issue contains the exclusive US presentation of "The Military Balance 1982/83," compiled by London's International Institute for Strategic Studies. "The Military Balance" is a comprehensive and handy reference guide to the world's armed forces. The cover illustration is by artist Michael David Brown.

Departments





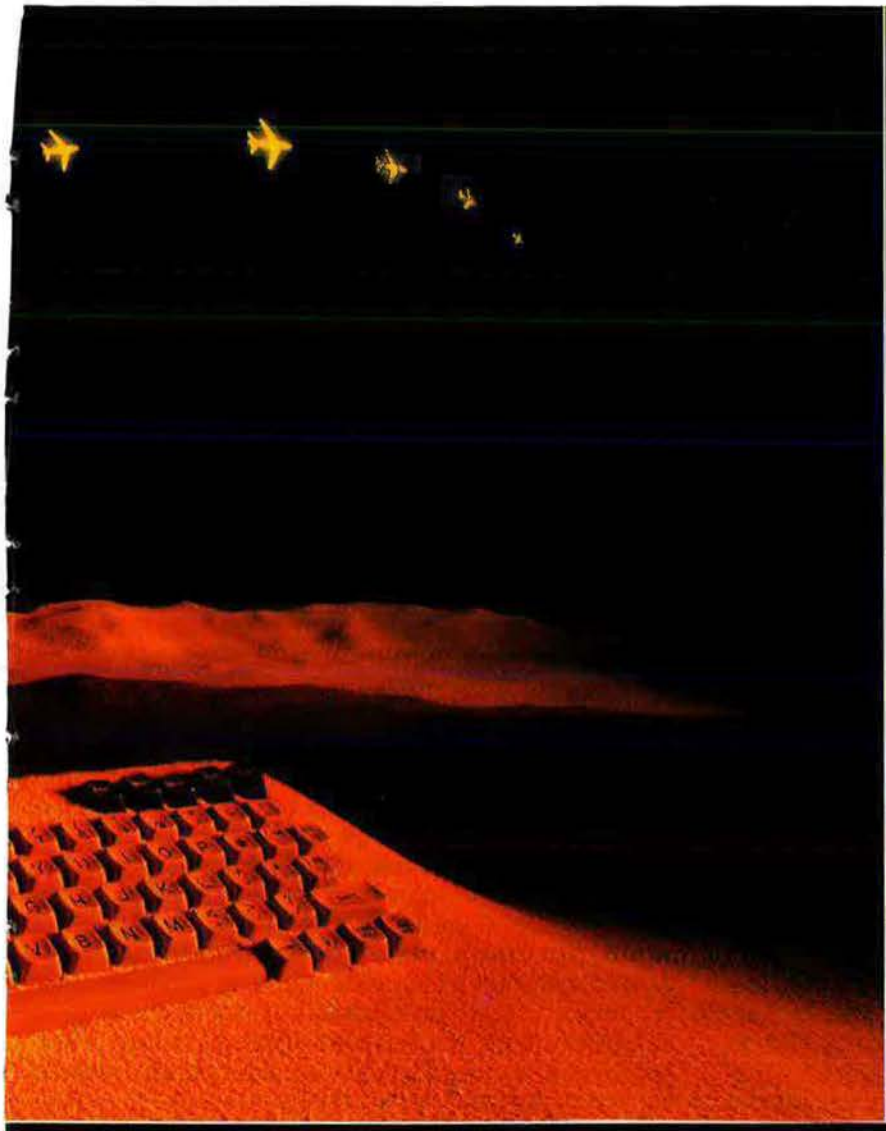


WE FIND THE ANSWERS ...RETHINK THE QUESTIONS

In many discussions about national needs, one crucial point tends to be obscured. U.S. leaders—especially in the defense community—are constantly faced with the need to prepare for a wide range of future threats and other contingencies. Perhaps 10 . . . 15 . . . even 25 years away. The exact nature of these contingencies can only be surmised. But our leaders have to make and implement pivotal decisions now. If they make the wrong choices, we could all suffer. Even if they make the right ones, and those decisions are not skillfully implemented, we could still be in big trouble. The stakes, as we all know, are very large.

The BDM Role How does BDM support its clients in resolving this dilemma? A dilemma further complicated in many defense programs by the fact that major systems or counterthreats now under consideration may not be available for at least 10 years?

Addressing a contingency, a known threat, or an implementation goal, the key is in knowing how best to define each core problem or requirement, focus on its central issues, derive the best possible data about them, quantify and qualify the pros and cons, and come up with solutions that work. Then help make them work. The first time.



...PUT THE FUTURE INTO FOCUS ...AND MAKE IT WORK

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In addition to a comprehensive spectrum of defense and communications programs, the Company has become increasingly active in important growth areas of energy, transportation, international programs, computers, and advanced technology.

We would be pleased to tell you more about BDM. Whether your interest is in getting a major problem solved — or just gaining a better financial and operational perspective on our Company — we welcome your inquiry. BDM International, Inc., 7915 Jones Branch Drive, McLean, Virginia 22102. Phone (703) 821-5000. Telex 901103.

MANAGING THE COURSE OF CHANGE

BDM

CHANGING THE COURSE OF MANAGEMENT

AN EDITORIAL

Eternally Hopeful

AS HAS been customary for more than a decade, this December issue of AIR FORCE Magazine presents the "Military Balance," prepared by The International Institute for Strategic Studies in London. This annual publication provides a snapshot of the armed forces of the world's nations: their composition, size, equipment, and other factors useful as a year-round reference.

Readers are encouraged to dip into the data as their interests lead them. Readers are especially urged to read the essays on the East-West conventional balance in Europe, on theater nuclear forces in Europe, and on estimating the Soviet-US strategic balance, beginning on p. 140. They go beyond statistical presentations into assessments and analyses.

December is a useful month in which to display these materials. It is a time when people review the year just ending and look ahead to the one to come. The "Military Balance" is one of the handiest publications for such an assessment. Like snapshot photos, it depicts a situation at a given moment, and is particularly valuable in that regard.

But trends are as important as momentary assessments. "Military Balance" addresses trends in the essays, mentioned above. Consider one case, the East-West conventional balance in Europe. It says, "The numerical balance over the last twenty years has slowly but steadily moved in favor of the East. At the same time the West has largely lost the technological edge which allowed NATO to believe that quality could substitute for numbers. One cannot necessarily conclude from this that NATO would suffer defeat in war, but one can conclude that there has been sufficient danger in the trend to require remedies."

Focus now on data about US-Soviet trends compiled by the Air Staff. In space, last year, the Soviets launched seventy-five military-related satellites vs. eight for the US. The Soviets have the world's only space weapon system; their antisatellite system has been demonstrated for years, and threatens satellites in low orbit. Since 1965, the Soviets have developed seven new models of intercontinental ballistic missiles and deployed six, while the US has deployed one. In the last year the Soviets have produced 200 new ICBMs, while the US continues to debate what to do about a new one.

In tactical combat aircraft, the Soviets lead the US by 8,000 to 3,600. Worse, their production rate of fighters and fighter-bombers is running at 1,500 per year while the US is building fewer than 300. This means not only that the gross numbers increase, but also that the average age of the Soviet fighter and fighter-bomber aircraft is low. By contrast, USAF's tactical force is aging and requires modernization. Look at air defense interceptors. The F-106s and F-4Cs average two decades old. USAF plans to replace both with F-15s and F-16s, but insufficient numbers are being built to reduce the average age. The B-52s of Strategic Air Command average almost twenty-three years old, and it looks as if most of them will see another decade of service.

In high technology, it has long been an article of faith that the US held the lead across the board, and that the Soviets had to produce large quantities of crude equipment to compensate. That is not accurate. One example cited by USAF sources is the MiG-23 Flogger. It is an all-weather fighter, flies nearly twice the speed of sound, and uses a laser rangefinder, among other advanced systems. It is constantly being improved. That is one example where emphasis on high technology is being translated into deployed fighting systems. USAF sources believe the Soviets have taken the lead in radio frequency devices, electrical power sources, chemical explosives, and directed energy weapons.

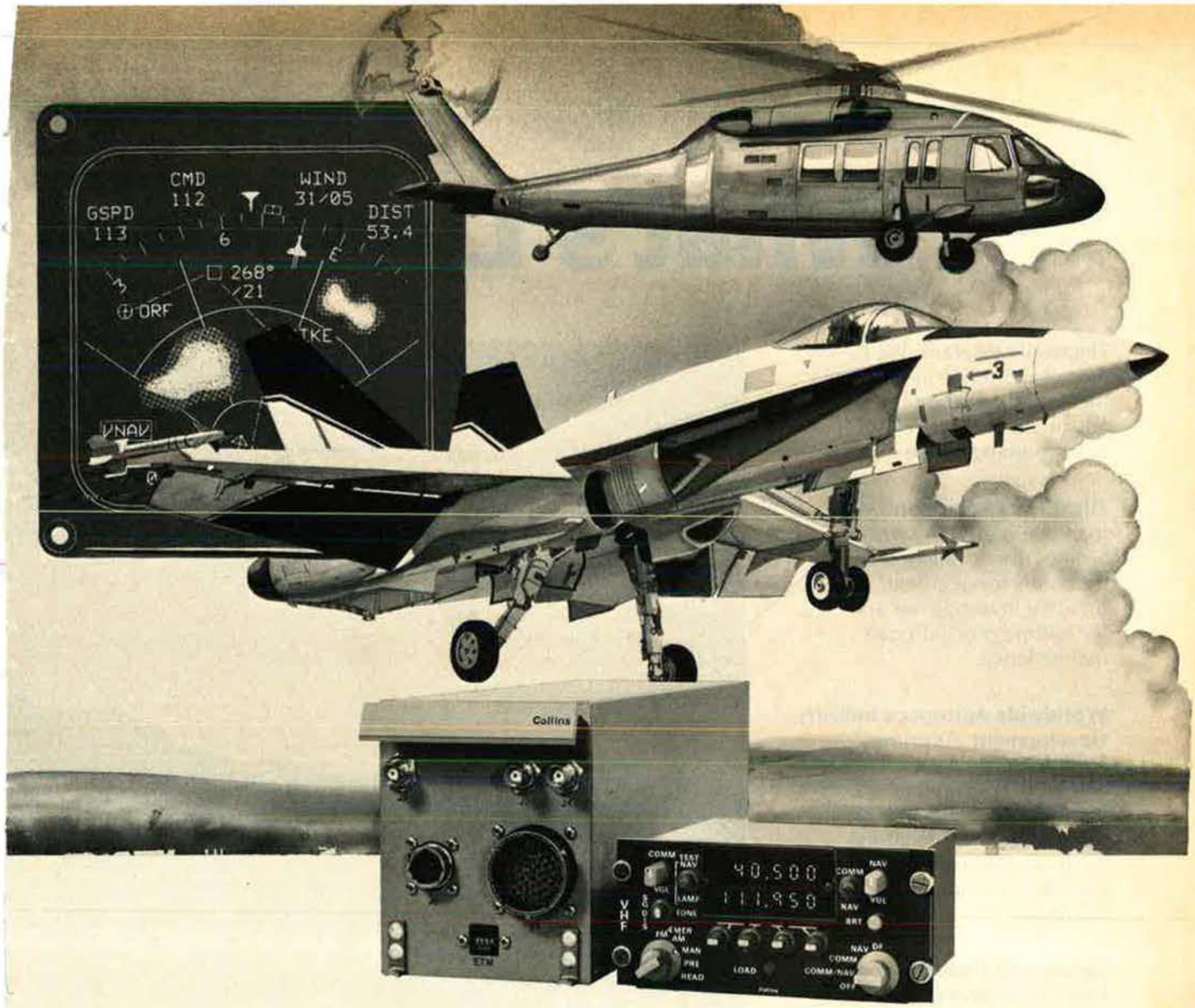
In directed energy weapons, the Soviets continue development of high energy laser weapon systems at three to five times the US level of effort. That means that deployed systems could be in the field and facing US forces by the late 1980s.

The US Air Force leadership is determined to meet the challenges these trends pose, and to keep the peace. That means setting priorities and then doing what is necessary. Secretary Orr and General Gabriel have set the priorities. The top five: first, people; then strengthening strategic nuclear forces; third, enhancing readiness and sustainability of tactical and airlift forces; fourth, improving mobility assets; and fifth, modernizing and expanding the tactical air forces, including the reserves.

Doing what is necessary to halt the acceleration of these ominous trends means spending some of the national treasure. Let one fact be clear: The country *can* afford what is necessary to achieve these modest goals. The other fact that is crystal clear: If we do not spend what is necessary, the grim reckoning will come sooner rather than later.

This nation's history gives the best reasons for the eternal hope expressed in the title of this editorial; when the need is clear, the people of the United States have responded as necessary to preserve this country and its envied system. They will do so again this time.

—F. CLIFTON BERRY, JR., EDITOR IN CHIEF



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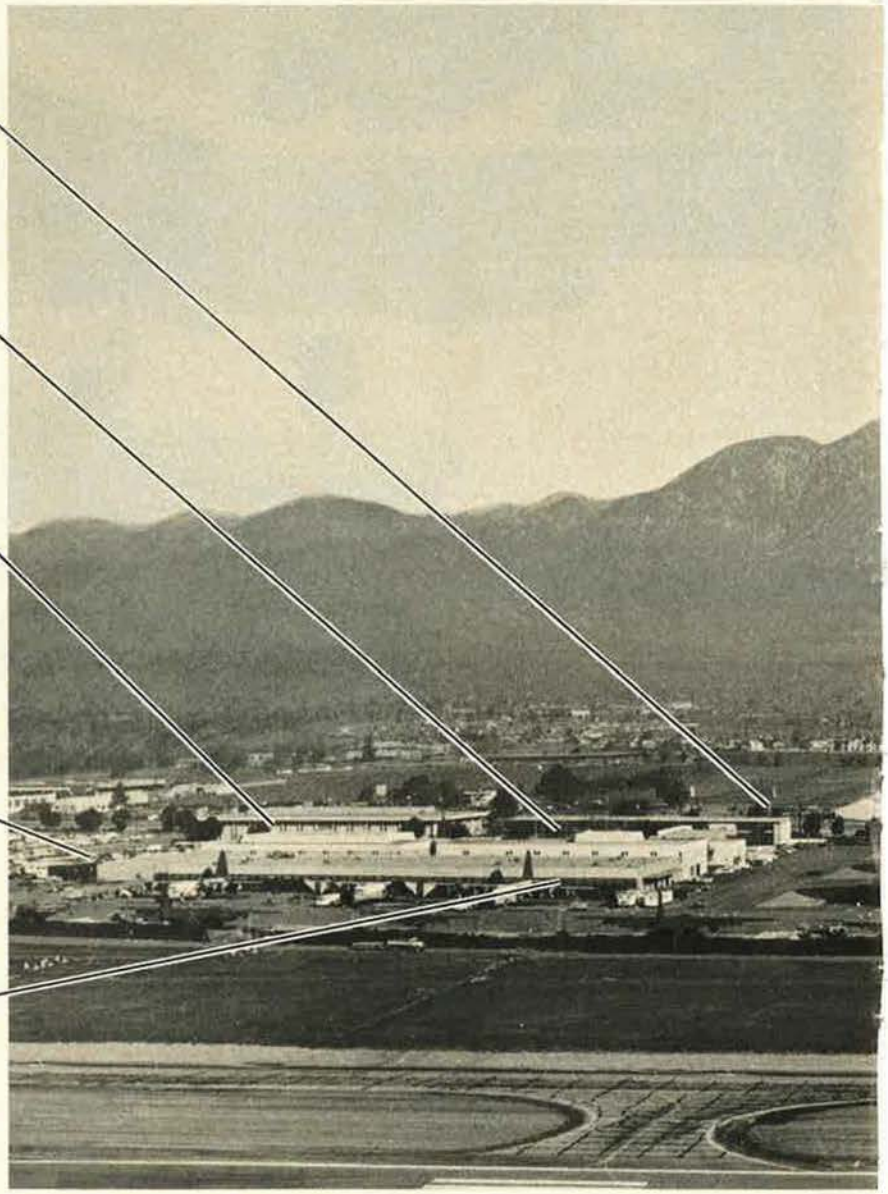

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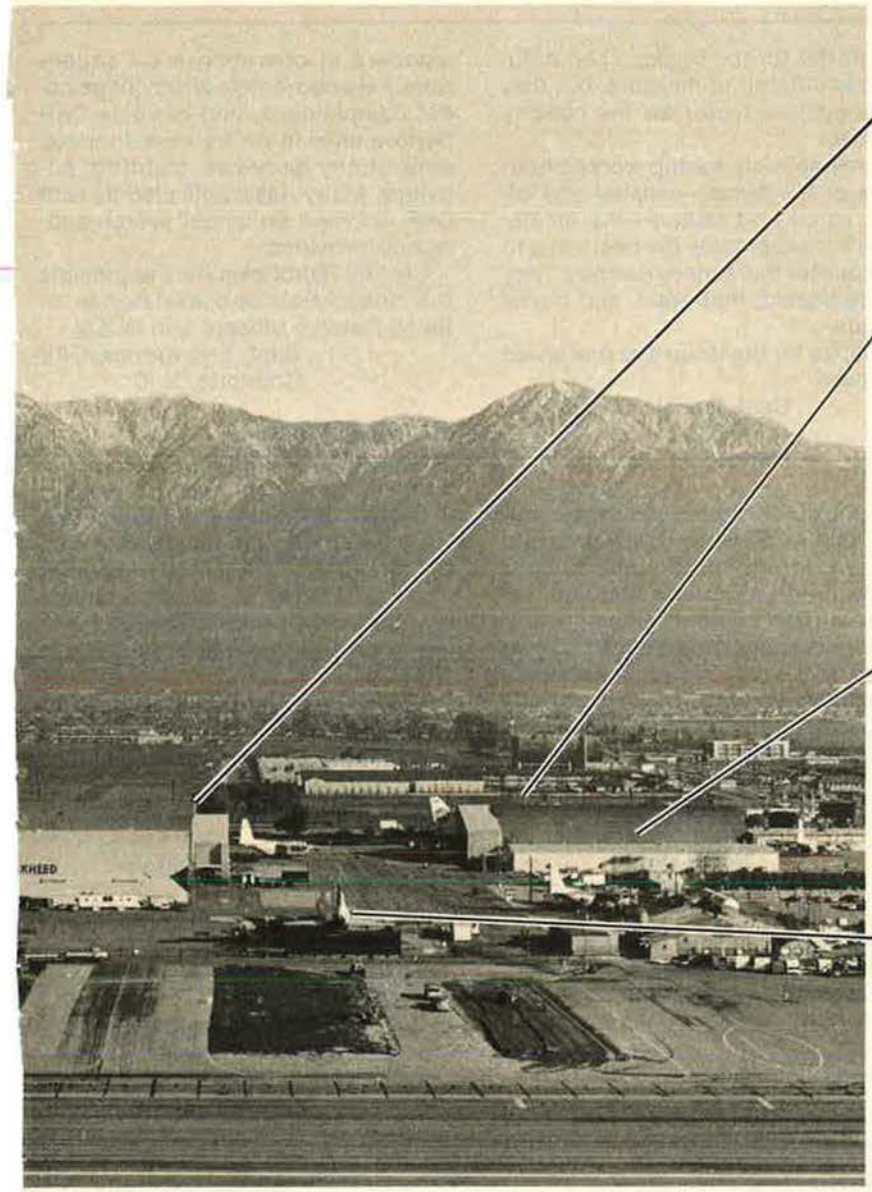

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AIRMAIL

October Issue

I read with great interest your October '82 issue, which highlighted the Air Reserve Forces. Each article was well written and summarized the broad spectrum of activities successfully performed by the Air National Guard and the Air Force Reserve. The only additional idea I feel was not touched on in the issue was the strong traditional/historical heritage that belongs to the "militia" forces (including AFRES) by being military units made up entirely of local citizens.

Being sixth-generation Pennsylvania militia myself, I am sensitive to a different perspective of the military not commonly understood by my Air Force counterparts. For more than two centuries . . . my family has served in a succession of local units. . . .

This tradition is not uncommon among reservists, and it has benefits that strengthen the military in ways not generally recognized outside of publications for the Guard or Reserve. One of these benefits is the strong personal attachments that are built up over the years among members of a local unit. Of my sixteen years of service, eight of which were enlisted, twelve years have been in the same squadron. This type of service provides an ideal opportunity for officers to know the people they manage, and vice versa.

Concurrently, many years in the same working environment with the same weapon systems sharpen skills to a greater degree than would be possible if frequent transfers were required. As for longevity, it is not unusual for a reservist to spend more than thirty years at the same base with the same unit.

Another benefit often overlooked is the frequency with which family members and relatives serve together in local units. There is no better retention incentive in the Regular Forces. Fathers, sons, daughters, wives, husbands, mothers, cousins, etc., often serve in the same units and can count on serving together throughout their careers. These attachments provide the mortar for the bricks. Their influence is difficult to measure, but they are a positive factor for the nation's defense.

In my opinion, having worked both sides of the fence—enlisted and officer, active and reserve—the Air Reserve Forces provide the best value to the country that money can buy. They are dedicated, motivated, and highly reliable.

Thanks for the issue that presented our case.

Capt. Dennis B. Ardinger, PaANG
Bridgeville, Pa.

Just a quick note to advise you that the October '82 issue finally gives the reserve components some decent recognition—a process that still has many of the die-hard Regulars uptight. I never appreciated the fact that it was an annual hassle to convince them that we could do a job if properly supported.

But, as Winston Churchill once observed, "Indifference to good people is the mark of a strong nation."

Col. Fred E. Bamberger, USAF (Ret.)
Lauderdale Lakes, Fla.

With regard to your October '82 issue: Reservists also play a valuable role as Reserve Assistance Coordinators for Civil Air Patrol units across the country.

These Reservists assist CAP commanders in operating local squadrons, help coordinate airlift, judge cadet competitions, and evaluate CAP performance in Air Force-authorized emergency services training activities. Many Reservists also fly with CAP aircrews on actual search-and-rescue missions.

Civil Air Patrol members appreciate the dedication and assistance of these Reserve officers and NCOs.

Capt. Eric Karnes, CAP
Charlotte, N. C.

Submissions to "Airmail" should be sent to the attention of the "Airmail" editor, 1750 Pennsylvania Ave., N. W., Suite 400, Washington, D. C. 20006. Letters should not exceed 500 words, and preferably be typed. We reserve the right to condense letters as necessary. Names will be withheld on request, but unsigned letters are not acceptable. Because of the volume of letters received, it is not possible to print all submissions. Please allow lead time of *at least* two months for time-sensitive announcements.

The Vital Difference

Regarding the letter "Overemphasis on Pilots?" from James D. Bradley in the "Airmail" section of the October '82 issue *(p. 12):* Let him be mollified by the old Air Corps marching song that we learned as aviation cadets swinging along at the technical training command center at Boca Raton in 1943:

You've heard of the pilots so daring
As they gracefully soar through the air,
If it weren't for the men in the hangar
They wouldn't be flying up there!
So here's to the men who maintain them,
The oilers and grease monkeys, too—
If a thing has two wings and an engine,
We'll fix it to fly in the blue!

This rollicking ballad in no way diminished the vital "flyboy" types we needed on Guam with the 16th Bomb Group, 315th Wing, Twentieth Air Force, in its missions against the Empire. It was Army Air Forces teamwork—as I am sure it is Air Force teamwork that makes the vital difference today.

(P.S.: Do any readers know the origins and other verses of this song?)

John Kennard
Milford, Conn.

Inexcusable?

Charles Corddry may be the dean of the Pentagon press corps, but his omission of the USAF contribution to

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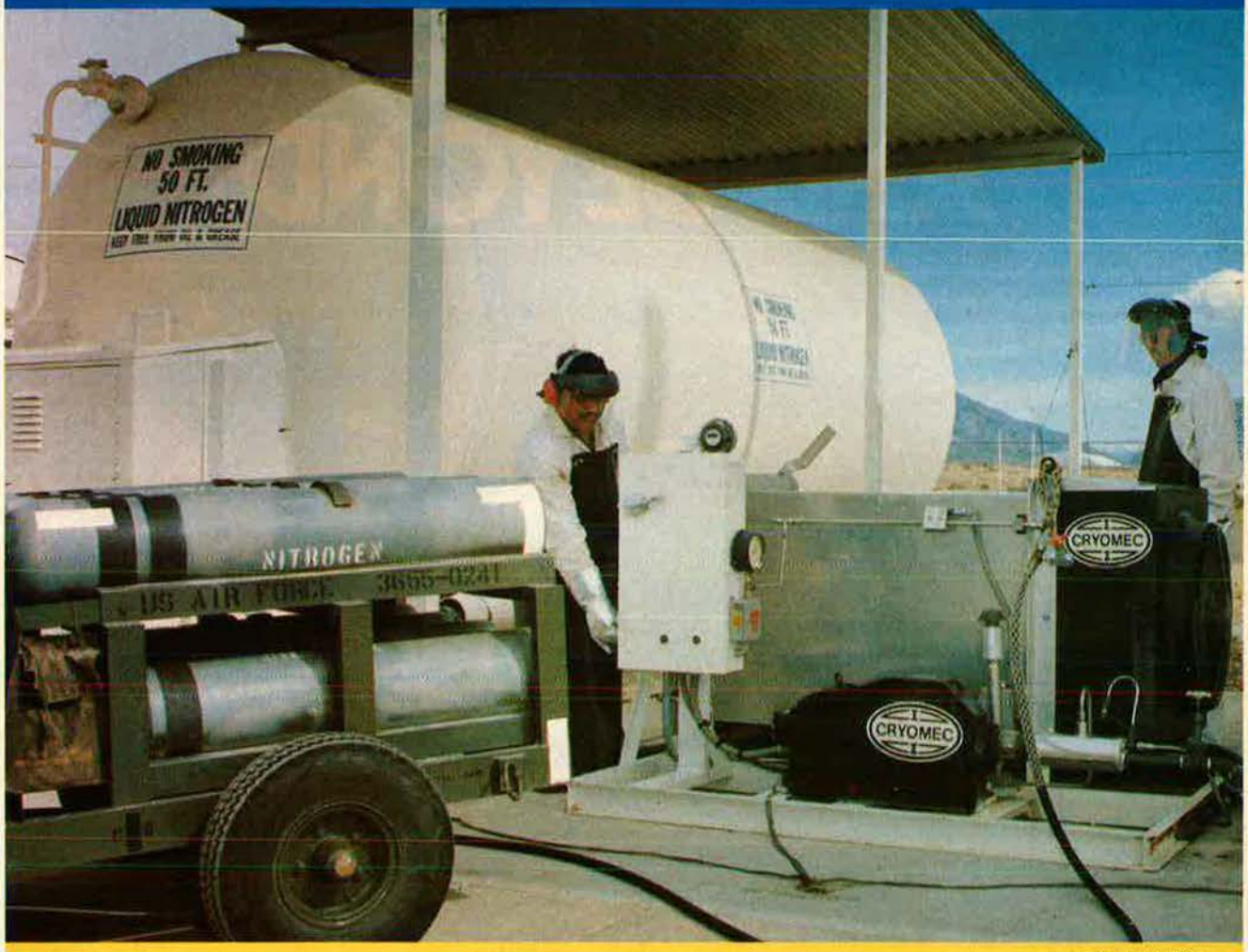

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This sophisticated electronic aircraft requires almost 20 percent less maintenance time per flight hour than budgeted by the Air Force. And even fewer hours than other, simpler aircraft.

But the true value of AWACS lies in its most important function — the international peacekeeper.

This eye-in-the-sky, with its powerful radar and data processing equipment, can deter aggression without aggressive action.

Wherever a crisis arises, AWACS is there. It has responded quickly to situations in Europe, Asia and the Middle East. In Saudi Arabia, AWACS provided Airborne Early Warning coverage 98 percent of the time during its first year of operation.

AWACS is reliable enough to meet all present needs, and flexible enough to handle all future threats.

It is more than a good airplane. It is a good investment in peace.

BOEING

the defense of Norway is a glaring deficiency *("Guardians of the Northern Flank," September '82, p. 160).*

Along with the Canadian brigade, the reinforcements counted on most are USAF units, composed mainly of Air National Guard and Air Force Reserve units. These squadrons are top-notch and have earned the respect and admiration of us all during their deployments and Checkered Flag visits to Norwegian bases. They are prepared to come to Norway, fight, and win.

To overlook them in AIR FORCE Magazine is regrettable; in fact, it borders on inexcusable.

Maj. Gen. Lawrence D. Garrison, USAF
Air Deputy, Hq. AFNORTH
Kolsaas, Norway

Orwellian History?

You blew my mind with the Orwellian turn your history took in "Designing the P-47 Thunderbolt" *(September '82, p. 132, by George C. Larson).*

How can you describe the Allison V-1710 as being "hoary" in 1940 when it had only passed Wright Field's muster in 1937, went into production in February 1940, reached production of 1,000 per month in 1941, and peaked at 3,000 per month in 1943?

And "anemic?" That's how you describe an engine that powered a P-40 that won the 1938 Air Corps fighter aircraft competition with a speed advantage of forty mph? Even today, the V-1710's throaty power can be heard in tractor pulls and hydroplane races.

Nice adjectives, but lousy history. Nay, hoary-bull history!

Donald G. O'Brien
Manager, Public Relations
Detroit Diesel Allison
Indianapolis, Ind.

Air Attachés

Your September '82 article on air attachés *("Air Attachés Answer the Questions," p. 182, by Mark E. Berent)* accurately portrayed the role and mission of attachés, and will hopefully recruit highly qualified and motivated officers and NCOs for attaché duty.

The two charts on p. 185, however, mar the article's overall accuracy because they do not reflect all of the stations where air attachés are assigned. Even the three high visibility air attaché posts mentioned in the text—the Soviet Union, China, Brazil—were omitted from the chart. Many other AIRA, AAIRA, and OPSCO positions were also inadvertantly omitted. Moreover, the charts were neither captioned nor referenced in the text.

AIRMAIL

This oversight detracted from an otherwise excellent article.

Lt. Col. James A. Richmond, USAF
Alexandria, Va.

• *We should have been more clear in labeling the charts to which Colonel Richmond refers. The charts were printed at the suggestion of the Directorate of Air Force Attaché Affairs to advertise* projected vacancies *for USAF personnel for defense attaché duty. As such, they were not intended to be a complete list of all positions and posts.*—THE EDITORS

Milton on the Academy . . .

As fate would have it, I happened to have come in contact with a recent Air Force Academy dropout a few days after reading General Milton's article *("Why the High Dropout Rate at the Academy?" September '82, p. 69).*

This was not my first encounter with someone who opted to leave the Academy; indeed, that happened some twenty-four years ago when, in the Academy's first graduating class, an outstanding cadet leader chose to leave in his final year. It may come as no surprise to some that the reasons for both departures were the same, despite the passage of time.

General Milton's concerned article touched all around the cause of the problem, but, unfortunately, missed the primary and common denominator that is to be found in case after case. This continuing exodus is the result of program deficiencies that affect the welfare and self-esteem of a cadet each and every day, and not because of the declining value of the Regular commission.

I have a hunch that someone on the school's staff is charged with the responsibility of questioning "SIE" (self-initiated elimination) cadets prior to their leaving the Academy. I'm sure that a major goal of that interview is to determine the specific reason(s) that prompted the youngster's decision to leave.

Could it be that there's been plenty of listening, but little hearing or heeding over the years?

John Jordan
Long Beach, Calif.

. . . And the Airlift Question

Having spent the better part of my life as an Air Force pilot and an airline pilot, I read General Milton's article, "Airlift: The Name of the Game Is Utilization" *(October '82, p. 97),* with considerable interest.

I agree with him that utilization is "where it's at," but regret to state that the estimated utilization rate for a major portion of the aircraft that will be available in a future war (the Civil Reserve Air Fleet) has not improved by so much as a single second in the three decades since its inception.

In my view, this is largely due to the very things General Milton mentions—neglect for aircrews, maintenance people, and spare parts. I have raised this issue within the Air Force and been told: "Don't worry, the airlines will take care of it." I have also raised it within the airline industry and been told: "Don't worry, the Air Force will take care of it."

With respect to "The Airlift Tragedy" *(August '82, p. 4):* The real tragedy is the refusal of the Air Force and Congress to look at the actual airlift needs and make the hard decisions necessary to fulfill them.

What is truly needed (as any knowledgeable airlift planner can tell you) is a large quantity of C-17s, or planes with a similar capability. I maintain there is only one way to get them—they must be built to military specifications *and* incorporate a quickly removable passenger module so that they can be utilized by the nation's airlines, pending arrival of the next war. Like it or not, there is just no way the United States is going to finance the large civil transport fleet it wants to have *and* the large military transport fleet it needs to have.

Until we all accept the hard reality that one fleet must be able to handle both requirements, the Air Force is never going to acquire the airlift capability that is so urgently needed.

Col. Dennis S. Arthur, USAFR
Miami, Fla.

Canadians in Vietnam

I am a Canadian journalist attempting to compile material on the estimated 40,000 Canadians who legally entered the United States in the 1960s and 1970s with the expressed intent of enlisting with military forces then engaged in Vietnam.

To date, I have located less than 100 of these veterans on whose recollections, good and bad, I hope to base a military-sociohistorical book.

The proposed book is not intended as a morality piece, but rather to learn why they went, what they did, and what they are doing now.

I am hoping that readers will recall any Canadians with whom they may have served, and that they will remem-

ber any significant particulars—time and location of tours of duty, actions they participated in, medals and other citations earned, and their last known address and/or status (KIA, wounded, returned to Canada, residing in the US, etc.).

My partial list to date includes Canadian medics, nurses, missionaries, correspondents, and military personnel who were in some way connected with the American air, land, and naval forces.

Any information on this matter will be most gratefully received. Please contact me at the address below.

Doug Clark
7 Douglas Crescent
Fergus, Ontario
Canada N1M 1C1
Phone: (519) 843-4019

Bombing of Oklahoma

During World War II, I was stationed at Dalhart, Tex., in a B-17 squadron, and I have a story I have never heard mentioned before. I hope that someone who was in the 333d Bomb Group, 469th Bomb Squadron, or someone from Boise City, Okla., can verify this story.

There were three lighted bombing ranges around the Dalhart base, and planes were supposed to fly a triangular course and drop one practice bomb on each target. One cold night (up there), in August or September of 1943, things went awry.

One plane got off course and accidently bombed Boise City, Okla. This would have been bad enough, but they dropped one bomb in front of the courthouse, one in back of the courthouse, and one in the cemetery!

Lt. Col. Clarence A. Davis, Jr., USAFR (Ret.)
2619 N. Texas Blvd., Apt. 116
Alice, Tex. 78332

One Man's Career

I'd like to correspond with persons assigned to any of the bases and units listed below during 1941–46. My purpose is to collect pictures, articles, and memorabilia relating to these places.

They include: Fort McArthur, Calif.; March Field, Calif.; 30th Bomb Group, March Field and Muroc Dry Lake, Calif.; Santa Ana AAB, Calif.; Sequoia Field, Calif.; Minter Field, Calif.; Stockton AAB, Calif. (Class 43-I); Randolph Field, Tex.; Williams Field, Ariz.; Cold Weather Testing Det., Watertown AAB, S. D.; CWTD, Eglin Field, Fla.; CWTD, Ladd Field, Alaska; Aircraft and Unit Departure Center, Great Falls AAB, Mont.; 329th Fighter Group, Glendale, Calif.; 332d Fighter Squadron, Santa Ana, Calif.; and the Discharge Center, Camp McCoy, Wis.

Please contact the address below.

T. A. "Ted" Campbell
3033 E. Valley Blvd.
Friendly Village, Sp. No. 11
West Covina, Calif. 91792

AIRMAIL

Masirah Island

During World War II, I was a technical sergeant in ATC, and spent almost two years on Masirah Island, Oman. While there, I had the opportunity to see a book, published in England, on the history of this island.

During the past few years I have tried unsuccessfully to find this book. I know we have an air base on this island at the present time, as several articles have been published on it.

If any readers could furnish information on this book, or if they were ever stationed on Masirah Island, I would really appreciate hearing from them.

Please contact the address below.

Clarence O. Pelham
1619 N. 6th St.
Clinton, Iowa 52732
Phone: (319) 242-0280

Postwar Aircraft Storage

I am preparing an article on the aircraft storage program that began in late 1945 at several bases across the US and that included, as far as I can now determine: B-29s and C-47s at Davis-Monthan Field, Ariz.; B-29s at Warner Robins, Ga., and Victorville, Calif. (now George AFB); and A-26s and P-51s at Hobbs AAB, N. M.

Can anyone tell me what other AAF bases were used at that time (1945–47) to store aircraft on a temporary basis, and what types of planes they remember seeing in storage at those bases? I'm interested in knowing of any AAF bases or Air Force bases (after September 1947) that were involved with aircraft storage and/or salvage activities on a larger than average scale.

Please contact me at the address below.

Col. Robert F. Schirmer, USAF (Ret.)
8978 East Anna Pl.
Tucson, Ariz. 85710

Wild Weasels

Wanted: Information and photographs of aircraft and crews involved in the Iron Hand SAM suppression missions during the Vietnam War.

I would like to hear from air and ground crews of the F-100F, F-105F/G, and F-4C Wild Weasels. Very little is known of the seven F-100F Wild Weasels that flew the first Weasel missions in late 1965, or the activities of the F-4C Weasel crews that flew during the last months of the war.

The above information and any photos/color slides will be used in my forthcoming book for Squadron/Signal Publications, titled *Wild Weasel—The SAM Suppression Story.*

Please contact me at the address below.

Larry Davis
Squadron/Signal Publications
4409 12th St. S. W.
Canton, Ohio 44710

Eglin AFB History

The Eglin AFB, Fla., History Office is doing research for a documentary on the history of Eglin AFB. Pictures and film are needed of the Eglin area during the 1930s and 1940s, and film footage on Eglin activities during World War II and later.

Please contact us if you have or know of photographs or films that might be appropriate. Photographs and films loaned will be promptly returned.

Melvin M. Kessler
Chief
Armament Division Office of History
Eglin AFB, Fla. 32542
AUTOVON: 872-3532/2314
Phone: (904) 882-3532/2314

55th SRW

The 55th Strategic Reconnaissance Wing has a varied and colorful history, and we are proud to announce the celebration of our forty-second anniversary of operations on January 15, 1983.

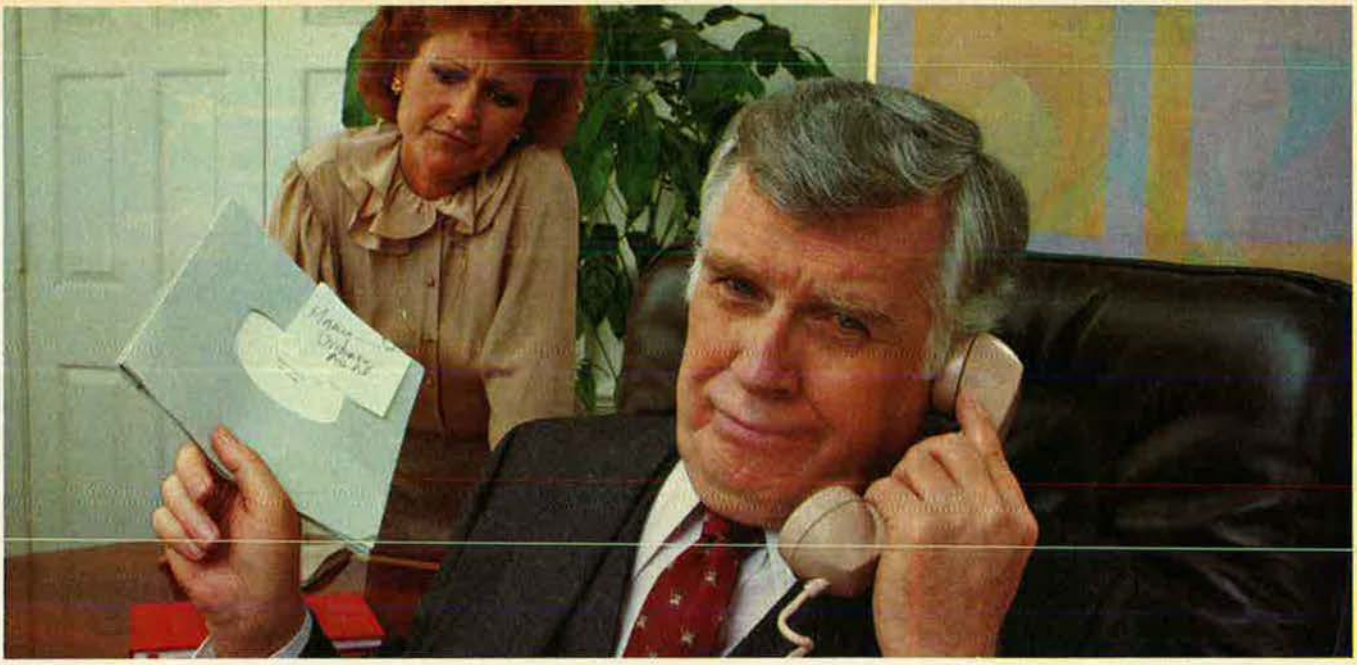
We would enthusiastically welcome any former members of the 55th Fighter Group, 55th Strategic Reconnaissance Group, or 55th Strategic Reconnaissance Wing to attend this year's Birthday Ball.

For more information, please contact the address below.

1st Lt. Katherine L. Tart, USAF
55th SRW/CCP
Offutt AFB, Neb. 68113
AUTOVON: 371-4977/2030

Colonel Thorsness

One of the model companies has just come out with a very good one-fourth-inch scale kit of the F-105G Wild Weasel version of the Thunderchief. Among other things, this triggered my interest in building a model of the F-105F flown by Lt. Col. Leo



"INFORMANIA"

It's having weekly reports for an inventory that changes minute to minute.

You're in charge.

You keep track of aircraft weapons inventories and support supplies. You make the decisions, place the orders, spend the money and reap the rewards.

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Burroughs can help. Because we know how to manage information. Strategically. We've put 95 years of thought and experience into it and we offer a comprehensive solution to the problem of "Informania."

Our sophisticated computers and office automation systems can help you collect, compose, analyze, store, recall, reformulate and distribute information.

So that you will know. Minute to minute.

When "Informania" strikes, the answer is Burroughs. Write for our free brochure: Burroughs Corporation, Standard Products Group, Dept. AF-79, 7925 Jonesbranch Drive, McLean, VA 22101.

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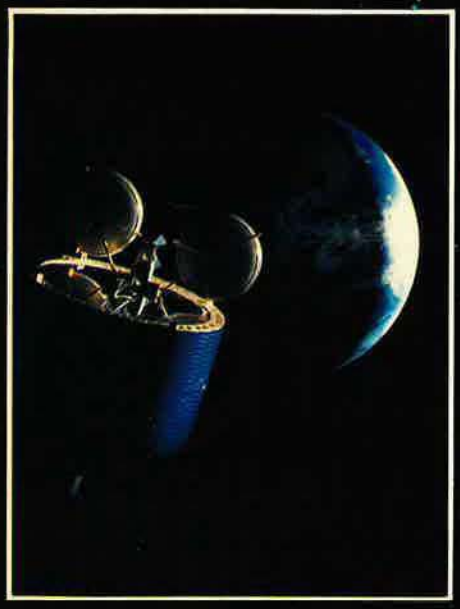

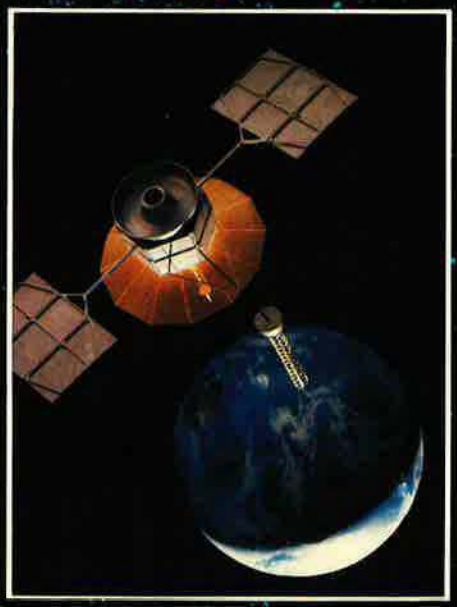

TRW is ready to meet the tough requirements of the new military communications satellite system, MILSTAR.

We have built more than 50 milsatcoms, including the highly successful Defense Satellite Communications System (DSCS II) and the most recent Fleet Satellite Communications System (FLTSATCOM).

As the backbone of U.S. military wideband communications for the past decade, the DSCS II system provides worldwide coverage for routine traffic as well as steerable spot-beams for small, individual areas. It also links all elements of the Worldwide Military Command and Control System (WWMCCS).

FLTSATCOM is the most complex military communications satellite in use. Shared by the Navy and Air Force, it provides high-priority, DoD communications for ships, submarines, aircraft, and ground units around the world. Since 1978, the four operational satellites have accumulated 140 spacecraft-months of flawless, on-orbit performance.

TRW is also building the sophisticated Tracking and Data Relay Satellite System (TDRSS), the first unit of which will be launched in early 1983. These 5,000-pound satellites will be used to transmit data between Earth-orbiting spacecraft, Earth-based users, and the large, highly automated TDRSS ground station at White Sands, New Mexico.

As the major supplier of milsatcom systems for DoD, we have assembled a team of professionals with unmatched experience to meet the MILSTAR challenge.

TRW

Space & Technology Group

K. Thorsness during the action for which he was awarded the Medal of Honor. . . .

If Colonel Thorsness is out there, I'd like to hear from him. I'd welcome—and gratefully return—any information available on the markings his aircraft carried at the time.

One of these days, God willing, someone will write a book about the Weasels and their operations in Southeast Asia. These men were at least as important as the MiG killers.

SSgt. Bob Martin, USAF
P. O. Box 19313
Topeka, Kan. 66619

Vietnam Pilots

For a book composed of personal experiences of pilots involved in the Vietnam theater of operations, I would appreciate anecdotes and narratives of these experiences from Air Force, Army, Navy, and Marine pilots on duty in that operational area.

All material will be properly credited. Please include name, rank, operational unit, the base from which operations were carried out, and time reference.

Please contact the address below.

Capt. (Dr.) George B. Crisp, Jr., USAF (Ret.)
662 South Henderson
Fort Worth, Tex. 76104

348th Fighter Group

I am doing research for a book about my second cousin, Neel E. Kearby, who was in the 348th Fighter Group of the Fifth Air Force during World War II in 1943 and 1944 (Wewak, New Guinea).

I am interested in hearing from anyone who might have known him, or who knows the whereabouts of any of the following men who flew with him: John F. Moore, William Dunham, R. Keith Gallagher, Edward S. Popek, Lawrence F. O'Neill, William M. Banks, Samuel V. Blair, Walter G. Benz, Edward F. Roddy, or Robert R. Rowland.

Please contact me at the address below.

Joe M. Stevens
1605 Jamestown Dr.
Irving, Tex. 75061

Raven FACs

I am beginning research for a book on the Raven FACs, and the unusual war they fought.

I would like to hear from the above types of veterans, and any others who may be able to help.

Please contact the address below.

Lt. Col. Bill Rees, USAF (Ret.)
3860 Helm Rd.
Duluth, Minn. 55811

AIRMAIL

Canadair Sabres

For a book that is being written on the Canadair Sabre, we would like to contact any pilots who flew the Canadair-built F-86E (CAN) Sabre jets with the 4th Fighter Wing during the Korean War.

Please contact the address below.

M. J. Kasiuba
c/o R. Fox
21 Gosford Blvd., #2
Downsview, Ontario
Canada M3N 2G7

WW II Liaison Pilots

I am attempting to put together a history and art book on the unknown liaison pilots of World War II.

Anyone having any personal or general information or historical anecdotes that they would like to share, please contact me at the address below.

P. Robert Leslie
Barncastle Ltd.
The Liaison Project
P. O. Box 1252
Cambria, Calif. 93428

Jet Aircraft

I am researching the history of jet aircraft, from the Me 262 to the present. Information on any and all performance characteristics is needed.

My second area of research is the combat records of jet aircraft. Such data as kill ratios and records of losses to SAMs, antiaircraft fire, accidents, etc., are desired.

Please contact the address below.

Ralph L. Russo
22 Cady Rd.
Barrington, R. I. 02806

Marguerite Higgins

I am currently looking for information on war correspondent Marguerite Higgins for a biography. Anyone who knew Ms. Higgins during her career, especially her involvement in World War II, Korea, or Vietnam, could provide useful information.

Please write me at the address below.

Lisa D. Johnson
East Texas State University
History Department
Commerce, Tex. 75428

AFROTC Det. 465

The 465th AFROTC Detachment at the University of Nebraska-Lincoln is celebrating its thirty-fifth anniversary. We are compiling a history of the detachment and have made the anniversary the theme of our 1982–83 activities.

We would like to have all AFROTC Det. 465 graduates contact us and provide us with some personal history: graduation date, active-duty assignments, and any interesting stories or memorabilia from their AFROTC days.

Please contact the address below.

465th AFROTC Cadet Group
Attn: Projects Officer
209 Military & Naval Science Bldg.
Univ. of Nebraska-Lincoln
Lincoln, Neb. 68588

AFROTC Det. 825

AFROTC Detachment 825 at the University of Texas at Austin is trying to locate all those who went through the AFROTC program.

We are compiling an alumni list for our yearbook, and we would like to know where you are what you have been doing since leaving the University of Texas.

Please contact the address below.

AFROTC Det. 825
University of Texas
RAS 115
Austin, Tex. 78712
Phone: (512) 471-1776

Looking for . . .

I am seeking help in my attempt to contact the pilot and crew members of the *Bataan Avenger,* a B-29 that was assigned to the 6th Bomb Group, 313th Bomb Wing, on Tinian in World War II. Pilot of the plane was Capt. Paul E. Jones of Ione, Wash.

During a night raid on Osaka, Japan, in June 1945, heat thermals flipped the Superfort on its back. Recovery was accomplished and the crew made it safely back to Tinian.

Also, I am anxious to correspond with anyone who recalls seeing the *Bataan Avenger* at either Victorville Field, Calif., or Tinker Field, Okla., during 1946–49. I am trying to establish the eventual fate of the Superfort, S/N 44-69753.

I am also trying to locate three members of my WW II B-29 combat crew: James R. O'Donnell, Herb Feldman, and John W. Huckins.

Please contact the address below.

Chester Marshall
2990 Watson
Memphis, Tenn. 38118

Nearly everyone knows of the poem, "High Flight," by John Gillespie Magee, Jr., an American fighter pilot with the RAF in World War II. He

didn't make it in the end, but he is not likely to be forgotten.

Bert Stiles, who is not well known, should not be forgotten. He was a fighter pilot in WW II, and he didn't make it to the end either. And he was a superior writer—not of poetry, but of prose.

He wrote what is perhaps the finest piece of aviation literature to come out of that conflict, "Serenade to the Big Bird." This was written during the period he was flying as a B-17 copilot in Eighth Air Force. He completed a tour of thirty-five missions, then volunteered for P-51s. He was killed on a mission in November 1944.

I would like to contact anyone who knew him in order to reconstruct his history. Anecdotes, comments, or any information will be appreciated.

Maj. Allen V. Mundt, USAF (Ret.)
14010 White Creek Lane
Reno, Nev. 89512
Phone: (702) 784-4971 (day)
853-2907 (night)

We need to locate all former members, both operations and maintenance personnel, of the 320th Air Refueling Squadron, March AFB, Calif., 1953–62, as soon as possible.

Please send names and addresses to the address below.

CMSgt. Herman G. Benton, USAF (Ret.)
6252 Hamilton Ct.
Chino, Calif. 91710
Phone: (714) 628-8681

We are trying to locate two former squadron mates who failed to appear at our fortieth reunion recently held in Atlanta. They are Steven C. Merena and Gerald Brandon.

We were with the 64th "Black Scorpion" Squadron of the 57th Fighter Group that made the trek from Cairo to Italy with Montgomery's Eighth Army.

Please contact the address below.

Col. R. M. Maloney, USAF (Ret.)
Lake Fairways Country Club
9818 Cree Lane
N. Fort Myers, Fla. 33903

I am trying to locate Lt. Gilbert C. K. Taylor, an air-sea B-17 rescue pilot, and Lt. William Smith, air weather service, who were stationed at Mallard Field, Dakar, French West Africa, during World War II.

If you have any information concerning these men, please contact the address below.

Lt. Col. Robert W. Heaviside, USAF (Ret.)
P. O. Box 4981
Carmel, Calif. 93921

AIRMAIL

Col. Cloyce J. Tippett, USAF (Ret.), former combat pilot and now a horse breeder at his Llangollen Farm in Virginia, is interested in learning the addresses of some of his former students. This was a special group at Houston CAA Center in 1940–41, conducted under a CPT program for advanced instrument multiengine training.

It is understood most of them were assigned to ATC or Troop Carrier, flying C-47s or C-46s. Colonel Tippett would like to hear from his former students.

Col. Cloyce J. Tippett, USAF (Ret.)
314 Dunbar Rd.
Palm Beach, Fla. 33480
Phone: (305) 659-6270

I am interested in contacting a P-51D pilot by the name of Capt. Wallace E. Louman, with the 55th Fighter Squadron of the 20th Fighter Group in the European theater. He used to live in Los Angeles, Calif.

I have been corresponding with a young Englishman, A. W. (Bill) Sharpe, of Northants., England. Captain Louman introduced him to Hershey Bars, O Henrys, and peanut butter during the fighting over Britain in World War II.

Sharpe, in England, is trying to locate an old Canadian fighter pilot by the name of John W. Simpson. John Simpson grew up with me in Canada before WW II.

If anyone knows of Captain Louman's whereabouts, help me do the English a good turn—maybe they will help me find my old friend, RAF Air Marshal W. A. Simpson.

William D. Karr
519 Hamilton Ave.
Pasadena, Calif. 91106

I am interested in locating, if possible, an old friend of World War II.

I was with Milburn O. Mills in Primary at Stamford, Tex.; Basic at Brady, Tex.; and we graduated from Lubbock Army Flying School, Tex., on March 20, 1943, in the Class of 43-C. Mills and myself were both aviation students and graduated as flight officers. He was an enlisted man before becoming an officer.

He is listed in our class yearbook as being from Beckley, W. Va. I lost track of Mills after flying the Hump airlift in the CBI theater in 1944. He and I were very close buddies.

Also, I would like to hear from any other members of Class 43-C.

Capt. William B. Harris, USAF (Ret.)
P. O. Box 331
Elkins, W. Va. 26241
Phone: (304) 335-2541

I am attempting to contact Lloyd A. Hammarlund, who was the bombardier, and Vincent E. McGrath, who was the waist gunner on a B-17 that we named *High Life.*

We were assigned to the 100th Bomb Group, and were stationed at Thorpe Abbots, Norfolk, England. Our last bombing mission was on August 17, 1943, and the target was the aircraft factory at Regensburg. We ended up in Switzerland and were interned. Eight of the ten crew members have been located.

I would appreciate any information on these two men. The crew wants to get together on the fortieth anniversary of our last bombing mission in August 1983.

Please contact the address below.

James P. Scott, Jr.
4215 McClain Lane
Huntsville, Ala. 35810

I am trying to reconstruct the service record of my father, Elmer E. Davenport.

He served in the infantry in World War II in Europe with the "Old Hickory" Division.

He was captured during the initial battle for Aachen, Germany, and was held prisoner by the Germans in Stalag 13A.

I believe he was repatriated by the Russian Army, and spent time recuperating in Nancy, France.

After the war he enlisted in the US Air Force, and served at Misawa Field, Japan, and Lowry Field, Colo., in the late 1940s.

I would appreciate hearing from any readers who knew my father and can furnish any information and/or photographs. All photos will be returned.

MSgt. Joseph E. Davenport, USAF
2085B Spitfire Dr.
Langley AFB, Va. 23665

I am looking for anyone who knew Herbert "Beau" Siebert, who was a fighter pilot in the ETO during World War II.

I am also looking for anyone who served with Flight Officer John R. S. Morgan, RCAF, who served in Canada and Europe in World War II.

Lastly, I'm looking for the 1972 Air

Force Register, Volume 2 (Retired List). I will pay GPO cost, plus postage.

Please contact me at the address below.

Lt. Col. Thomas F. Corrigan, USAF (Ret.)
3815 Somerset Dr.
Colorado Springs, Colo. 80907

I would like to hear from anyone who may have known or worked with my father, Lt. Col. Irvin Leroy "Phil" Philpott, USAF (Ret.).

I don't know much about him, as my parents were divorced when I was young. He passed away in 1979.

Please contact the address below.

Tamyra L. Philpott
P. O. Box 92960
Worldway Postal Center
Los Angeles, Calif. 90009

Collectors' Corner

While reading the thirty-fifth anniversary issue of AIR FORCE Magazine, I recalled a mug commemorating the Air Force's twenty-fifth anniversary that my husband purchased and that became his favorite coffee cup. Unfortunately, I dropped this cup and it broke.

I'm wondering if any readers have one of these mugs that I could purchase as a replacement?

Margaret G. Emrick
2815 S. Atlantic, No. 201
Cocoa Beach, Fla. 32931

AFROTC Det. 745 at Grove City College is starting a collection of unit patches.

If readers have any patches that they would like to contribute, please mail them to the address below.

AFROTC Det. 745
Capt. Richard P. Graziano, USAF
Grove City College
Grove City, Pa. 16127

Here is an exceptional opportunity to purchase a rare photo collection of thirty-six photographs of American pilots shot down over North Vietnam. The collection also includes photos of their downed aircraft.

If you are interested, please contact the address below.

John Cornel
12365 Cohasset St.
N. Hollywood, Calif. 91605

I am an Air Force aviation enthusiast. I am looking for any Air Force patches to add to my rather limited collection.

Please contact the address below.

SSgt. Darrel F. Butler, USAF
PSC Box 3316
Chanute AFB, Ill. 61868

Is there a historian for the 325th Fighter Group? I was in the service group supporting this unit in 1944–45 while it was in Italy.

I have several pictures I would be happy to turn over to the Group historian. Most of the photos are of crashes and battle-damaged aircraft (P-47/P-51).

Please contact the address below.

Lt. Col. Bruno J. Antonietti, USAF (Ret.)
657 Blairshire Circle
Winter Park, Fla. 32792

I'm interested in buying a small size Nomex flight jacket and a Nomex scarf. They have to be in mint condition.

I would appreciate any help readers could give me in obtaining these items.

S. Cha
25461 Esrose Ct.
El Toro, Calif. 92630
Phone: (714) 581-9097

Serious collector wishes to buy, trade, or accept donations of patches, badges, or other insignia of any military service. Items from any time period are welcome. I have a special interest in World War II Army Air Forces insignia.

Please contact the address below.

MSgt. James B. Walker, Jr., USAF
1407 Rickenbacker Circle
Charleston AFB, S. C. 29404

I am a midshipman at the Naval Academy, and plan to seek an Air Force commission upon graduation.

I am very interested in obtaining patches, photographs, and flight manuals for the B-36 Peacemaker, the B-47 Stratojet, the B-58 Hustler, and the experimental XB-70 Valkyrie.

Any assistance in obtaining any items relating to these aircraft, or to SAC aircraft in general, would be greatly appreciated.

Karl W. Kornchuk
19th Company
US Naval Academy
Annapolis, Md. 21412

I have in my possession various pictures, souvenirs, press clippings, programs, etc., dating back to 1941–43, when a number of British air cadets received their flying training in Arizona during World War II.

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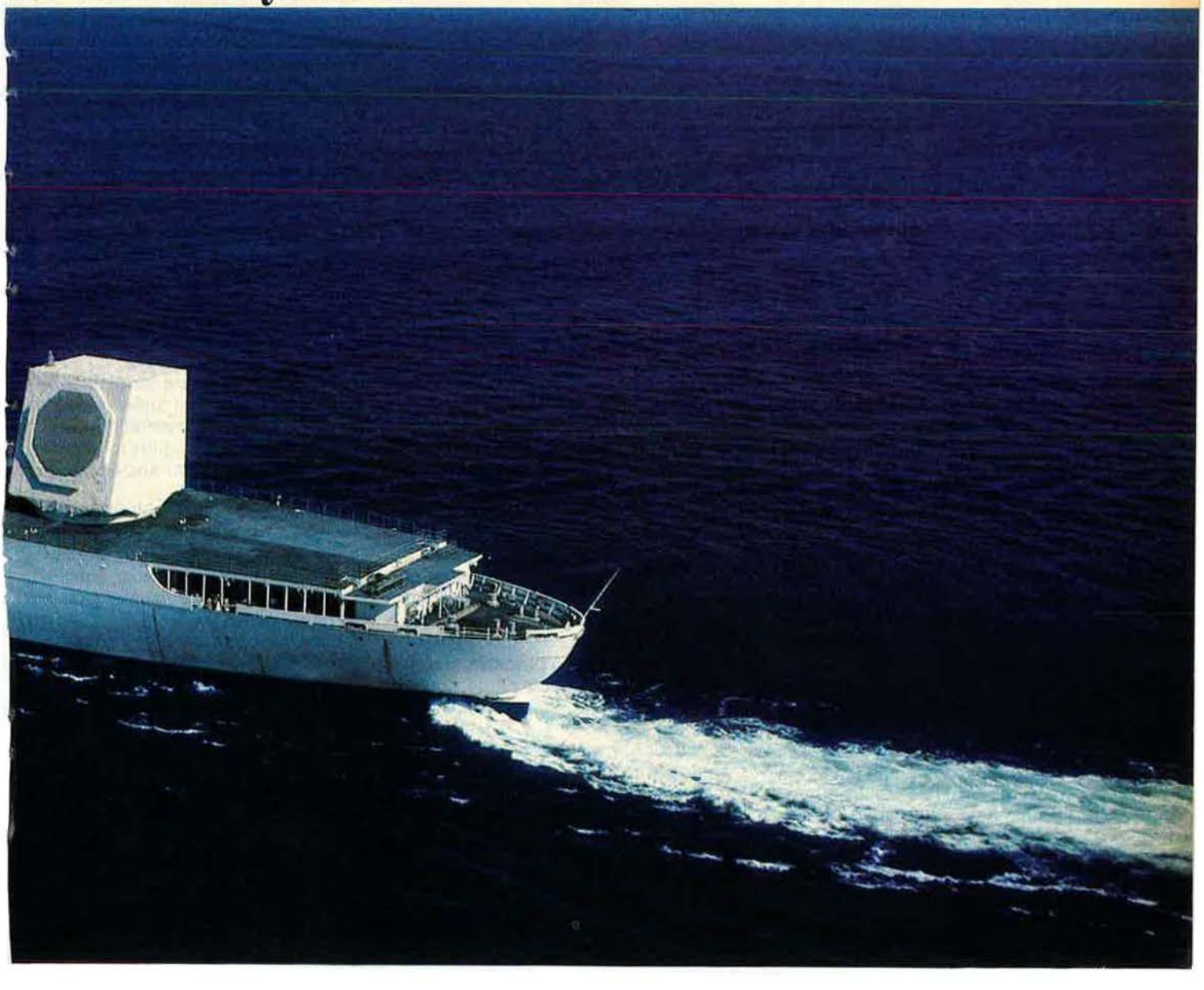

IN FOCUS...

Scoping the Technology Baseline

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Looking Ahead: Aerospace Planes and Airborne Lasers?

Washington, D. C., Nov. 2

As budgetary realities force the Air Force and the Defense Department to adjust the pace and scope of weapons programs in progress to an unavoidable budget crunch, the challenge of sustaining long-term advanced technology efforts—whose distant payoff may not be totally clear—becomes larger than lifesize.

Solving the dilemma of meeting today's pressing and obvious operational needs without depleting the technological reservoir of tomorrow ranks as the key task of Lt. Gen. Lawrence A. Skantze, the Air Force's new Deputy Chief of Staff for Research, Development and Acquisition.

By the time the FY '85 program objective memorandum (POM) goes into effect, he told this writer, "we ought to be able to define the scope and size" of the Air Force's technology base programs. Warning that the temptation to engage in "fire fighting," meaning to respond to near-term imperatives on an *ad hoc* basis, is "overwhelming," he stressed that there is an equally compelling need to develop the discipline and mechanism to "look ahead."

He cited two examples in the latter category: Reexamination of the "aerospace plane" concept espoused and subsequently dropped in the 1960s, and the proposition that airborne laser weapon systems could have significant military utility.

In the case of the former, he said, the advantages of taking off and landing horizontally at a variety of airfields are self-evident. So is the fact that ramjet-propelled aerodynamic vehicles might succeed in getting up to extremely high altitudes and speeds while capitalizing on the economics of air-breathing flight before they "boomerang into space." Generically, the aerospace plane uses "ambient" air to boost itself to the edge of the stratosphere, rather than loft both the propellant and "oxydizer" that rockets require.

Tentative evidence from initial Air Force studies suggests that a "reasonable degree of confidence" exists that such a vehicle can be put into operation over the long term. These reviews of the aerospace plane's technological feasibility, General Skantze said, are "generic" in character and not based on any assumptions about specific operational needs.

A similar, tentative technology challenge pivots on tailored feasibility demonstrations of airborne laser weapons, General Skantze suggested. "Here we need to ask the question, 'Given that an airborne laser system works, what can we do with it?' The initial answer seems to center on two primary candidate missions, anti-SLBM (sea-launched ballistic missiles) and antisatellite."

The objective in the case of anti-SLBM applications of high-energy laser weapons is to intercept the SLBM launcher in the boost phase, before separation of the individual multiple independently targetable reentry vehicle (MIRVs) can occur. Yet to be demonstrated is the practical feasibility of keeping a sufficient number of airborne laser platforms on patrol to provide the required coverage of Soviet SLBM launch areas.

Turning to the Advanced Technology Fighter (ATF), a less futuristic, long-term technology challenge facing the Air Force, General Skantze said that full-scale development of such a system should be initiated by FY '87 to allow for initial operational capability (IOC) by FY '93. Assuming ultimate congressional approval of the Senate Appropriations Committee's "mark" to allocate about $23 million in FY '83 for the program, General Skantze said the Air Force's initial ATF effort will concentrate on "engine definition."

Two Air Force research efforts—the engine model derivative program and the gas generator program—he said, have already shown clearly that "we know how to build engines with considerably fewer parts and that weigh less" than the current generation of high-performance powerplants. The ATF's engine will be marked, therefore, by significant improvements in durability, reliability, and increased efficiency.

He added that "new superalloys and composite materials can tolerate higher temperatures and reduce our dependence on critical strategic materials. Digital electronic engine controls will also improve reliability and allow unrestricted throttle movement with stall-free operation. Up to fifty percent fewer parts, forty percent less supersonic fuel consumption, and twenty-five percent higher thrust-to-weight engine performance will combine to lower engine life cycle costs by twenty to thirty percent."

The Air Force approaches ATF from the premise that the F-15 and F-16, although based on old technology, are first-rate performers, and that the new design will need to incorporate a range of technological advances that in combination can "make a significant difference," according to General Skantze.

Features that should be considered essential, he said, include:

- Short takeoff and landing to reduce dependency on runways and increase deployment flexibility.
- Greater aircraft agility to increase survivability and enhance engagement options.
- Increased speed and altitude envelopes to improve survivability and deny potential enemy sanctuaries.
- Reduced aircraft radar, infrared, radio frequency, and visual signatures to delay detection.
- Increased range and payload capabilities to increase both deployment and employment options.
- Better vehicle and weapons integration to minimize the penalty that current designs pay to deliver munitions to desired targets.
- Lastly, improved systems reliability to reduce support costs and increase readiness and sustainability.

To sort out various promising technologies and blend them into an inte-

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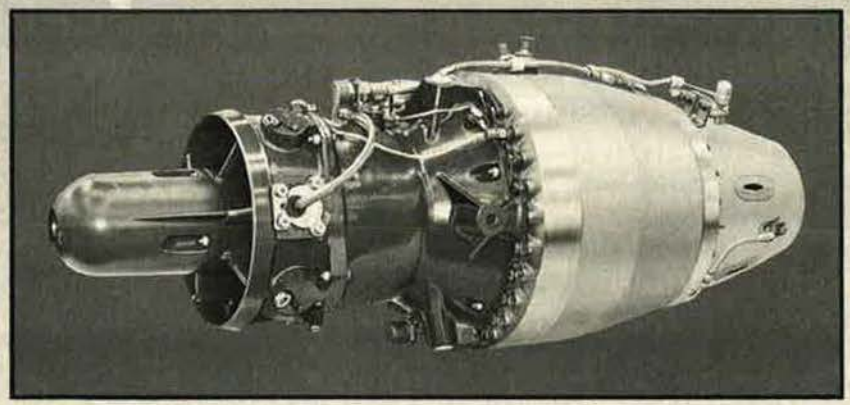

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grated concept will take another year or more, he said. Several current demonstration programs are likely to funnel information into the ATF concept formulation, General Skantze said. Included here are two programs of long standing—the Advanced Fighter Technology Integration (AFTI) and HiMAT, for High Maneuverability Advanced Technology, involving RPVs as test beds.

A relatively new program, the X-29A Forward Swept Wing project that is slated for initial flight testing early in FY '84, could become a major player in the ATF design. This program is carried out jointly by the Defense Advanced Research Projects Agency (DARPA), the Air Force, and NASA. Analytical evidence suggests that a forward swept wing (FSW) tactical fighter could be as much as twenty-five to thirty percent lighter than an equivalent aft swept design.

Whatever the ultimate nature of the ATF airframe, according to General Skantze, the design will take advantage of new materials to lower weight and reduce drag by means of advanced airfoil shapes. Metal matrix and graphite epoxy composites as well as powdered and "super plastic" formed aluminum materials may well turn out to be the stuff that ATF will be made of, he suggested.

Aerodynamically, the airframe could benefit significantly from improvements in high lift, reduced supersonic drag, and increased control power. Potential concepts include close coupled canards, vortex lift devices, and active variable camber. The payoff would be reduced takeoff and landing speeds, improved maneuvering agility, and more efficient supersonic operation.

Multimode, digital flight control technology should simplify further integration of the aircraft's flight, propulsion, and fire-control systems. Such technologies can take full advantage of the aircraft's unprecedented maneuvering flexibility and automated weapons delivery.

ATF's STOL requirement causes USAF to develop and flight-test several associated technologies. These include two-dimensional thrust vectoring and reversing engine nozzles, integrated flight and propulsion controls, high lift devices, rough/soft field landing gear, and refined pilot displays and controls to reduce the pilot's work load in the STOL mode to safe, manageable levels.

ATF, General Skantze predicted, will capitalize on recent major advances in avionics technology where the only limiting factors appear to be "our imagination." Key objectives here are extensive cockpit automation and integration using advanced higher order computer languages, very large scale and very high speed integrated circuits (VLSI and VHSIC), and the fusion of the information flow from various sensors with flexible, multifunction displays and wide field of view head-up displays (HUDs).

IN FOCUS...

There is even the possibility of providing ATF with what he termed a "gold watch" feature—the use of voice command for some pilot functions. The Phase II test program of the AFTI F-16 project includes a voice command demonstrator that is showing promise of operational utility.

In order to nail down promising technology options for ATF's concept formulation, the Air Force is working with eight prime contractors on what General Skantze terms a "freewheeling" approach where both air-to-air and air-to-ground missions are being considered.

For the short term, General Skantze is determined to get maximum return from the Air Force's investment in the F-15 and F-16 by developing dual-role derivatives. For that purpose the Air Force will run a comparative evaluation of the F-16E (XL) and F-15E. These aircraft will be looked at from an analytical point of view as well as in terms of flying quality and weapons delivery capability.

The intent is to have Air Force Systems Command and TAC run the comparative evaluation and then examine various levels of upgrading for both aircraft types. The end result, he said, could be that one aircraft is picked for the long-range interdictor mission (tailored for the interdiction of the Warsaw Pact's rear echelons), transforming the aircraft in effect into a dual fighter, while the other is earmarked for some "lesser upgrading."

Modifications of the aircraft center on the air-to-ground role, especially the incorporation of LANTIRN for night and under-the-weather missions, according to General Skantze. Other options include an improved radar system, additional weapons carriage, the imaging infrared (I^2R) Maverick, laser-guided bombs, and a standoff attack weapon, a short-range (ten to fifteen miles) low-altitude munition dispenser.

Some time next summer, the Air Force plans to decide which aircraft is to be upgraded for the dual-role mission and what upgrades are to be performed on the other aircraft. Originally, the plan called for the acquisition of 400 interdictors, but the Air Force, at this time, is undecided about the required number, according to General Skantze.

The upgrading of the F-15 or F-16 to the dual-role or "E" model configuration is not linked to the Air Force's plan to acquire an alternate engine for its fighter force. This January the Air Force will issue a request for proposal (RFP) for an alternate engine to the F100 powering both the F-15 and F-16, General Skantze explained. The competing alternate design is GE's F101.

The reasoning behind the Air Force's decision to set up a second production line, according to General Skantze, is "that we don't want to confine ourselves to a sole source position and do want to maintain the industrial base at a broader level." The intention at this time is to pick representative block buys of either the F-15 or F-16 and equip those aircraft, beginning in 1985, with the alternate engine.

One of the most pressing problems that concerns General Skantze is the low annual buy rate of Air Force fighters: "Buying at a rate of about 160 aircraft a year does not offset aging and attrition factors, to say nothing of building up the force. In the outyears of the Five-Year Defense Plan, we get to a buy rate of between 270 and 280 aircraft a year, which begins to solve the problem. It is essential to sustain this pace, and that will be tough in light of the investments in strategic systems that we need."

Washington Observations

★ The Air Force's 1984 POM (Program Objective Memorandum) puts considerable stress on expeditious development and acquisition of an advanced, compact, extended-range SRAM, also called the Advanced Strategic Missile System. While some of the proposed design's performance features remain tentative, the missile is to have a range of about 100 miles on the deck and several hundred when flown in a semiballistic mode.

The current inventory of SRAMs—with a range of about thirty miles and 100 miles respectively—is aging and developing reliability problems. Some of the motor cases are cracking, and the system is not nuclear-hardened. SAC, therefore, requested development of a follow-on design rather than reopen the production line of a system based on obsolescent technology.

IN FOCUS...

The advanced SRAM is meant to augment both the B-1B and the Advanced Technology (Stealth) bomber. In the case of the B-1B, the aircraft can penetrate on the deck, pop up for a quick look by its ALQ-161 sensor for hostile radars, and launch an advanced SRAM against these targets. The effect is a "smart" nuclear weapon of considerable reach.

With about thirty percent of the Soviet target base falling into the category of imprecisely located targets, the importance of an extended-range SRAM carried by the B-1B or ATB can't be overstressed. It would be possible, for instance, to attack and destroy reliably with a B-1B/advanced SRAM combination the dozen or so highly mobile divisions (each with 320 main battle tanks) the Soviets maintain along the Sino-Soviet border. The prospect of the vast Chinese Army then having unimpeded access to all of Siberia is probably sufficiently grim to put the Soviet Politburo into a catatonic state.

★ Assistant Secretary of Defense for International Security Policy Richard N. Perle recently disclosed that the Israeli Air Force, during the conflict with Syrian forces in Lebanon, lost an aircraft carrying highly sensitive Israeli-developed ECM equipment. The Israelis, determined not to let the equipment fall into enemy hands, mounted a strike to destroy totally the downed aircraft on the ground. By the time the Israelis arrived over the target, there were "already Russians on the ground pulling out pieces" of the downed aircraft. As a result, the Israelis "got the Russians" as well as the downed aircraft, he said.

Other sources told this column that, according to reliable intelligence information, eleven Soviets were killed in the Israeli raid.

★ As part of the Air Force's "declaration of war on cost overruns," a major program review identified labor settlements as one cause of cost growth. According to USAF's Assistant Vice Chief of Staff, Lt. Gen. Hans H. Driessnack, "It is not our business to tell industry how much to pay their employees, but it is our business to tell them how much we are willing to pay for their products." An in-depth Air Force analysis of the labor contracts of fourteen major defense contractors led to the "obvious conclusion . . . that aerospace workers are well paid and their wages are increasing faster than inflation."

The Air Force analysis found further that "aerospace labor rates are significantly higher than the Bureau of Labor Statistics average manufacturing rates, the rates for durable goods manufacturers, and local wage rates. Our analysis of cost growth in Air Force weapon systems acquisitions reveals practices that may have contributed to the inflationary spiral in the aerospace industry."

The Air Force made its concern over labor cost growth known to chief executive officers of major contractors. Air Force Secretary Verne Orr issued instructions to "make every effort to see that we do not pay negotiated wage settlements to our weapon producers that are greater than the amounts that the federal government decides are adequate for its own employees and recipients."

★ The Air Force, according to Under Secretary of Defense for Research and Engineering Dr. Richard D. DeLauer, is studying a new generation of space vehicles under a program called "Advanced Military Spaceflight Capability" that emphasizes such requirements as "on-demand launch, use of conventional airfields, [and] military mission capability."

As the military use of space becomes more essential, he told the Senate Foreign Relations Committee, "the requirement for a more responsive launch capability has become more critical. Quick reaction launch, survivable launch, and reusable aerodynamic space vehicles are examples of concepts which have been proposed to meet this need." NASA and the Defense Department are already investigating launch vehicle concepts to supplement the Shuttle over the near term, he reported.

One concept under consideration is the so-called "Big Dumb Booster," or SRB-X, that uses one or three solid rocket boosters, plus upper stages, to orbit up to 100,000 pounds, or almost twice the Shuttle's payload.

Another concept, he told Congress, is the "In-Line" launcher concept that uses a module with one or two main engines placed under the Shuttle's external tank. These concepts are attractive, according to Dr. DeLauer, "because they would permit operation of a mixed system, but not always require the Shuttle Orbiters which may not be able to meet the future demands for space transportation."

Turning to "areas of major uncertainty in our ability to predict with confidence" the utility of space-based laser weapons, he defended DoD's laser program. DoD's approach is "designed to permit an informed decision in FY '87 on the military utility, cost-effectiveness, and development prospects for near term [1990s] space-based chemical laser weapons. It includes Air Force efforts to address overall system and utility issues, to include survivability, total system architecture [surveillance and command and control], and the Soviet ability to harden potential targets. It also includes plans to pursue [development] of technology for short wavelength lasers, which are less mature than chemical lasers, but show promising advantages which may be realizable further in the future."

★ Air Force experts believe that there could be significant spinoff from the joint DARPA/Navy Blue-Green laser communications system that is developing the means to communicate from space with submarines at operational depths. These experts suggest that this space-based system might provide global coverage, survivability, and flexibility in both tactical and strategic operations of the Air Force as well as of the Navy.

One promising application might be linkage of AWACS to space-based command control and communications systems, especially when the E-3As have to operate under cloud cover.

★ The General Accounting Office's propensity for playing fast and loose with the facts when the objective is to derogate the Defense Department and its components reached new heights in a report of September 29 that accused DoD and the Air Force of improper lobbying in behalf of the C-5B.

The Department, through Deputy Secretary of Defense Frank C. Carlucci III, shot back with the statement that the GAO report "contains numerous factual mistakes and erroneous interpretations of federal statutes. It is our firm conviction that neither the Office of the Secretary of Defense nor the Air Force engaged in any improper or illegal lobbying activity."

DoD's official comment asserted further that "the factual errors and incorrect legal conclusions contained in the report might have been prevented if the GAO had not violated its own standards and procedures in denying DoD the opportunity to comment on a draft report before the final report was released to Congress and the media." ■

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SCIENCE/SCOPE

A modified F-15 Eagle is proving its potential as a cost-effective, dual-role fighter that can serve as a strike aircraft without sacrificing any of its air superiority capabilities. The U.S. Air Force is testing the Advanced Fighter Capability Demonstrator F-15 equipped with a radar enhanced with high-resolution mapping modifications. The aircraft has shown it's versatile enough to strike ground targets at night or in bad weather with the accuracy of a daytime attack aircraft. Because the radar changes involve minor new hardware and some new computer software, the F-15 keeps its air-to-air features. It sees long ranges, searches large volumes of the sky, detects targets at all altitudes and aspects, and has a "look-down, shoot-down" capability to spot low-flying targets in heavy ground clutter. The demonstrator is co-sponsored by Hughes Aircraft Company, supplier of the AN/APG-63 radar, and McDonnell Douglas, builder of the F-15.

Two communications satellites made history as the first to be launched from NASA's space shuttle. The first of the pair, SBS-3, is operated by Satellite Business Systems and will carry high-speed data for many U.S. companies. The second spacecraft, Anik-C, is operated by Telesat Canada and will improve telephone, television, and data service in Canada. The satellites are versions of the Hughes HS 376, the world's most widely purchased communications satellite. Hughes now has built 70% of the world's operating commercial communications satellites and has more successes than all other companies combined.

A new "quick draw" capability for the Maverick missile system would let pilots hit more targets in less time and reduce their risk of being hit by enemy fire. In the last of 21 flight tests, a U.S. Air Force F-4 fighter crew fired three air-to-surface Mavericks within 12 seconds from an altitude of 700 feet. The three missiles scored direct hits on three trucks parked about 70 meters apart in normal convoy fashion. Although TV-guided versions of the Hughes missile were used in the tests, the system could be used for imaging infrared Mavericks.

Advanced military electro-optical systems are being produced in large numbers and at high rates at a new Hughes manufacturing facility. The complex, which covers one-half million square feet, is designed specifically for making such high-technology devices as infrared night sights and laser rangefinders. Recent milestones include the following deliveries to the U.S. Army: the 2,000th laser tank fire control system for the M60A3 tank, the 1,000th airborne TOW antitank missile system for the Cobra attack helicopter, and the 1,000th thermal imaging system and laser rangefinder for the M1 Abrams tank. In addition, production rates for the two M1 units have reached 70 per month.

A safety device that detects and snuffs explosions in half the time it takes the eye to blink is protecting U.S. military personnel in various vehicles. The Dual Spectrum™ sensing and suppression system detects fire explosions within an enclosed area and releases a gaseous chemical that suppresses the fire in 100 milliseconds, well before someone could be injured. The system is already in use for the Army's M1 Abrams tank and the M2/M3 Bradley Fighting Vehicles. A Hughes subsidiary, the Santa Barbara Research Center, developed the system.

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CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Oct. 25

Interim Spending

The Pentagon, as of October 1, is operating under the constraints of a continuing resolution that prohibits starting any new programs. However, unlike other government agencies that are restricted to FY '82 spending levels, DoD is allowed a relatively high overall figure—$228.7 billion, or about $24 billion more than the FY '82 figure—until the regular appropriations bill is passed.

For now, the no-new-starts provision does not affect the B-1B and C-5B procurement, thus staving off schedule delay and cost increases in both major USAF programs.

The five MX missiles authorized are not funded. Air Force officials believe the MX schedule will not be adversely affected, unless the resolution stays in effect through March when the missile contracts are expected to be let. Expiration date of the current measure is December 17. Congressional and DoD spokesmen expect the regular FY '83 bill to be enacted by that time. Both the House and Senate anticipate floor debate on their respective versions of that bill in early December, with the House bill several billion dollars below the Senate's.

MX Outlook

Skepticism is running high in Congress about deploying MX in a Closely Spaced Basing (CSB) scheme, also known as "Dense Pack." Expecting the President to choose MX/CSB, USAF is briefing members of Congress and key staff in detail on a daily basis. Difficulty in persuading them to look favorably on MX/CSB results from the system's inherent complexity for the layman and the failure by some to spend sufficient time to comprehend those complexities. Even some influential members of the Armed Services Committees are unsure of the system's viability.

The House Appropriations Subcommittee on Defense may deal MX/CSB its first blow. Panel Chairman Rep. Joseph Addabbo (D-N. Y.), a known opponent of new strategic systems, alleges that by canceling some large systems, significant budget savings could be realized. The estimated $25 billion for the MX/CSB program becomes an attractive target for the antidefense budget cutters.

Representative Addabbo views MX/CSB as a "last-straw attempt to salvage a bad idea" and prefers leaving Minuteman in place and possibly improving its accuracy, warheads, and command and control. Most defense experts believe that ICBMs in fixed silos are not survivable, considering the present and growing Soviet threat, mainly new, large ICBMs with larger, more accurate warheads.

Informed congressional sources believe the chairman plans to cancel all MX missile procurement funds and probably at least some of the basing R&D funds. With skepticism running high, he could be successful.

Fighter Derivative

The Senate Appropriations Committee funded R&D of the F-15 and F-16 aircraft derivative programs—the F-15E and F-16E—for the purpose of development competition. It warned the Air Force against planning for development of both air-to-ground enhancement "E" versions, since it will support only one aircraft reaching full-scale engineering development and "possibly" production. The funds appropriated permit a comparative flight demonstration of the two models now in flight testing.

Originally USAF planned to procure 400 of one "E" aircraft, but now it reportedly wants to leave open the option to procure both the F-15E and the F-16E. However, the Committee stated that USAF cannot afford to develop both because it has so many priority programs in procurement and development. More importantly, the panel warned that any moves to get both aircraft could endanger what it views as a greater need—an Advanced Tactical Fighter for the 1990s.

Nunn on NATO Troop Cut

Sen. Sam Nunn (D-Ga.), a respected member of the Armed Services Committee, wants to substitute a freeze of US forces in Europe at current levels until the allies strengthen their conventional forces to credible levels for a controversial provision in the Senate's FY '83 DoD Appropriations bill. That provision would reduce US troops in Europe by about 23,000, capping force strength at the 1980 level.

Senator Nunn thinks US troop strength in NATO must not be decided on the basis of "legitimate frustrations," anger, and budgetary concerns, but rather in line with US security interests. He also proposes to hold the growth of US expenditures for NATO to three percent a year. He pointed out that if the US reduces its forces unilaterally, the Soviets will have little incentive to engage in the Mutual Balanced Force Reduction Talks. The Nunn measure is likely to be supported by some Armed Services Committee members and may defeat the planned force reduction.

LANTIRN Redirection

The Senate Appropriations Committee eliminated the authorization constraints on the Air Force's LANTIRN (Low Altitude Navigation and Targeting Infrared for Night) night precision attack R&D effort and provided $100 million for continuation of full-scale development of that system.

The Committee specifically prohibited the funds from being used for any competition between LANTIRN and any other infrared night attack system. This is in opposition to the authorization, which hinged support for LANTIRN on a competitive demonstration with the Navy's F/A-18 FLIR (Forward-Looking Infrared) electro-optical pod. The Senate Committee estimated that integrating the FLIR pod on USAF tactical aircraft for test and evaluation could cost more than $100 million and result in a two- to three-year delay in the USAF night precision attack program.

The House will probably fund LANTIRN R&D. Should the Senate provision prevail, LANTIRN may be in more trouble next year in the authorization where some Armed Services Committee staff members reportedly have threatened to get LANTIRN canceled if funds are not directed toward competition. ■

AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

Washington, D. C., Nov. 3

★ A segment of the Rapid Deployment Joint Task Force's airpower—the 1st Tactical Fighter Wing at Langley AFB in Virginia—has been designated to receive two important equipment additions.

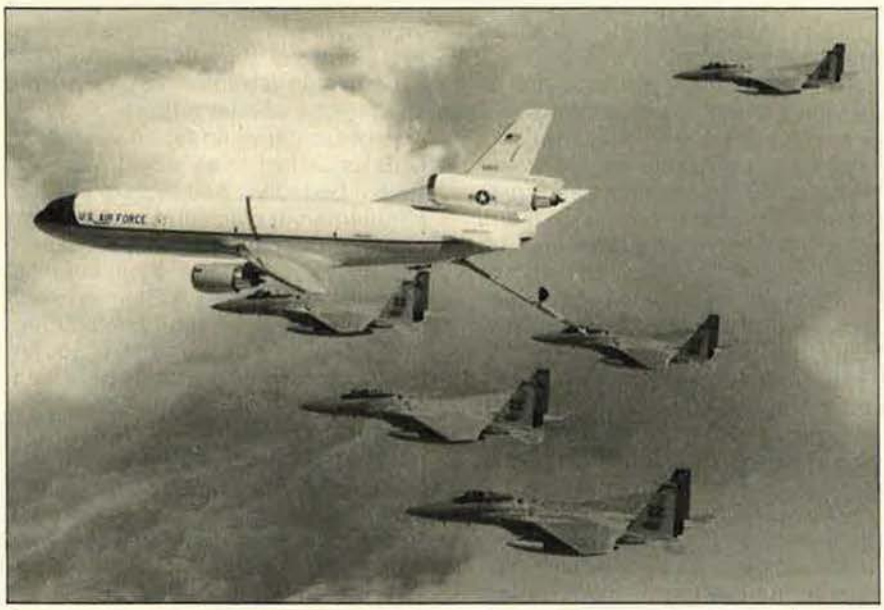
Under a $15 million contract, McDonnell Douglas Corp.'s Titusville, Fla., division has already delivered the first of 150 bomb racks (BRU-26A/A) that enable fighter aircraft to drop multiple bombs at supersonic speed.

Each bomb rack can carry up to six 810-pound bombs. Previous racks designed for supersonic release could carry only one.

Langley's F-15s will be equipped with three bomb racks each, with provisions for two more on the conformal fuel tanks. The 16.5-foot-long racks can also be configured for use with the F-16.

The 1st TFW is the only CONUS-based unit equipped with the latest F-15s—the "C" and two-seat "D" versions. To give these aircraft additional reach, they will be equipped with contoured, add-on fuel tanks that will increase the F-15s' internal fuel capacity by more than seventy percent.

The thirty-two-foot-long tanks are being built under a $29 million contract awarded to McDonnell Douglas.



During the nonstop record-setting deployment from Okinawa to the US, an F-15 Eagle gulps fuel from a KC-10 tanker. The flight of some 7,000 miles proved the mission readiness of the 18th Tactical Fighter Wing aircraft, which were refueled seven times en route. See item below.

★ Six F-15 Eagles and a KC-10 flew 7,028 miles nonstop from Kadena AB, Okinawa, Japan, to Eglin AFB, Fla., to participate in William Tell '82 and then a Red Flag exercise at Nellis AFB, Nev.

During their flight over nearly one-third of the earth's circumference, the 18th Tactical Fighter Wing F-15s logged air time of fourteen hours, forty-eight minutes with seven in-flight refuelings. On board the KC-10 were fifty-nine support people with thirteen pallets weighing 27.5 tons. It was the first deployment of a KC-10 to Kadena.

Besides establishing a new long-distance record for the F-15, the flight also demonstrated that the aircraft were "mission-ready," said Col. "Mac" Macfarlane, 18th TFW Vice Commander.

"We have the capability to turn these F-15s around and be combat-ready in no time. That's what it's all about," he added.

The crew chiefs who had launched the F-15s at Kadena were the same who welcomed them to Eglin.

An aircraft unique to its mission will be this Schweizer SGM 2-37 powered sailplane, being acquired by the Air Force Academy. Eight of the 2-37s will be used to teach cadets the art of soaring. First flight of the aircraft took place in September, with certification by year's end. See adjacent item.

★ The Air Force Academy Airmanship Division is seeking rated career officers with sailplane or light aircraft experience "interested in pioneering the powered sailplane into American aviation."

With the use of the new Schweizer SGM 2-37 powered sailplane, the division hopes to increase the sortie rate and decrease the number of sorties required to teach all Academy cadets

to fly a sailplane. The plan is to solo more than 1,200 sophomore cadets annually.

To this end, the soaring branch is to acquire eight of the powered aircraft, each a "self-launching glider" capable of sustained operations at high-density altitudes and possessing the flight characteristics of the primary sailplane trainer. The first delivery is expected in January.

For additional information, contact Capt. Eli Colotta, Airmanship Personnel Manager, AUTOVON 259-2495. The commercial phone number is (303) 472-2495/97.

First flight of the Schweizer SGM 2-37 took place in late September, with FAA certification expected in December. The Air Force Academy will be first to purchase the plane, and deliveries to civilian customers are expected to begin next spring.

Cruising, the 2-37 will burn between four and six gallons of fuel per hour. Gross weight stall speed is forty mph, and maximum design speed is 150 mph.

The aircraft will be certified using a Lycoming O-235 engine rated at 112 hp and designed for 2,000 hours of operation between overhauls.

According to the company, the aircraft's climb and cruise performance will make it ideal for bush operation, glider towing, and aerial observation.

★ In late September, the battleship USS *New Jersey* (BB 62) returned to Long Beach Naval Shipyard in California after successfully completing a four-day sea trial.

It was the first time in thirteen years that the ship had been to sea on her own power. The *New Jersey* completed preliminary tests of its main engineering plant and auxiliary systems.

Additionally, initial checkout of many of the electronic systems, including search and fire-control radar, aids to navigation, and communications were conducted in preparation for the second sea trial. Also, a LAMPS (for light airborne multipurpose system) helicopter was successfully landed aboard the ship.

The controversial *New Jersey,* brought out of retirement and modernized to add punch to future amphibious landings, is to continue sea trials with commissioning scheduled for January.

★ The Air Force Communications Command has activated a new subordinate unit—Space Communications Division—with headquarters in Colorado Springs, Colo.

The new division, SPCD for short, will support the communications needs of the recently established Air Force Space Command (SPACECOM) and the North American Aerospace Defense Command. Missions include operation and maintenance of space surveillance and missile warning communications and certain automatic data-processing equipment for the Cheyenne Mountain complex and Peterson AFB, Colo. This entails staff communications support of SPACECOM, Aerospace Defense Command, and NORAD.

SPCD is to be commanded by Maj. Gen. Winston D. Powers, already serving in several joint assignments within USAF's current space setup.

SPCD, Communications Command's eighth major subordinate unit, is authorized 1,400 slots, realigned from existing AFCC and other Air Force assets. The new division will consist of one communications group, eight squadrons, and a number of detachments and operating locations.

Largest unit within the division will be the 47th Communications Group, some 400 strong, stationed at Cheyenne Mountain.

In a related matter, AFCC in October assumed responsibility for the control of Defense Satellite Communications Systems and will represent the three armed services in establishing the first operations center at Sunnyvale AFS, Calif.

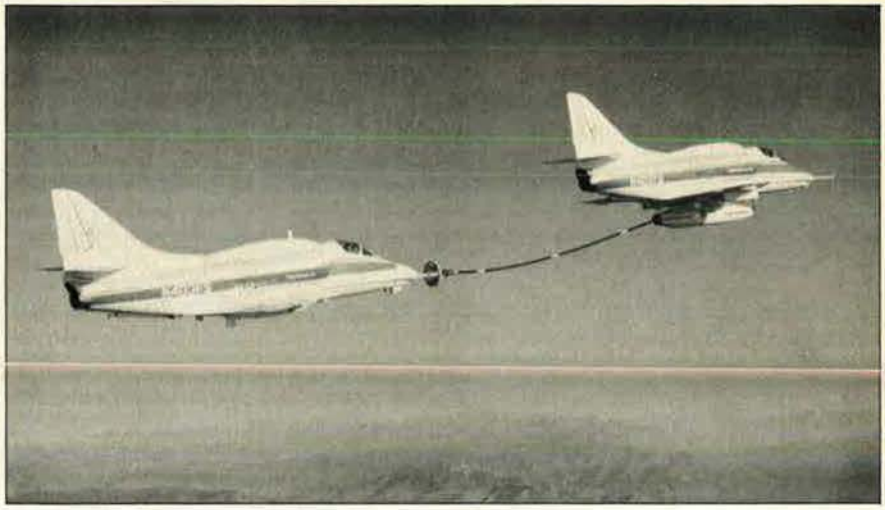
A second DSCS operations center is slated for Clark AB in the Philippines, to go into operation in 1986.

Satellite communication control heretofore has been conducted by the Defense Communications Agency.

The ultimate system will have the Army, Navy, and Air Force controlling four DSCS III satellites through eight operating centers—two for each satellite. The first center at Sunnyvale AFS to be run by the 1999th Communications Squadron paves the way for the other services, officials said.

Current plans call for two operators, a telecommunications systems controller, and a space communications systems equipment operator to be on duty around the clock.

The experience base is being built by assuming DSCS II communications payload control, and thus the transition should be smooth following the launch of the first DSCS III satellite.



Fairchild Republic Co., Farmingdale, N. Y., recently concluded testing of this prototype aerial refueling system installed on the center pylon of an A-4. The system will be one of several to be evaluated by the Navy to replace existing equipment currently used to extend aircraft range and for emergency refuelings far out at sea. The Fairchild design offers an axial hose approach rather than the transverse reel of systems now in operation. Characteristics are improved reliability and increased fuel flow rate, according to Fairchild.

★ It's been a calculated risk. As the pilot approaches his target, he must make a decision that could mean life or death. If he remains at altitude, he is exposed to enemy radar and antiaircraft. But if he hugs the terrain during the bombing run, he may fall victim to his own exploding ordnance.

Despite the risks of flying at high speeds just above the weeds, such tactics have proven advantages. This, however, must be coupled with some method of slowing a bomb's airspeed when drops are made below 300 feet (91 m).

The Air Inflatable Retarder (AIR), currently under test at Eglin AFB, Fla., is the first such device to slow bombs

What engine gives the F-15 and F-16 the power and performance to meet the

mission for the air forces of 12 nations? The proven F100.

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successfully that are moving at supersonic speeds.

Retarders have been in use for quite some time, and most air forces of the world have them. Most, however, are limited to subsonic release speeds and are of restricted value in today's combat environment.

The pear-shaped retarder has already been tested at Nellis AFB, Nev., on operational aircraft by the 422d TES, with a reliability greater than ninety-five percent, according to Joe Renshaw, AIR program manager. The AIR systems, designed for use with 500- and 2,000-pound bombs, have been developed jointly by USAF and the Navy.

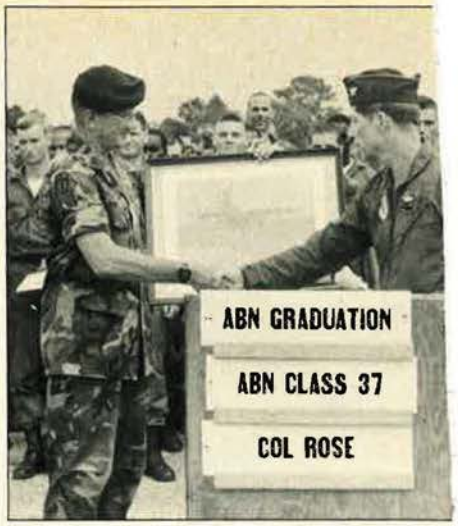
The devices can be used during straight-and-level flight and toss-and-dive maneuvers. On bomb release, they inflate in a fashion similar to auto air bags, greatly increasing drag. Produced by Goodyear Aerospace, the devices began to be delivered to operational units in September.

AEROSPACE WORLD

★ Final operational tests have begun on a modernized air defense command and control system for the surveillance of US and Canadian airspace.

Tests of the new Joint Surveillance System (JSS) are being conducted by Hughes Aircraft Co. at Tyndall AFB, Fla., the first of eight regional centers making up the improved air defense network.

According to officials, the $200 million system is expected to slash US air defense costs by $100 million annually and is scheduled to be fully operational by mid-1984. It will integrate existing Air Force radars and a number of FAA air traffic control and Canadian radars into a shared-radar data system.



Army Col. Robert Rose accepts autographed lithograph from 439th TAW Vice Commander, Col. Lewis Paskevicz, to mark AFRES's last C-123 mission to support paratroop training. See item.

The JSS will reach out 200 miles beyond the coastlines and is fully automated to identify unknown aircraft to radar console operators in the regional control centers. If warranted, the command and control functions could be handed over to E-3A AWACS aircraft, which regularly perform special airspace surveillance assignments.

When JSS is operational, 5,000 fewer people will be required to operate the air defense network, officials declared.

In addition to Florida, JSS centers are to be located in California, New York, Washington, Alaska, Hawaii, and two in Canada.

The JSS is one of twenty air defense command and control systems being developed by Hughes. Other customers include NATO, Japan, the UK, Spain, and Switzerland.

Members of a medical team receive simulated casualties during a triservice readiness exercise conducted recently in the Washington, D. C., area. Dubbed Operation Joint Eagle, it served as a test of the Civilian-Military Contingency Hospital System. Besides medical facilities of the three services, some forty-two civilian hospitals were involved. See adjacent item.

★ Malcolm Grow USAF Medical Center, Walter Reed Army Medical Center, Bethesda Naval Medical Center, and forty-two civilian hospitals in the Washington/Baltimore area participated in a triservice medical readiness exercise in September.

The exercise—called Operation Joint Eagle—served as a test of the Civilian-Military Contingency Hospital System as well as a training exercise for medical staffers.

In the "disaster," 122 doctors, nurses, and medical and administrative technicians moulaged, received, diagnosed, processed, and treated 200 simulated casualties in a triage/staging area, set up in Hangar Three at An-

drews AFB, Md. One hundred Marines from Quantico Marine Base, Va., and 100 soldiers from Fort McNair and Fort Meade volunteered as "casualties." Two hundred other patients were processed at Fort Meade.

The program is designed to use civilian hospitals to receive casualties in time of war or national emergency, based on the fact that military facilities would be overwhelmed with casualties in wartime.

Officials also pointed out that time to build and mobilize a military medical support base in the US will not exist.

Said one military medical official: "Participation in the program is voluntary and the decision to participate is made by the individual institutions, not by any government direction. We hope, however, that all of these medical facilities will cooperate fully, should the need arise."

This is the first time such an exercise has been conducted on the east coast and, "It served its purpose 100 percent. There was a little confusion, but the reason for this walk-through was to find out where possible problems are."

★ Air Force Reservists from the 439th Tactical Airlift Wing, Westover AFB, Mass., have flown the last C-123 Provider mission in support of Army basic airborne training.

Paratroopers dropped from the aircraft during ceremonies marking an airborne class graduation and the final flight over Fort Benning, Ga.

AFRES, to which the only remaining C-123s in the Air Force are assigned, has used the aircraft to support airborne training at Fort Benning since 1973. The jet-assist K-models in current use were first flown in 1971.

Except for three specially equipped aircraft AFRES will keep temporarily to support USAF's aerial spray mission, the last C-123Ks are being phased out this year in favor of C-130s.

Originally developed as a glider, the Fairchild-built C-123 became USAF's first assault airlift transport designed to operate from short, unimproved airstrips. It was widely used in Southeast Asia in such roles as night-flare operations, defoliation; aeromedical evacuation, and counterinsurgency, besides being a basic cargo and troop hauler.

★ The Army has initiated a project to operate an aircraft on liquefied methane fuel.

Under a $178,000 contract, Beech Aircraft has been designated to equip a TH-55A training helicopter at Fort Rucker, Ala., with the company's cryogenic system for a nine-month test.

"Considering only fuel expense, a potential savings of approximately $10,000 per year for each of the helicopters at Fort Rucker can be realized," according to Michael G. Neuburger, a Beech senior vice president. The Army operates a fleet of 144 TH-55As in student pilot training at Fort Rucker.

Further, according to the company executive, "the Army anticipates a significant reduction in routine maintenance cost and increased engine life because methane burns cleaner than gasoline."

The Beech system initially will be operated on a test stand to establish performance characteristics with identical tests being performed on an engine fueled with aviation gasoline for baseline comparison of all data.

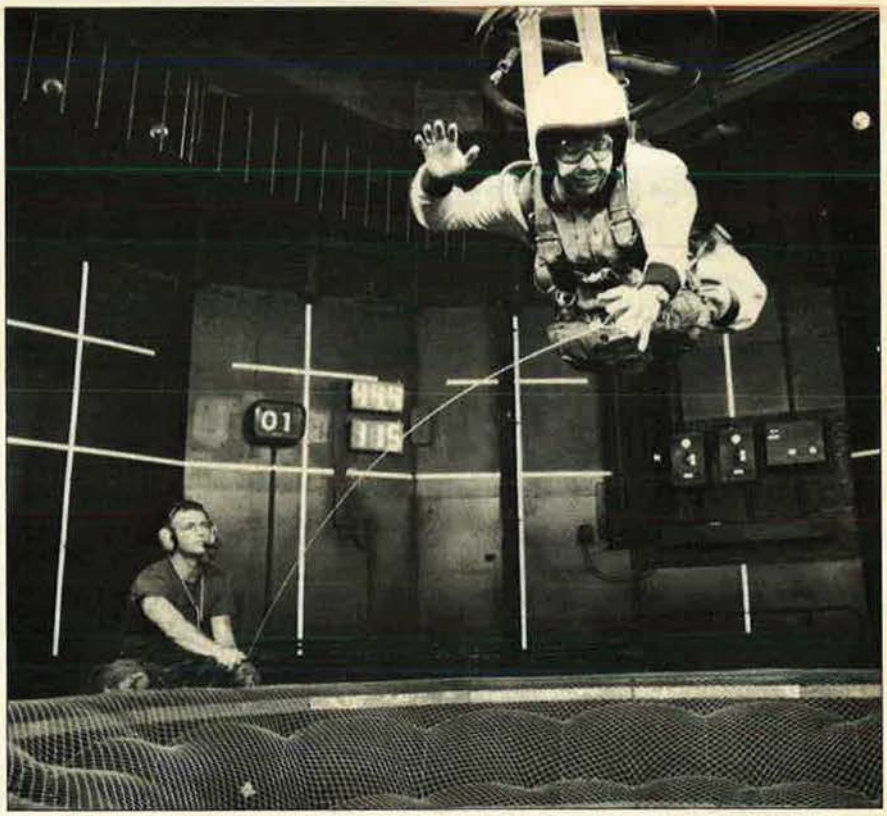
Army pilots will then put the system through a flight test and evaluation phase entailing the complete Army pilot training syllabus.

The system was developed by Beech's Boulder, Colo., Division, with the cryogenic fuel system technology being acquired during the past twenty-five years of participation in NASA's manned spacecraft program. Liquid hydrogen, oxygen, and helium storage systems went into most of the major spacecraft, including the Space Shuttle.

According to Beech, it has tested liquefied methane fuel systems in a variety of motor vehicles dating back to 1972. Last year, the company flew a modified Beechcraft Sundowner on liquefied methane.

Methane is in abundant supply and is a renewable fuel resource. It may be produced through on-site liquefaction from landfills, sewage plants, animal waste, and coal seams. According to Beech, the estimated retail cost of liquefied methane would be almost seventy percent less than aviation fuel.

★ More than two dozen Army personnel from Special Forces at Fort Bragg, N. C., recently practiced free-fall parachuting—inside a vertical wind tunnel at Wright-Patterson AFB, Ohio.



Army Special Forces Capt. Walter Martinez practices "free falling" under the watchful eye of his instructor, SFC Bill Marolf, at Flight Dynamics Laboratory vertical wind tunnel at Wright-Patterson AFB, Ohio. Such training saves time and money. See item. (USAF photo by John Stephenson)

Within the silo-like tunnel operated by Flight Dynamics Laboratory, the free-fall students took turns training on a column of air rushing upward at about ninety mph, closely matching the velocity of a jumper's fall.

Outfitted with parachute harness,

standard jumpsuit, and helmet, each practiced free-fall body positions and emergency procedures as instructors watched and coached. The results were reviewed from videotapes.

Thus, training "jumps" could be undertaken without the expense of piloted aircraft and the fear factor of stepping into thin air thousands of feet up. Also, such training can go on indefinitely until the instructor is satisfied.

According to the parachutists, body control is particularly important in jumps from 20,000 feet or more, helping to slow the fall and reduce opening shock.

FDL's engineers had modified the tunnel to meet the jumpers' needs, including setting safety nets. Then instructors test-flew the device before the students took their crack at it.

The only other government-operated vertical tunnel is at NASA's facility near Langley, Va., but it is incapable of generating strong enough windstreams.

★ The new Joint Nuclear Accident Coordinating Center has opened at Kirtland AFB in New Mexico. The facility is designed to provide emergency information following a nuclear weapons accident or radiological incident.

The Center is located at the base's Defense Nuclear Agency Field Command site and is operated around the clock on standby to provide national and local authorities with information about resources available to respond to emergencies involving nuclear materials.

Such resources include members of federal agencies who can handle the detection and control of radiation, decontamination, explosive ordnance disposal, security, medical assistance, legal assistance, and public affairs.

The foundation of the Center's data is a "World-Wide Military Command and Control System Intercomputer Network" that enables the assessment of available resources by type and location that would be available in an emergency.

★ Willis M. Hawkins, Jr., Senior Advisor to Lockheed Corp., has been named recipient of the Wright Brothers Memorial Trophy, sponsored by the National Aeronautic Association.

According to NAA: "Mr. Hawkins has combined a lifelong career in aviation with distinguished achievement

AEROSPACE WORLD

Test of New Air Traffic Control Procedures

"Drag," "Decel," "Left three," are abbreviations that military pilots may someday hear routinely from air traffic controllers.

These shortened bits of radio conversation and a dozen other revolutionary techniques were recently tested successfully at Kadena AB, Japan. The test was a feature of the aircraft surge launch-and-recovery demonstration staged by Hq. AFCC and Hq. PACAF and participated in by controllers of the 1962d Communications Group and pilots of the 18th Tactical Fighter Wing.

Capt. Linda L. Johnson of the 1962d explained: "We were demonstrating USAF's ability to launch and recover aircraft rapidly during a wartime situation in bad weather. By abbreviating the radio talk, redistributing pilot/controller work load, and reducing the distance between aircraft, we demonstrated the ability to increase the number of airplanes we can recover from thirty-five to eighty per hour."

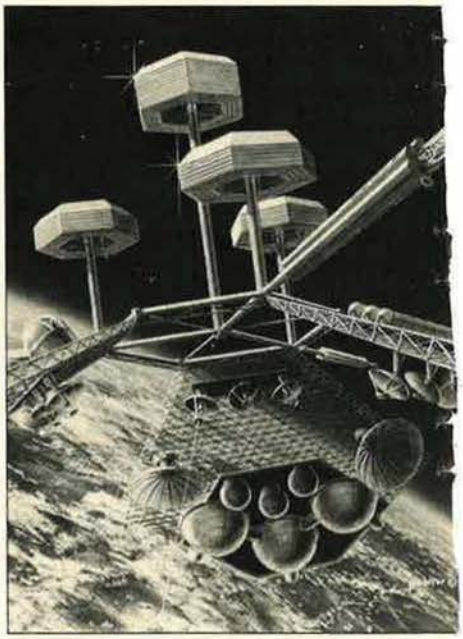
The war in Southeast Asia taught many lessons, said Captain Johnson. "In particular, it taught controllers that when there was an abundance of aircraft to launch and recover, standard FAA guidelines designed for passenger aircraft would not suffice. Unprecedented methods to recover aircraft came into use."

In line with this has been TAC's requirement for increased surge capacity, so AFCC established a task force to develop wartime air traffic control procedures. Within two years, twenty-one tests had been conducted at Holloman AFB, N. M., at two bases in Germany, in the Philippines, and at Kadena.

"We successfully landed airplanes one and a half to two miles apart, instead of the standard three-mile minimum," commented Maj. Dennis Lund, Chief of ATC Operations at Kadena. "To prepare for the demonstration, new approaches were designed incorporating techniques to minimize maneuvering on final approach."

The procedures, practiced initially on a simulator, required the use of airborne radar, specialized navigation systems, formation flights, and specified speed reduction points.

"The overall Aircraft Surge Launch and Recovery Program has introduced streamlined procedures, new ways of solving old problems, and has rekindled innovative thinking for many people," concluded Major Lund.



TOP: Artist's concept of an orbiting space station being developed by a team of scientists and engineers at Lockheed Missiles & Space Co. in Sunnyvale, Calif. Under contract to NASA, Lockheed is identifying the scientific, commercial, national security, and other missions such as space outpost. This and similar studies by the aerospace industry will be the basis for a national decision on whether such a station should be the next major initiative in space. ABOVE: Monterey, Calif., park policeman with one of two ultralights acquired for patrol work.

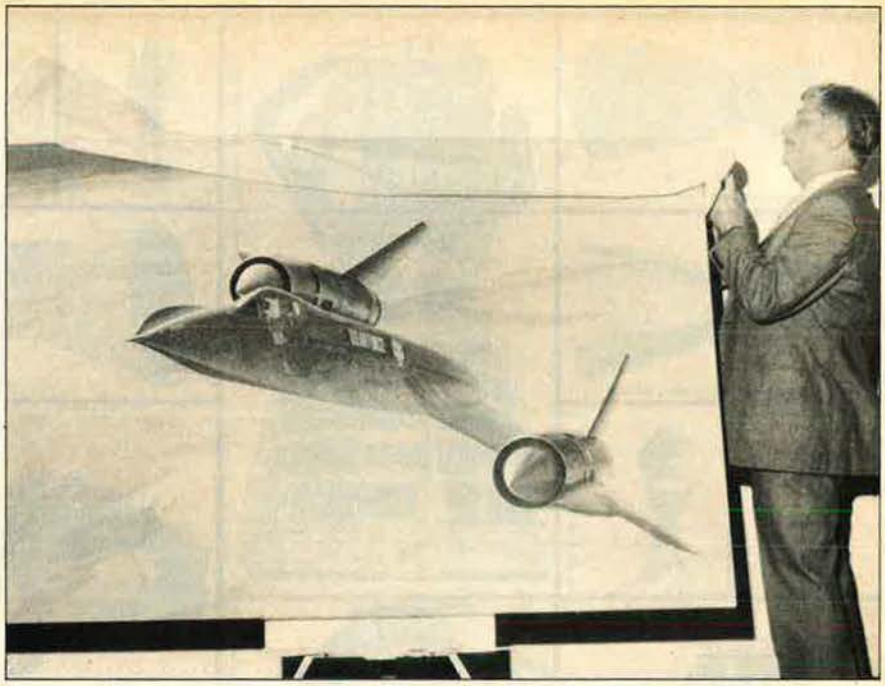
in public service and national affairs."

Mr. Hawkins's some forty-five years in aviation date back to 1937 when he first joined Lockheed. He rose steadily through the executive ranks and helped found Lockheed Missiles and Space Co. in 1953.

The aerospace industry executive has been decorated by the Army, Navy, and NASA for his many contributions in the space field and national defense.

The Washington-based NAA is the oldest national aviation organization in the US with the objective of keeping the nation first in air and space. The Wright Trophy will be presented to Mr. Hawkins in ceremonies in Washington on December 10, 1982.

★ **NEWS NOTES—Brig. Gen. Diann A. Hale** has replaced retired **Brig. Gen. Sarah P. Wells** as Air Force Nurse Corps Chief. With her recent promotion, the former ATC command nurse is now the second highest ranking woman in USAF. The top-ranking is **Brig. Gen. Wilma L. Vaught,** currently Commander, US Military Enlistment Processing Command, Fort Sheridan, Ill.



Hal McCormick unveils his painting, "The Edge of Space," recently presented to the 9th Strategic Reconnaissance Wing, Beale AFB, Calif. The artist has contributed many paintings under US Air Force's art program.

After years of preparation following its brief public appearance in October 1980, the Howard Hughes flying boat ***Spruce Goose* is to be accessible to the public for the first time in February 1983.** The *Goose,* "enclosed in the world's largest clear-span aluminum dome" 415 feet in diameter and the height of a twelve-story building, will be a part of the *Queen Mary* hotel and entertainment complex at Long Beach, Calif.

The first "convertible" aircraft **with a Civil Reserve Air Fleet role**—a United Airlines DC-10-10CF—has been completed. It's been fitted with a large side cargo door, stronger floors, and a roller system for conversion from passenger to cargo transport.

The Federal Emergency Management Agency (FEMA) is seeking **experienced civilian executives to serve in key government posts during national emergencies.** These would be trained under a FEMA program to augment "active-duty" executives in much the same way AFRES would mobilize. **Candidates must be US citizens without Reserve or Guard obligations.** Criteria include specialized experience, demon-

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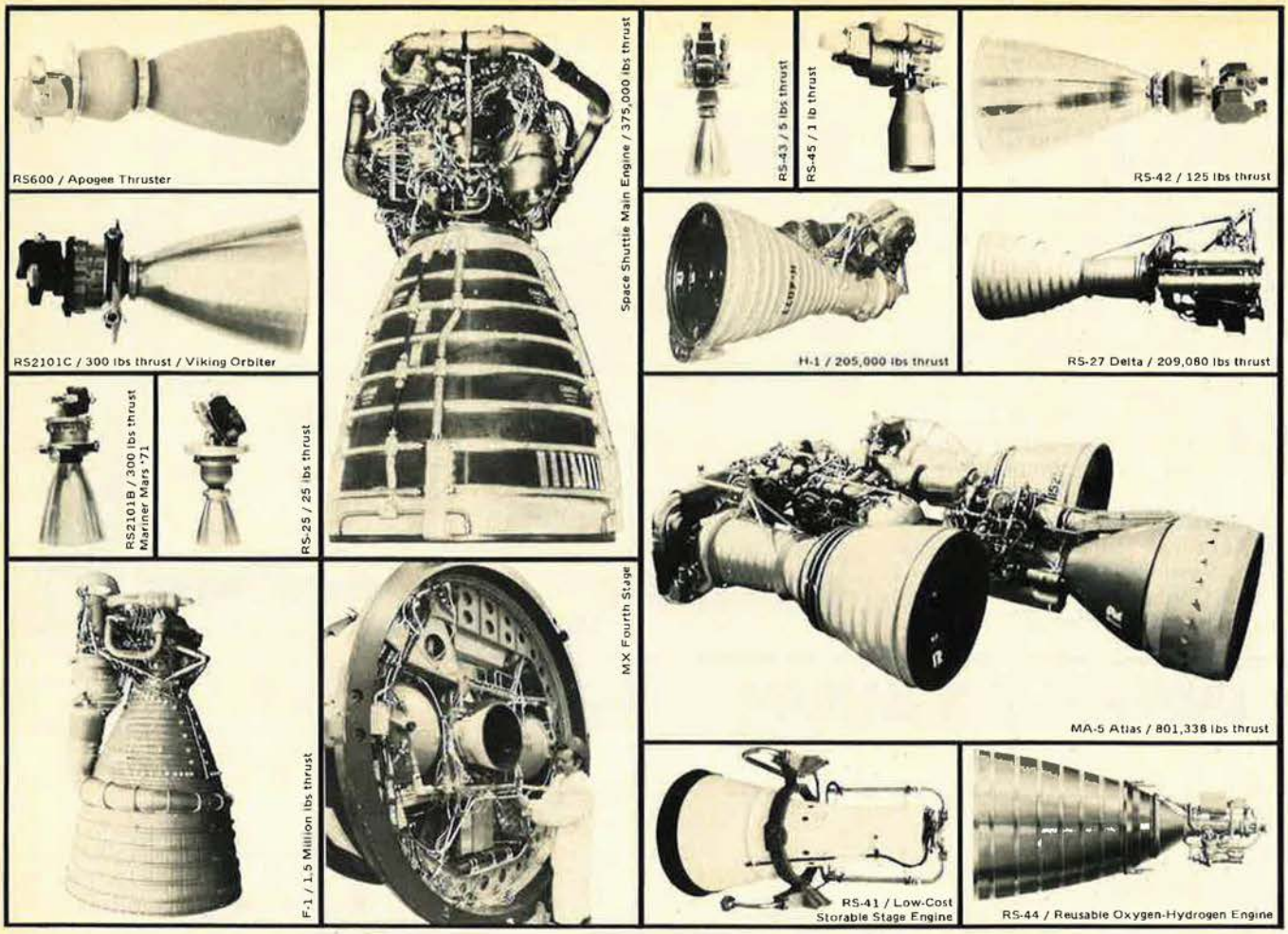

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For further information contact: Communications, Rocketdyne Division, Rockwell International, 6633 Canoga Ave, Canoga Park, CA 91304 (213)710-2380

AEROSPACE WORLD

Under NASA contract, Lockheed is also studying a solar High-Altitude Powered Platform, shown here in artist's conception, that could loiter at 70,000 feet for months to survey crops and other earth resources.

strated ability, and eligibility for a "secret" clearance. Contact Dr. Allan R. Zenowitz, National Defense Executive Reserve Program, FEMA, Washington, D. C. 20472, or call (202) 287-3960.

"Probe," a **thirty-minute presentation that explores the solar system** through the "eyes" of Mariner, Voyager, Pioneer, and other unmanned spacecraft, has opened to the public at the National Air and Space Museum's Spacearium. Almost 200 projectors are used to create a 360-degree panorama.

Died: Gen. Samuel E. Anderson, who during a military career of thirty-five years commanded Fifth and Eighth Air Forces and Air Materiel Command, of heart failure at Fort Sam Houston in Texas in September. The long-time AFA member was seventy-six.

Died: Leroy R. Grumman, innovative engineer and pilot whose company built thousands of Navy aircraft during World War II and which he led into the modern era of jets and space, after a long illness in Manhasset, N. Y., in October. He was eighty-seven.

Died: T. Claude Ryan, aviation pioneer who founded the company that built Charles Lindbergh's *Spirit of St. Louis* (in sixty days), in San Diego, Calif., in September. He was eighty-four. ■

The Shifting Sands of Farnborough '82

The 33d SBAC Exhibition and Flying Display was held on September 5–12, 1982, at Farnborough Airfield in England—the place where Texas-born Samuel Franklin Cody made the first recorded flight in a powered aeroplane in the UK seventy-four years ago.

BY JOHN W. R. TAYLOR, EDITOR, JANE'S ALL THE WORLD'S AIRCRAFT

ELEGANT but menacing as a coiled rattlesnake, Rockwell's fourth B-1 bomber towered above all else in the static park at Farnborough '82. The effect recalled the words of Sherif Feisal's Arabs when they first caught sight of the big Handley Page O/400 that Lawrence of Arabia had acquired to support their campaign against the Turks, in Palestine, in 1918: "Indeed, and at last, they have sent us THE aeroplane, of which these other things were foals."

Anyone who mentioned Stealth was reminded that the production B-1B's radar signature will be one percent the size of the B-52's. Or they were given the stock "April First" explanation of why certain large US manufacturers only *appeared* to have stayed away this year. It seemed that any visitor who strayed off course on the other side of the airfield was likely to walk slap into one of the parked Stealth aircraft that our transatlantic cousins had flown in, unseen and unheard, before the show opened.

A more believable explanation for the absenteeism was given by Pratt & Whitney Aircraft Group President Bob Carlson after a press dinner on the eve of the show, when he said that P&W could not justify expenditure like the $1.5 million spent on the 1981 Paris Air Show, exclusive of personnel transportation and accommodation. A further reason for the nonappearance of such airliners as the TriStar and DC-10 was visible near the Farnborough runway, where Europe's Airbus A310 seemed to be crossing tails with the new Boeing 757 and 767 from Seattle.

The financial problems of recession and competition that have threatened, and even killed off, fine transport aircraft did not reduce either the size or the value of Farnborough '82. Close to 500 exhibitors, from eighteen nations, made it by far the largest of the SBAC displays held over the past fifty years. The three tents housing their products had a total covered area of 387,475 square feet. Of the 150 aircraft on show outside, more than sixty different types took part in the flying display on trade days. When the public arrived in hundreds of thousands during the final weekend, they were treated to extras ranging from World War II veterans to a Concorde, and the Red Arrows aerobatic team in their nine red, white, and blue Hawk trainers.

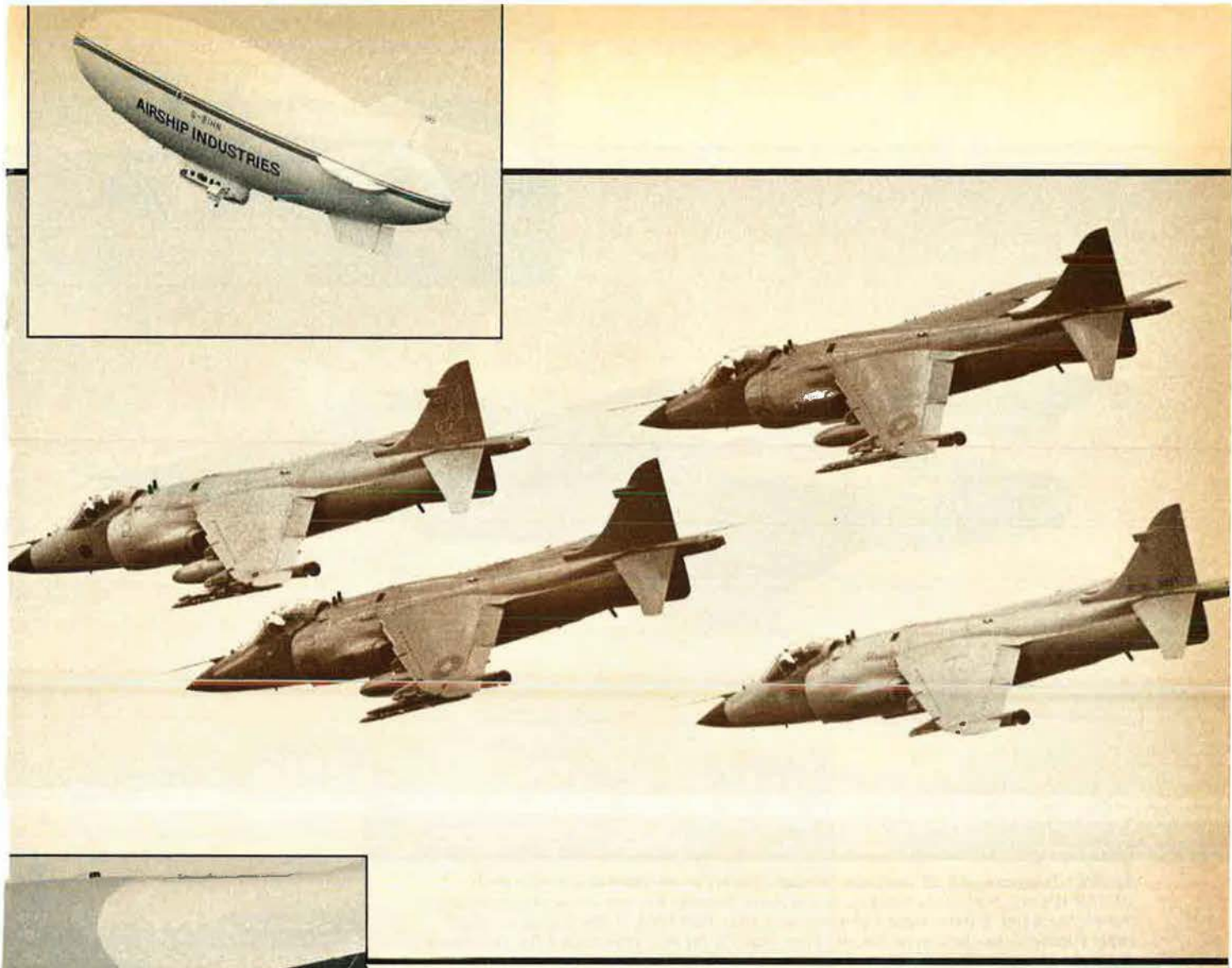
The Red Arrows are in their eighteenth season as the RAF's premier aerobatic display team, but there were plenty of entirely new items in the 1982 flying program. It opened each day with a type of aircraft never before seen at an SBAC display. Airship Industries' Skyship 500 traversed the airfield in a slow and gentlemanly manner suited to the period reserved traditionally for a brief shut-eye after a good lunch. This did not deceive the well-briefed spectators, who knew that the envelope is large enough to house the forty-two-inch antenna of a MEL Marec II search radar. The fact that the airship on view was fitted with a Tracor Omega receiver, and an Aérospatiale ATAL television camera pod for aerial surveillance, confirmed a more aggressive side to its nature.

USN Interest in Skyship

The US Navy has already shown interest in the possibility of leasing a Skyship to evaluate the capability of a thoroughly modern nonrigid for maritime patrol duties, towing on the water surface such equipment as a towed-array sonar, sidescan sonar, and an acoustic decoy. Airship Industries is also negotiating con-

tracts with other operators for one Skyship 500 and two larger Skyship 600s equipped for coastal patrol, fisheries protection, and marine science missions.

British visitors asked if an AWACS-configured airship might have been able to provide, economically and survivably, the early warning cover so sadly lacking in the Royal Navy task force dis-

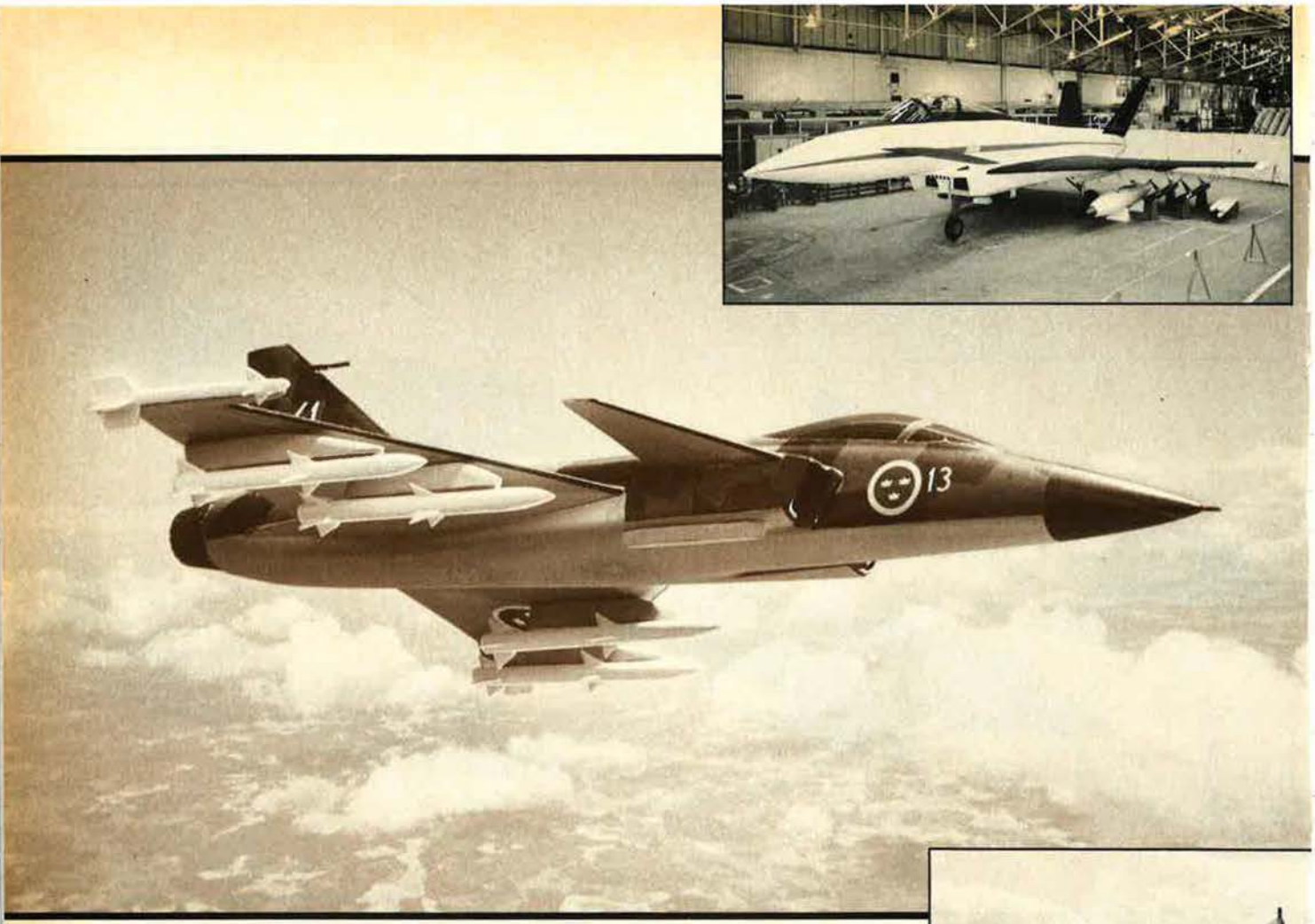


LEFT: Rockwell International's B-1 and Lockheed's TR-1 spearheaded US aerospace technology at Farnborough '82. TOP PHOTO: Airship Industries' Skyship 500 making history as the first airship to appear at an SBAC display. ABOVE: Flypast by Royal Navy Sea Harriers newly returned from service in the South Atlantic. (Photos by Brian M. Service)

patched to the South Atlantic in the spring. The same question could be posed with respect to long-endurance RPVs, as glassfibre structures are as transparent as fabric to radar signals. The short answer is that those who extol the potential of airships and unmanned vehicles in an age of high technology must first overcome prejudice based on concepts of the 1930s and '40s, and then remember that men become generals by flying SR-71s, not RPVs.

A low-level high-speed flypast by Sea Harriers that had operated in the Falklands campaign reflected the other extreme—technology so unique that it is still accepted only reluctantly. There is little evidence that thirteen years of RAF experience with routine in-the-field V/STOL operations, and a dozen years of US Marine Corps flying, have influenced NATO thinking to an adequate extent. Too many years will elapse before the AV-8Bs and Harrier GR Mk 5s, shown at Farnborough in model form, evolve into hundreds of combat aircraft. Meanwhile, after a small war in which virtually no other fixed-wing combat aircraft could be used by one side, Europe remains packed with aircraft that are unable to take off in some kinds of European weather, and unlikely to find an undamaged place at which to land after a sortie if they did.

There was little V/STOL technology visible in the air or on the ground at Farnborough. As always, the F-16 Fighting Falcon was a dazzling star of the flying display, its reputation enhanced by reports of spectacular victories against MiGs of every kind over the Bekaa Valley in Lebanon. The Mirage 2000 also performed with its customary *élan*, its reputation boosted not in recent combat but by large contracts from Egypt and India, as well as from the *Armée de l'Air*. At the moment there is still no announced order for its twin-engine scale-up, the Super Mirage 4000.



ABOVE: Sweden's JAS 39 multirole combat aircraft in air defense configuration. UPPER RIGHT: Full-scale mockup of the Agile Combat Aircraft under development for the air forces of Britain, West Germany, and Italy. FAR RIGHT: The piston-engined NDN-1 Firecracker prototype trainer. First order is for the turboprop NDN-1T. (Photo by Brian M. Service)

Tornado Squadrons Forming

In contrast, with well over 100 Tornados delivered so far to the air forces of Britain, West Germany, and Italy, and the first operational squadrons forming, these Mach 2 variable-geometry aircraft seemed to exude power and speed as they raced over the airfield at the lowest permitted altitude. Important new contracts are being discussed. However, China, lacking both foreign currency and the ability to cope with too-advanced technology, is likely to choose Mirage 2000s, rather than anything more sophisticated, to follow its current production J-8. This will dismay its own aircraft industry, which will have to abandon the new J-12 and its advanced Chinese-developed radar.

The three nations responsible for the Tornado need a smaller partner for it, to enter service in the late 1980s. They persuaded their industries to begin development of something suitable as a private venture. Results were seen at Farnborough in the form of models of various TKF (future combat aircraft) proposals from MBB, and Dornier teamed with Northrop. British Aerospace did rather better, by showing a full-size mockup of what was described as an ACA (Agile Combat Aircraft).

In fact, this represented an aircraft on which a team of BAe/MBB/Aeritalia design engineers have been working since April, embodying features of earlier German TKF research and British studies under designations such as P110. The RAF wants a "1990s Spitfire"—a fighter smaller and more maneuverable than the Tornado, and one that can replace the Jaguar in an attack role and the Phantom in an interception role. The Italians need to replace F-104G and F-104S Starfighters. The Germans want a battlefield air-superiority fighter that "will cost only two-thirds as much as a Tornado, but will be better than the F-18."

The ACA is intended to make extensive use of composites where this is cost-effective, notably in the fuselage. It will have fly-by-wire active controls, a synthetic-aperture track-while-scan radar, and will be armed with ASRAAM and with AMRAAM snapdown air-to-air missiles. Its powerplant will consist of two Turbo-Union RB.199s, developed from the Tornado engines to save cash. Not that the German gov-

ernment is expected to have any money for the program before 1984/85. The British government hopes that some Middle Eastern benefactor might like the ACA enough to buy a large financial stake in the program.

During the Farnborough show it was suggested that the UK government had allocated £40 million to keep the program alive. Only a portion of that sum will go to the ACA as exhibited. Other portions of the very small cake will sustain a variety of fighter-related technology projects, including one entirely different "ACA" from another division of BAe, which prefers a V/STOL or STOVL (short take-off/vertical landing) approach.

Swedes' No-Nonsense Approach

As in the past, the Swedes demonstrated again this year their no-nonsense approach to defense mat-

ters. They will need replacements for the whole family of Viggen variants during the last decade of this century. After carefully studying what would be available from beyond their borders, they decided to design and build their own JAS (*Jakt/Attack/Spaning:* interceptor/attack/reconnaissance) aircraft. Only thus can they be sure to get precisely what they need for the unique task of defending their small nonnuclear nation against mighty nuclear-armed neighbors, without threat to the future supply of spares, or restriction on what they wish to carry in terms of equipment and weapons.

Romania's IAR-825TP Triumf military trainer was unknown in the West until its surprise arrival at Farnborough after a troubled flight from Bucharest.

Shown in accurate model form at Farnborough for the first time, the JAS 39 promises to be as remarkable as its predecessors from Saab. As a start, it will outperform the Viggen, but will weigh only half as much and cost forty percent less. Its canard delta configuration is similar, but with the important difference that the foreplanes will operate as conventional all-moving control surfaces, whereas those on the Viggen are fixed surfaces with trailing-edge flaps. Location of flying control surfaces both fore and aft of the CG is expected to give much improved maneuverability and reduced drag.

About thirty percent of the JAS 39's airframe will be made of carbonfibre-reinforced plastics, weighing twenty-five percent less than metal. Powerplant will be an advanced version of the F-18's General Electric F404 augmented turbofan, in the 18,000-pound thrust class. At a gross weight of 17,635 pounds, the fighter will operate from Sweden's dispersal bases on main roads, and will be supersonic at all altitudes. Armament will include a high-performance automatic cannon and a wide range of air-to-air, air-to-surface, and antishipping missiles. Equipment will include multimode pulse-Doppler radar, FLIR, holographic head-up display, and very advanced ECM and decoys. What, one wonders, would be the production potential of such an aircraft, domestic and export, if it were a product of the aerospace industries of the US or USSR?

The Soviets Next Time?

Well-informed rumor implied that the Soviet Union itself planned to exhibit its wares at Farnborough '82. It has been a participant in Paris Air Shows for many years, and might have added the 1982 SBAC display to its circuit had it not delayed too long. Farnborough airfield is smaller than Le Bourget, and all sites were fully booked long before the first tentative enquiry was received from Moscow. But, perhaps next time. . . .

There were the usual lesser surprises. The Romanian industry team encountered difficulties between Bucharest and Farnborough, but still arrived at midweek with a hitherto-unsuspected trainer known as the IAR-825TP Triumf. This inherits features of the IAR-823 two/five-seater, including the basic wing, and in prototype form is powered by a Pratt & Whitney Aircraft of Canada PT6A-15AG turboprop removed from an earlier agricultural aircraft. It compares well with types like the Pilatus PC-7, and should prove popular with Romanian Air Force pilots when it gets its intended 750-shp PT6A-25C production engine.

It was, in some respects, Good News Week for builders of military trainers. Desmond Norman was able to announce the first order for his NDN-1T turboprop Firecracker.

RIGHT: Among the microlights that put in a first appearance at Farnborough is the Dragon, powered by a 45-hp Hunting two-stroke engine. Cruising speed is sixty mph. (Photo by Brian M. Service) BELOW: Sikorsky's projected XH-59B could well point to the combat helicopters of the future. BOTTOM: Air Force Orientation Group Display entitled "Peace Through Readiness."

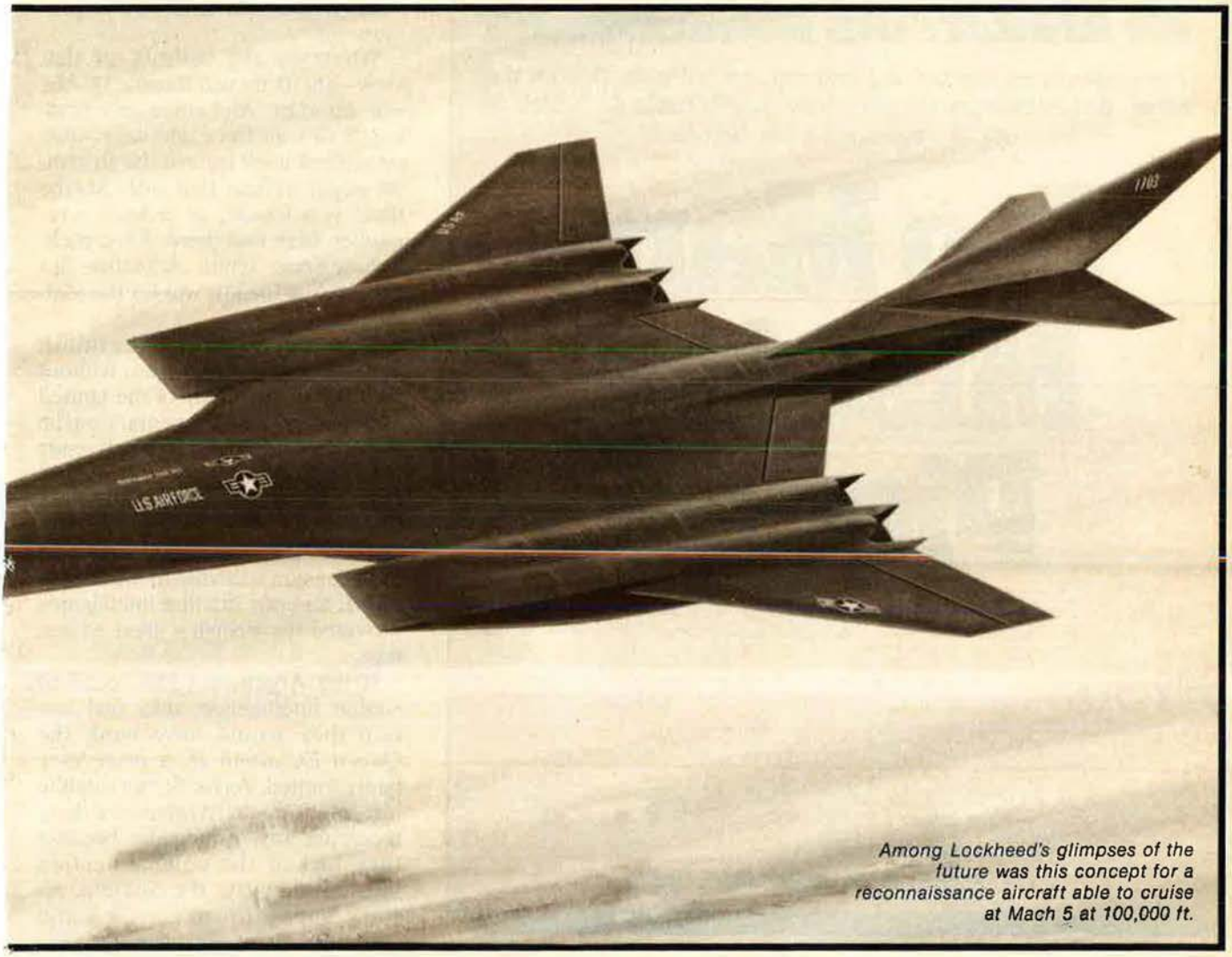
RFB of Germany sold forty-seven of its ducted-fan Fantrainers to Thailand, in versions with both 420- and 600-shp Allison turboprops. Slingsby's new Firefly basic trainer took off with an initial order for ten. There were bold suggestions that the activities of NDN and Slingsby, allied to the imminent manufacture of the tail-pusher Lear Fan in Northern Ireland, and the twin-engined Sheriff in the Isle of Wight, could indicate a rebirth of the long-dormant British lightplane industry. This seems premature; but most of the world's lightplane business is in a poor state financially at present, whereas one deal being negotiated by NDN could change UK fortunes dramatically.

Few aircraft are, of course, sold over the counter at air shows. This may alter now that the sacred turf of Farnborough has been invaded by the first microlights; but the real business is done on the equipment stands inside those three huge tents. Here, too, the discerning visitor can catch glimpses of the future of airpower and air travel that seldom make news in the daily press.

From Lockheed's Skunk Works

Lockheed never fails to enliven the conversation with a few highly futuristic aircraft projects that would look more at home in films like *Star Wars* or *Airport 2110*. This year its offerings included a twin-hulled flying-boat freighter with ten engines, a "Mach 5 at 100,000 feet" design for a reconnaissance aircraft conceived in the famous Skunk Works, and a ring-wing twin-turbofan airliner that is to be wind tunnel-tested soon. It is easy to treat such designs lightly; but who ever expected to see a transonic combat aircraft hovering, flying backwards, and taking off a ski-jump ramp on a ship, like the Harrier?

John W. R. Taylor is only the fourth Editor of Jane's All the World's Aircraft *since it began in 1909, having assumed the chair in 1959. Mr. Taylor is the pre-eminent aviation authority in the world, and AIR FORCE Magazine is proud to carry his by-line on this article, on the bimonthly "Jane's Supplement," and the annual aerospace review, as well as the galleries of aerospace weapons for the USAF (May) and Soviet (March) Almanacs. John Taylor's next major book project (following on 200 previously) is a multivolume series on the history of flight.*



Among Lockheed's glimpses of the future was this concept for a reconnaissance aircraft able to cruise at Mach 5 at 100,000 ft.

One should accept that the unbelievable is possible before touring the equipment stands. At Farnborough '82 was a Plessey radar compact enough to fit on even the smallest of warships, yet agile enough to detect an incoming attack by a sea-skimming missile like Exocet. Partnering it were missiles like the French Naval Crotale, which is able to intercept a sea-skimming missile, and the British Seawolf, which has done so. From FFV of Sweden came a countermeasures pod able in two seconds to project a smokescreen 100 yards ahead of any helicopter that suddenly found itself in need of cover, to the discomfiture of operators of infrared or thermal imaging weaponry on the ground.

Wallop Industries offers a deluxe package of similar devices known as Rampart, which can throw a web of smoke, infrared decoys, and chaff around anything it is required to protect on the ground, simultaneously releasing a mass of helium-filled Skysnare balloons reminiscent of World War II barrage balloons and parachute-and-cable devices. Suddenly the thought of an early morning assault by hundreds of helicopters on the Central Front in Europe begins to seem a little less alarming and unstoppable.

Even more potent antihelicopter defense may be on the way. Sikorsky was able to release details of its proposed XH-59B combat helicopter, based on the well-tested XH-59A Advancing Blade Concept (ABC) research prototype. Bell and Boeing Vertol could well solve another NATO problem by developing a version of their forthcoming tilt-rotor JVX as an early warning aircraft able to operate from carriers as small as the Royal Navy's *Invincible*.

Clearly, there should be much of interest to see at future "Farnboroughs." When this year's show was planned, there were fears that it could be the last. As one of its latest moves in the endless search for ways to save money, Her Majesty's government decided to phase out its support of Farnborough airfield after 1986. Now, it seems that the birthplace of powered flight in Britain may be saved by private companies willing to operate it as a general aviation center, on a severely restricted basis. Reassured, the SBAC has announced that its next two shows will be held on September 3–9, 1984, and September 1–7, 1986. Don't miss them! ■

THE FALKLANDS: AN ARGENTINE ASSESSMENT

The Argentines feel US aid and equipment gave Britain the edge. But problems ranging from faulty fuzes to a lack of aerial refueling were crucial.

Too Many Missing Pieces

BY GEN. T. R. MILTON, USAF (RET.)

As we have all learned at one time or another, there are two sides to any argument. Wars, to take a few liberties with Clausewitz, are simply extensions of arguments by other means, the right side depending on where you are. In the case of the recent Falklands/Malvinas scrape, the natural tendency is to blame the Argentines. The British were, after all, in clear possession of those bleak little islands, and if the title was clouded in the Argentine view, there was no doubt about who had been running things for some 150 years. The Argentine incursion, then, appeared to be a standard aggressive move, and the British response was thus both understandable and correct.

Looked at through Argentine eyes, the view is somewhat different. The Malvinas, so named by the Spanish in a corruption of the original French Malouines, are claimed by Argentina as an inheritance from Spain, which periodically contested its ownership with the British. The complex history of those tiny godforsaken outcroppings, however, is not important. What is important is the war they caused.

An Unplanned War

It was a war, the Argentines say, that really was not planned. What they will not say in so many words, understandably enough, is that the Falkland invasion was badly planned and poorly timed. It now seems clear that there was little coordination among the various services prior to the occupation of Stanley. Had the British not sunk the *Belgrano* with its loss of 400 lives, perhaps the whole affair would have ended in negotiation. That, at least, is what the Argentines say.

Whatever the validity of that view—the Brits will dispute it—the war did start. And since only land-based air—air force and navy—distinguished itself against the British, we ought to hear that side. Maybe there is a lesson, or at least a reminder, here and there. This, then, is how some senior Argentine airmen look at the lost war for the Malvinas.

To begin with, they say the British could not have won that war without the considerable help of the United States, an ironic commentary on the American attempt to stay friends with both sides, since the general feeling in Britain is that we did not help enough. At any rate, in the Argentine view, American assistance at Ascension was vital to the British effort, and our satellite intelligence provided the British a great advantage.

If the Argentines had received similar intelligence, they feel certain they would have sunk the *Queen Elizabeth II*, a prize they badly wanted. As for Soviet satellite information, the Argentines deny receiving any, principally because they lacked the communication links. Evidently, the Soviets, always happy to take on a Latin American client, did offer their services.

Because the war was essentially an unexpected contingency brought on by the surprising British reaction to the invasion, or by the need to avenge the lives lost on the *Belgrano*, the Argentines had not done some of the things that would

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Gen. T. R. Milton's pre-Falklands War analysis of the Argentine Air Force, "A Blessed and Troubled Land," appeared in this magazine last April. Regular readers look forward to his monthly columns on various aspects of airpower. General Milton commanded bomber units in Europe during World War II, and held a series of high-level command and staff positions after the war. Prior to his retirement from the Air Force in 1974, he was US Representative to the NATO Military Committee.

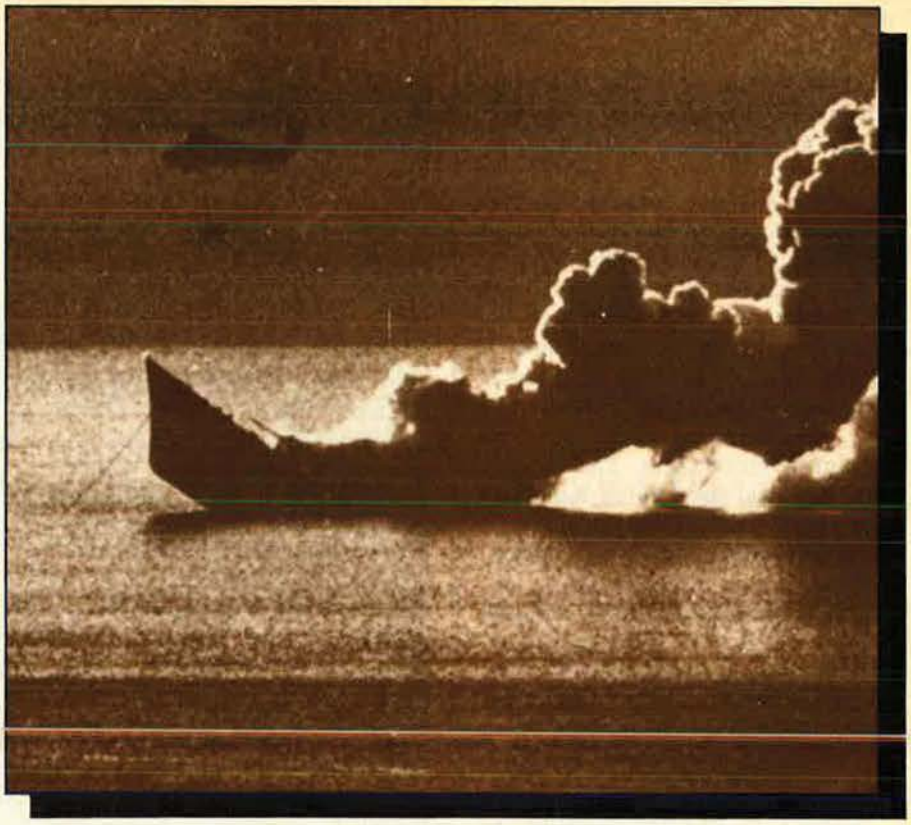
occur to a prudent planner. They had not, for instance, lengthened the runway at Stanley, nor had they even put pierced metal planks on the island. Then, when the British submarines cut off sealift, there was insufficient airlift for the job. Another deficiency was the lack of portable runway arresting gear. It was on order, but not yet in stock. Without it, Stanley airport was unusable by A-4s or Mirages, leaving only the counterinsurgency turboprop Pucarás for island basing.

Need for Reconnaissance

So there they were, faced with a modern British fleet operating at the outer limits of the Argentine Air Force's radius of action. A still further complication was the lack of any real reconnaissance capability in pinpointing their targets. The Argentines did set forth in a Boeing 707 at 18,000 feet one day in search of the *QE II*, and while they never found that great ship, they managed to dodge a barrage of British surface-to-air missiles without harm. Lack of reconnaissance, as well as the lack of any electronic warfare capability, was a continuing source of frustration to the Argentine air commanders.

Nonetheless, they began to score some successes. The *Sheffield*, of course, was sunk by an Exocet missile delivered by a navy Super Etendard flying at wavetop height. All the world has seen pictures of that ship's final moments, but another Exocet strike claimed by the Argentines has not had British confirmation. That one involved the carrier *Invincible*. My informants claim two A-4s flew formation with the Exocet as it homed in on and struck the *Invincible*. The Argentine belief is that the missile, along with a bomb from one of the A-4s, did considerable damage below deck, judging from the smoke and fire a returning pilot reported. The British have denied that *Invincible* was ever hit, so maybe it was another ship the Argentine pilots had in their sights. It is easy to make mistakes at 400 knots on the deck, especially if someone is trying to kill you.

The Harrier jump jet gained a considerable measure of respect from the Argentine Air Force, for it proved an elusive opponent at low altitudes. But it was the AIM-9L Sidewinder air-to-air missile that caused the most envy. In the opinion of the Argentines, almost any airplane becomes something to be taken seriously if it has the AIM-9L aboard. Again, they say, it was US support that gave the British this edge.



The British frigate Antelope *sinks after an undetonated bomb exploded as the British were trying to disarm it. Exocet was the best antiship weapon, but Argentina had only five available. (Wide World photo)*

Iron bombs, however, are still formidable weapons against ships. If the fuzing had not betrayed them, the Argentines feel certain they could have sunk several more ships, perhaps even turned things their way. Unhappily, the bombs too often failed to explode after they had struck their targets. The tactics were sound, the pilots skilled and aggressive, but the fuzes let them down. As for the now famous Exocet, Argentina had only five on hand.

No Regrets

Looking back on this war, the two Argentine airmen profess no regrets. The Air Force, along with some land-based navy pilots, has reason to be proud. There were severe losses—they put the number at thirty-eight airplanes—but the Argentine Air Force, they say, came out of the war with high morale, and there will surely be a monument at the Air Force Academy in Córdoba to those who were lost in combat.

If the Argentines were to fight again, they would want all their fighters to be air refuelable. Neither the Mirages nor the Etendards had that capability, a severe limiting factor to Argentine tactics. Their two KC-130s were heavily used in refueling A-4s, but the Argentines could have made good use of more and better tankers. If they had had a few KC-135s, they could have attacked the British fleet from all points of the compass.

The lack of an electronic warfare capability was a distinct handicap, and so was the lack of reconnaissance. The Argentines feel these were important disadvantages, along with, of course, their conviction that without United States help to the British, it would have been an even game.

Dormant But Not Settled

For the time being, then, the Falklands/Malvinas matter is dormant, but not, in the Argentine view, settled. A visitor to an Argentine office will see posters proclaiming the Malvinas forever. Meanwhile, the British have moved a force of some 3,000 men into the Falklands, and the runway at Stanley has been lengthened and equipped with arresting gear to accommodate a squadron of Phantoms. All indications are for prolonged British military preparedness against another Argentine move. Mrs. Thatcher, in fact, has said the United Kingdom will never give up those islands.

Nevertheless, this is very expensive business, this providing defense and a logistic lifeline to islands so far from Britain. The Argentines appear to be counting on the fact that this burden may eventually become too heavy. Meanwhile, they are thinking about modernizing their depleted air force.

Despite the fact that relations between the United States and Argentina are distinctly cooler than they were a year ago, the Argentines would probably like American airplanes if the terms are within reason and the President clears the way by certifying Argentine respectability in the matter of human rights, something he has not yet indicated he will do. There are other sources of airplanes, the Argentines say, and they are going to get them somewhere. The French are standing by with Mirage 2000s, and the Soviets have made one of those offers you cannot refuse—unless, that is, you know the Soviets.

From all indications, the military junta is approaching the end of its regime. Elections may take place as early as next year, at least in the provinces. Once the elective process is in force, some sort of Peronist victory seems assured. Maybe it will be a moderate version of Peronism, one that would begin an Argentine recovery from the present economic morass. Then again, maybe not. But whatever happens, whether Peronism, further military coups, or even an improbable shift to conservative democracy, we have not heard the last of the Falklands or the Malvinas. ■

THE FALKLANDS: A BRITISH ASSESSMENT

Political will, professional forces, and good equipment—helped along by luck and improvisation.

Britain's Near-Thing Victory

BY CHARLES W. CORDDRY

London

"JUST," the taxi driver answered with an amused smile.

The question was whether he could maneuver his cab through a narrow entry into the tiny square off Fleet Street where the newspaper I work for has its London office. "Just" is a rather stronger term in English than "just barely" is in American, signifying that, indeed, the task can be done—not to worry too much.

This thought was percolating when the taxi whizzed past the Wellington Museum at Hyde Park Corner, and one reflected that the Duke had been just ready for Waterloo. The battle was, he said afterward, "the nearest run thing you ever saw in your life."

Some moments later the sight of Admiralty Arch across Trafalgar Square recalled a visit many years ago to a naval officer who explained how Britain had been, in its usual mode, "just ready" when plunged into World War II. He was thinking of the Spitfires and Hurricanes. Today people think of the Harrier.

Great Britain in 1982 went to war with Argentina in the Falkland Islands, its first conflict in a quarter century during which there had been recurrent retrenchments in its military power; once again the old saw about readiness applied. From the moment that Argentine forces invaded the islands, it was clear to the British government that in retaking the Falklands, its Task Force would be heavily outnumbered in combat aircraft.

The fine calculation was made, however, that the Falklands' location 400 miles from the Argentine

mainland, at the extreme reach of most of Argentina's warplanes, should allow "a just tolerable air situation to be obtained," as one source put it.

The calculation was right, as it turned out. Harriers and antiaircraft missiles took a terrible toll of Argentine aircraft. But there were times when it seemed a question whether the Argentine Air Force would be defeated before the Royal Navy suffered unacceptable losses.

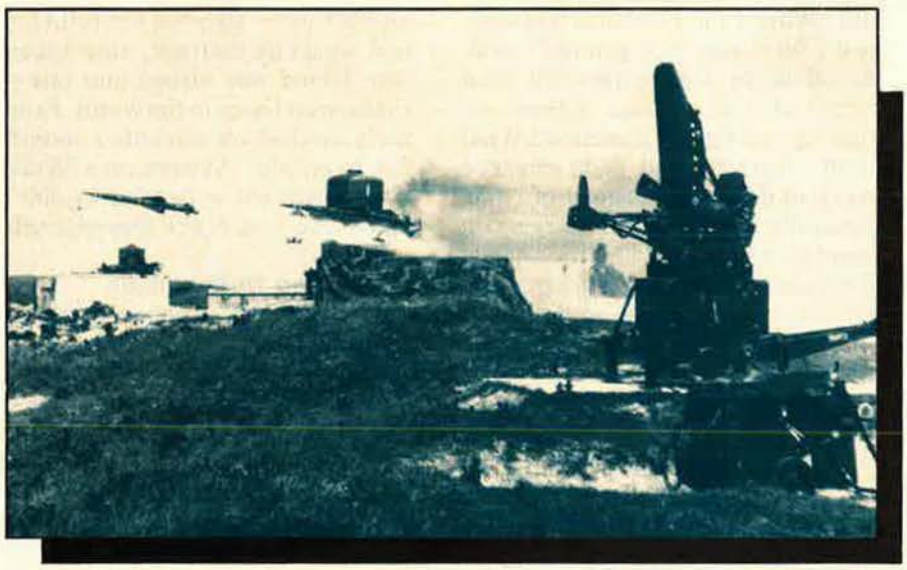
Five British ships were sunk—two to sea-skimming Exocet missiles—and others escaped only because perhaps a dozen iron bombs were duds. The Navy and the Royal Air Force together lost no more Harriers to enemy action than the fleet lost ships—just five, all to ground fire, in the course of 1,650 sorties flown in air defense, bombing, interdiction, close support, and reconnaissance roles, from two aircraft carriers and a 690-foot metal plank runway at the San Carlos beachhead.

The Royal Navy mounted 1,500 Harrier sorties in which the jump jet proved its versatility in war. Although Harrier has a vertical takeoff and landing capability, most launches were made with use of a ramp.

For the Royal Navy, which mounted 1,500 of the Harrier sorties, and for the government, the Falklands operation proved the validity of the V/STOL aircraft and small aircraft carrier concept, if *Nimitz*-type battle groups cannot be afforded. This is provided that the horrible absence of airborne early warning, which probably caused most of the grief in the Falklands, can be overcome. Rapid conversion of Sea King helicopters to carry Searchwater radar—the first one done in eleven weeks—goes part way to meeting this problem.

The Royal Air Force Harrier GR3s are configured for close support missions in Europe. But, given that the Navy could mobilize just twenty-eight Sea Harriers in the face of about 120 land-based Argentine jets, it was immediately decided to convert RAF aircraft for possible attrition replacements. In a week's time, nine GR3s had been fitted with US all-aspect AIM-9L Sidewinder missiles, as well as Royal Navy two-inch rocket pods. Eventually fourteen were deployed. But it turned out they were not needed in the air defense role and could be dedicated to the other airpower missions.

The RAF, which also had seven pilots serving with the Navy in Sea Harriers, similarly concludes that V/STOL aircraft proved their versatility in the war and, though not optimal air combat jets, did their air-to-air job superbly in an out-of-the-NATO-area conflict.



British antiaircraft missiles took a terrible toll of the Argentine Air Force. The Rapier air defense system, shown here, accounted for thirteen of the forty British SAM kills.

Unexpected Reaction

After a two-week period of tension over an incident in South Georgia Island, a Falklands dependency, the conflict had its beginning April 2 when Argentine forces invaded the Falklands, under the total misimpression apparently that they could get away with it.

"The English are peculiar, and they get annoyed when people trifle with them," an air marshal remarked to this reporter a score or so of years ago in urging that a peace

group's hooting of a defense speech by USAF Gen. Lauris Norstad was unrepresentative. On April 2, the British were annoyed. The next day John Nott, the Defense Minister, announced that the Navy would put to sea April 5 "in wartime order and with wartime stocks."

The speed was necessary to show Argentina—and the world—that Great Britain meant business. Mr. Nott had to be allowed, therefore, some poetic license about the wartime stocks.

The swift departure of ships from British ports was feasible, it is now authoritatively pointed out here, only if a supply chain could be established to provide the essential stores not initially on board. The fleet sailed, trailing RAF helicopters, which put some of the necessities aboard as the fleet made for Ascension Island, 4,100 miles to the south. C-130 Hercules and VC-10 transports rushed stores and personnel to Ascension to be in place when the ships got to the island. From then on, Ascension was the linchpin of an operation that provided continuous supply to the front line, 3,900 miles from the island and 8,000 miles from Britain.

Air transport ranked, as a pivotal asset, with the air refueling capability, much of it swiftly improvised, that enabled bombers, fighters, transports, and reconnaissance planes to project British power to that 8,000-mile distance.

By May 21, when diplomacy clearly had failed, the British forces were landed at San Carlos. On June 14, Argentina's numerically larger but isolated and entirely dispirited forces ran up the white flag.

Learning the Lessons

Britain won the war with a combination of political will, well-trained professional forces, good equipment (some of it rapidly turned out for the conflict), geographical luck regarding the air situation—and a great deal of improvisation.

When it was over, it was possible for some—maybe many—to render a Wellington-type judgment on the nearness of the thing. John Nott was not, of course, one of those. His ministry's "interim commentary" on British equipment was close to euphoric. This ran across the spectrum and, in regard to air operations, noted that 109 Argentine aircraft were destroyed from all causes, including thirty-one Skyhawks and twenty-six Mirages. Sea Harriers accounted for twenty-seven, thanks notably to Sidewinder missiles. The various British sea- and land-based air defense missiles were credited with forty kills. All claims were under continued study to be sure which weapon did what, to wring out duplications, to determine causes of failures, and to assess future implications. The lack of airborne early warning was unblushingly called a "disadvantage."

One who decidedly took the nearthing view, in contrast to Mr. Nott, was Capt. John E. Moore, the Editor of *Jane's Fighting Ships*. In the 1982–83 edition, he wrote:

"The whole of the naval effort was fully extended by an encounter with a small South American state of dubious stability, and the support work was a triumph for the British ability to produce a 'lash-up'. Time was on Britain's side. It may not be next time."

Besides these lacerating judgments, reflecting the general naval annoyance at cuts projected by Mr. Nott last year in order to moderate the rise in defense spending, the air has been full of "What-If's?" What if Argentina had had nuclear-powered submarines roaming at will in the South Atlantic, as Britain did? What if the Falklands had been just a bit closer to Argentina's land-based air, or if Argentina had been better able to manage in-flight refueling and fighter direction? What if the Harriers had been engaged more in dogfights, instead of being generally able to wait for targets on bombing missions with little chance for maneuvers? (The Harriers probably would have done well.)

But all that is as relevant as asking what if the Luftwaffe had been smart enough to fly under British radar in 1940. The point is that those were not the circumstances that existed in the Falklands war of 1982.

The circumstances that did exist were challenging enough. And, as John Moore makes brutally plain, even if by indirection, the opposing forces were not those of a Napoleon or a Hitler but of a Galtieri.

In Whitehall and Parliament, the war is still being reconstructed and everything about it is being studied for future use, from the adequacy of soles on soldiers' footgear to the structure of Her Majesty's forces. A defense White Paper is due soon. Other reports will deal with the events leading up to the war and what might have been done to head it off.

In the upshot, though, it is difficult to envision major changes in policy or forces, given the financial and security imperatives as seen by the Thatcher government. The main arena is still to the east, not the far South Atlantic. Obviously, London will see to the defense of the Falklands and to that end is arranging for air defense with F-4 Phantoms operating on a much-improved airfield at Port Stanley.

There had been increasing talk, before the 1982 conflict, of the need for out-of-area operations, in view of world changes and the reach of Soviet military power. Mr. Nott's 1981 report on defense revisions spoke of such operations, using the new small carriers and Sea Harriers "in the South Atlantic, Caribbean, Indian Ocean, or further east."

Nothing like the Falklands contingency was contemplated, however; when it came, it was an *ad hoc* war.

On very little notice, the fleet was dispatched, airlift was mobilized, aircraft were adapted for refueling and weapons carriage, and Ascension Island was turned into one of the busiest bases in the world. From forty aircraft movements a month, for example, Ascension's Wideawake Airfield expanded to 400 *a day* as the Task Force moved south.

Correcting Deficiencies

The conflict exposed quite serious deficiencies, known ones as far as the British military leadership was concerned, the most serious of which was probably the one that has been most advertised—the lack of airborne early warning.

But many of these were fixed (not AEW, alas) in an astoundingly short time, once the government decreed that money was no object; and as a

result, there have been important enhancements in military capabilities, particularly in airpower:

- The RAF Harrier, which was not scheduled to be fitted with Sidewinders until next year, received them immediately. The first aircraft was modified in thirty-six hours. For carrier duty, the GR3 was given tie-down shackles, had holes closed to keep out sea water, and was provided with a modified oxygen resupply system to be compatible with the Navy's. In two weeks, Ferranti developed and delivered FINRAE (inertial navigation rapid alignment equipment) for shipboard use in aligning the GR3's navigation-attack system.

(Of the fourteen GR3s deployed to the Falklands, all made nine-hour flights to Ascension. Ten went the rest of the way on container ships while four flew the distance (another nine hours, with no alternate) and set down directly on the carrier *Hermes*.)

- In an operation strung over 8,000 miles, maritime surveillance was an urgent need. Victor tankers were quickly modified with radar, photo, and improved navigation equipment. Using a buddy system, Victor tankers and recce aircraft conducted surface shipping surveillance and both pre- and post-attack reconnaissance of South Georgia Island in fourteen hours, forty-minute missions from Ascension.

Nimrods, the RAF's maritime reconnaissance aircraft, meanwhile, were rapidly modified for in-flight refueling so they could perform the major surveillance mission over the full operating area. Nineteen-hour sorties, with an extra pilot and navigator, became routine just four weeks after the modification was ordered. Nimrods also were given Sidewinders for self-protection, and a capability for attack with bombs, Stingray torpedoes, and Harpoon antiship missiles.

- Air operations depended on in-flight refueling. At the start, only Harriers and F-4 Phantoms (used for air defense at Ascension) were equipped as receivers, and only the two squadrons (sixteen aircraft) of Victors were available as tankers. Moreover, some tankers had to be retained for normal operations with fighters in Britain. Besides the Nimrods, therefore, it was necessary to equip Vulcan bombers and C-130 Hercules transports as receivers, and six Vulcans and four Hercules were converted to tankers as well.

Modified in five weeks for air-to-air refueling, the C-130s ran a series of missions from Ascension to the Falklands, carrying airdropped spares, mail, and other necessities, in twenty-five-hour sorties. A world record Hercules flight of twenty-eight hours and three minutes is claimed for Flight Lt. Terry Locke and his crew on an airdrop to East Falkland on June 18, four days after the cease-fire.

Reams have been written on the "lessons," real or imagined, of the Falklands war, and repetition is not needed. But perhaps these few observations are in order:

- Political resolve was vital, and of this the Thatcher government had a full supply.
- The unforeseen happens. Wars break out in unexpected places. What works well in such cases should be exploited and deficiencies should be attended to. But there are not many Falklands to repossess, and major changes for that purpose are not likely in forces designed primarily for the NATO area.
- The scene of a war is, nevertheless, hard to leave. A garrison will be required in the Falklands for an indeterminate period, with some impact on readiness elsewhere.
- Limited resources (and whose aren't?) are likely to dictate increasing cooperation between air forces and navies, as the Falklands showed abundantly and as the US Navy and USAF are demonstrating in the Indian Ocean-Persian Gulf region.

Questions remain as to what, precisely, the United Kingdom will do about defense in light of its reconstruction and analysis of the war in the South Atlantic. Nothing said officially so far suggests any alteration of long-stated security priorities or, therefore, any radical changes in force structure. This is not just because of politicians' need to say they were generally right in last year's defense review, in which cuts fell mainly on the surface Navy.

It has already been decided, in fact, that the Navy will operate three, instead of two, 20,000-ton *Invincible*-type carriers. And the Navy would like to stop the cut in its fleet of fifty-nine destroyers and frigates at nine instead of seventeen. Any such result would be viewed triumphantly. But, if one thinks about it, the victory could prove not to be long-lasting.

British priorities, at least as long as the Tories are in power, are maintenance of the nuclear deterrent through expensive modernization with US Trident-2 missiles and new submarines; home defense, involving large outlays for Tornado aircraft; maintenance of the British Army of the Rhine at 55,000 men, and modernization of the RAF in Germany with the US-UK Harrier AV-8B and the Tornado strike version; and enhanced maritime air and submarine efforts, while reducing the surface fleet.

These priorities, and particularly the emphasis on the Trident, greatly restrict the defense debate and point the way to more problems for the Royal Navy over the long term.

Britain has, however, moved away from the 1966 Defense Review's position that the nation "will not undertake major operations of war except in cooperation with allies." Mr. Nott's review was clear on that point last year, and Prime Minister Thatcher said on conclusion of the Falklands war: "We must have the capacity to act independently. We need both the power to act and the will to see it through."

With its out-of-area plans and its much vaster nuclear enterprise, as well as its alliance commitments, Britain retains earmarks of a world power—just. ■

Charles W. Corddry is the Defense correspondent for the Baltimore Sun, *and dean of the Pentagon press corps. His articles for* AIR FORCE *Magazine have included visits to Thule, Greenland, and to the Distant Early Warning (DEW) Line. His most recent article for this magazine, in September '82, examined the role of the nations on NATO's northern flank. Mr. Corddry has the longest tenure among Washington correspondents on the Public Broadcasting Service program "Washington Week in Review."*

The US must develop the doctrine and technology to counter ever expanding Soviet electronic warfare capabilities and, in the process, capitalize on the "force multiplier" effects of tactical command and control. A first step toward realizing these goals is . . .

A JOINT APPROACH TO C³I

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

THE artful integration of hardware, software, and doctrine known as command control communications and intelligence (C^3I) eventually could help restore to the US the kind of relative advantage over the USSR this country enjoyed in the early phases of the nuclear age. Equally important, a fully matured tactical C^3I umbrella system would provide a real-time inventory of friendly and hostile forces combined with other pertinent information to remove from all echelons of command "that bane of conflict, the fog of war."

This was how Lt. Gen. Brent Scowcroft, USAF (Ret.), a former Assistant to the President for National Security Affairs, summed up the potential of C^3I, in terms of global deployment and employment of general-purpose forces, before a symposium devoted to this subject on October 4–5 at the MITRE Corp. in Bedford, Mass.

Dampening this sanguine long-term outlook is the fact that at this time "tactical C^3I tends to be fractionated into too many program elements, making it hard to understand the whole picture," according to Lt. Gen. James W. Stansberry, Commander of AFSC's Electronic Systems Division—and along with MITRE a co-sponsor of the event. The ESD Commander disclosed details of an important new tactical C^3I program named "Joint STARS," for Joint Surveillance and Target Attack Radar System. Purpose of this program is the development and fielding of a joint Air Force/Army radar surveillance and attack control system designed to detect, locate, track, and control weapons against time-sensitive moving and stationary targets beyond the forward edge of the battle area (FEBA).

ESD is the executive agent of this joint program that eventually also might involve US Navy and Marine Corps participation. The roots of Joint STARS go back to the US Army's Standoff Target Acquisition System (SOTAS) and the Air Force's Pave Mover program, which was initiated by ESD and the affiliated Rome Air Development Center (RADC) in 1978 with the award of parallel contracts to Hughes Aircraft Co. and Grumman Aerospace Corp. Pave Mover led to impressive demonstrations by both companies of how side-looking, moving-target indicator radars—combined with digital data links, ground-based data processing, and weapon guidance—can provide reliable, real-time target acquisition and strike capabilities.

The advanced development models of the two contractors subsequently demonstrated the feasibility of detecting and tracking missiles and aircraft in flight and moving ground targets. With a range of about 200 kilometers, Pave Mover showed a way for looking far beyond the FEBA to guide both aircraft and such standoff missiles as the T-16 and T-22 against a variety of targets.

The Army's SOTAS program also involved development of an airborne radar system to detect and locate moving targets beyond the FEBA. SOTAS was to be carried on the Army's YEH-60 helicopter. Last year, Congress canceled SOTAS on grounds that the Army's cost estimates for the system had grown from $900 million to $2.4 billion in less than two years while the system's initial operational capability (IOC) slipped by almost three years. In asserting that the Army could not afford to spend $2.4 billion for SOTAS at that time, Congress, however, took pains to support the requirement for a moving target indicator radar system of this type.

The Defense Department last May responded to the demise of SOTAS on the one hand, and to the successful Pave Mover demonstrations on the other, by directing the two services to develop a common core moving-target indicator radar, and to set up a jointly staffed program office at ESD. Two aircraft, the TR-1 and the OV-1, are to be evaluated as potential carriers of Joint STARS radars.

In its initial phase, Joint STARS is to concentrate on quickly attainable, economical designs—especially so far as antenna size is concerned—to satisfy the Army's surveillance needs while at the same time allowing for systems growth to meet Air Force criteria. Initially, the Army will use the system to direct artillery fire and its Multiple Launch Rocket System (MLRS), which can launch a variety of submunitions, including terminally guided antiarmor warheads, over a range of about thirty kilometers.

The Air Force is to use Joint STARS at first in connection with fighter aircraft that will penetrate hostile airspace low and fast and, with the system acting as their eyes and ears, "pop up" over the target for instant weapons release. Over the longer term, the Air Force is considering development of a self-contained Joint STARS aboard converted Boeing 707 aircraft that would operate in support of the Rapid Deployment Joint Task Force (RDJTF).

Complementing Joint STARS is a companion program—carried out also on a joint basis but with the Army as the executive agent—that combines development of the Army's Corps Support Weapon System with the Air Force's Conventional Standoff Weapon System.

T-16 and T-22 missiles are being evaluated for this application.

RDJTF Requirements

Lt. Gen. Robert C. Kingston, Commander of the Rapid Deployment Joint Task Force (which on January 1, 1983, is scheduled to become a unified command), focused on the use of communications "for the gathering of intelligence and dissemination of orders for command control of forces in the crucible of combat." He found the situation wanting so far as Southwest Asia—including the Persian Gulf region and the Horn of Africa—is concerned. The RDJTF, he pointed out, "must be able to rapidly project substantial power into an area devoid of US military presence, into a region that has only very limited strategic communications access, that lacks adequate infrastructure—roads, ports, storage areas, runways, etc.—and little or no prepositioned supplies for sustainability prior to closure of sea lines of communication."

The RDJTF's potential area of operations, some 7,000 air miles from the eastern US seaboard, is much larger than the US, General Kingston pointed out. Moreover, a full-scale RDJTF deployment to such a large area is likely to involve as many as 220,000 soldiers, sailors, airmen, and Marines. It follows, he told the ESD/MITRE symposium, that the success of such a mission is "directly related to the capability to move a sizable force to the potential area of operations quickly; to be able to promptly receive, process, and utilize intelligence from all sources—national, strategic, and tactical; to exercise effective command and control over substantial forces spread across a large geographical area; and to sustain that force logistically."

The problem boils down to establishing and maintaining strategic communications with the NCA, necessary linkages "laterally, and tactical communications downward." Dependence on satellite communications will be extensive, since other links are subject to frequent atmospheric interruptions. The tactical C^3 picture, he warned, is equally stressed: "Current military communications equipment is old, of limited reliability, and in short supply. Moreover, the area is almost totally devoid of commercial local and long-line voice and teletype circuits. In short, the lack of host nation infrastructure will require the US to carry all required communications with us—to erect, establish, and exercise critical strategic, tactical command control and intelligence communications links, perhaps at the same time we are conducting combat missions."

To overcome these deficiencies, General Kingston said, the RDJTF communications system must meet these command control and intelligence criteria:

"Provide reliable multipath, secure, high-volume, jam-free, voice and data-handling linkage with National Command Authorities, the Joint Chiefs of Staff, and adjacent supporting unified commands;

"Establish reliable multipath, secure, high-volume voice and data linkage with major subordinate headquarters, adjacent US embassies, host governments, and, if appropriate, host and allied military headquarters and components;

The RDJTF . . . "must be able to rapidly project substantial power into an area devoid of US military presence, into a region that has only very limited strategic communications access . . ."

"Be able to reliably and rapidly access national and tactical intelligence systems, including sensitive compartmented sources; and

"Have fully capable command and control aircraft in order that the RDJTF Commander and battle staff can move within the potential operating area as necessary while maintaining secure contact with all headquarters."

In terms of the RDJTF mission, its Commander pointed out, "it is vital that individual communications units be compact, air transportable by the C-141, ground mobile, and sufficiently rugged to operate reliably under conditions of extreme heat, unstable power sources, and sustained exposure to dirt, grit, and sand. Further," General Kingston asserted, "C^3I equipment must be able to handle vast amounts of data associated with various combat support functions as well as transmit quickly and reliably high-quality imagery, map overlays, data collected from modern reconnaissance sensors, and from digital data bases requiring computer-to-computer transfers. Lastly," he said, "high-quality, secure voice communications are of overriding importance."

To overcome critical shortfalls in the RDJTF's C^3I capabilities, he told the ESD/MITRE symposium "several programs on the drawing boards, under design, or in prototype are desperately needed in the field as quickly as they can be made available."

Once the force is called into action, intelligence sensors must be moved forward promptly—among "the first airlift loads—to establish critical strategic intelligence links in the theater and to begin the collection of tactical information upon which effective force employment is dependent.

"One piece of equipment soon to come into inventory that is most needed," he said, "is the Deployable Intelligence Data-Handling System. This unit will process all categories of intelligence rapidly and provide intelligence analysts with automatic data processing facilities in the field."

General Kingston explained that within a few short hours from the decision to "go," almost the entire force will have to be moved by air from CONUS sites. During that critical period the airborne RDJTF Commander and his battle staff need improved means for close contact with the National Command Authorities and the Joint Chiefs of Staff, require rapid access to fast-breaking intelligence, and must be able to monitor the force flow and implement changes and modifications of the battle plan while en route.

He added that "thanks to the full cooperation of the Strategic Air Command, an EC-135 with much of this capability has always been made available to me. However, I need more upgrades of the airborne command and control fleet for improved C³I during mobile command operations.

"When we first arrive in the theater, our communications capability will be limited at a most critical time—the buildup of combat power," General Kingston said.

Four new developments that he termed vital for the RDJTF's improved C³I are:

- Secure, jam-resistant, high-capacity, easily transportable communications terminals to provide secure uninterrupted linkage among headquarters, RDJTF components, and major theater force units.
- The Tri-Tac Joint Tactical Communications Systems, to provide more reliable communications support, due to its advanced digital design.
- A deployable World-Wide Military Command and Control System (WWMCCS) is needed also, to interface with national command and control systems and to open up a whole new arena of improved C³I.
- Lastly, the Defense Satellite Communications System (DSCS III) is needed urgently because of its increased capacity and jam-resistance. So is an Indian Ocean satellite to support operations in Southwest Asia.

General Kingston stressed that "from the RDJTF's perspective, improved satellite communications, timely fielding of all Tri-Tac equipment, and establishment of a Southwest Asian communications infrastructure are all required to ensure interconnection and interoperability of both tactical and strategic C³I systems."

Air Force C³I Needs

USAFE's Vice Commander in Chief, Lt. Gen. Robert W. Bazley, applauded the fact that NATO is acquiring eighteen E-3A AWACS to complement those assigned to the European theater by the US as well as the eventual availability of the TR-1 sensor platform "that will search for enemy elint [Electronic Intelligence] emitters and down-link that information in real time to special ground stations." Another important counter to the Soviet Union's vast and growing radio electronic combat capabilities is the EF-111A—that is now entering the inventory—as well as "Compass Call" (a C-130 derivative) that provides "versatile" jamming of Soviet C³I systems.

"The NATO C³ network," General Bazley said, "is made up of alliance-wide systems as well as facilities operated and maintained by the individual member nations. In general, NATO is responsible for those parts of the system that furnish tactical control or command and control of logistics and support functions. Upgrading the NATO net, therefore, is difficult because the alliance as a whole, as well as the individual member nations, must strike a consensus to do so," he said. Key need is for the system to employ equipment that is "smart, quickly responsive, and survivable."

"We need a high-speed mechanism at multiple echelons to keep track of our aircraft, parts, munitions, crews, and air base facilities as well as to help formulate and disseminate mission taskings in real time."

With the pending deployment of GLCMs (ground-launched cruise missiles) in Europe, General Bazley stressed, the need for absolute control becomes imperative, "meaning survivable command centers and reliable long-haul communications over multiple media paths to hedge against blockage of any one channel."

For USAFE to get high effectiveness from its combat aircraft, "we need a high-speed mechanism at multiple echelons to keep track of our aircraft, parts, munitions, crews, and air base facilities as well as to help formulate and disseminate mission taskings in real time." Specifically this translates into "automatic bookkeeping, quick data retrieval and manipulation in combination with secure high-speed links and information transfer." All the sensor data in the world, he added, "won't mean much unless we get [the information] that we really need and can screen out what we don't need. We must combine information smartly so we can pick the right targets for our aircrews, warn them of threats, and forward all this information where it's needed."

Once launched, he stressed, "the aircrews must be able to communicate with the ground and with each other effectively, even in the face of enemy ECM [electronic countermeasures]." The ensuing requirement is for "reliable, secure data links, efficient cockpit displays, the confidence of positive identification, and the flexibility of voice links that will operate in a jammed environment."

The need for secure voice links, from USAFE's point of view, is paramount, according to General Bazley: "Basically, we know how to do this, but the trick is to sort out who should be doing what—the US or NATO—

and to persuade the decision-makers to field the needed systems."

USAFE, he explained, is trying to gain this objective by "leading by example," such as formulation of a C³I master plan comprised of existing capabilities, new systems about to be fielded, and others that, although essential, are still in a conceptual stage. In addition, the command is stepping up cooperation with the European allies in the development and deployment of C³ systems as well as expanding efforts to influence the design of allied C³ systems by providing technical documentation such as identifying C³ baseline needs by such means as the draft of a five-volume air command and control architecture for NATO's Central Region.

TAC's Vice Commander, Lt. Gen. John L. Piotrowski, underscored the importance of "intra-squadron" communications: "We need to be able to communicate at the line of scrimmage to give those audibles. While data is important, I don't want to have to send a telegram to a [squadron member] to tell him that he has got a MiG on his tail. I want to be able to talk to him." TAC's view is that interoperability starts with "fighter pilot talking to fighter pilot" as well as AWACS and forward air controllers (FACs).

The key problem, he told the MITRE/ESD symposium, is "that we have ignored Soviet ability to jam us, and we are now ten years late" in responding. Recent TAC exercises under "Green Flag" showed that "about fifty percent of our missions are ineffective" when flown against simulated Soviet jamming, even though the level of jamming TAC was able to simulate was significantly lower than what would be encountered in combat, General Piotrowski reported.

According to TAC's analyses, Soviet radio electronic combat capabilities are tailored to destroy at least thirty percent of USAF's C³I capability and rendering ineffective by jamming another thirty percent. The only relevant antijam system being built by the Air Force, Have Quick, can be negated by existing—although not yet fielded—Soviet technology, he said. Seek Talk, an advanced and highly effective antijam system proposed by ESD, was denied funding by Congress.

USAF's Assistant Chief of Staff for Studies and Analyses, Maj. Gen. Robert A. Rosenberg, conceded that until recently "almost the entire focus of our activities has been directed toward the Central European theater." It took the revolution in Iran, he said, to expand "our horizons and force us to consider the possibilities of a conflict in another part of the world." The formation of the RDJTF caused the Air Force to reexamine its approach to warfighting and C³I, according to General Rosenberg.

He cited as the three recurring problems in the tactical C³I field "the difficulty of integrating intelligence with the command and control function, the necessity of secure jam-resistant communication, and the importance of survivability."

Traditional design approaches in the C³ field, General Rosenberg pointed out, have tended to shortchange mobility: "Fixed sites and hardened shelters used to house this equipment do not put many constraints on size, weight, and durability. A deployable force faces a different problem. Not only does the equipment need to be mobile, but maybe more importantly, it must be transportable." Future design criteria should combine cost-effectiveness analyses with "weight-effectiveness" assessments in the recognition that the ability to airlift C³ equipment is a make-or-break criterion. Equipment that can only be sealifted, he stressed, "will be of little value in a short-term conflict unless it is prepositioned, and [even] once we are in the theater there is a very high probability that it will have to be moved often."

The C³ requirements of RDJTF and other, highly mobile force projection missions are met best by modular designs and greater use of "off-the-shelf" items. The Air Force, he stressed, "cannot continue the 'hobby shop' approach of continually trying to improve systems in development when they are needed in the field. If it meets the mission requirements, field it!"

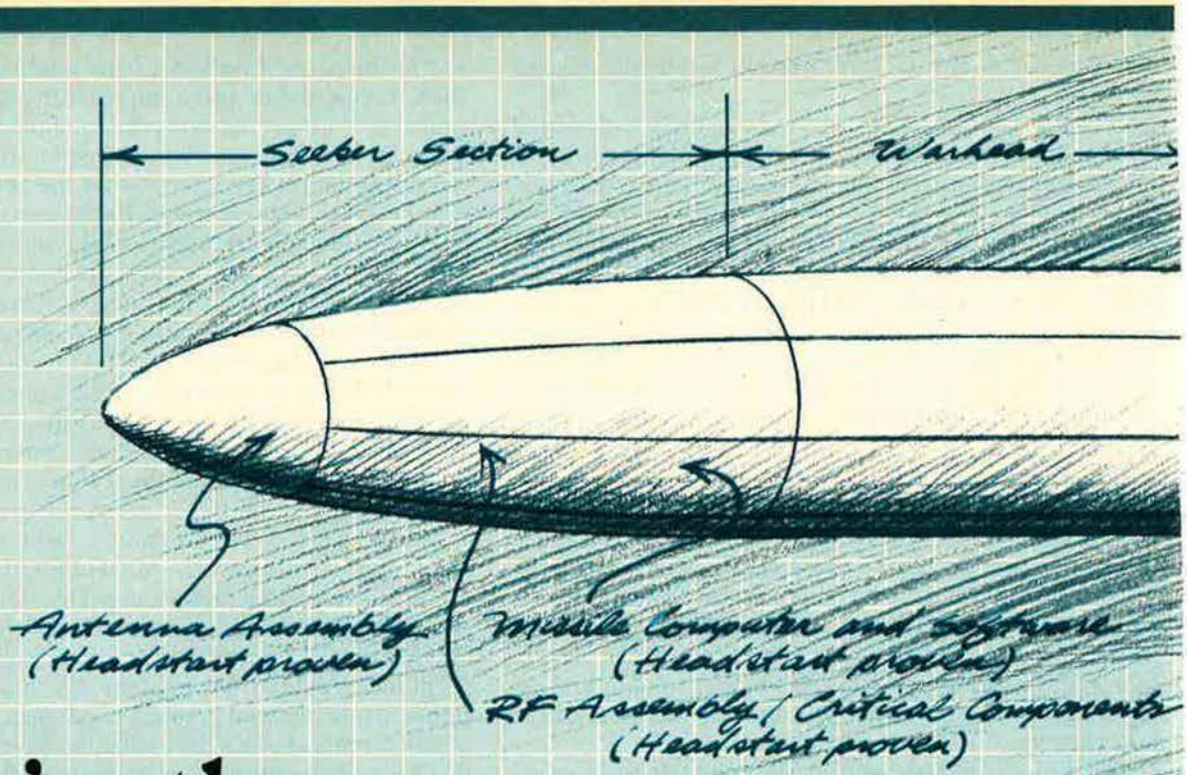
Lt. Gen. Thomas H. McMullen, Commander of AFSC's Aeronautical Systems Division, stressed the importance of the Air Force's LANTIRN (Low Altitude Navigational Targeting Infrared for Night) system that "will let us extend our fighting day into the night-time hours, using infrared systems to navigate and locate and attack targets. LANTIRN will also have a radar terrain avoidance capability to permit penetration of clouds en route to the target areas. We plan on putting LANTIRN on A-10s for night close air support (CAS), F-16s for CAS and battlefield interdiction, and on two-seat F-15s or F-16s for deeper penetration and attack on second-echelon targets. The ability to execute that around-the-clock capability—to exercise control of it—is an important requirement that needs a greater commitment of resources than it is now receiving."

The Navy's Tactical C³ Needs

"We deploy surface and air forces around the clock 365 days a year that need to be under positive control and command from the NCA on down to the commanding officer," according to the symposium's keynoter, Vice Adm. Gordon R. Nagler, USN, Director of Command and Control in the Office of the Chief of Naval Operations.

Referring to the Gulf of Sidra incident in August 1981 when Libyan aircraft "vectored in" on two US F-14s, he said that "within sixty seconds we had that information back in Washington to the White House . . . and for the next several days watched from moment to moment." Although "we have the best command and control in the world today for peacetime and crisis management, we cannot handle the enduring C³ needed in wartime," he stressed. "The counter to burgeoning Soviet electronic warfare capabilities," he said, "is a joint approach to command and control countermeasures," adding "that no one service can accomplish command and control countermeasures by itself."

Overall, he stressed, that joint C³ management and policy must reside in the Joint Chiefs of Staff: "Our C³ directions must be streamlined, and joint policies must be enforced. We can't allow the present fragmented approach to continue. C³ is a force multiplier and in the joint arena that can only be settled by one policy-maker—and that's the Joint Chiefs of Staff." ■



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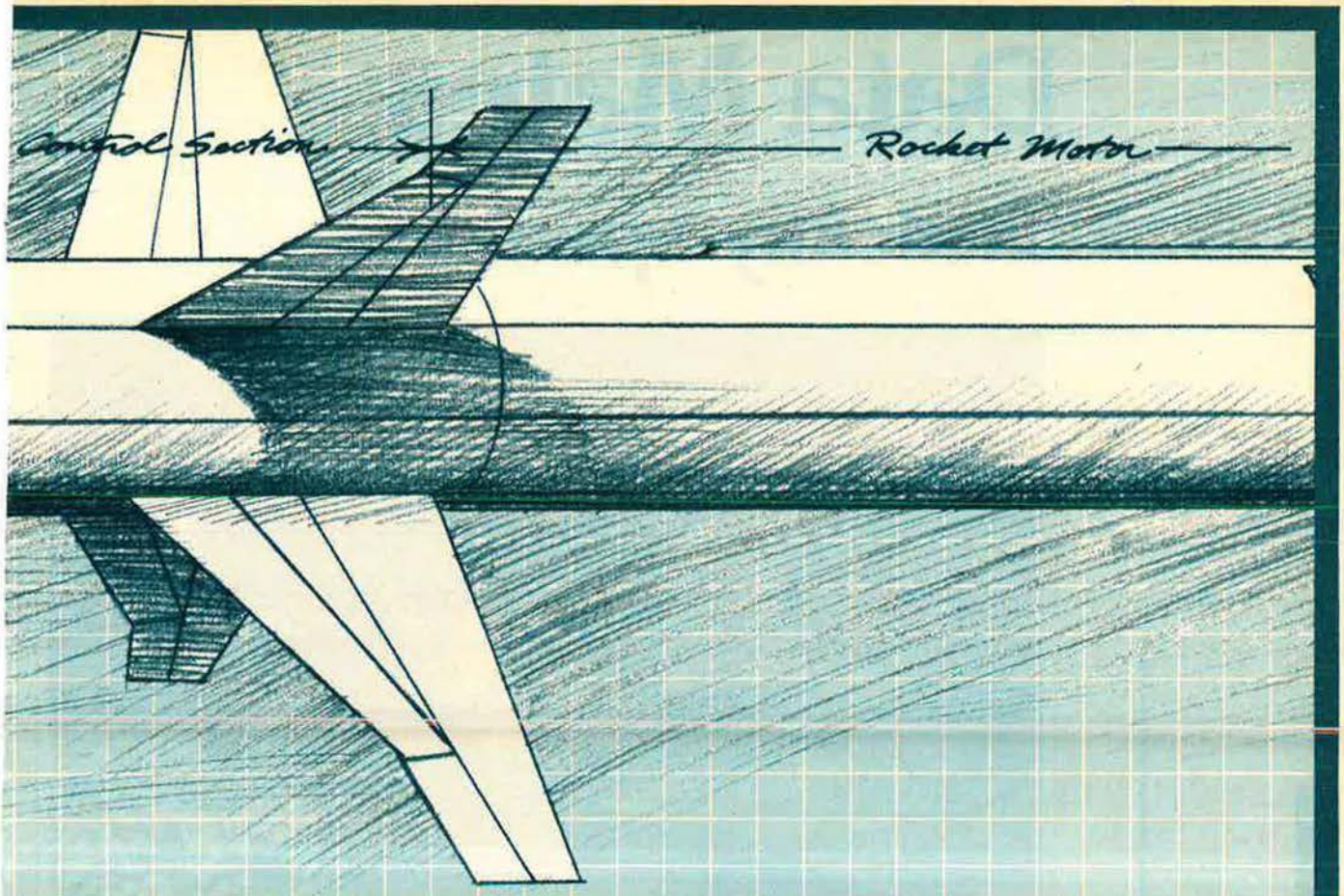

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THE MILITARY BALANCE 1982/83

As Compiled by The International Institute for Strategic Studies, London

ONCE again, AIR FORCE Magazine presents to its readers the exclusive US presentation of the annual international standard reference, "The Military Balance 1982–83." "The Military Balance" has appeared in AIR FORCE Magazine each year since 1971.

This comprehensive reference provides a detailed, unclassified, quantitative assessment of the elements of military power and defense expenditures worldwide. As such, it is a handy and authoritative unclassified reference accepted as the leader in the field.

Something the compilation is not: It is not an assessment of the balance of power in the world, either globally or regionally. The document has been prepared by the Director of the London-based International Institute for Strategic Studies and his staff, who accept full responsibility for its contents. The contents cannot represent a consensus of the worldwide views of the IISS's worldwide membership, nor could they. For this publication, AIR FORCE Magazine has added photos and captions, and we assume responsibility for them. As in the past, minor tabular material has been excluded from this reprint because of space limitations. Readers wishing the original volume may order it direct from the International Institute for Strategic Studies, 23 Tavistock St., London WC2E 7NQ, England. The cost is $14, postpaid.

Highlights of IISS's commentary on the compilations:

- The two superpowers now tend to buy increasingly similar forces for increasingly similar needs. IISS calls this "a case of convergence."
- Economic information relevant to defense is given in greater detail in this edition than ever before. IISS says, "More is buying less, even in those countries determined to increase defence expenditure marginally in real terms."
- The Institute detects a Third World trend toward diversification of arms suppliers, "primarily for political reasons, despite the fact that this greatly increases logistic difficulty. . . ."
- Peacekeeping operations are becoming more important. IISS says, "This results from an increase in the general level of international tension and an acknowledgement that some crises and conflicts can be resolved only by the interpositioning of 'neutral' forces."

A final qualification by IISS is that ". . . there have been so many conflicts occurring during the preparation of this year's 'Military Balance' that it has been peculiarly difficult to assess what has been lost in action and what replaced." Where assessments are especially tentative, notes have been made to that effect.

AIR FORCE Magazine has retained IISS's system of abbreviating military units and weapons, and its British spelling and usage (as in "programme"). A list of abbreviations used in the text appears on p. 62.

Where a $ sign is used, it refers to US dollars, unless otherwise stated. Defense expenditures are expressed in US dollars. For the USSR and China, defense expenditures are estimates. Explanatory notes are provided at the end of the sections on those countries.

—THE EDITORS

ABBREVIATIONS

⟨	under 100 tons
–	indicates part of establishment is detached
AA	anti-aircraft
AAM	air-to-air missile(s)
AB	airborne
ABM	anti-ballistic missile(s)
ac	aircraft
AD	air defence
AEW	airborne early warning
AFV	armoured fighting vehicle(s)
ALBM	air-launched ballistic missile(s)
ALCM	air-launched cruise missile(s)
amph	amphibious
APC	armoured personnel carrier(s)
Arg	Argentinian
armd	armoured
arty	artillery
ASM	air-to-surface missile(s)
ASW	anti-submarine warfare
ATGW	anti-tank guided weapon(s)
ATK	anti-tank
Aus	Australian
AWACS	airborne warning and control system
AWX	all-weather fighter(s)
bbr	bomber
bde	brigade
bn	battalion *or* billion(s)
Br	British
bty	battery
Can	Canadian
cav	cavalry
cdo	commando
Ch	Chinese (PRC)
comd	command
COIN	counter-insurgency
comms	communications
coy	company
CW	chemical warfare
det	detachment
div	division
ECM	electronic counter-measures
ELINT	electronic intelligence
Elm(s)	element(s)
engr	engineer
eqpt	equipment
EW	early warning
excl	excludes/excluding
FAC(G)	fast attack craft (gun)
FAC(M)	fast attack craft (missile)
FAC(P)	fast attack craft (patrol)
FAC(T)	fast attack craft (torpedo)
fd	field
FGA	fighter(s), ground-attack
flt	flight
Fr	French
FRG	Federal Republic of Germany
GDP	gross domestic product
GDR	German Democratic Republic
GLCM	ground-launched cruise missile(s)
GNP	gross national product
GP	general-purpose
gp	group
GW	guided weapon(s)
hel	helicopter(s)
how	howitzer(s)
hy	heavy
ICBM	inter-continental ballistic missile(s)
incl	includes/including
indep	independent
inf	infantry
IRBM	intermediate-range ballistic missile(s)
km	kilometres
KT	kiloton (1,000 tons TNT equivalent)
LCA	landing craft, assault
LCG	landing craft, gun
LCM	landing craft, medium/mechanized
LCT	landing craft, tank
LCU	landing craft, utility
LCVP	landing craft, vehicles and personnel
LHA	amphibious general assault ship(s)
log	logistic
LPD	landing platform(s), dock
LPH	landing platform(s), helicopter
LSD	landing ship(s), dock
LSM	landing ship(s), medium
LST	landing ship(s), tank
lt	light
m	million(s)
MARV	manoeuvrable re-entry vehicle(s)
MBT	main battle tank
MCM	mine counter-measures
mech	mechanized
med	medium
MICV	mechanized infantry combat vehicle(s)
MIRV	multiple independently-targetable re-entry vehicle(s)
Mk	mark (model number)
mod	modified/modification
mor	mortar(s)
mot	motorized
MR	maritime reconnaissance
MRBM	medium-range ballistic missile(s)
MRCA	multi-role combat aircraft
MRL	multiple rocket launcher(s)
MRV	multiple re-entry vehicle(s)
msl	missile
MT	megaton (1 million tons TNT equivalent)
n.a.	not available
Neth	Netherlands
nm	nautical miles
OCU	operational conversion unit(s)
org	organized/organization
para	parachute
pdr	pounder
Pol	Polish
Port	Portuguese
RCL	recoilless launcher(s)
recce	reconnaissance
regt	regiment
RL	rocket launcher(s)
RV	re-entry vehicle(s)
SAM	surface-to-air missile(s)
SAR	search and rescue
sigs	signals
SLBM	submarine-launched ballistic missile(s)
SLCM	sea-launched cruise missile(s)
Sov	Soviet
SP	self-propelled
spt	support
sqn	squadron
SRAM	short-range attack missile(s)
SRBM	short-range ballistic missile(s)
SSBN	ballistic-missile submarine(s), nuclear
SSM	surface-to-surface missile(s)
SSN	submarine(s), nuclear
sub	submarine
TA	Territorial Army
tac	tactical
tk	tank
tp	troop
tpt	transport
trg	training
UNDOF	United Nations Disengagement Observation Force
UNFICYP	United Nations Force in Cyprus
UNIFIL	United Nations Interim Force in Lebanon
UNTSO	United Nations Truce Supervisory Organization
USGW	underwater-to-surface guided weapon
veh	vehicle(s)
VIP	very important person (tpt)
V(/S)TOL	vertical (/short) take-off and landing
Yug	Yugoslav

The United States and the Soviet Union

The United States

STRATEGIC FORCES

The Reagan Administration announced in October 1981 a programme for continuing the upgrading of American strategic nuclear forces, including both delivery systems and, most importantly, the associated command control communications and intelligence-gathering systems (C^3I). This sets the direction for US procurement, but it is too soon for these changes to be reflected in the deployed forces. The US intends to bring 100 MX ICBM into service by the late 1980s (the precise basing mode remains undecided), to proceed with the rapid development of the *Trident* II/D-5 SLBM, and to procure 100 B-1B intercontinental bombers and SLCM for land-attack.

Decisions taken by previous Administrations have resulted in the deployment during the year of the first *Ohio*-class SSBN with 24 *Trident* I/C-4 missiles. Eight more are under construction or funded. Also, eight more *Lafayette*-class SSBN have been retrofitted with *Trident* I/C-4 missiles, bringing the total carrying this longer-range missile to twelve. Twelve more of the *Poseidon* boats were to have been converted. Eight have been funded; no programme has yet been announced concerning the remaining four. All *Polaris*-equipped boats have now been retired.

The cumulative results of these changes have been to reduce the total SSBN inventory by four (from 36 to 32), while SLBM totals have gone down by 56 (from 576 to 520), and the number of SLBM warheads has temporarily fallen by 304 (from 5,072 to 4,768) until the C-4 missile is in full service. There has been virtually no change, however, in the sea-based deliverable megatonnage (at about 315 MT).

The operational ICBM inventory remains at 1,052 (reflecting the earlier loss of 2 *Titan* II silos). Although one damaged silo is expected to return to service later in 1982, all *Titan* II forces are scheduled to be retired from 1983. Conversions of *Minuteman* II ICBM to *Minuteman* III will result in a drop of 50 of the former and a corresponding increase in the latter by the mid-1980s. Of the present 550 *Minuteman* III ICBM, 300 are estimated to have been fitted with the new (and more powerful) W-78 warhead, containing three Mk 12A MIRV. Warhead totals for the ICBM force remain at 2,152, but there has been an increase of 123.75 in deliverable megatonnage (from 1,198.5 to 1,322.25) as a result of warhead changes. Other improvements to the existing missile force are expected to continue, including greater accuracy, penetration, and protection against countermeasures. Significant development and purchase of improvements to early-warning, threat-assessment, and C^3I systems are also planned.

There has been no significant change in the US strategic bomber force. There are reports that two FB-111A aircraft are to be retired (presumably to be replaced from the active reserve), that the B-52D will be retired shortly, that 28 B-52H will be used to support the Rapid Deployment Joint Task Force (RDJTF) in a conventional mode, and that 14 B-52G are nearing the completion of their conversion to carry the AGM-86B Air-Launched Cruise Missile (ALCM), with a total programme of 104 G and possibly 96 H to be converted eventually. Introducing the TR-1 long-range strategic reconnaissance aircraft, uprating the E-4A command aircraft to E-4B (replacing the aging EC-135N), and purchases of new tanker aircraft (KC-10A) round out current strategic modernization.

GENERAL-PURPOSE FORCES

Despite the attention given by the Reagan Administration to strategic forces, it has been general-purpose forces which have received proportionately greater funding, and future investment plans concentrate largely on them. New equipment is being introduced in all branches of the conventional forces and more is planned.

In the ground forces, the *Abrams* tank appears largely to have overcome its development problems, although the M-60 is still being purchased in substantial numbers. The *Sheridan* light tank has been almost entirely phased out. M-2 and M-3 *Bradley* MICV are beginning to enter service in significant quantities. Ground-based anti-air defences for the field army have not greatly improved, although a trial purchase of the *Roland* system has been made, and *Patriot* continues in development.

It is the size and shape of the US Navy which has perhaps caused most debate, but it is the hardest to change in the short run. A large programme has been

funded or is envisaged, including three more *Los Angeles*-class SSN, a third *Nimitz*-class nuclear-powered aircraft carrier (CVN), additional escorts (2 *Kidd*-class guided-missile destroyers (DDG) and 4 *Perry*-class guided-missile frigates (FFG)), and a further air wing for the CVN. The US Marine Corps and the Navy are taking delivery of the F/A-18 fighter/bomber. In the longer run, a 600-ship Navy—including 15 carrier task forces (there are currently 12)—has become the target of this Administration.

The US Air Force is replacing the F-4 and F-106 with the F-16 and F-15 respectively and is enhancing its airborne early warning and control capability with additional E-3A *Sentry* aircraft. The future of the heavy-lift capability remains uncertain, but either additional (and modified) C-5 or Boeing 747 aircraft are likely to be ordered.

There has been little fundamental change in the RDJTF during the year, although the network of transit and prepositioning arrangements has been refined and added to, and exercising has begun in the Near and Middle East (including Oman). Nevertheless the political constraints remain considerable, and it may be some years before substantial improvement can be made to air and sea lift. Furthermore, command and control arrangements remain to be finalized and put into effect.

THE UNITED STATES

Population: 230,049,000.
Military service: voluntary.
Total armed forces: 2,116,800 (185,680 women).
GDP 1981: $2,924.8 bn.
Estimated defence expenditure 1982–3: $215.9 bn (national definition).[1]
GDP growth: −0.2% (1980), 2.0% (1981).
Inflation: 12.4% (1980), 8.9% (1981).

Strategic Nuclear Forces:[2]

OFFENSIVE:

(a) *Navy* (21,000): 520 SLBM in 32 SSBN.
1 *Ohio* SSBN with 24 *Trident* I/C-4.
31 *Lafayette* SSBN: 12 with 16 *Trident* I/C-4 (192 msls); 19 with 16 *Poseidon* C-3 (304 msls) (8 being retrofitted with C-4).
(On order: 8 *Ohio* SSBN; 320 *Trident* I/C-4 msls.)

(b) *Strategic Air Command* (SAC) (118,000): 2 Air Forces. 12 divs.
ICBM: 1,052: 9 strategic msl wings, 26 sqns.
9 sqns with 450 *Minuteman* II (50 to be replaced with *Minuteman* III).
11 sqns with 550 *Minuteman* III.
6 sqns with 52 *Titan* II (to be phased out).
(Some 100 ICBM in storage.)
Aircraft: 436 combat ac: 19 bomb wings.
Long-range bombers: 316.
16 sqns (2 trg) with 151 B-52G, 90 B-52H (of which 28 normally have a conventional role).
(1 sqn of 14 B-52G being converted to carry 12 AGM-86B ALCM; a further 90 G and 96 H will be converted.)
5 sqns (1 trg) with 75 B-52D (to be retired).
Medium-range bombers: 60.
5 sqns (1 trg) with 60 FB-111A.
Active reserve: a further 3 FB-111A, 31 B-52 (perhaps 3 D, 22 G, 6 H).
Storage: 223 B-52 (all series).
ASM: perhaps 1,140 AGM-69A SRAM, 200 AGM-86B ALCM.
Strategic recce and comd:
1 sqn with 9 SR-71A.
1 sqn with 8 U-2R.
1 sqn with 2 TR-1.
1 sqn with 4 E-4A/B (3 A to convert to B).
3 sqns with 16 RC-135, 7 EC-135N (to be replaced by E-4), 14 EC-135C, EC-135S/U/V.
Tankers: 49 sqns (1 trg) with 646 KC-135A (incl 13 Air National Guard with 107 ac, 3 Air Force Reserve with 21 ac), 6 KC-10A.
(On order: 100 B-1B bombers, 2 E-4B comd, 16 TR-1A recce (2 -1B trg), 10 KC-10A tankers, 720 AGM-86B ALCM.)

DEFENSIVE:

North American Aerospace Defense Command (NORAD) is a joint US-Canadian organization with HQ at Cheyenne Mountain near Colorado Springs, USA. It includes:

Aircraft: Interceptors: 258 (official total stated as 312, incl 54 Can CF-101).
(i) Regular: Air Defense (TAC), Alaskan Air Command (32 alert locations): 6 sqns; 5 with 75 F-106A (F-15 to replace), 1 with 18 F-15.
(ii) Air National Guard (ANG): 10 sqns; 5 with 90 F-4C/D, 5 with 75 F-106A.
(iii) 1 AD sqn (in Iceland) with 21 F-4 (being replaced by F-15).
(iv) Tactical Air Force augmentation: 1 sqn with 18 F-15. Additional ac on call from naval, marine, and air forces.
AAM: *Genie, Falcon, Super Falcon, Sidewinder, Sparrow.*

Warning Systems:
1. ICBM, SLBM, satellites:
(a) Satellites. TRW Block 647: 1 over Indian Ocean: infra-red surveillance and warning system. Control stations at Guam, Pine Gap, and Nurrungar (Australia).
(b) Ballistic Missile Early Warning System (BMEWS). USAF 474L system: 3 stations: Clear, Alaska (AN/FPS-49, FPS-50); Thule, Greenland (AN/FPS-50 and FPS-92); Fylingdales Moor, England (AN/FPS-49 + other). 12 radars detect and track satellites, ICBM and IRBM, but not MIRVs. 4,800-km range.
(c) Space Detection and Tracking System (SPADATS):
(i) *Space Defense Operations Center* (SPADOC). NORAD/ADCOM Combat Operation HQ, Cheyenne Mountain. Tracking, identification, and cataloguing of all space objects; command control and communications to all space-associated commands and agencies.
(ii) *Cobra Dane* phased-array radar system at Shemya, Aleutians. Augments BMEWS in Alaska. (*Cobra Judy*, a Pacific-based, ship-borne phased-array radar (AN/SPQ-11), supplements Shemya research programmes, but is not part of SPADATS and has no early-warning function.)
(iii) USAF 496L *Spacetrack*. FPS-17 detection, FPS-79 tracking radars at Pirinclik (Turkey); optical tracking systems in New Mexico, California, at St Margarets (NB, Canada), Pulmosan (S. Korea), San Vito (Italy), Maui (Hawaii), Mount John (New Zealand).
(d) USN Space Surveillance System (NAVSPASUR). 9 field stations in south-east US (3 transmitting, 6 receiving sites, and civilian agencies).
(e) Perimeter Acquisition Radar Attack Characterization System (PARCS). 1 north-facing phased-array, 130° arc, 2,800-km range system at Grand Forks, ND (identifies and tracks individual re-entry vehicles, incl SLBM, in Central US, Arctic Ocean areas).
(f) Miscellaneous radars. US Army: Kwajalein Atoll (Pacific). USAF: Ascension Island (Atlantic), Antigua (Caribbean), Kaena Point (Hawaii); MIT Lincoln Laboratory, Westford, Mass.
(g) Two new systems are under development:
(i) Ground-based Electro-Optical Deep Space Surveillance System (GEODSS). A planned five-station system; stations now exist at White Sands, NM, Taegu (S. Korea), and Maui (Hawaii).
(ii) Pacific Radar Barrier (PACBAR).
2. SLBM:
(a) Pave Paws system: 1 phased-array radar (AN/FPS-115) each on US East and West coasts; 5,500-km range. 2 more planned in south-east and south-west US.
(b) 1 FPS-85 and 1 AN/FSS-7 station in Florida. Alternate Space Defense Center. Linked to *Spacetrack* and *SPASUR* through NORAD HQ. Also to identify and track fractional-orbit bombardment systems (FOBS).
3. Anti-Air (aircraft, cruise missile):
(a) Over-The-Horizon-Backscatter (OTH-B). 414L system. 3,900-km range. 2 sites in Maine (2 transmitters, 5 receivers), arcs and range still under development; 1 in Washington state planned. Another in southern US under consideration.
(b) Distant Early Warning (DEW) Line. 31 AN/FPS-19/-30 radars (21 in Canada) roughly along the 70°N parallel from Point Lay, Alaska, to Greenland, and two in Iceland, detecting aircraft and cruise missiles to 12,000 m at 320-km range.
(c) CADIN/Pinetree Line: 24 stations in Southern Canada.
(d) Tactical Air Command:
(i) *Semi-Automatic Ground Environment* (SAGE). 416L air weapons control and warning system at 6 locations (2 in Canada); combined with BUIC and Manual Control Center (MCC) in Alaska.
(ii) *Back-up Interceptor Control* (BUIC). All stations but 1 semi-active (AD command and control to support Joint Surveillance System (JSS) in tactical control of interceptor forces).
(SAGE, BUIC, and MCC will be replaced in 1983 by USAF/Federal Aviation Authority JSS, with 7 Region Operations Control Centers (ROCC): 4 in US, 1 in Alaska, 2 in Canada. Will control 84 radars: 46 in US, 14 in Alaska, and 24 in Canada, for coordination/control of military and civil air traffic, surveillance and tracking of objects in high- and medium-altitude transpolar flight.)
4. Intermittent programmed photographic recce satellites:
(a) USAF: *Titan* 3D launcher; 50–80 day life span.
(b) CIA: KH-11.

Strategic (non-nuclear):[2]

Rapid Deployment Joint Task Force (RDJTF) (assigned from existing units).
HQ: 1 Army Corps: 1 mech, 1 AB, 1 air assault divs, 1 air cav bde, special forces.
1 Naval Force: 3 carrier battle gps; 3 carrier spt gps; 1 surface action gp; 5 ASW patrol air sqns; 1 amph ready gp; 13 prepositioned spt ships; 1 marine amph force (div, 1 air wing), 1 marine amph bde.

[1]See p. 70 for footnotes.

1 Air Force: 2 sqns B-52H, 6 tac fighter wings, 1 tac fighter gp, 1 airborne warning and control wing, recce, tac airlift sqns.

Army: 790,800.
4 Army HQ; 5 corps HQ (1 AB) (1 forming).
4 armd divs (5–6 tk, 4 mech inf bns).
6 mech divs (4 tk, 5 mech inf, 3–4 arty, 1 hel, 1 SAM bns, 1 armd cav sqn, spt units).[3]
4 inf divs (1 to be reduced to 5,000-man cadre by 1986).[3]
1 airmobile div.
1 AB div: 3 bdes (each 3 para bns, 1 arty bn), 1 armd, 1 armed hel bn.
9 arty gps: 12–16 bns.
4 AA arty gps.
1 indep armd bde.
4 indep inf bdes.
1 indep air cav combat bde.
3 armd cav regts.
4 *Pershing* SSM bns (1 trg); 8 *Lance* SSM bns (in corps arty).
1 *Patriot* SAM bn forming (4 launchers, 32 msls); planned total 9 bns.
3 Special Forces Groups: 2 Ranger bns.
Army Aviation: 1 air bde. Indep bns and dets, mixed types of eqpt, assigned to HQ for tac, tpt, and medical duties.
Tanks: Some 12,130, incl 2,060 M-48A5, 1,555 M-60, 5,775 M-60A1, 540 M-60A2 with *Shillelagh* ATGW, 1,500 M-60A3, 300 M-1 *Abrams* MBT; 400 M-551 *Sheridan* lt tks with *Shillelagh* (330 trg).
AFV: some 20,000 incl M-577, 1,100 M-901 *TOW*, 12,300 M-113 (some with *TOW*) APC, M-2, M-3 *Bradley* MICV.

Arty and Msls: about 2,500 105mm, 155mm towed guns/how; 2,959 155mm and 203mm SP how; 68 MLRS 203mm MRL (2,496 rockets); 3,500 81mm, 2,800 107mm mor; 1,000 90mm and 106mm RCL; 400 *Hellfire* ATGW, 6,200 *TOW*, 10,400 *Dragon* ATGW launchers; 144 *Pershing* and *Lance* SSM.
AA Arty and SAM: 20mm and some 550 40mm towed and SP AA guns; some 2,600 *Vulcan* towed and SP 20mm AA guns; *Redeye*, FIM-92A *Stinger*, 600 *Chaparral*, 10 *Roland* systems; *Nike Hercules* and *Improved HAWK* SAM (being replaced by *Patriot*).
Aircraft/Hel: about 580 ac, incl 200 OV-1/-10, 200 RU-21, RC-12D, 80 C-12A; some 8,000 hel, incl 300 AH-1G/Q, 700 AH-1S, 4,000 UH-1 (being replaced) and UH-19, 277 UH-60A, 436 CH-47A/B/C, 80 CH-54, 2,500 OH-6A/-58A.
AAM: M1M-92A *Stinger*.
Trainers incl about 100 T-41/-42 ac; 250 TH-55A hel.
(On order: 340 M-60A1, 981 M-60A3, 720 M-1 MBT; 892 M-901 *Improved TOW* AFV, 400 M-2/M-3 inf/cav MICV; 450 M-198 155mm towed, 232 M-109A2/A3 155mm, M-110A2 203mm SP how; 300 81mm mor; 44 MLRS MRL; 39 *Pershing* II SSM; 12,000 *TOW* ATGW; *Viper* ATK RL; 50 *Sgt York* DIVAD 40mm SP AA guns; 3,000 *Stinger*, 32 *Rapier*, 17 *Roland* (595 msls), 32 *Chaparral*, 795 *Improved HAWK*, 50 *Patriot* (244 msls) SAM launchers; 12 C-12A ac; 324 AH-1S, 11 AH-64, 354 UH-60A, 11 HH-60D *Nighthawk* hel; 680 *Hellfire* ATGW (ASM), 11 GLCM launchers (120 msls).

DEPLOYMENT: *Continental United States* (incl Alaska, Hawaii, and Canal Zone):
Strategic reserve:
(i) Rapid Deployment Joint Task Force (RDJTF): 1 corps HQ, 1 mech, 1 AB, 1 air assault divs, 1 air cav bde (see above).
(ii) To reinforce 7th Army in Europe: 2 armd, 3 mech, 2 inf divs, 1 inf bde, 1 armd cav regt.[4]
(iii) Alaska: 1 inf bde.
(iv) Panama: 1 inf bde (7,900).
(v) Hawaii: 1 inf div less 1 bde.
(See also *Forces Abroad*, below.)

RESERVES: 614,300.
(i) Army National Guard: (389,300). 3,285 units; capable after mobilization of manning 2 armd, 1 mech, 5 inf divs, 22 indep bdes (4 armd, 8 mech, 10 inf; 4 of them in regular army divs), 4 armd cav regts, 8 AA bns; plus HQ, reinforcements, and spt units to fill regular formations. Indep bns: 5 tk, 2 mech, 50 arty, 4 ATK *(TOW)*; 1 inf (Arctic recce) gp, 5 bns; 2 Special Forces gps, 6 bns; 105 air units, 150 sections; 2,568 ac.
(ii) Army Reserve: (225,000); 49,000 a year do short active duty. 3,410 units; 12 trg divs; 1 mech, 2 inf indep combat bdes; 67 indep bns, incl 1 tk, 2 inf, 15 arty; 2 Special Forces gps, 7 bns; 130 indep air units and sections with 566 ac.

Navy: 553,000; 90 attack submarines, 204 major surface combat ships. A further 27 major surface combat ships are in active reserve and storage. Four Fleets.
Submarines, Attack: 90:
85 nuclear (SSN): 18 *Los Angeles* with *Harpoon* SSM and *SUBROC*; 5 *Allen* (converted SSBN); 52 with *SUBROC* (1 *Lipscomb*, 1 *Narwhal*, 37 *Sturgeon*, 13 *Thresher*); 5 *Skipjack*, 4 *Skate*, 1 *Tullibee*.
5 diesel (SS): 3 *Barbel*, 1 *Grayback*, 1 *Darter*.
Aircraft carriers: 14 (1 trg).
4 nuclear (CVN): 3 *Nimitz* (91,400 tons), 1 *Enterprise* (89,600 tons).
10 conventional (CV): 3 *Kitty Hawk* (78/80,800 tons), 1 *Kennedy* (82,000 tons), 3 *Forrestal* (76/79,000 tons), 2 *Midway* (51/62,000 tons, 1 has no regular air wing), 1 *Intrepid* (trg, no ac assigned).
12 normally carry 1 air wing (70–95 ac) of 2 fighter sqns (with 24 F-14A (incl 6 RF-14 recce) or 24 F-4J), 3 attack (2 lt with 24 A-7E, 1 med with 10 A-6E), 2 ASW (1 with 10 S-3A ac, 1 with 6 SH-3A/D/G/H hel), 1 ECM with 4 EA-6B, 1 AEW with 4 E-2B/C; 5 KA-6D tankers, 1 lt tpt ac.
Other surface ships:
190 major combat vessels:
9 nuclear-powered GW cruisers (CGN) with 2 × 4 *Harpoon* SSM; 4 *Virginia* with 2 × 2 *Standard* SAM, *ASROC*, 2 SH-2F hel; 2 *California* with 2 × 1 *Standard*; 1 *Truxtun* with 1 × 2 *Standard*, 1 SH-2F hel; 1 *Long Beach*, 1 *Bainbridge* with 2 × 2 *Standard*.
18 GW cruisers (CG) with *Standard*, *ASROC*, some with 2 × 4 *Harpoon*: 9 *Leahy*, 9 *Belknap* with 1 SH-2F hel.
41 GW destroyers (DDG) with SAM, *ASROC*, some with *Harpoon*: 4 *Kidd*, 10 *Coontz*, 4 *Sherman/Hull*, 23 *Adams*.
43 gun/ASW destroyers (DD), most with SAM or *ASROC*: 30 *Spruance* (24 with 2 × 4 *Harpoon*), 13 *Sherman/Hull*.
24 GW frigates (FFG): 18 *Perry* with 1 *Harpoon/Standard*, 2 hel; 6 *Brooke* with 1 *Tartar/Standard*, 1 × 8 *ASROC*, 1 hel.
55 gun frigates (FF) with 1 × 8 *ASROC*: 42 *Knox* with 1 hel (most with *Harpoon* SSM, *Sea Sparrow* SAM), 10 *Garcia* (8 with 1 SH-2F hel), 2 *Bronstein*, 1 *Glover*.
7 minor surface combatants:
4 *Pegasus* GW hydrofoils (PHM) with 2 × 4 *Harpoon* SSM.
3 *Aggressive* ocean minesweepers.
65 amph warfare ships: 2 *Blue Ridge* comd (LCC); 5 *Tarawa* LHA (mix of AV-8A ac or 12 CH-46, 4 CH-53, 3 UH-1N, 4 AH-1T hel; 4 LCU); 7 *Iwo Jima* LPH (mix of 6 AV-8A, 4 OV-10 ac, or 2 HH-46, 10 CH-53, 1 UH-1N hel); 12 *Austin*, 2 *Raleigh* LPD; 5 *Anchorage*, 8 *Thomaston* LSD, 18 *Newport* LST; 6 *Charleston* amph cargo ships (LKA).
90 LCU: 59 Type 1610, 31 Type 1466; many smaller amph craft.
44 replenishment and 20 depot and repair ships.
Military Sealift Command: 16 stores/cargo, 13 oil, 3 gasoline, 1 water tanker, 14 oceanographic research ships.
Anti-sub msls, nuclear: *ASROC*, *SUBROC*.
SSM: *Standard* (SM-1), *Harpoon*, *Tomahawk* (trials).
SAM: *Standard* (SA-1), *Aegis* (SM-2) (some nuclear), *Talos*, *Sea Sparrow*, *Tartar*, *Terrier*.
Ships in active reserve and storage:
6 CV, 4 battleships (planned reactivation begun), 4 cruisers, 9 DD, 4 FF, 1 LCC, 5 LST, 5 LKA, 46 log spt, 41 tp ships, 22 ocean minesweepers. National Defense Reserve Fleet: Ready Reserve Force, 27 dry cargo ships, 165 other vessels (579 govt-owned cargo ships and tankers could be used for auxiliary sea-lift).
(On order and funded (5 years): 8 SSBN, 18 SSN, 1 CVN, 1 CV, 7 *Ticonderoga* CG, 1 DDG, 1 DD, 30 FFG, 2 PHM, 1 LSD, 3 landing craft, 18 auxiliaries, 8 ocean surveillance ships (AGOS); 240 *Harpoon* SSM/ASM.)
Aircraft: 12 attack carrier air wings; some 1,350 combat ac, some 218 armed hel.
26 fighter sqns: 15 with 180 F-14A, 45 RF-14A, some 130 more F-14 in reserve; 11 with 144 F-4 (3 converting to F-14).
24 attack sqns: 12 med with 116 A-6E, 36 KA-6D tankers; 12 lt with 164 A-7E.
2 recce sqns with 12 EA-3, 12 EP-3.
24 land-based MR sqns with 45 P-3B, 171 P-3C.
11 ASW sqns with 110 S-3A *Viking*.
9 electronic warfare sqns with 35 EA-6B *Prowler*.
13 AEW sqns with 48 E-2C *Hawkeye*.
18 ASW hel sqns: 11 with 110 SH-3A/D/G/H, 7 lt with 85 SH-2F LAMPS.
2 MCM hel sqns with 23 RH-53D.
17 misc spt sqns with 14 C-130F/LC-130C, 3 EC-130Q, 7 C-118, 31 C-1A, 17 C-2A, 2 C-9B, 16 CT-39, 13 C-131, 6 C-117, 57 UC-12B ac; CH-46, SH-3, SH-2B/C/D hel.
1 aggressor trg sqn with 13 F-5E/F.
21 OCU: 7 fighter trg (6 with 96 F-14/TA-4J/F; 1 with 34 F-18, 1 UC-880); 6 attack with 60 TA-7C, A-6; 1 recce with EA-3/-4; 2 MR with 32 P-3B/C; 3 AEW with E-2B; 1 ASW with S-3A ac, SH-2F hel; 2 hel with TH-12, TH-57A.
15 trg sqns with T-1A, T-2B/C, T-28/-29B/-44, 183 T-34C, TS-2A, TE-2 ac; 43 TH-57, UH-1D/N hel.
AAM: *Sparrow*, AIM-5A, AIM-5C *Phoenix*, *Sidewinder*.
ASM: *Standard*, *Bullpup*, *Shrike* (anti-radiation), *Walleye*, *Harpoon*, *Maverick*.
(On order: 30 F-14, 50 F-18 fighters, 12 A-6E attack, 6 E-2C AEW, 12 P-3C MR, 8 UC-12B, 18 EC-130Q, 6 EA-6B ECM, 39 C-2A tpt, 300 *Hawk*, 60 T-34C trg ac; 18 SH-2F, 26 CH-53E, 32 MH-53E *Super Stallion* MCM, 55 TH-57, 18 SH-60B hel; 30 AIM-5C AAM, 88 ALCM.)

DEPLOYMENT AND BASES (average strengths of major combat ships):
Second Fleet (Atlantic): 31 SSBN, 41 attack subs, 4–5 carriers, 76 surface combatants, 27 amph. Norfolk (HQ), Mayport, Roosevelt Roads (Puerto Rico), Charleston, Jacksonville, Brunswick, New London, Newport, Boston, New Orleans, Bangor, Kings Bay.
Third Fleet (Eastern Pacific): 1 SSBN, 30 SSN, 3 carriers, 44 surface combatants. Pearl Harbor (HQ), San Francisco, Whidbey Island, San Diego, Long Beach, Adak (Alaska).
(See also *Forces Abroad*, below.)

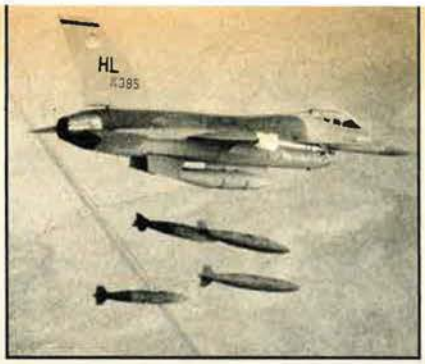
RESERVES: 87,900.
Ships in commission with the Reserve incl 5 DD, 4 FF, 4 amph warfare ships, 22 ocean minesweepers, 2 LST.
2 carrier wings: 18 sqns (6 attack with 60 A-7B; 4 fighter with 48 F-4N; 2 recce with 18 RF-8G; 2 AEW with 8 E-2B; 2 ECM with EA-6A, EKA-3B; 2 tanker with KA-3).
2 MR wings: 13 sqns with 110 P-3A/B.
1 tac spt wing: 12 sqns (2 composite with TA-4J; 1 tac EW with EA-6A; 9 spt with C-9, C-118, C-130).
1 hel wing: 7 sqns (4 ASW with 26 SH-3D, 2 lt attack with 16 HH-1K, 1 SAR with HH-3).
Naval Construction Bde: 9 regts, 17 bns.
2,126 specialist and spt units; 62 boats/patrol craft.

Marine Corps: 192,000.
3 divs, each of 9 inf, 1 recce, 1 tk, 1 engr, 1 amph bns, 1 arty regt.
1 indep bde (MAB) for Rapid Deployment Joint Task Force *(see p. 64 above).*
576 M-60A1 MBT; 985 LVTP-7 APC; 175mm SP guns; 150 105mm (being replaced), M-198 155mm towed, 218 155mm, 203mm SP how; 230 81mm mor; 106mm RCL; *Zuni* 5-in MRL; *TOW, Dragon* ATGW; *Redeye, Stinger* SAM.
3 Air Wings: (35,600); some 441 combat aircraft, 102 armed hel.
12 fighter sqns with 144 F-4N/S (1 being replaced with 26 F-18).
14 FGA sqns: 3 lt with 45 AV-8A/C *Harrier* V/STOL; 6 lt with 114 A-4M; 5 med with 50 A-6A/E.
1 recce sqn with 21 RF-4B.
1 ECM sqn with 15 EA-6B.
2 observation sqns with 36 OV-10A.
2 command sqns with 16 OA-4M.
2 utility sqns with 24 C-117D/CT-31G.
3 assault tpt/tanker sqns with 36 KC-130F.
29 hel sqns: 8 hy with 128 CH-53D/-53E; 15 med with 180 CH-46F; 3 lt with 72 UH-1E/N; 3 attack with 72 AH-1J/T *(TOW).*
Other hel incl 140 CH-53D/E, 30 AH-1T/J.
7 trg sqns with TA-4F, TAV-8A.
2 SAM bns with *Improved HAWK.*
AAM: *Sparrow, Sidewinder.*
ASM: *Maverick.*
(On order: 329 LVTP-7 APC, 12 AV-8B ac, 12 CH-53E hel, *Stinger* SAM, 3 hovercraft (LCAC).)

RESERVES: 37,000.
1 Marine div: 3 regts, 21 combat and spt bns.
1 Fleet Marine Force: 1 regt, 7 bns.
1 air wing: 4 aviation, 1 service, 1 air control gps: 11 ac sqns (2 fighter with 24 F-4N, 6 attack with 72 A-4E, 1 EW with EA-6A, 1 observation with 16 OV-10A/E, 1 tpt/tanker with 12 KC-130F); 10 hel sqns (1 attack with 18 AH-1J, 3 hy with 18 CH-53A/D, 2 med with 36 CH-46, 4 lt with 21 UH-1N). 1 SAM bn with *HAWK.* 32 spt units.

DEPLOYMENT:
Continental United States: 2 divs.
Hawaii: 1 bde (from Japan-based div).
(See also *Forces Abroad,* below.)

Air Force: 581,000; some 3,650 combat aircraft.[5]
26 combat wings, comprising 83 sqns: 26 with 624 F-4 (14 to be replaced with F-16); 16 with 376 F-15; 13 with 312 F-16; 5 *Wild Weasel* (1 trg) with 84 F-4G; 11 with 252 F-111A/D/E/F, 5 EF-111A; 12 with 288 A-10A.
6 tac recce sqns with 126 RF-4C.
3 AWACS sqns with 26 E-3A *Sentry.*
11 tac air control sqns; 6 with 96 OV-10/O-2A; 1 with 7 EC-130E; 1 with 11 EC-135K ac; 3 with 27 CH-3 hel.
5 special operations sqns: 3 with 18 MC-130 ac; 1 with 20 AC-130A/H ac, 9 CH-3E, 10 UH-1N hel; 1 with 9 HH-53H hel.
4 aggressor trg sqns with 72 F-5E, T-38.
18 OCU: 1 with F-111A; 1 with 13 F-16; 7 with F-4; 1 with F-5; 2 with F-15; 2 with F-101/-106; 3 with 60 A-10; 1 with RF-4C.
14 tac airlift sqns with 231 C-130.
17 hy (strategic) tpt sqns: 4 with 73 C-5A, 13 with 254 C-141B.
Other tpts: 7 C-135, 5 VC-137B/C, 11 C-140A/B.
8 SAR sqns incl 1 SAC msl spt sqn: 25 HC-130 ac, 62 HH-3/-53, 79 T/H/UH-1 hel.
3 medical tpt sqns with 19 C-9.
3 weather recce sqns with 13 WC-130, 5 WC-135B.
30 trg sqns: 8 F-16B, 120 T-33A, 662 T-37B, 620 T-38, 113 T-39, 100 T-41A/C, 13 T-43A, 4 C-5A, 28 C-130, 16 C-141B, 5 HC-130, 2 UV-18A (DHC-6) ac; 8 HH-53, 8 HH-3, 10 H/U/TH-1 hel.
Hel incl 40 UH-1, 23 HH-3E.
AAM: *Sidewinder, Sparrow.*
ASM: *Maverick; Standard ARM, Shrike, HARM* (anti-radiation); GBU-15 glide bomb.



An F-16A drops bombs at the Utah Test Range. Delivery of F-16Cs will begin in 1984.

(On order: 480 F-16, 36 F-15 fighters, 20 A-10 FGA, 5 F-5, 9 E-3A, 12 EF-111A, 8 C-130H, EC-130H ac; 11 UH-60A hel; 40 ALCM.)

DEPLOYMENT: *Continental United States* (incl Alaska):
(i) *Tactical Air Command* (incl NORAD assigned ac): (110,000): 2 Air Forces; 9 air divs: 28 wings; 36 sqns (30 fighter, 3 tac recce, 3 tac air spt).
(ii) *Alaskan Air Command:* (7,300): incl 1 fighter wing (1 sqn with F-4E/F-15), 1 composite wing (1 sqn with A-10, 1 sqn with O-2A), 1 control (warning) gp, 2 combat spt gps.
(iii) *Military Airlift Command:* (74,000): 2 Air Forces; 1 air div, 1 gp; 9 wings: 11 tac, 17 strategic airlift sqns; weather, SAR sqns.
(iv) Support elements: (171,500). Comms, log, systems, trg, electronic security Comds.
(See also *Forces Abroad,* below.)

RESERVES: 160,400. 41 wing equivalents.
(i) Air National Guard: (98,500); 24 wings (12 tactical), 67 gps, 92 sqns; 1,074 combat ac.
10 interceptor sqns (NORAD-assigned): 34 fighter/FGA sqns (1 with 20 F-105B/D, 12 (1 OCU) with 160 F-4C, 1 *Wild Weasel* with 12 F-105G, 15 (1 OCU) with 375 A-7D/K (to get 24 F-16), 5 with 90 A-10); 8 recce sqns with 107 RF-4C; 5 tac air spt sqns (3 with 50 OA-37B, 2 with 75 O-2A); 19 tac tpt sqns with 168 C-130A/B/E; 13 tanker sqns with 107 KC-135 (NORAD-assigned); 1 special electronics sqn with 20 EC-130E; 2 SAR sqns with 8 HC-130 ac, 12 HH-3E hel. Trg ac incl 40 T-33, 6T-43A.
(ii) Air Force Reserve: (61,900); 17 wings, 55 sqns: some 188 combat ac, 5 armed hel.
10 fighter sqns (1 with 35 F-105D/F, 5 with 55 F-4C/D; 4 with 88 A-10, more forming); 15 tac tpt sqns (12 (1 OCU) with 120 C-130/A/B, 1 with 17 C-123K, 2 with 32 C-7A); 3 tanker sqns with 21 KC-135, 7 KC-10; 2 special operations sqns (1 with 10 AC-130 ac, 1 with 5 CH-3 hel); 1 weather recce sqn with 7 WC-130; 4 SAR sqns with 14 HC-130H/N ac, 8 C/HH-3E, 10 H/UH-1 hel.
20 Reserve Associate sqns (personnel only): 4 for C-5A, 13 for C-141, 1 for KC-10A, 1 for C-7A, 1 aero medical for C-9A.
(iii) Civil Reserve Air Fleet: 323 long-range commercial ac (numbers fluctuate): 215 passenger (Boeing 707/747, L-1011, DC-8/-10); 108 cargo and convertible (Boeing 707/747, DC-8/-10).

Para-Military Forces:
Coast Guard: 45,000; 41 destroyer-size vessels, 6 icebreakers, 79 patrol craft, 119 other vessels; 51 ac (4 HU-25A, 22 HC-130B/E/H, 17 HC-131, 1 VC-4A, 1 VC-11A, 6 HU-16E; 93 hel (24 HH-3F, 69 HH-52A (to be replaced by HH-65)).
(On order: 9 cutters, 37 HU-25A ac, 90 HH-65 hel.)
Coast Guard Reserve: 11,600 (a further 9,700 have some Reserve obligation); 1 cutter, 167 Port Security units in 40 ports, 59 spt units, 63 reserve gps, 150 small vessels.

Civil Air Patrol: 59,000 (23,000 cadets): HQ, 8 Geographical Regions, 52 Wings, 1,883 units, 605 ac plus 7,570 private ac. Assist in SAR.

Forces Abroad:
General: Europe: 348,600; Pacific/Far East: 133,400; Caribbean/Latin America: 13,950; other areas: 4,500.

ARMY:
Europe: 221,300.
(i) Germany: (208,800). 1 Army, 2 corps HQ: 2 armd, 2 mech divs; 1 armd, 1 mech, 1 cav bdes; 2 armd cav regts; 30 AD btys with *HAWK;* 3,000 MBT.[6]
(ii) West Berlin: (4,300). HQ elements and 1 inf bde.
(iii) Greece: (440).
(iv) Italy: (3,800).
(v) Netherlands: (800).
(vi) Turkey: (1,100).
(vii) Other (2,060).
Pacific (see also *Deployment,* above):
(i) South Korea; 28,500. 1 inf div (13,900), 1 AD bde (2 bns) with 4 *Improved HAWK* btys (4 more in 1982).
(ii) Japan: 2,500; base and spt personnel.

NAVY:
Second Fleet (Atlantic) (See also *Deployment and Bases,* above): Guantánamo Bay (Cuba), Bermuda, Keflavik (Iceland), Holy Loch (Britain).
Sixth Fleet (Mediterranean): 5 subs, 2 carriers, 14 surface combatants. Gaeta (HQ), Naples, Sigonella, La Maddalena (Italy), Rota (Spain).
Seventh Fleet (Western Pacific): 8 subs, 3 carriers, 21 surface combatants. Yokosuka (Japan, HQ), Subic Bay (Philippines), Agana, Apra Harbor (Guam), Midway.
Dets serve in the Indian Ocean: 1 carrier task force (some 6 surface combatants), 13 chartered stores ships. Middle East Force (Persian Gulf): 1 cmd ship, 4 surface combatants.

MARINES:
Caribbean: Cuba (Guantánamo) 420. 1 reinforced marine coy.
Pacific: Japan/Okinawa: 1 MAF (1 div (–), 1 air wing), 1 Marine Amphibious Unit (MAU), 1 bn landing team.[7]
Indian Ocean: 1,800: 1 MAU deployed intermittently.

AIR FORCE:
Europe: US Air Force, Europe (USAFE): (54,000); some 700 combat ac. *Britain* (22,000): 1 Air Force HQ: 4 combat wings: 315ac in 15 sqns (7 with 156 F-111E/F, 6 with 126 A-10, 1 with 18 RF-4C, 1 combat trg with 15 F-5E); 1 tpt wing with 16 C-130 (MAC); 29 KC-135 (SAC), 4 EC-135H. *Germany:* 1 Air Force HQ: 5 combat wings: 12 sqns (2 with 48 F-16, 5 with 120 F-4E, 1 with 24 F-4G, 1 with 18 RF-4C, 3 with 72 F-15C/D); 1 special operations sqn with 4 MC-130E, 1 air control wing of 3 sqns (2 with OV-10A ac, 1 with HH-53C hel), 1 (MAC) tpt wing of 4 sqns (1 with 18 C-130E). *Netherlands:* 1 sqn with 24 F-15C/D. *Iceland:* 1 AD sqn with 24 F-4E. *Spain:* 1 Air Force HQ: 1 tac wing of 3 sqns with 54 F-4D, 1 trg wing (no ac assigned), units in Italy, Greece (2,400), and Turkey; 1 strategic recce unit (SAC).
1 tac fighter wing with F-4E in US on call as reinforcements.
Pacific: Pacific Air Forces (PACAF): (34,000). *Japan:* 1 Air Force HQ: 1 div: 1 wing with 72 F-15C/D, 18 RF-4C, T-39A ac, UH-1E/F hel, det with 2 E-3A AWACS. *Korea:* 1 div: 2 wings: 6 sqns (2 with 36 F-4E, 2 with 48 F-16, 1 with 18 A-10, 1 with 18 OV-10). *Philippines:* 1 Air Force HQ: 1 wing, 2 fighter sqns (1 with F-4E, 1 with F-4E/G); 1 special operations sqn with 4 MC-130E; 1 tac airlift wing with 32 C-130 (MAC); 1 trg gp with 15 F-5E, T-33, T-38).
Middle East (all services): Sinai (MFO), 1,100; Egypt, 323; Saudi Arabia, 861.
Africa (all services): 120.

The Soviet Union

STRATEGIC FORCES

Soviet strategic forces show little change in the year. There has been a small shift in the composition of the ICBM inventory, as a few more SS-11 have been retired and some 10 SS-19 have replaced them in existing silos. Warhead numbers have been marginally increased, as each SS-19 has 6 × 550-KT warheads against a single 1-MT warhead for the SS-11.

In the intermediate-range category, the switch from SS-4 and SS-5 to SS-20 continues. By July 1, 1982, 315 SS-20 MRBM were estimated to be deployed, with two or three more missile complexes reported under construction in the Western USSR, although in March 1982 the Soviet Union announced that for the time being no further SS-20 bases were being built in the European part of her territory. The SS-4 and SS-5 M/IRBM arsenals are being reduced quite sharply (from some 600 to 290 in the past three years), though warhead numbers in the force have risen from about 600 to some 1,235, as the great majority of SS-20 are equipped with three MIRV. Deliverable megatonnage, on the other hand, has declined by some 168 MT as 3 × 150-KT MIRV replace the 1-MT single warheads on the withdrawn missiles. The numbers of now aging *Bear* (150) and *Bison* (45) aircraft of the Long-Range Air Force (LRAF) are also believed to be slowly declining, while numbers of *Backfire* (in both naval and LRAF configurations) are increasing significantly. Some may be entirely new aircraft; others may be the earlier A models reworked into the later B configuration. A new long-range strike bomber (NATO codename: *Blackjack*) is reported under development, as is a new high-level, high-speed reconnaissance aircraft.

The first *Typhoon*-class SSBN has now entered service. Its missile, the SS-NX-20 SLBM, is believed to have a range of 8,300 km and to carry as many as 12 MIRV. Two more D-III SSBN (each with 16 SS-N-18 SLBM) became operational during the year, and three Y-I-class (with SS-N-6) retired, as did two older G-class diesel boats.

Organizational changes have occurred in the strategic defence forces. *PVO-Strany* and the Air Defence Troops of the Ground Forces appear to have merged, enabling better control and co-ordination of all air defence forces.

Modernization of the interceptor force continues, with increases in the numbers of MiG-23 at the expense of the older types. A variant of the MiG-25, the *Foxhound*, which carries a new AAM (the AA-X-9), is reported. This is believed to indicate a significant improvement in the *PVO's* 'look-down/shoot-down' capability. The SA-3 *Goa* has been undergoing modifications which significantly add to the number of on-site launchers, and the SA-10 is entering service, although details are sketchy. The USSR is known to be building a new series of large phased-array radars to supplement her existing long-range early warning systems.

GENERAL-PURPOSE FORCES

Earlier reports of an increase in the number of the army field formations have now been confirmed; the motor rifle division total has increased from 119 to 126. The extra divisions appear to have gone to the European USSR, Southern USSR (replacing those in Afghanistan), and the Sino-Soviet border. Although two divisions were withdrawn from East Germany in 1980/81, it is believed that the manpower of the divisions remaining has been augmented by an equivalent number of men. Inventories of most major equipment have increased, but the anticipated deployment of the new T-80 main battle tank has not yet been noted, and production of T-64/-72 MBT continues, although perhaps at a somewhat reduced rate. BTR-50/-60 APC are being replaced by BTR-70 APC and BMP MICV. Battlefield support SSM of a new generation are being slowly introduced, with SS-21/-22/-23 replacing *FROG*, SS-12, and *Scud* respectively.

The Soviet Navy continues with a steady if undramatic construction programme. The third *Kiev*-class carrier is on trials, a second *Kirov*-class nuclear-powered missile cruiser is fitting out, and the first of a new class of cruiser (temporary NATO designation 'Black Com-1') is in service, with more under construction. Two more *Udaloy*-class missile/ASW destroyers are building. A wide variety of new naval missiles are reported as deployed or under development: SS-N-19 and SS-NX-22 SSM; SA-N-5 and SA-NX-7 SAM; and the SS-N-15 ASW missile, which may have a nuclear warhead. Mi-14 *Helix* ASW and MCM helicopters have been added to the fleet.

The Soviet Tactical Air Force continues to replace obsolescent aircraft with new models. The veteran MiG-21, Su-7, and Su-17 are all being phased out, to be replaced by a mix of MiG-27D/J and Su-24 attack aircraft, and an entirely new attack aircraft, the Su-25 *Frogfoot*, has been reported in Afghanistan. The Yak-28 is now represented only in its ECM version. The helicopter force has been reorganized to provide one support regiment in each Ground Army in East Germany and in Sino-Soviet border districts, marking the acceptance of the helicopter as an integral component supporting the field forces.

SOVIET DEFENCE EXPENDITURE

No single figure for Soviet defence expenditure can be given, since precision is not possible on the basis of present knowledge. The declared Soviet defence budget is thought to exclude a number of elements such as military R&D, stockpiling, and civil defence—indeed some contend that it covers only the operating and military construction costs of the armed forces. The problem of arriving at a current budgetary figure was discussed in *The Military Balance 1973–1974*, pp. 8–9, and on pp. 109–110 of the 1976–1977 edition. The official defence budget for 1981 of 17.05 bn roubles equals about 5.3% of the total government expenditure, or about 2.8% of GNP, according to non-Soviet estimates of the latter.

Soviet pricing practices are quite different from those in the West. Objectives are set in real terms

Soviet Defence Expenditure

Source	Price base	1970	1975	1979	1980	1981	1970–1980 % annual growth rate	1970–1980 Burden (% of GNP)
Billions of Roubles								
CIA[a]	1970	40–45	50–55	—	—	—	4.5	11–13
Lee[b]	1970	43–49	72–79	99–111	108–126	—	8–10	14–15
Lee[b]	Current	43–49	67–76	—	—	—	—	—
China[c]	Current	49	72.5	[102]	[110.43]	—	8.26	15+
USSR[d]	Current	17.9	17.43	17.2	17.1	17.05	—	5.3
Britain[e]	Current	—	—	76–81	81–86	[85–90]	4.0	12–14
France[f]	Current	34.0	42.3	—	—	—	—	—
Billions of Dollars								
CIA[g]	1979	131	152	180	185	[191–2]	3–4	—
CIA[h]	Current	66–99	105–108	165	[177.37]	—	—	—
Lee[i]	1970	80–105	97–133	[124–162]	[130–170]	—	5	—
Commercial bank estimates (consolidated)								(1980:) 8.4–8.9

[a] *Estimated Soviet Defense Spending in Roubles*, CIA SR 78-10121, June 1978.
[b] W. T. Lee, 'Soviet Defense Expenditures in the 10th FYP', *Osteuropa Wirtschaft, No. 4, 1977*; Lee, *The Estimation of Soviet Defense Expenditures, 1955–75: An Unconventional Approach* (New York: Praeger, 1977); correspondence.
[c] *Peking Review*, November 1975, January 1976. 1979, 1980 figures extrapolated, using the Chinese growth rate.
[d] Official declared budget.
[e] *Statement on the Defence Estimates 1981*, HMSO Cmnd 8212, April 1981, p.4. 1981 figures extrapolated.
[f] Anonymous, 'Combien de Roubles pour la Défense?', *Défense Nationale*, November 1976, p.54.
[g] *Soviet and US Defense Activities 1970–79: A Dollar Cost Comparison*, CIA SR 80-10005, January 1980. 1970 and 1975 figures taken from diagram. 1981 figures by extrapolation.
[h] *Ibid*, 1979 prices converted to current ones using wholesale price index. 1980 figures by extrapolation.
[i] W. T. Lee, 'Soviet Defense Expenditures' in W. Schneider and F. P. Hoeber (eds), *Arms, Men & Military Budgets, Issues for Fiscal Year 1977* (New York: Crane Russak, 1976). 1979 and 1980 figures by extrapolation.

with no requirement for money prices to coincide with the real costs of goods and services. The rouble cost of the defence effort may thus not reflect the real cost of alternative production forgone, and in turn a rouble value of defence expressed as a percentage of Soviet GNP measured in roubles may not reflect the true burden.

If rouble estimates are then converted into dollars to facilitate international comparisons, the difficulties are compounded, because the exchange rate chosen should relate the purchasing power of a rouble in the Soviet Union to that of a dollar in the USA. The official exchange rate is considered inadequate for this purpose, and there is no consensus on an alternative.

An alternative approach—estimating how much it would cost to produce and man the equivalent of the Soviet defence effort in the USA—produces the index number problem: faced with the American price structure, the Soviet Union might opt for a pattern of spending different from her present one. This particular method tends to overstate the Soviet defence effort relative to that of the USA.

Accordingly, the estimates produced by a number of methods are given in the table, both in roubles and dollars, together with official figures for the defence budget published by the Soviet Union. Estimates produced by China are also given, but their basis is not known. For a critique of estimates of Soviet defence expenditure in general, see Franklyn D. Holzman, 'Soviet Military Spending: Assessing the Numbers Game,' *International Security*, Spring 1982, pp. 78–101.

THE SOVIET UNION

Population: 269,650,000.
Military service: Army and Air Force 2 years, Navy and Border Guards 2–3 years.
Total armed forces: 3,705,000.[8]
Estimated NMP: 458.5 bn roubles[9] (1980), 474.0 bn (1981).
Estimated GNP range: 620.0–1,002.62 bn roubles (1980), 614.25–939.16 bn (1981).
Estimated defence expenditures—see above.

Strategic Nuclear Forces:

OFFENSIVE:

(a) *Navy:* 989 SLBM in 83 subs (950 SLBM and 62 subs within SALT Agreement, plus 39 SLBM and 21 subs outside it).
1 *Typhoon*-class SSBN with 20 SS-NX-20 (more building): (20 msls).
13 D-III SSBN, each with 16 SS-N-18: (208 msls).
4 D-II SSBN, each with 16 SS-N-8: (64 msls).
18 D-I SSBN, each with 12 SS-N-8: (216 msls).
1 Y-II SSBN with 12 SS-N-17 (trials): (12 msls).
25 Y-I SSBN, each with 16 SS-N-6 *Sawfly:* (400 msls).
1 H-III SSBN with 6 SS-N-8: (6 msls).
6 H-II SSBN, each with 3 SS-N-5 *Serb:* (18 msls).
1 G-III SSB with 6 SS-N-8: (6 msls).
(msls but not subs counted under SALT)
13 G-II SSB each with 3 SS-N-5: (39 missiles; non-SALT).

(b) *Strategic Rocket Forces* (SRF): 325,000 (50,000 civilians),[10] 6 operational rocket armies, org in divs, regts, bns, and btys; 1 msl launcher per bty; 300 launch control HQ; 3 msl test centres.

ICBM: 1,398.[11]
570 SS-11 *Sego* (some 60 in SS-19 silos; may be modified to SS-19).[12]
60 SS-13 *Savage*.
150 SS-17 (mostly mod 1, 4 MIRV).
308 SS-18 (mostly mod 2, 8 MIRV; modification to mod 4 may have begun).
310 SS-19 (mostly mod 3, 6 MIRV).

IRBM and MRBM: some 606 deployed (perhaps 500 in Western USSR, rest in central and eastern USSR).
16 SS-5 *Skean* IRBM (being reduced).
315 SS-20 IRBM (mobile launchers capable of being reloaded).[13]
275 SS-4 *Sandal* MRBM (being reduced).

RESERVES: 520,000 personnel; a proportion of the msls withdrawn from service.

(c) *Long-Range Air Force* (LRAF): 68,000; some 809 combat aircraft.
3 Air Armies; 2 (North West and South West bomber corps) opposite NATO in Europe, 1 (Far East bomber corps) of 9 regts in Eastern USSR.[14]
Long-range bombers: 150.
105 Tu-95 *Bear* A/B/C, 45 Mya-4 *Bison* (some 70 *Bear* B have AS-3 ASM).
Medium-range bombers: 535 (425 in Western USSR).
310 Tu-16 *Badger* A/G, 125 Tu-22 *Blinder* A/B, 100 Tu-22M *Backfire* B (AS-4 ASM).
Recce: 34.
4 Tu-95 *Bear* E, 15 Tu-16 *Badger* D/E/F/K, 15 Tu-22 *Blinder* C. (A long-range high-altitude ac, 'Ram-M', reported under development.)
ECM: 90 Tu-16 *Badger* H/J.
Tankers: 45.
35 Mya-4 *Bison* A, 10 Tu-16 *Badger*.
ASM: AS-3 *Kangaroo*, AS-4 *Kitchen*, AS-5 *Kelt*, AS-6 *Kingfish*.
(A new bomber ('Ram-P'), possibly Tu-160 *Blackjack*, characteristics unknown, is reported under development.)

DEFENSIVE:

Troops of Air Defence (Air Defence Force (*PVO-Strany*) and Air Defence Troops of the Ground Forces have been merged). Domestic: 630,000:[10] 10 Air Defence Districts, numerous AD regiments; 14 specialist schools.

ABM: 32 ABM-1B *Galosh* (32 former launchers non-operational); range over 320 km, warheads nuclear, presumably MT range. 8 sites at 4 complexes around Moscow.

Aircraft: Some 2,250; in regts and sqns.

Interceptors: some 825 MiG-23 *Flogger* B/G, 240 MiG-25 *Foxbat* A, 90 MiG-25 *Foxhound*, 750 Su-15 *Flagon* D/E/F, 120 Tu-28P *Fiddler*, 200 Yak-28P *Firebar*. (New MiG-29 *Fulcrum* ('Ram-L') reported.)
Airborne Warning and Control Aircraft: 10 modified Tu-126 *Moss*.
Trg ac incl 40 Su-11, 120 Su-15, 20 MiG-15, 60 MiG-17, 50 MiG-23, 50 MiG-25, 10 Yak-28.

AAM: AA-2 *Atoll*, AA-3 *Anab*, AA-5 *Ash*, AA-6 *Acrid*, AA-7 *Apex*, AA-8 *Aphid*, AA-X-9.

AA artillery: 9,000 23mm, 57mm, 85mm, 100mm, 130mm towed, ZSU-23-4, ZSU-30-6 (trials), and ZSU-57-2 SP guns.

SAM: About 10,000 launchers in some 1,400 fixed sites: some 13,000 launcher rails: SA-1 *Guild;* SA-2 *Guideline;* SA-3 *Goa* (over 400 sites, low-altitude msl, multiple launcher rails); SA-5 *Gammon* (over 100 complexes, long-range intercept); SA-10 low-altitude msls now entering service. Field: mobile systems: SA-4 *Ganef*, SA-6 *Gainful*, SA-7 *Grail* (man-portable), SA-8 *Gecko*, SA-9 *Gaskin*, SA-11, SA-12, SA-13 (replacing SA-9).

Warning Systems: Some 7,000, incl satellites and EW and ground control intercept radars.
(i) *Satellites:* 2 with highly elliptical semi-synchronous orbits may give a launch detection capability (anti-ICBM).
(ii) *Over-the-Horizon (Backscatter) radars:* 3 (possibly 4), near Minsk, near Nikolayev (Caucasus), and in the Far East; targeted on the US and polar areas.
(iii) *Long-range early-warning ABM radars:* At least 5 reported sites. Mostly *Hen*-series (*e.g., Hen House*), range 6,000 km, covering approaches from the west, north-east, south-east and, possibly, south. (Large phased-array radar to supplement system being built; 10 sites, range 2,000 km.)
(iv) *Intermediate-range radars: Dog House* and *Cat House*, associated with the Moscow ABM complex, range 3,000 km (new system reported building).
(v) *ABM-associated control radars: Try Add* (with *Galosh*).
(vi) *High-altitude, aircraft-associated radars: Tall King*, 600 km range.
(vii) *SAM-associated short-range radars: Yo-Yo* (with SA-1); *Fan Song, Spoon Rest* (SA-2); *Flat Face, Squint Eye, Squat Eye, Low Blow* (SA-3).
(viii) *Gun-associated radars: Fire Can, Flap Wheel, Gun Disc.*

Civil Defence: nationwide programme under Defence Ministry down to city/rural/industrial level includes some 75 comd posts within 120 km of Moscow, and accommodation for at least 110,000 officials.

Army: 1,825,000 (perhaps 1,400,000 conscripts).
46 tk divs.
126 motor rifle divs.
8 AB divs (each 3 para regts, 1 arty regt, 1 AA bn).
Some 8 air assault bdes (each 3 rifle bns, spt tps).
Front and Army tps:
14 arty divs.
Indep tk regts, arty, SSM, ATK, engr bdes, CW regts, bns, spt services.

Tanks: Some 50,000: some 38,000 T-10, T-10M hy, T-54/-55/-62, MBT; some 12,000 T-64/-72 MBT (most fitted for deep wading); PT-76 lt.

AFV: 62,000: BRDM scout cars; BMP and BMD MICV, BTR-50/-60/-70/-152 (-50/-60 being replaced by -70 and BMP), MT-LB APC.

Artillery: Some 20,000 122mm, 130mm, 152mm, 180mm towed, 122mm and 152mm SP guns/how; 7,200 82mm, 120mm, 160mm, and 240mm (incl 240mm SP) mor; 4,000 122mm, 140mm, and 240mm (incl BM-27) MRL.

ATK: 40mm RPG-7, 64mm RPG-15, 73mm RPG-16 RL; 73mm SPG-9 RCL; 10,800 76mm, 85mm, 100mm towed and ASU-75/-85 SP ATK guns; AT-2 *Swatter*, AT-3 *Sagger*, AT-4 *Spigot*, AT-5 *Spandrel*, AT-6 *Spiral* ATGW.

SSM (nuclear-capable): about 1,300 launchers (units organic to formations), incl some 680 *FROG* (482 facing NATO area, some 186 in Far East); some SS-21 (replacing *FROG*), 540 *Scud* A/B (450 NATO area, 90 Far East), SS-23 (replacing *Scud*), 120 SS-12 (70 NATO area, 50 Far East), being replaced by SS-22 (100).

DEPLOYMENT:

Central and Eastern Europe (565,000): 30 divs (15 tk, 15 motor rifle) plus 1 arty; 10,500 MBT.[15] East Germany (380,000): 9 tk, 10 motor rifle, plus 1 arty; Poland (40,000): 2 tk; Hungary (65,000): 2 tk, 2 motor rifle; Czechoslovakia (80,000): 2 tk, 3 motor rifle.

European USSR Military Districts (MD): 69 divs (23 tk, 40 motor rifle, 6 AB), plus 7 arty. Baltic: 3 tk, 6 motor rifle, 2 AB, plus 2 arty; Belorussian: 9 tk, 3 motor rifle, 1 AB, plus 1 arty; Carpathian: 3 tk, 9 motor rifle, plus 1 arty; Kiev: 6 tk, 4 motor rifle, plus 1 arty; Leningrad: 8 motor rifle, 1 AB, plus 1 arty; Moscow: 2 tk, 4 motor rifle, 1 AB; Odessa: 6 motor rifle, 1 AB, plus 1 arty.

Central USSR: 6 divs (1 tk, 5 motor rifle). Ural: 1 tk, 2 motor rifle; Volga: 3 motor rifle.

Southern USSR: 24 divs (1 tk, 22 motor rifle, 1 AB) plus 3 arty. N. Caucasus: 1 tk, 6 motor rifle plus 1 arty; Trans-Caucasus: 11 motor rifle, 1 AB plus 1 arty; Turkestan: 5 motor rifle, plus 1 arty.

Sino-Soviet border: 47 divs (6 tk, 41 motor rifle), plus 3 arty. Central Asian: 1 tk, 6 motor rifle. Under High Command Far East (HQ Irkutsk): Siberian, 5 motor rifle; Transbaykal, 2 tk, 7 motor rifle, plus 1 arty; Far Eastern, 1 tk, 21 motor rifle, plus 2 arty; Mongolia, 2 tk, 2 motor rifle. (For Afghanistan, see *Forces Abroad*, below.)

Soviet divs have three degrees of combat readiness: Category 1, 75–100% strength, with complete eqpt; Category 2, 50–75% strength, complete with fighting vehicles; Category 3, about 25% strength, possibly complete with fighting vehicles (some obsolescent).

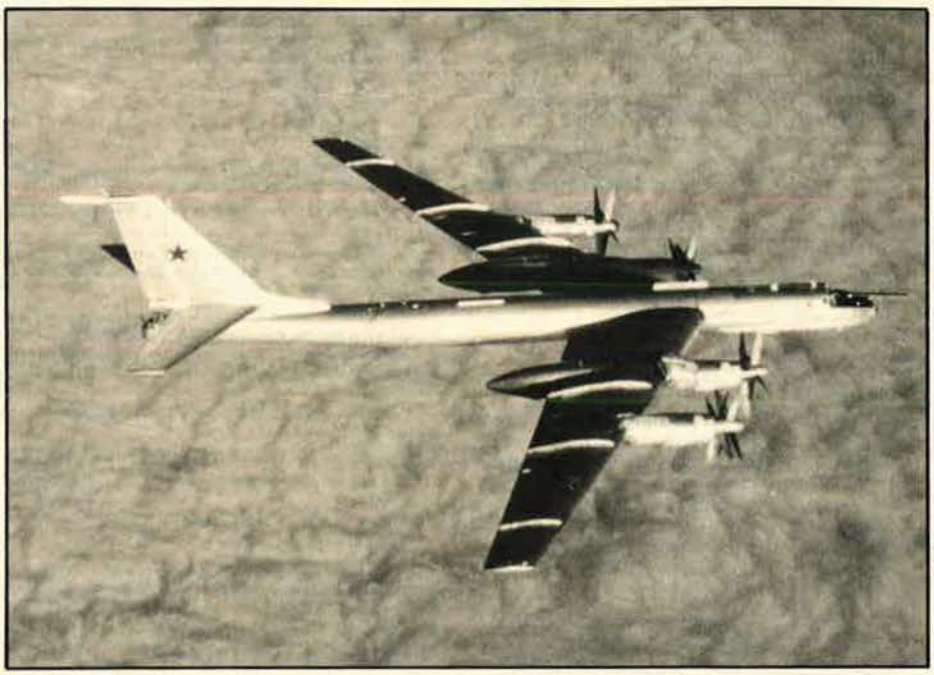
The 30 divs and 1 arty div in Eastern Europe and AB divs are Category 1. About 25% of the divs in European USSR and the Far East are in Category 1 or 2. Most of those in Central and Southern USSR are likely to be Category 3. Tk divs in Eastern Europe have some 335 MBT, motor rifle divs up to 266, but elsewhere holdings may be lower.

Navy: 450,000 (some 75% conscripts), incl Naval Air Force, Naval Infantry, and Coastal Artillery and Rocket Troops; 273 cruise-missile and attack subs (105 nuclear, 168 diesel), 290 major surface combat ships. A further 107 attack subs and 28 major surface combat ships are in reserve.

Submarines, cruise-missile: 69:
49 nuclear (SSGN): 1 O-class (24 SS-N-19); 1 P-class (10 msl tubes, possibly SS-N-7 or -9); 12 C-I, 6 C-II (8 SS-N-7 *Siren* each, some C-II may have SS-N-9); 29 E-II with 8 SS-N-3a each (some may carry SS-N-12).
20 diesel (SSG): 16 J-class (4 SS-N-3a each), 2 *W-Long Bin* (4 SS-N-3 each); 2 *W-Twin Cylinder* (2 SS-N-3 each) trg vessels.

Submarines, attack: 204:
56 nuclear (SSN): 6 A-, 13 N-, 16 V-1, 6 V-II-, 10 V-III-, 5 E-I-class. (A further 8 Y-1 SSBN may be converting to SSN.)
148 diesel (SS): 15 T-, 60 F-, 10 R-, 10 Z-IV-, 50 W-, 3G-1 class (conversion).
(More modern A-, V-SSN, T-class ss may carry some SS-N-16 and/or SS-N-15 ASW msls.)

Surface Ships:
290 major combat vessels:
2 *Kiev* carriers (37,000 tons) with 4 × 2 SS-N-12 *Sandbox* SSM, 2 × 2 SA-N-3/-4 SAM, 1 × 2 SUW-N-1 ASW, 14 Yak-36 *Forger* A/B VTOL ac, 16 Ka-25 *Hormone* A/B hel; (1 more on trials).
2 *Moskva* ASW hel carriers with 2 × 2 SA-N-3 SAM, 1 × 2 SUW-N-1 ASW; 18 Ka-25 hel.
1 *Kirov* nuclear-powered GW cruiser (CGN) with 20 SS-N-19 SSM, 12 SA-N-6, 2 twin SA-N-4, SAM, 2 twin SS-N-14 *Silex* ASW, 2–4 Ka-25 hel (1 more fitting out).
18 GW ASW cruisers: 7 *Kara* with 2 × 2 SA-N-3, 2 × 2 SA-N-4 SAM, 2 × 4 SS-N-14 SSM, 1 hel; 10 *Kresta*-II with 2 × 2 SA-N-3, 2 × 4 SS-N-14, 1 hel; 1 'Black Com-1' with 16 SSM (?SS-N-12), SA-N-6 SAM, (?SS-N-14) ASW, 1 hel (more building).
8 GW cruisers: 4 *Kresta*-I with 2 × 2 SS-N-3b SSM, 2 × 2 SA-N-1 SAM; 4 *Kynda* with 2 × 4 SS-N-3b, 1 × 2 SA-N-1.
7 *Sverdlov* cruisers (2 with 1 × 2 SA-N-4, 1 hel).
42 GW destroyers (DDG): 7 SSM/SAM (1 *Sovremenny* with 2 × 4 SS-NX-22 SSM, 2 SA-NX-7 SAM (more building); 6 mod *Kashin* with 4 SS-N-2, 2 × 2 SA-N-1); 4 SSM *Kildin* with 4 SS-N-2; 29 SAM (13 *Kashin*, 8 *Kanin*, 8 SAM *Kotlin*); 2 ASW *Udaloy* with 2 × 4 SS-N-14, 2 *Helix* (modified Ka-25) hel (on trials, more building).
27 gun destroyers (DD): 15 *Kotlin*, 12 *Skory*.
77 GW frigates (FFG): 32 *Krivak*-I/-II with 1 × 4 SS-N-14, 2 twin SA-N-4; 1 *Koni*, 44 *Grisha*-I/-III with 1 × 2 SA-N-4.
106 gun frigates (FF): 6 *Grisha*-II (with KGB), 18 *Mirka*, 45 *Petya*, 37 *Riga*.
837 minor surface combatants:
25 GW corvettes: 1 *Tarantul* II with 2 × 2 SS-NX-22; 2 *Tarantul* I with 2 × 2 SS-N-2c; 22 *Nanuchka* I/III with 6 SS-N-9, 1 × 2 SA-N-4.
130 FAC(M): 15 hydrofoil (1 *Sarancha* with 2 × 2 SS-N-9, 1 × 2 SA-N-1; 14 *Matka* with 2 SS-N-2c); 70 *Osa*-I, 45 *Osa*-II with 4 SS-N-2b.[16]
219 FAC(T): 5 *Pauk* with 1 × 4 SA-N-5, 62 *Poti*, 90 *Stenka*, 28 *Shershen*, 1 *Slepen* (trials); 1 *Babochka*, 32 *Turya* hydrofoils.
68 patrol craft: 30 SO-1, 8 *Susanin*, 18 T-58; 2 T-58, 10 T-43/PFR radar pickets.
43 coastal patrol craft((mostly KGB): 18 *Pchela* hydrofoils, 25 *Zhuk*.
3 *Alesha*-class minelayers.
125 ocean minesweepers: 35 *Natya*, 45 *Yurka*, 45 T-43.
165 coastal minesweepers: 2 *Andryusha*, 40 *Sonya*, 3 *Zhenya*, 8 *Sasha*, 72 *Vanya*, 40 *Evgenya*(.
59 minesweeping boats(: 10 *Ilyusha*, 4 *Olya*, 5 TR-40, 40 K-8.
84 amph ships:
1 *Ivan Rogov* LPD with 1 × 2 SA-N-4; 14 *Alligator*,[16] 14 *Ropucha* LST; 51 *Polnocny*,[16] 4 MP-4 LSM.
Some 91 amph craft:
Some 35 LCU: 20 *Vydra*, 15 SMB-1.
56 hovercraft: 12 *Aist*, 3 *Uterok* (more building), 11 *Lebed*(, 30 *Gus*(.
214 principal auxiliary ships:
28 fleet replenishment oilers, 28 spt tankers, 107 msl spt, supply, and cargo ships. 19 submarine tenders, 32 repair ships. Merchant fleet, 2,300 ships, could augment these.
59 intelligence collection vessels (AGI); 119 naval, 340 civilian oceanographic, space-associated, and hydrographic research vessels.
Additional ships in reserve:
7 Z-, 85 W-, 15 Q-class subs; 3 *Sverdlov* cruisers; 3 *Kotlin*, 12 *Skory* destroyers; 10 *Riga* frigates; 20 T-43 minesweepers.
(On order: *Typhoon* SSBN; O-class SSGN; A-, V-



The Soviet Bear F is a much-refined antisubmarine version of the Tu-142. Like other models of the Bear, it has long range and endurance. The purpose of the projection from the rear of the fin tip is not known.

The Soviet Mi-24 Hind helicopter began as a platform to ferry troops to the battlefield, but recent versions—such as this D model—have been redesigned as gunships.

III-class SSN; T-class SS; 2 *Kiev* carriers; 3 *Kirov* CGN; 'Black Com-1' CG; 4 *Sovremenny*, 3 *Udaloy* DDG; *Krivak*, *Grisha* III frigates; *Tarantul* GW corvettes; *Matka* hydrofoil FAC(M); *Pauk* FAC; 1 *Rogov* LPD; *Ropucha* LST; hovercraft.

NAVAL AIR FORCE: (59,000); some 755 combat ac, some 300 hel.

Four Fleet Air Forces; org in air divs, each with 2–3 regts of HQ elements and 2 sqns; recce, ASW, transport org in indep regts or sqns.

Strike bbrs: 80 Tu-22M *Backfire* B with AS-4 ASM.

Med bbrs: 310: 240 Tu-16 *Badger* C/G with AS-2/-5/-6 ASM, 30 Tu-16 *Badger* A, some 40 Tu-22 *Blinder* A.

FGA: 75: 40 Yak-36 *Forger* A/B VTOL, 35 Su-17 *Fitter* C/D.

ASW: 190 ac: some 50 Tu-95 *Bear* F, 50 Il-38 *May*, 90 Be-12 *Mail*. Some 240 hel: 90 Mi-14 *Haze*, 150 Ka-25 *Hormone* A, *Helix*.

MR/ECM: 100: some 40 Tu-16 *Badger* D/E/F/K, 45 Tu-95 *Bear* D, 5 Tu-22 *Blinder* C, 10 An-12 *Cub* B ac; Ka-25 *Hormone* B, *Helix* B hel.

MCM: 20 Mi-14 *Haze* A (mod Mi-8) and Mi-8 *Hip* C hel.

Tankers: 70 Tu-16 *Badger*.

Tpt/trg ac: 330 ac and hel, incl An-12 *Cub* A, An-26 *Curl*, Il-14 *Crate*, Il-18 *Coot*, An-24 *Coke* ac; Mi-6/-8 *Hook/Hip*, Ka-25 *Hormone* hel.

ASM: AS-2 *Kipper*, AS-4 *Kitchen*, AS-5 *Kelt*, AS-6 *Kingfish*.

NAVAL INFANTRY (Marines): (13,500).

Some 5 naval inf bdes/regts (each 3 inf, 1 tk bn), one each with Northern, Baltic, and Black Sea Fleets; Marine div (of at least two regts) with Pacific Fleet.

50 T-54/-55 MBT, 150 PT-76 lt tks; BTR-60P/PA/PB APC; M-1974 122mm SP how; BM-21 122mm MRL; ZSU-23-4 SP AA guns; SA-9 SAM.

COASTAL ARTILLERY AND ROCKET TROOPS: (8,000).

Hy coastal guns, perhaps 100 SS-C-1b *Sepal* SSM (similar to SS-N-3) to protect approaches to naval bases and major ports.

DEPLOYMENT AND BASES (average strengths, excluding units in reserve):

Northern Fleet: 45 SSBN, 140 other subs, 75 major (incl 1 carrier), 120 minor surface combatants, 15 amph, 75 principal auxiliary spt ships, 80 bombers. Severomorsk (HQ), Motovskij Gulf, Polyarny, Severodvinsk, Archangelsk. Some 10 subs serve in the Mediterranean.

Baltic Fleet: 30 subs (incl 6 G-II), 50 major, 292 minor surface combatants, 25 amph, 21 principal auxiliary spt ships, 100 bombers, marines, 6 SSM bns. Baltiysk (HQ), Kronshtadt, Tallin, Liepaja, Riga.

Black Sea Fleet (incl Caspian Flotilla; Mediterranean sqn with some 12 surface combatants): 20 subs, 80 major (incl 1 carrier, 2 ASW hel carriers), 210 minor surface combatants, 25 amph, 41 principal auxiliary spt ships, 90 bombers. Sevastopol (HQ), Poti, Odessa.

Pacific Fleet: 25 SSBN, 95 other subs, 85 major (incl 1 carrier), 215 minor combatants, 20 amph, 77 major auxiliary spt ships, 330 combat ac (incl 120 bombers). Vladivostok (HQ), Petropavlovsk, Sovyetskaya Gavan. Detachments from this fleet (average 3 subs, 7 surface combatants, 18 spt ships) serve in the Indian Ocean; facilities also in Vietnam (Da Nang and Cam Ranh Bay), South Yemen (Aden, Socotra), and Ethiopia (Dahlak Is).

Air Force: 475,000.[17]

Tactical Air Force: (195,000); some 4,480 combat aircraft, some 2,300 armed hel.

16 Air Armies of varying strengths (totalling 150 ac regts and some indep ac sqns), mostly org in divs of 3 regts (each regt usually of a single ac type in 3 sqns, totalling 45 ac).

FGA: some 2,050: some 100 MiG-21 *Fishbed*, 550 MiG-27 *Flogger* D/J, 150 Su-7 *Fitter* A, 650 Su-17 *Fitter* C/D/H, 550 Su-24 (Su-19) *Fencer*, 25 Su-25 *Frogfoot* ('Ram-J'), some Su-27 (on trials).

Fighters: 1,750: 500 MiG-21 *Fishbed* D to N (not H, M), 1,250 MiG-23 *Flogger* B/G.

Recce: 640: 150 MiG-25 *Foxbat* B/D, 130 MiG-21 *Fishbed* H, 200 Yak-28 *Brewer* D, 160 Su-17 *Fitter* H.

ECM: 40 Yak-28 *Brewer* E.

Hel: 3,450: 1 regt per ground army in GSFG, Sino-Soviet border: 700 Mi-1/-2 *Hare/Hoplite*, 50 Mi-4 *Hound* A, 400 Mi-6 *Hook*, 1,500 Mi-8 *Hip* C (armed tpt) and E (gunship), 800 Mi-24 *Hind* A/B/C/D/E (armed).

Trainers: Some 1,000 ac; 700 hel.

AAM: AA-1 *Alkali*, AA-2 *Atoll*, AA-7 *Apex*, AA-8 *Aphid*, AA-X-9.

ASM: AS-7 *Kerry*, AS-10; hel-borne: AT-2 *Swatter*, AT-6 *Spiral*.

Military Transport Aviation: (65,000); some 600 aircraft. Org in regts. Incl some 400 An-12 *Cub* med, 150 Il-76 *Candid* (replacing *Cub*), 55 An-22 *Cock* hy. Some 200 *Cub* and *Candid*, and 1,100 med- and long-range passenger ac of the civil *Aeroflot* fleet could augment military ac.

DEPLOYMENT:

4 Tactical Air Armies (2,000 ac) in Eastern Europe, 1 in each of 12 MD in USSR (not in N. Caucasus, Siberia, Ural, Volga).

RESERVES (all services):

Soviet conscripts have a Reserve obligation to 50. Total Reserves could be 25,000,000, of which some 5,000,000 have served in last five years.

Forces Abroad:

Afghanistan, 95,000:
(Army: 3 motor rifle, 1 AB divs, 1 air assault bde. Air: possibly 1 air div: 1 air, 1 hel regts, tpts.)

Algeria, 1,000; Angola, 200; Congo, 350; Cuba, 2,800; Ethiopia, 1,350; Iraq, 1,200; Kampuchea, 300; Laos, 500; Libya, 1,800; Mali, 200; Mauritania, 200; Mozambique, 300; Vietnam, 5,000; Syria, 2,500; N. Yemen, 500; S. Yemen, 1,500.

Para-Military Forces: 560,000.

KGB border tps 300,000, with tks, SP guns, AFV, ac and ships; MVD security tps 260,000, with tks and AFV. By law part of armed forces of USSR.

Part-time military training organization (DOSAAF) conducts such activities as flight training, shooting, parachuting, and pre-military training of those aged 15 and over in schools, colleges, and workers' centres. Claimed active membership 80 million, with 5 million in instructors and activists; effectives likely to be much fewer.

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[1] Revised outlay requested in President's last budget proposal; Total Obligational Authority for FY 1983 was $258.0 bn. and Budget Authority $257.5 bn.

[2] Manpower included in Army, Navy, and Air Force totals.

[3] One National Guard bde is incorporated in each of 2 mech and 2 inf divs.

[4] 1 armd, 1 mech divs, 1 armd cav regt have hy eqpt stockpiled in FRG. Storage facilities for 2 more divs being built.

[5] Excluding ac in SAC and NORAD; incl ac in ANG and Air Force Reserve.

[6] Includes those stockpiled for the Strategic Reserve formations. The armd and 2 mech bdes are from the divs in the US earmarked to reinforce 7th Army.

[7] MAUs are 5–7 amph ships with a composite Marine bn gp, incl tks, arty, and hel, embarked. Only 1 in Mediterranean and 1 in Pacific are regularly constituted. 1 Bn Landing Team (MAU less hel) also deployed in Pacific; 1 occasionally formed for the Atlantic.

[8] Excludes some 560,000 Border Guard, internal security, railroad and construction troops.

[9] Official exchange rate 1979, $1 = 0.657 roubles.

[10] The SRF and *PVO Strany*, separate services, have their own manpower.

[11] Figures may vary slightly during conversion.

[12] There are 360 SS-19 silos.

[13] A possible 37 complexes—average 9 launchers (333 msls)—is believed to be planned (some 35 now built). Some launchers may have 1 ready reload.

[14] There are also staging and dispersal points in the Arctic.

[15] Excluding from the area tks in reserves (replaced by new ones but not withdrawn).

[16] Some *Osa*, *Alligator*, and *Polnocny* units are fitted with SA-N-5 SAM.

[17] Excluding Long-Range Air Force.

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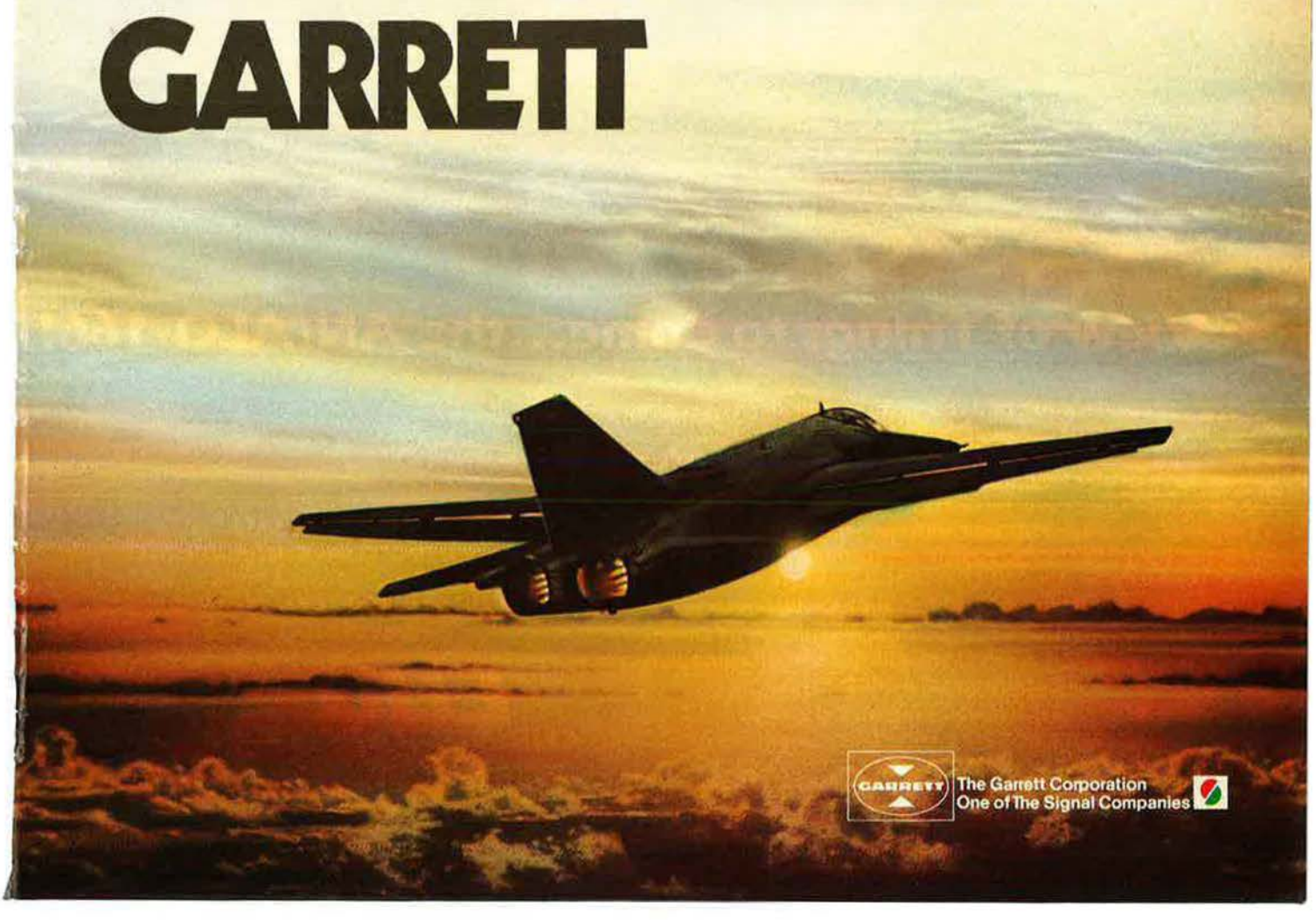

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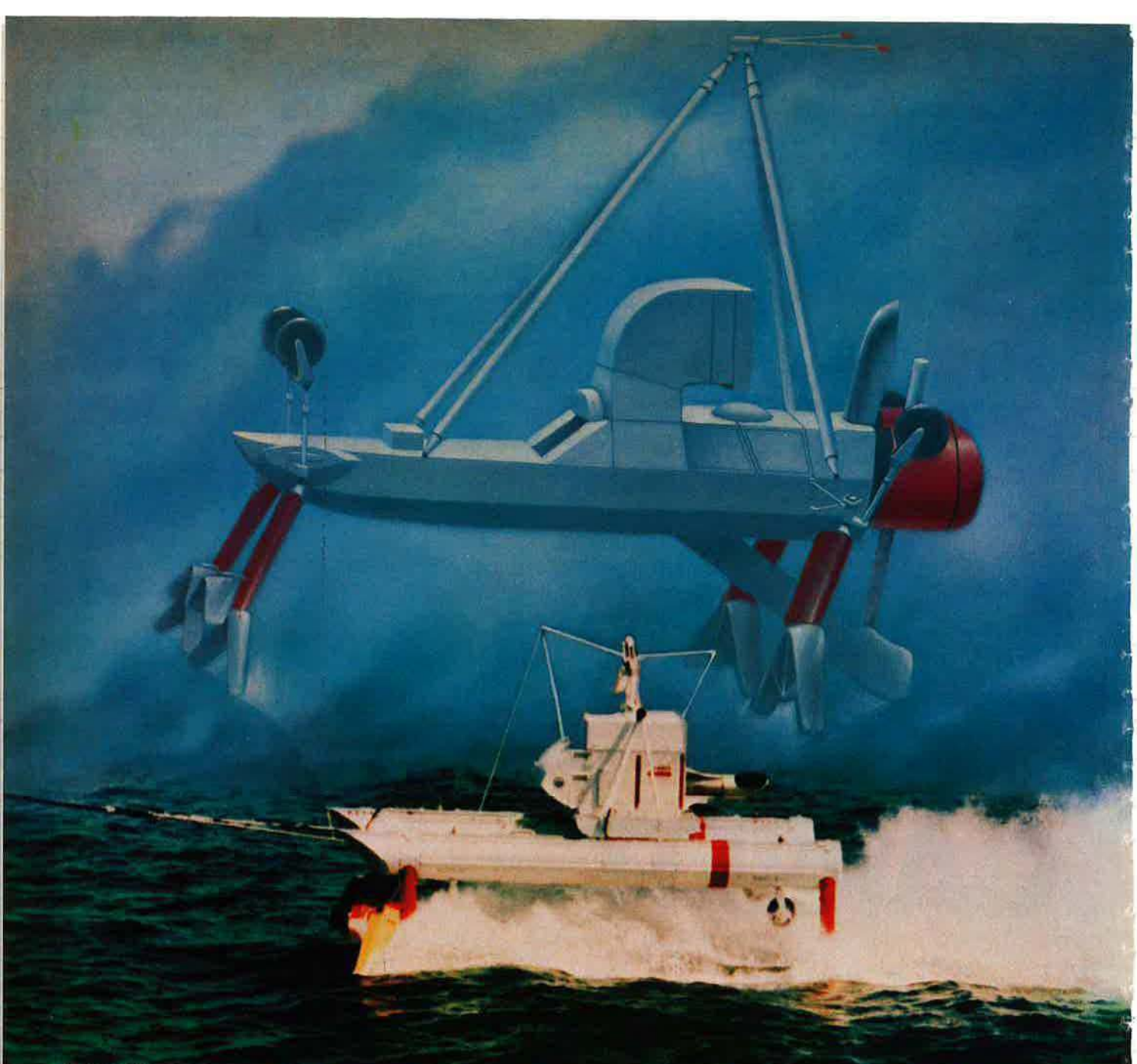

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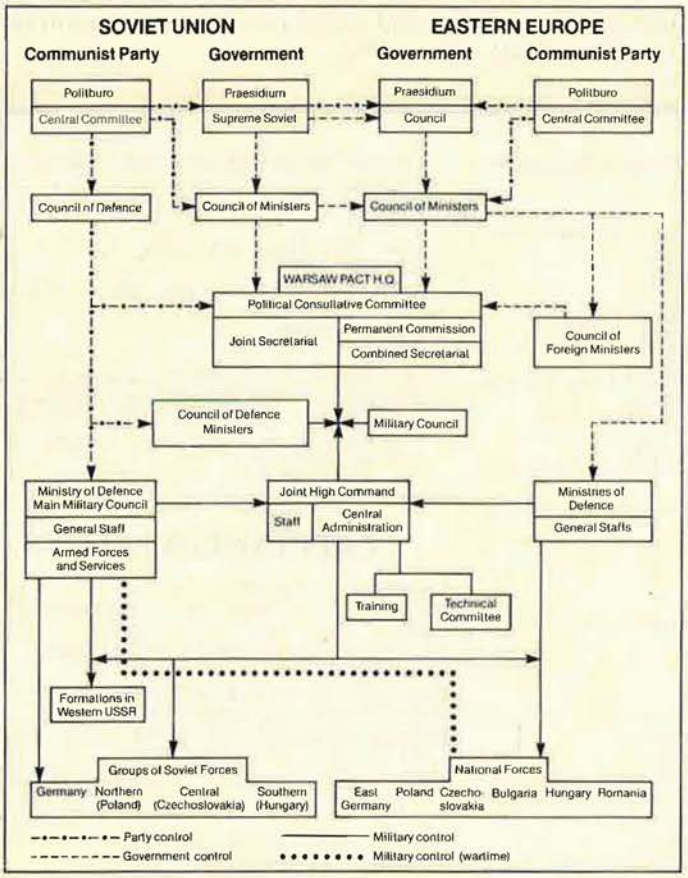
The Warsaw Pact

TREATIES

The Warsaw Pact is a multilateral military/politico alliance formed by the 'Treaty of Friendship, Mutual Assistance and Co-operation' signed in Warsaw on 14 May 1955 by the Governments of the Soviet Union, Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania; Albania left the Pact in September 1968. The Pact is committed to the defence only of the European territories of the member states.

The Soviet Union is also linked by bilateral treaties of friendship and mutual assistance with Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. These also have similar bilateral treaties with each other. The essence of East European defence arrangements is not therefore dependent on the Warsaw Treaty as such. The Soviet Union concluded status-of-forces agreements with Poland, East Germany, Romania, and Hungary between December 1956 and May 1957, and with Czechoslovakia in October 1968; all remain in effect except the one with Romania, which lapsed in June 1958 when Soviet troops left Romania.



WARSAW PACT

1. Bulgaria
2. Czechoslovakia
3. German Democratic Republic (East Germany)
4. Hungary
5. Poland
6. Romania

ORGANIZATION

The senior formal political body is the Political Consultative Committee (PCC) which comprises the First Secretaries of the Communist Parties, Heads of Government or their representatives, the Foreign and the Defence Ministers of all the member countries, the Soviet Chief of General Staff, and the Commander-in-Chief (C-in-C) and Chief of Staff (C of S) of the Pact Joint High Command. Its executive agency is the Joint Secretariat, with representatives from each country, which is responsible for armaments and logistics and for preparing the PCC's agendas. It also has a Permanent Commission responsible for recommendations on general questions of foreign policy. Both are located in Moscow.

The Council of Foreign Ministers advises the PCC on foreign policy, working with the permanent Commission

and the Combined Secretariat. The senior military body is the Council of Defence Ministers. Chaired by the C-in-C, Warsaw Pact, it includes his C of S, the Deputy Ministers of Defence of the Pact nations, Deputy C-in-C, Soviet Air Defence Forces (whose operational area includes Central Europe), and probably the Inspector-General of the Pact and the Chairman of the Technical Committee. This Council meets infrequently to supervise the work of the Permanent Joint High Command (JHC). That Command is headed by a Soviet Marshal, who is also the Soviet First Deputy Minister of Defence. Each Pact Defence Ministry has a senior general as a permanent representative on the JHC staff, while a Soviet general is assigned to each national HQ, except in Romania. The Staff is responsible for operational plans and for managing the Pact field exercises. The Pact military representatives also form the Military Council which, chaired by the C-in-C, and including the C of S, advises the JHC on non-operational matters, and controls the Central Administration for training, standardization, and, possibly, technical affairs. The offices of C-in-C and C of S and all important staff posts have always been held by Soviet officers.

The JHC controls the Soviet Forces in Eastern Europe and Western USSR. The East European Pact armies remain under national control until war breaks out, when they are expected to come under command of the JHC. Among the Soviet military HQ in the Warsaw Pact area are the Group of Soviet Forces, Germany (GSFG) at Zossen-Wünsdorf near Berlin; the Northern Group of Forces (NGF) at Legnica, Poland; the Central Group of Forces (CGF) at Milovice, north of Prague, and the Southern Group of Forces (SGF) at Budapest. A Soviet Tactical Air Army is located with each Group of Forces. Command of the air defence system covering the whole Warsaw Pact area, with the probable exception of Romania, is centralized in Moscow and is directed by the C-in-C of the Soviet Air Defence Forces, *Voyska Protivovozdushnoy Oborony Strany (PVO-Strany).*

NUCLEAR WEAPONS

The Soviet Union has deployed short-range surface-to-surface launchers and nuclear-capable aircraft in Eastern Europe. East European countries also have short-range SSM launchers, but there is no evidence that nuclear warheads have been supplied, nor is there any reason to assume so. Soviet longer-range SSM and aircraft are based in the Soviet Union.

DEFENCE ECONOMIC AND READINESS DATA

The COMECON countries, with the exception of Hungary and Romania, are not International Monetary Fund members. GNP/GDP figures are calculated by various means on the basis of their respective Net Material Product (NMP) statistics. Their defence budgets are not compiled in the same way as those in Western nations, and data on their composition is scanty. Finally, exchange rates do not represent market values and are subject to arbitrary adjustment factors. Calculation of GNP/GDP and defence expenditures in dollar terms is, therefore, subject to wide ranges of interpretation. NMP figures are taken from estimates published in the UN Economic Commission for Europe's *Economic Survey of Europe, 1981.*

East European Warsaw Pact divisions are of three categories, with different manning (and hence readiness) levels. Category 1 formations are up to 75% of establishment strength; Category 2 up to 50%; Category 3 little more than cadres. The 'voluntary' para-military organizations correspond to the DOSAAF organization in the Soviet Union *(see p. 70).*

BULGARIA

Population: 8,950,000.
Military service: Army and Air Force 2 years, Navy 3 years.
Total regular forces: 148,000 (94,000 conscripts).
Estimated NMP 1981: 22.0 bn leva.
Estimated 1981 GNP range: $30.2–39.1 bn.
Defence expenditure 1981: 928.4 m leva ($1.346 bn).
$1 = 0.93 leva (1981 official), 0.69 (adjusted).

Army: 105,000 (70,000 conscripts).
3 Military Districts:
8 motor rifle divs.
5 tk bdes.
3 SSM bdes with *Scud.*
4 arty, 3 AA arty regts.
1 mountain bn.
2 recce bns.
Special commando coys.
300 T-34, 1,500 T-54/-55, some 60 T-72 MBT; 290 BRDM-1/-2 scout cars; BMP MICV, 1,500 BTR-50/-60, 35 OT-62, MT-LB APC; 76mm, 85mm, 100mm, 400 122mm, 130mm towed, SU-100 SP guns; 100 152mm how; 100 BM-21 122mm MRL; 36 *FROG-7*, 30 *Scud* SSM; 82mm, 350 120mm, 160mm mor; 90 57mm ATK guns; 150 SPG-9 73mm, 82mm RCL; *Sagger, Snapper* ATGW; 23mm, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4 SP AA guns; SA-6/-7 SAM.

RESERVES: 150,000. 750,000 have a Reserve liability.

Navy: 9,000 (6,000 conscripts); 12 combat hel.
2 ex-Sov R-class subs.
2 *Riga* frigates.
3 *Poti* corvettes.
11 patrol craft: 6 SO-1, 5 *Zhuk* coastal(.
4 FAC(M) with *Styx* SSM: 3 *Osa*-I, 1 *Osa*-II.
6 *Shershen* FAC(T).
28 MCM vessels: 2 T-43 ocean, 4 *Vanya* coastal, 18 PO-2, 4 *Yevgenya*(inshore.
19 *Vydra* LCU, 9 MFP D-3 landing craft.
1 underway replenishment ship.
2 hel sqns: 1 ASW with 12 Mi-14 *Haze;* 1 SAR with 6 Mi-2, 6 Mi-4.
2 coastal arty regts (1,000): 20 btys; 100mm, 150mm guns.
2 indep *Samlet* SSM bns.
3 Naval Guard coys.

Bases: Varna, Burgas, Sozopol, Atiya.

RESERVES: 25,000.

Air Force: 34,000 (18,000 conscripts); some 248 combat ac, some 12 armed hel.
1 air division: 3 combat regts:
6 FGA sqns with 64 MiG-17, some 20 MiG-23.
8 interceptor sqns: 6 with 80 MiG-21; 2 with 60 MiG-17.
2 recce sqns with 24 MiG-17.
1 tpt regt: 10 Il-14, 4 An-24, 2 Tu-134, 9 An-2.
1 hel regt with 30 Mi-2, 40 Mi-4/-8, 12 Mi-24, 12 Ka-26.
Trg ac incl 80 L-29, Yak-11/-18, 30 MiG-15UTI.
AAM: AA-1 *Alkali*, AA-2 *Atoll.*
1 para regt.
1 AD div: 3 zones: 30 SAM sites; 280 SA-2/-3/-4.

RESERVES: 20,000.

Para-Military Forces: Ministry of Interior border guards: 15,000, 16 regts. Security police: 7,500. People's Territorial Militia: 150,000. 'Voluntary Organization for Co-operation in National Defence'.

CZECHOSLOVAKIA

Population: 15,450,000.
Military service: Army 2 years, Air Force 3 years.
Total regular forces: 196,500 (117,000 conscripts).
Estimated NMP 1981: Kč 480.1 bn.
Estimated 1981 GNP range: $73.1–121 bn.
Defence expenditure 1981: Kč 24.14 bn ($3.796 bn).
$1 = 5.85 koruny (1981 official), 6.36 (adjusted).

Army: 142,500 (100,000 conscripts).
2 Military Districts:

5 armd divs (2 at Category 2 status).
5 motor rifle divs.
1 arty div: 2 arty, 1 AA, 3 *Scud* SSM bdes, 2 ATK regts (6 bns).
1 AB bde.
6 engr bdes.
3,400 T-54/-55/-72 MBT; 1,250 OT-65 and BRDM scout cars; 950 BMP MICV, 2,800 OT-62/-64 APC; 150 100mm, 300 122mm, 25 130mm guns; 200 152mm SP how (incl Tatra 813 truck-mounted); 200 RM-70 122mm, 120 M-51 130mm MRL; 40 *FROG*, 27 *Scud* SSM; 81mm mor; 100 82mm RCL; 112mm P-27 RL; 285 AT-3 *Sagger* and AT-4 *Spigot* ATGW; 500 57mm towed, ZSU-23-4, M-53/59 30mm SP AA guns; SA-4/-6/-7 SAM.

RESERVES: 295,000 (liability to age 50).

Air Force: 54,000 (17,000 conscripts); 471 combat ac, some 12 armed hel.
2 air armies: 3 air divs: 15 combat regts:
13 FGA sqns: 6 with 80 Su-7BM/U; 1 with 12 MiG-23; 3 with 42 MiG-21/-21U; 3 with 30 MiG-15.
18 interceptor sqns with 252 MiG-21/-21U/-23.
3 recce sqns: 1 with 25 MiG-21RF; 2 with 30 L-29/-39.
2 tpt regts with 6 An-24, 40 Il-14, 1 Tu-134, LET L-410M, Tu 154B.
1 hel regt, 3 indep hel sqns with Mi-1/-2, 70 Mi-4, 20 Mi-8, 12 Mi-24.
Trg ac incl 100 L-29, 24 L-39, Zlin 326.
AAM: AA-2 *Atoll*.
3 AD divs: 6 SAM regts: some 40 sites; 250 SA-2/-3.

RESERVES: 30,000.

Para-Military Forces: Border troops 11,000: 7 bdes, 28 bns, AFV, ATK guns. Civil Defence tps 2,500. 120,000 People's Militia. 'Association for Co-operation with the Army'.

GERMAN DEMOCRATIC REPUBLIC

Population: 16,750,000.
Military service: 18 months.
Total regular forces: 166,000 (92,000 conscripts).
Estimated NMP 1981: 182.6 bn ostmarks.
Estimated 1981 GNP range: $96.8–142.13 bn.
Defence expenditure 1982: 15 bn ostmarks ($7.39 bn).
$1 = 2.26 ostmarks (1981 official), 2.03 (adj).

Army: 113,000 (67,000 conscripts).
2 Military Districts, 2 Army HQ:
2 tk divs (each 3 tk, 1 motor rifle regts).
4 motor rifle divs (each 1 tk, 3 motor rifle regts).
2 SSM bdes with *Scud*.
2 arty, 1 AA arty regts.
2 AD regts with SA-4 SAM.
3 sigs regts.
2 engr regts, 1 engr bn.
1 railway construction regt.
2 ATK bns.
1 AB bn.
About 1,500 T-54/-55, T-72 MBT (1,600 more in storage); 500 BRDM-1/-2 scout cars; 700 BMP MICV, 1,000 BTR-50P/-60P/-152, MT-LB APC; 335 122mm incl M-1974 SP, 100 130mm, 72 152mm towed, 36 M-1973 152mm SP guns/how; 108 BM-21 and RM-70 122mm MRL; 24 *FROG*-7, 18 *Scud* B SSM; 250 120mm mor; 120 100mm towed, ASU-85mm SP ATK guns; AT-3 *Sagger*, AT-4 *Spigot* ATGW; 36 57mm towed, 96 ZSU-23-4 SP AA guns; SA-4/-6/-7/-9 SAM.

RESERVES: 250,000. 8-yr active commitment; up to 3 months call-up per year to total 24 months.

Navy: 15,000 (10,000 conscripts) incl Frontier Bde.

Large numbers of the T-54/55 main battle tank remain in service with Warsaw Pact forces, although the regular Soviet Army has largely been reequipped with newer equipment.

2 *Rostock* frigates (ex-Sov *Koni*) with 1 × 2 SA-N-4 SAM.
6 *Parchim* corvettes with 2 SA-N-5 SAM.
10 *Hai* large patrol craft.
15 *Osa*-I FAC(M) with 4 *Styx* SSM.
49 FAC(T): 18 *Shershen*, 31 *Libelle*.
50 coastal minesweepers: 20 *Kondor*-I, 30 -II.
12 *Frosch* LST.
2 *Kondor*-I, 1 *Okean* intelligence collection vessels.
8 supply ships and tankers, 2 mod *Frosch* lt tpts.
1 hel sqn with 8 Mi-4, 5 Mi-8.
Coastal Frontier Bde (2,500): 5 beach patrol bns, 2 afloat 'divs', 1 boat gp (recce); 34 vessels incl 18 *Kondor*-I above, 152mm guns, *Samlet* SSM.
(On order: 6 *Parchim* corvettes.)

Bases: Peenemünde, Rostock/Warnemünde, Sassnitz, Wolgast, Tarnewitz.

RESERVES: 25,000.

Air Force: 38,000 (15,000 conscripts); 359 combat ac, 15 armed hel.
2 air divs:
6 AD regts: 18 sqns with 300 MiG-21F/MF/PF/U/-23.
4 FGA sqns: 3 with 35 MiG-17; 1 with 12 MiG-23.
1 recce sqn with 12 MiG-21.
7 SAM regts, some 30 sites with 200 SA-2/-3.
2 radar regts.
1 tpt regt: 3 sqns: 20 Il-14, 15 Tu-134, An-2/-14.
2 hel regts: 6 sqns with 40 Mi-2/-4, 70 Mi-8, 15 Mi-24.
Trg ac incl Yak-11, L-29/-39, Zlin 226, MiG-15UTI.
AAM: AA-2 *Atoll*. ASM: AT-3 *Sagger* ATGW.

RESERVES: 30,000.

Forces Abroad: Algeria, 250; Angola, 450; Ethiopia, 250; Guinea, 125; Iraq, 160; Libya, 400; Mozambique, 100; S.Yemen, 325; Syria, 210.

Para-Military Forces: 71,800. Ministry of Defence: Frontier Troops (45,000): 18 border, 2 indep, 1 special, 6 trg regts (some 66 bns), 1 boat section; 24 patrol craft. Ministry for State Security: 1 Guard regt (Berlin) (5,300): 6 motor rifle, 1 arty, 1 trg bns; PSZH-IV APC, 120mm mor, 85mm, 100mm ATK, ZU-23 AA guns, hel. Ministry of Interior: People's Police Alert Units (13,000): 21 bns; APC, 82mm mor. Transport Police (8,500): 16 coys; small arms, RPG-7 RL. Workers' Militia: 15,000 combat groups; AFV incl SK-1 APC, 82mm mor, 76mm ATK, 23mm, 37mm AA guns. 'Sport and Technology Society' (450,000, 75% active): 1 central, 14 regional subordinate district gps, some 15,000 units; small arms.

HUNGARY

Population: 10,750,000.
Military service (incl Border Guard): 18 months.
Total regular forces: 106,000 (58,000 conscripts).
Estimated NMP 1981: F 631.4 bn.
Estimated 1981 GDP range: $37.7–52.8 bn.
Defence expenditure 1982: F 20.26 bn ($1.318 bn).
$1 = 34.4 forints (1981 official), 15.37 (adjusted).

Army: 85,000 (50,000 conscripts) incl Danube Flotilla.
1 tk div.
5 motor rifle divs.
1 arty bde, 1 SSM bde with *Scud*.
1 AA arty, 1 SAM regts.
1 AB bn.
About 1,200 T-54/-55, 30 T-72 MBT; 100 PT-76 lt tks; 125 BMP-1 MICV; about 300 BRDM and some 200 FUG-65 scout cars; 1,400 PSZH, MT-LB APC; 250 122mm, 40 M-1974 122mm SP how; 100 152mm guns/how; 50 BM-21 122mm MRL; 24 *FROG*, 12 *Scud* SSM; 300 82mm, 100 120mm mor; 150 SPG-9 73mm, 107mm RCL; 150 85mm, 100mm ATK guns; 100 *Sagger*, *Snapper* ATGW; 100 57mm towed, 50 ZSU-23-4

MiG-21 all-weather counterair fighters, such as this Fishbed F, are still in service, but MiG-23 Floggers are replacing them as the standard combat fighter.

and ZSU-57-2 SP AA guns; 80 SA-6, 300 SA-7, 50 SA-9 SAM.
Danube Flotilla (700): 10 100-ton patrol craft, river MCM, 5 small LCU, small tp tpts.

Air Force: 21,000 (8,000 conscripts); 140 combat ac, 12 armed hel.
1 air div:
2 AD fighter regts: 6 interceptor sqns with 120 MiG-21/F/PF/bis/U, 20 MiG-23.
1 tpt regt: 2 tpt sqns with 24 An-2/-24/-26, Il-14, 2 Tu-134.
1 hel regt: 3 hel sqns: 1 with 35 Mi-4/-8, 1 with 12 Mi-24, 1 with 12 Ka-26.
Trg ac incl L-29, MiG-15UTI.
AAM: AA-2 *Atoll*.
1 AD div: 3 SAM regts, some 20 sites; 150 SA-2/-3.

RESERVES: (all services): 143,000.

Para-Military Forces: Border guards 15,000 (11,000 conscripts); 11 districts. Part-time Worker's Militia 60,000. 'Sport Association for National Defence'.

POLAND

Population: 35,900,000.
Military service: Army, internal security forces, Air Force 2 years; Navy, special services 3 years.
Total regular forces: 317,000 (187,000 conscripts).
Estimated NMP 1980: Zl 1,936.2 bn.
Estimated 1981 GNP range: $88.1–133.8 bn.
Defence expenditure 1981: Zl 75.18 bn ($5.41 bn).
$1 = 3.35 zloty (1981 official), 13.9 (adjusted).

Army: 207,000 (154,000 conscripts).
3 Military Districts:
5 armd divs.
8 mech divs.
1 AB div.
1 amph assault div.
3 arty bdes, 1 arty regt, 5 AA arty regts.
3 ATK regts.
1 AD bde with SA-4 SAM.
4 SSM bdes with *Scud*.
3,000 T-54/-55, 60 T-72 MBT, 130 PT-76 lt tks; 2,800 OT-65/FUG and BRDM-1/-2 scout cars; 5,500 BMP-1, SKOT/SKOT-2AP, MT-LB, TOPAS APC; 400 100mm, 122mm guns; 200 122mm incl SP, 250 152mm guns/how; 250 BM-21 122mm, 130mm, 140mm, 240mm MRL; 51 *FROG*-3/-7, 36 *Scud* SSM; 650 82mm, 120mm mor; 450 85mm, 100mm towed ATK guns; 73mm, 82mm, 107mm RCL; *Snapper*, AT-4 *Spigot*, *Sagger* ATGW; 750 23mm, 37mm, 57mm, 85mm, and 100mm towed, 75 ZSU-23-4 SP AA guns; SA-4/-6/-7/-9 SAM.

Navy: 22,000 (6,000 conscripts).
4 W-class submarines.
1 *Kotlin* destroyer with 1 × 2 *Goa* SAM.
13 *Osa* FAC(M) with 4 *Styx* SSM.
15 FAC(T): 5 *Pilica*, 10 *Wisla*(.
23 large patrol craft: 13 *Obluze*, 1 *Oksywie*, 9 *Gdansk*.
49 MCM: 12 *Krogulec*, 11 T-43 ocean, 1 *Notec* coastal minesweepers; 25 K-8 boats.
23 *Polnocny* LCT, 4 *Marabut* LCM, 15 *Eichstaden* LCA.
4 intelligence vessels (AGI): 1 B-10, 2 *Moma*, 1 T-43 radar picket.
1 Naval Aviation Div (52 combat aircraft):
1 attack regt: 3 sqns with 42 MiG-17.
1 recce sqn with 10 Il-28.
1 hel regt: 2 sqns with 25 Mi-2/-4/-8.

Bases: Gydnia, Hel, Swinoujscie, Kolobrzeg, Ustka.

Air Force 88,000 (27,000 conscripts); 705 combat ac, 5 armed hel.
4 air divs:
6 FGA regts: 18 sqns: 3 with 35 Su-7/-7U; 3 with 35 Su-20; 12 with 150 MiG-17.
10 AD regts: 33 sqns with some 430 MiG-17/-21/-21U.
6 recce sqns: 35 MiG-21RF, 5 Il-28, 15 LIM-6.
2 tpt regts: 9 An-2, An-12, 12 An-26, 12 Il-14.
1 comms/liaison sqn with 2 Tu-134A, 5 Yak-40 Il-18 ac; 4 Mi-8 hel.
3 hel regts with 165 Mi-1/-2, 5 Mi-4, 22 Mi-8, 5 Mi-24.
300 trg ac: TS-8/-11, MiG-15/-21UTI, Su-7U.
AAM: AA-1 *Alkali*, AA-2 *Atoll*.
3 AD divs: 9 SAM regts: some 50 sites; 425 SA-2/-3.

RESERVES: (all services): 605,000.

Forces Abroad: Syria (UNDOF): 129.

Para-Military Forces: 85,000. Ministry of Interior border troops 20,000: 12 bdes, some 34 coastguard patrol craft incl 5 *Obluze*, 9 *Gdansk* above. Internal defence troops 65,000: tks, AFV, ATK guns. Citizen's Militia 350,000. 'League for National Defence' (some 200,000 active).

ROMANIA

Population: 22,400,000.
Military service: Army and Air Force 16 months, Navy 2 years.
Total regular forces: 181,000 (109,000 conscripts).
Estimated NMP 1980: L 516.4 bn.
Estimated 1981 GNP range: $77.1–120 bn.
Defence budget 1982: L 10.77 bn ($1.4 bn).
$1 = 4.47 lei (1980/2 official), 7.7 (adjusted).

Army: 140,000 (95,000 conscripts).
3 Military Districts:
2 tk divs.
8 motor rifle divs.
3 mountain bdes.
2 arty bdes, 2 arty, 2 AA arty, 4 ATK regts.
2 *Scud* SSM bdes.
1 AB regt.
200 T-34, 1,600 T-54/-55, some T-72, some M-77 MBT; 600 BRDM-1/-2 scout cars; 2,000 BTR-50/-60, TAB-72 (BTR-60), OT-810 APC; 150 76mm, 50 85mm, 100mm, 130 SU-100 SP guns; 600 122mm, 150 152mm guns/how; 122mm, 150 130mm MRL; 30 *FROG*, 20 *Scud* SSM; 500 82mm, 200 120mm mor; 57mm ATK guns; 73mm, 260 76mm and 82mm RCL; 120 *Sagger*, *Snapper* ATGW; 400 30mm, 37mm, 250 57mm, 85mm, 100mm towed, ZSU-23-4 SP AA guns; SA-6/-7 SAM.

RESERVES: 300,000.

Navy: 7,000 (4,000 conscripts).
Black Sea Fleet, Danube Sqn, Coastal Defence.
3 *Poti* corvettes.
5 *Osa* FAC(M) with 4 *Styx* SSM.
3 *Kronshtadt* large patrol craft.
19 *Shanghai* FAC(G/P/ASW).
32 FAC(T): 20 *Huchwan* hydrofoils, 6 ex-Sov P-4, 6 *Epitrop*(.
46 river patrol craft incl 18 VB-76 monitors.
14 minesweepers (4 ex-GDR M-40 coastal, 10 ex-Sov T-301 inshore); 8 ex-Pol TR-40, 20 VD-141 minesweeping boats(.
4 Mi-4 SAR hel.
Coastal Defence (2,000): HQ Constanta, 4 sectors; 18 arty btys with some 110 130mm, 150mm, and 152mm guns, observer post tps, naval engineers. Would get 2 regts of naval inf on mobilization.

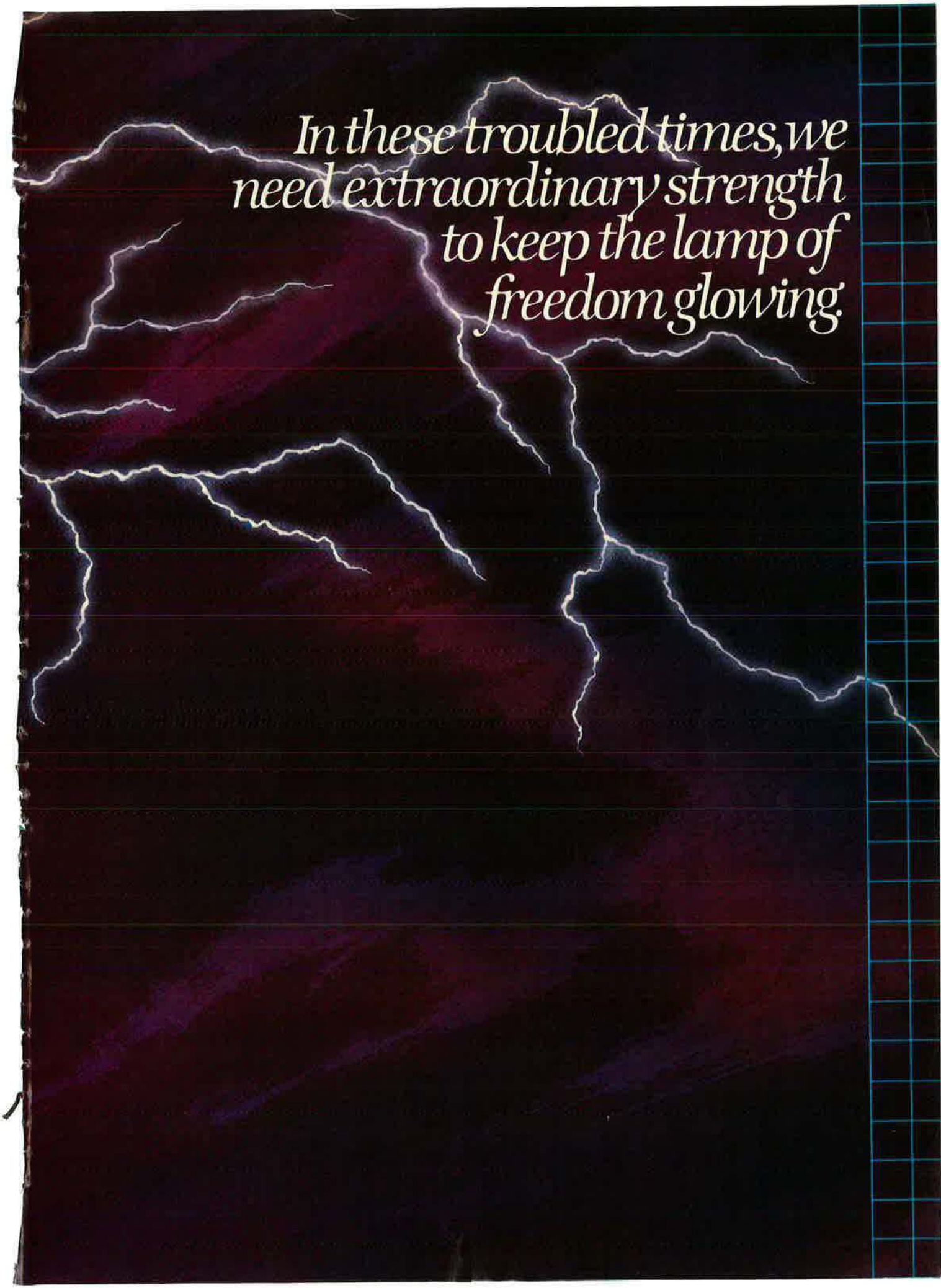
RESERVES: 20,000.

Bases: Mangalia, Constanta; Danube: Braila, Galati, Giurgiu, Sulina, Tulcea.

Air Force: 34,000 (10,000 conscripts); 328 combat aircraft.
2 air divs: 4 combat regts:
6 FGA sqns with 70 MiG-17.
12 interceptor sqns with 240 MiG-21F/PF/U and MiG-23.
1 recce sqn with 18 Il-28.
1 tpt regt with 3 Il-14, 4 Il-18, 1 Il-62, 10 An-24, 6 An-26, 5 Li-2, 1 Boeing 707.
1 hel regt: 10 Mi-4, 25 Mi-8, 45 IAR-316B (*Alouette* III), 15 IAR-330 (*Puma*).
Trg ac: 50 L-29, 50 MiG-15UTI.
AAM: AA-2 *Atoll*.
1 AD div:
Some 20 SAM sites with 108 SA-2.
(On order: 23 IAR-93 FGA/trg ac.)

RESERVES: 45,000.

Para-Military Forces: 37,000. Border guards: 17,000; 12 bdes. Ministry of Defence security troops: 20,000; AFV, ATK guns. Local Air Defence: some 900,000 Patriotic Guard. Youth Homeland Defence: 650,000. 'Voluntary Sports Association'.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The North Atlantic Treaty

TREATIES

The Brussels Treaty of 1948 commits its signatories—Belgium, Britain, France, Luxembourg, and the Netherlands—to give one another 'all the military and other aid and assistance in their power' if one is the subject of 'armed aggression in Europe'. The Treaty's duration is 50 years.

The North Atlantic Treaty was signed on 4 April 1949 by Belgium, Britain, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, and the United States; Greece and Turkey joined in 1952, West Germany in 1955, and Spain on 30 May 1982. The Treaty unites Western Europe and North America in a commitment to consult together if the security of any one member is threatened, and to consider an armed attack against one as an attack against all, to be met by such action as each of them deems necessary, 'including the use of armed force, to restore and maintain the security of the North Atlantic area'. The Paris Agreements of 1954 added a Protocol aimed at strengthening the Alliance structure, revised the Treaty to enable West Germany and Italy to join, and established the principle that the Treaty had no date of termination. In 1966 France withdrew from the military organization but remains a member of the Alliance. Greece, which left the military structure in 1974, rejoined it in 1980. A 1969 amendment requires members to give one year's notice of their intention to withdraw from the Alliance.

The US also maintains a number of important bilateral treaties with her European allies covering the stationing of US forces and the American use of bases and facilities. Iceland, Italy, Norway, Portugal, Spain, and Turkey are among those which have such ties. Norway and the US reached agreement in January 1981 over pre-positioning military stores. The US-Turkish bilateral Treaty was revised in 1980.

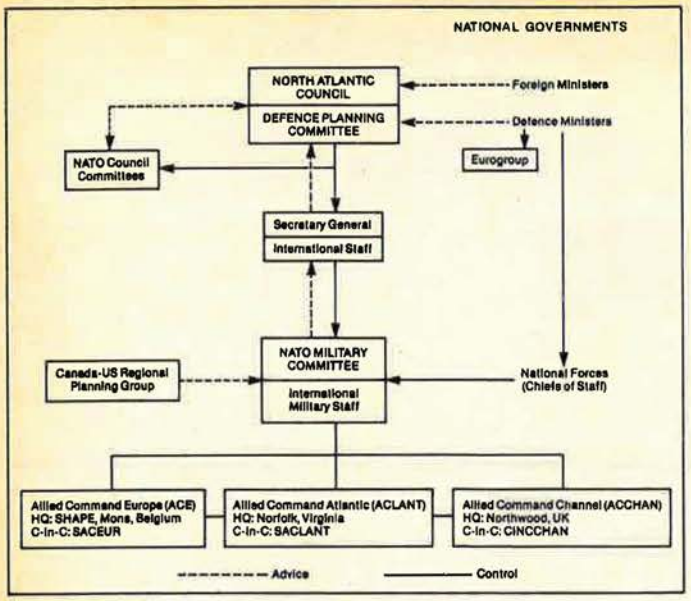
THE NORTH ATLANTIC TREATY ORGANIZATION

1. Belgium
2. Britain
3. Canada (not included in map)
4. Denmark
5. France
6. Germany: Federal Republic (West Germany)
7. Greece
8. Italy
9. Luxembourg
10. Netherlands
11. Norway
12. Portugal
13. Spain
14. Turkey

ORGANIZATION

The Organization of the Alliance is known as NATO. Its governing body is the North Atlantic Council, with its headquarters in Brussels, which consists of representatives from the sixteen member countries—usually the Foreign Ministers, who normally meet twice a year, and permanent ambassadors representing each government, who meet at least weekly. The Council has a President, appointed annually from each member nation in alphabetical order. The Secretary General is a permanent appointment; he is Chairman of the Council. With the International Staff, he advises the Council and its Committees on political, military, financial, economic, and scientific aspects of defence planning.

The Council controls a number of specialist Committees. Their recommendations or decisions represent the collective views of the member governments. They include: Political Affairs, Economics, Defence Review, Armaments, Civil Emergency Planning, Logistics, Air Defence, the Nuclear Defence Affairs Committee (NDAC, open to all members except France, Iceland, Luxembourg, and Portugal), and the Nuclear Planning Group (NPG, comprising all members except France and Iceland), which is responsible for the detailed work required as the basis for nuclear policy. The Council meets at various levels: Heads of State, Foreign



Ministers, Permanent Representatives. It usually meets twice a year at the ministerial level and is in 'permanent' session at the Representative level. Agreement is by common consent. All aspects of military planning and policy are the responsibility of the Defence Planning Committee (DPC), composed of national Defence Ministers and their permanent ambassadors, which has essentially the same function and authority as the Council within its specialized field.

The Eurogroup, an informal advisory body of the West European Alliance members (except France and Iceland), was set up in 1968. It has produced the European Defence Improvement Programme (EDIP, 1970), and the Independent European Programme Group (IEPG, 1976), and agreements on principles of co-operation in the fields of armaments (1972), training (ENTG, 1973), logistics (1975), battlefield communications, and procurement. It meets frequently to discuss and to recommend improvements in European defences.

The International Staff comprises the Offices of the Secretary General, of the Executive Secretary, of Security, of Management, and of the Financial Controller, and five Divisions, each under an Assistant Secretary General. These are: Political Affairs; Defence Planning and Policy; Defence Support; Infrastructure, Logistics and Council Operations; and Scientific and Environmental Affairs. Of these, Defence Planning and Policy and Defence Support are the most directly involved in defence matters. Planning and Policy provides analysis and planning in the fields of force structures and nuclear and civil emergencies. Defence Support deals with armaments research, development, production, and procurement; air defence systems; and command control and communications. Its particular responsibility is the NATO Air Defence Ground Environment System (NADGE).

The highest military authority in the Alliance is the Military Committee. It comprises the Chiefs-of-Staff of all member countries except France, which maintains a liaison staff, and Iceland, which has no military forces. The Chiefs appoint Military Representatives who are in permanent session at NATO HQ in Brussels. The Committee has a President, who changes annually and is provided by member countries in alphabetical order, and a Chairman, elected for a two- to three-year term, who is the Committee's representative on the Council. The Committee makes recommendations to the Council and Defence Planning Committee on military questions and advises Allied Commanders and subordinate military authorities. The Committee controls a number of agencies through the International Military Staff (IMS).

The Treaty covers all member countries in Europe and North America, Turkey in Asia Minor, the islands under the jurisdiction of any member in the North Atlantic area north of the Tropic of Cancer, and any Allied military presence in that area or in the Mediterranean. The area is divided among three Allied Commands: Europe, Atlantic, and Channel, which are further subdivided. The accompanying tables show this division and the subordinate Commands. North American defences are developed by the Canada/US Regional Planning Group. Strategic nuclear forces are outside NATO command, but Europe and Atlantic Commands participate in the US Joint Strategic Planning System. The Supreme Allied Commander Europe (SACEUR) exercises NATO planning control over a small number of US and all the British ballistic missile submarines. The Supreme Allied Commander Atlantic (SACLANT) has control over a larger US SSBN contingent.

(I) ALLIED COMMAND EUROPE (ACE): European area, less Britain, France, Iceland, and Portugal. Under the command of the Supreme Allied Commander Europe (SACEUR) with his HQ (Supreme Headquarters Allied Powers Europe, or SHAPE), ACE prepares unified defence plans for the area and, in wartime, would control all land, sea, and air operations, including the air defence of Britain. Internal defence, including coastal waters, remains a national responsibility. National authorities maintain a representative at SHAPE.

SACEUR has some 6,000 tactical nuclear warheads in his area. The number of delivery vehicles (aircraft, missiles, and howitzers) is over 3,000, spread among all countries except Luxembourg. The nuclear devices, except for certain British weapons and French tactical nuclear weapons, which are only held in France, are maintained in American custody. Norway and Denmark do not permit nuclear weapons on their soil in peacetime. The average yield of bombs is about 100 kilotons and that of missile warheads 20 kilotons.

About 66 division-equivalents are assigned, or earmarked for assignment, to SACEUR in peacetime. The Command also has some 3,500 tactical aircraft, based on about 200 standard NATO airfields, backed up by a system of jointly financed storage depots, fuel pipelines, and signal communications. Most land and air forces stationed in the Command are assigned to SACEUR, while naval forces are normally earmarked. A 1978 decision to deploy an integrated force of airborne warning and control system (AWACS) aircraft has led to the formation of NATO Early Warning Force (NAEW), and delivery of the aircraft, with which the British *Nimrod* AEW aircraft will be compatible, has begun.

The 2nd French Corps of three divisions (which is not integrated in NATO forces) is stationed in Germany under a status agreement reached between the French

ALLIED COMMAND EUROPE

Allied Forces Northern Europe (AFNORTH)
HQ: Kolsaas, Norway

- Allied Forces North Norway (COMNOR)
  HQ: Bodö
- Allied Forces South Norway (COMSONOR)
  HQ: Oslo
- Allied Forces Baltic Approaches (BALTAP)
  HQ: Karup, Denmark

Allied Command Europe Mobile Force (AMF)
HQ: Seckenheim, Germany

United Kingdom Air Forces Command (UKAIR)
HQ: High Wycombe, UK

NATO Early Warning Command (NAEW Comd)
HQ: Maisieres, Belgium

Allied Forces Central Europe (AFCENT)
HQ: Brunssum, Netherlands

- Northern Army Group (NORTHAG)
  HQ: München-Gladbach, Germany
- Central Army Group (CENTAG)
  HQ: Seckenheim, Germany
- Allied Air Forces Central Europe (AAFCE)
  HQ: Ramstein, Germany
  2 Allied Tactical Air Force (2 ATAF)
  4 Allied Tactical Air Force (4 ATAF)

Allied Forces Southern Europe (AFSOUTH)
HQ: Naples, Italy

- Allied Land Forces Southern Europe (LANDSOUTH)
  HQ: Verona, Italy
- Allied Land Forces South-Eastern Europe (LANDSOUTHEAST)
  HQ: Izmir, Turkey
- Allied Air Forces Southern Europe (AIRSOUTH)
  HQ: Naples
- Allied Naval Forces Southern Europe (NAVSOUTH)
  HQ: Naples
  - *Maritime Air Forces Mediterranean (MARAIRMED)*
  - *Submarine Force Mediterranean (SUBMED)*
  - *Naval On Call Force Mediterranean (NAVOCFORMED)*
  - *Western/Central/Eastern/North-Eastern Mediterranean Commands (COMMEDOC/CENT/EAST/NOREAST)*
- Naval Striking and Support Forces Southern Europe
  HQ: Naples

and German Governments. Co-operation with NATO forces and commands has been agreed between the commanders concerned.

(a) Allied Forces Central Europe (AFCENT) has command of both the land forces and the air forces in the Central European Sector. Allied Air Forces, Central Europe (AAFCE), set up in 1974, provides centralized control of air forces in the sector. Northern Army Group (NORTHAG), responsible for the sector north of the Göttingen-Liège axis, includes the Belgian, British, and Dutch divisions, four German divisions, and one American brigade and is supported by 2nd Allied Tactical Air Force (2 ATAF), composed of Belgian, British, Dutch, and German units. American forces, seven German divisions, and the Canadian brigade group are under Central Army Group (CENTAG), supported by 4 ATAF, which includes American, German, and Canadian units and an American Army Air Defense Command.

(b) Allied Forces Northern Europe (AFNORTH) is responsible for the defence of Denmark, Norway, Schleswig-Holstein, and the Baltic approaches. Most of the Danish and Norwegian land, sea, and tactical air forces are earmarked for it, and most of their active reserves assigned to it. Germany has assigned it one division, two combat air wings, and her Baltic fleet. Apart from exercises and some small units, US naval forces do not normally operate in this area. Some Allied equipment is pre-positioned in Norway.

(c) Allied Forces Southern Europe (AFSOUTH) is intended to safeguard the sea lanes of communication in the Mediterranean and to defend the territorial integrity of Greece, Italy, and Turkey. It is responsible for the air defence of the Southern Region in peace and war and for naval operations in the Mediterranean and Black Seas. The ground defence system is based upon two separate commands: the Southern (LANDSOUTH), comprising Italy and its approaches, and South-eastern (LANDSOUTHEAST), covering Turkey. There is also an overall air command (AIRSOUTH) which includes the tactical air forces of these countries. There are also two naval commands (NAVSOUTH and STRIKEFORSOUTH) responsible to AFSOUTH. Maritime patrol aircraft from Southern Region nations and the United States are co-ordinated by Maritime Air Forces Mediterranean (MARAIRMED); French aircraft participate. Submarine Force Mediterranean (SUBMED) is responsible for the conduct of all submarine operations. The Allied Naval On Call Force Mediterranean (NAVOCFORMED) consists of a ship from each of the allied powers concerned with the Southern Region, including Britain and the United States, and is normally activated twice each year for a month. Other forces have been earmarked, as have the US Navy's Sixth Fleet and naval forces from Greece, Italy, and Turkey.

(d) ACE Mobile Force (AMF) has been formed with particular reference to the northern and south-eastern flanks. Provided by eight countries—Belgium, Britain, Canada, Germany, the Netherlands, USA, Italy, and Portugal—it comprises eight infantry battalion groups, an armoured reconnaissance squadron, six artillery batteries, helicopter detachments, and ground-support

ALLIED COMMAND ATLANTIC

Western Atlantic Command (WESTLANT)
HQ: Norfolk, Virginia

Submarine Force Western Atlantic Area
Ocean Sub-Area
Canadian Atlantic Sub-Area
Bermuda Island Command
Azores Island Command
Greenland Island Command

Submarines Allied Command Atlantic
HQ: Norfolk, Virginia

Eastern Atlantic Command (EASTLANT)
HQ: Northwood, UK

Maritime Air Eastern Atlantic Area
Northern Sub-Area
Maritime Air Northern Sub-Area
Central Sub-Area
Maritime Air Central Sub-Area
Submarine Force Eastern Atlantic Area
Iceland Island Command
Faeroes Island Command

Standing Naval Force Atlantic (STANAVFORLANT)
HQ: Afloat

Striking Fleet Atlantic Command
HQ: Afloat

Carrier Striking Force
Carrier Striking Groups One and Two

Iberian Atlantic Command (IBERLANT)
HQ: Lisbon, Portugal

fighter squadrons, but has no air transport of its own. The composition of the Force varies depending on the flank to which it is to be deployed. Approximately half of the forces listed are declared for each flank.

(II) Allied Command Atlantic (ACLANT) is responsible for the North Atlantic area from the North Pole to the Tropic of Cancer, including Portuguese coastal waters. In the event of war, its duties are to participate in the strategic strike role and to protect sea communications. The only forces assigned to the command in peacetime are the Standing Naval Force Atlantic (STANAVFORLANT), which normally consists, at any one time, of four destroyer-type ships. However, for training purposes and in the event of war, forces which are predominantly naval are earmarked for assignment by Britain, Canada, Denmark, Germany, the Netherlands, Portugal, and the United States. There are six subordinate Area Commands: Western Atlantic, Eastern Atlantic, Iberian Atlantic, Striking Fleet Atlantic; Submarine Allied, and STANAVFORLANT. The nucleus of the Striking Fleet Atlantic has been provided by the United States Second Fleet with some five attack carrier groups; carrier-based aircraft share the nuclear strike role with missile-firing submarines.

(III) Allied Command Channel (ACCHAN) would in wartime control the English Channel and the southern North Sea. Many of the smaller warships of Belgium, Britain, and the Netherlands are earmarked for this Command, as are some maritime aircraft. There are arrangements for co-operation with French naval forces. A subordinate Standing Naval Force, Channel (STANAVFORCHAN) was formed in 1973 to consist of mine counter-measure ships from Belgium, Denmark, Germany, the Netherlands, and Britain; Norway and the US participate on a temporary basis.

COMMANDERS

Unlike the Warsaw Pact, high command of NATO forces is not restricted to one nation. Senior commanders reflect the major contributing components of the force. SACEUR and SACLANT have always been American Officers, and the Commander-in-Chief Channel (CINCCHAN), one of the two Deputies to SACEUR and the Deputy SACLANT, British; the other Deputy to SACEUR is German. SACEUR is also Commander-in-Chief of the United States Forces in Europe (CINCUSEUR). AFCENT is commanded by a German general, AFNORTH by a British general, and AFSOUTH by an American admiral, with LANDSOUTH and LANDSOUTHEAST under Italian and Turkish commanders respectively, and MARAIRMED and SUBMED under American rear-admirals.

WEAPONS PROCUREMENT

NATO member nations have been reluctant to compromise over the design and production of weapons systems. This stems from national pride, economic and commercial considerations, and tactical doctrines. In consequence much effort has been wasted in duplicate

ALLIED COMMAND CHANNEL

Plymouth Channel Command (PLYMCHAN)
HQ: Plymouth, UK

Maritime Air PLYMCHAN

Standing Naval Force Channel (Mine Counter-Measures) (STANAVFORCHAN)
HQ: Afloat

Nore Channel Command (NORECHAN)
HQ: Rosyth, UK

Maritime Air NORECHAN

Benelux Channel Command (BENCHAN)
HQ: Walcheren, Netherlands

Allied Maritime Air Force Channel Command (COMMAIRCHAN)
HQ: Northwood, UK

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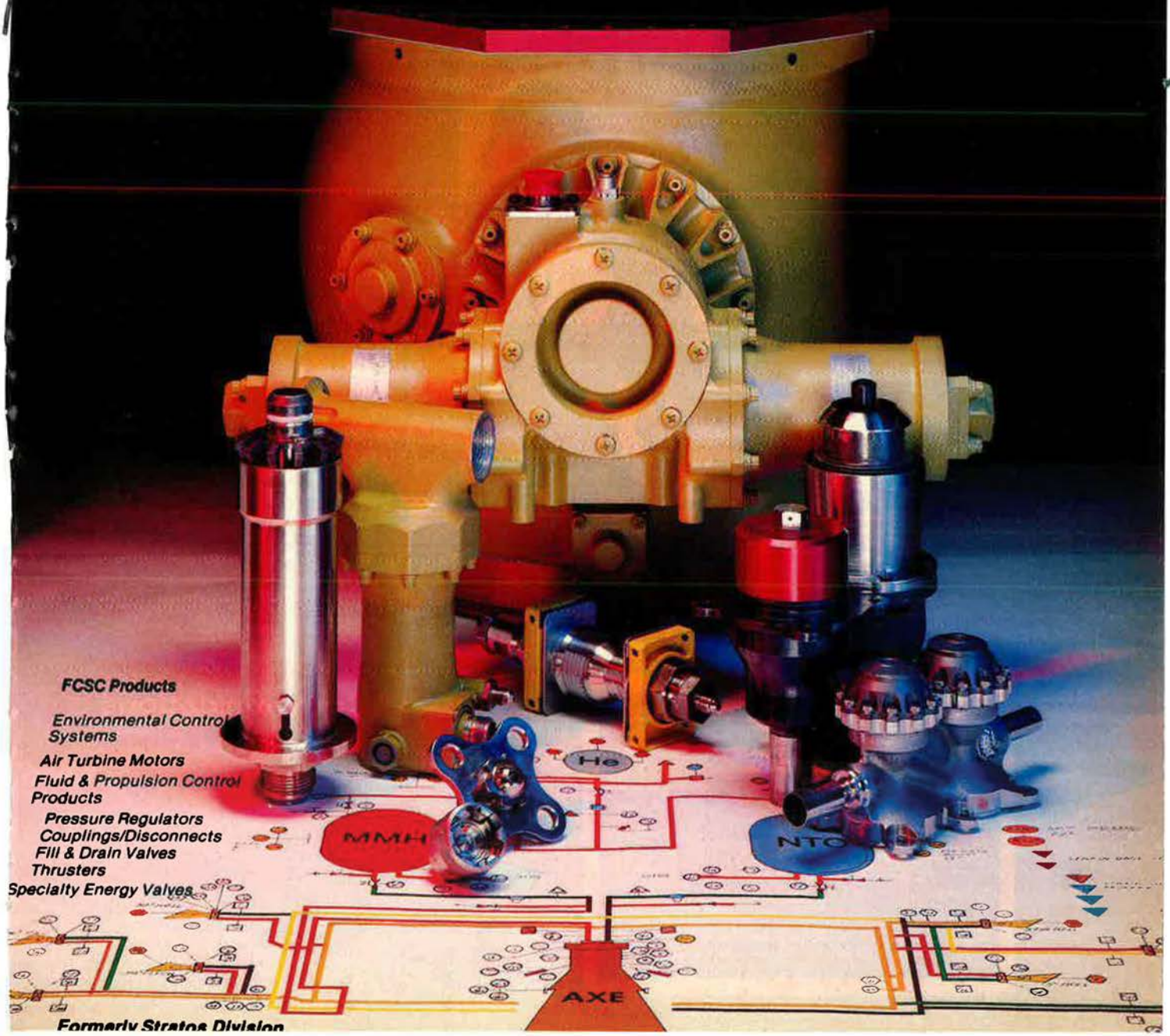

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national programmes. Moves to co-ordinate design and production have been going on since 1952 and some success recorded. Notable examples of general co-operation include such weapons as the 7.62 standard small-arms round, the *HAWK* AD missile, *Sidewinder* AAM, *Milan* ATGW, and joint projects such as the FH-70 155mm towed howitzer, and the F-16 and *Tornado* aircraft programmes.

SPAIN AND PORTUGAL

The accession of Spain to the Alliance has added a sizeable but no longer modern military force. There are still many questions, political as well as military, which remain to be resolved. Spain's exact status with respect to the naval and air defense arrangements for the Iberian Peninsula and its approaches is still undefined. The status of Gibraltar is likely also to be affected. The Lisbon Government is particularly concerned lest the entry of its larger neighbour adversely affect Portugal's political position. This position is already difficult because of shortages of modern equipment in almost all areas of Portugal's military structure. Major modernization programmes must follow to support the changing roles of both nations.

BELGIUM

Population: 9,904,000.
Military service: 8 or 10 months.[1]
Total armed forces: 93,500 (3,600 women; 31,600 conscripts).
Estimated GDP 1981: fr 3,744.4 bn ($100.84 bn).
Defense expenditure 1982: fr 128.873 bn ($2.878 bn); NATO definition $2.878 bn.[2]
GNP growth: 2.7% (1980), −1.3% (1981).
Inflation: 7.5% (1980), 8.1% (1981).
$1 = 44.776 francs (1982), 37.131 (1981).

Army: 68,700 (incl Medical Service; 26,900 conscripts).
1 corps HQ, 2 div HQ.
1 armd bde.
3 mech inf bdes.
1 para-cdo regt.
3 recce bns.
1 tk bn.
2 mot inf bns.
3 arty bns.
1 SSM bn with 5 *Lance*.
4 AD bns: 2 SAM with 36 *Improved HAWK*; 2 AA with *Gepard*.
5 engr bns (3 fd, 1 bridge, 1 eqpt).
4 aviation sqns.
334 *Leopard*, 25 M-47 MBT, 133 *Scorpion* lt tks; 153 *Scimitar* AFV, 1,123 APC (M-75, AMX-VCI, 266 *Spartan*); 27 105mm, 17 203mm how; 90 M-108 105mm, 26 M-44, 41 M-109 155mm, 10 M-110 203mm SP how; 5 *Lance* SSM; 80 JPK C-90 SP ATK guns; 240 *Milan* ATGW; 43 *Striker* AFV with *Swingfire* ATGW; 115 20mm, 55 *Gepard* 35mm SP AA guns; 36 *Improved HAWK* SAM; 12 *Islander* ac, 68 *Alouette* II hel.
(On order: 514 MICV, 523 M-113 APC; 746 *Milan* ATGW.)

RESERVES: 133,000 (incl Medical Service), some on immediate recall status; 1 mech, 1 mot inf bdes; combat, combat spt, and log spt tps, 11 mot inf regts, 4 mot inf bns for territorial defence.

Navy: 4,300 (1,100 conscripts).
4 E-71 frigates with 4 *Exocet* SSM, 1 × 8 *Sea Sparrow* SAM.
7 ex-US Type 498 ocean minehunters/minesweepers.
6 ex-US Type 60 coastal MCM (4 in reserve).
14 *Herstal* inshore minesweepers.
2 log spt and comd ships (MCM).
6 river patrol boats.
3 *Alouette* III hel.
(On order: 10 MCM vessels.)

Bases: Kallo, Ostend, Zeebrugge.

RESERVES: 4,500 (on immediate recall status).

Air Force: 20,500 (3,600 conscripts); 164 combat aircraft.
5 FGA sqns: 3 with 54 *Mirage* 5BA/5BD; 2 with 36 F/TF-104G (being replaced; 20 F-16A/B).
2 AD sqns with 36 F-16A/B.
1 recce sqn with 18 *Mirage* 5BR.
2 tpt sqns with 12 C-130H, 2 Boeing 727QC, 3 HS-748, 5 *Merlin* IIIA, 2 *Falcon* 20.
1 SAR hel sqn with 3 HSS-1, 5 *Sea King*.
Trg and liaison sqns ac incl 30 SF-260MB, 23 Fouga CM-170; 2 sqns with 32 *AlphaJet*.
AAM: *Sidewinder*.
8 SAM sqns with 72 *Nike Hercules*.
(On order: some 55 F-16A fighters.)

RESERVES: 4,000.

Forces Abroad: Germany: 25,000; 1 corps HQ, 1 div HQ, 1 armd, 1 mech inf bdes; 3 recce, 1 tk, 3 arty, 1 SSM, 2 SAM, 2 AA, 3 engr bns; 3 aviation sqns.

Para-Military Forces: Gendarmerie 16,200; 62 FN armd cars, 5 *Alouette* II, 3 *Puma* hel. (On order: 80 BDX *(Timoney)* APC.)

BRITAIN

Population: 55,965,000.
Military service: voluntary.
Total armed forces: 327,600 incl 15,700 women and some 10,100 enlisted outside Britain.
Estimated GDP 1981: £235.27 bn ($449.85 bn).
Defence expenditure 1982–3: £14.09 bn ($25.4 bn); NATO definition $26.2 bn.
GDP growth: −2.3% (1980), −2.0% (1981).
Inflation: 15.1% (1980), 12.0% (1981).
$1 = £0.554 (1982), £0.523 (1981).

Strategic Forces:
SLBM: 4 *Resolution* SSBN, each with 16 *Polaris* A3 msls with 3 MRV (being modified with *Chevaline*).
Ballistic Missile Early Warning System (BMEWS) station at Fylingdales.

Army: 163,100 (incl 5,970 women and 9,750 enlisted outside Britain, of which 9,600 are Gurkhas).
1 corps, 4 armd, 1 arty div, 20 bde, 1 Field Force HQ.
11 armd regts.
8 armd recce regts.
48 inf bns (incl 1 demonstration bn disbanding August 1982).
6 Gurkha inf bns.
3 para bns (1 in inf, 2 in para role).
1 special air service (SAS) regt.
1 msl regt with *Lance* SSM (4 btys, each with 3 SSM).
3 AD regts with *Rapier* SAM (each of 3 btys with 12 fire units).
17 arty regts (1 hy, 14 fd (1 cdo), 1 GW, 1 locating), 4 indep ATK btys.
11 engr regts (incl 4 armd div, 1 armd, 1 amph, 1 Gurkha), 1 indep sqn.
6 army aviation regts.
AFV: 900 *Chieftain* MBT (60 in reserve), 271 FV 101 *Scorpion* lt tks; 243 FV 601 *Saladin* armd cars; 290 FV 107 *Scimitar*, 1,429 *Ferret*, 200 *Fox* recce; 2,338 FV 432, 600 FV 603 *Saracen*, 60 FV 103 *Spartan*, 500 FV 1611 APC.
Arty: 100 105mm lt guns, pack how; 195 FH-70 155mm towed how; FV 433 *Abbot* 105mm, 101 M-109/109A2 155mm, 31 M-107 175mm, 16 M-110 203mm SP guns/how; 12 *Lance* SSM.
ATK: Carl Gustav 84mm, 120mm RCL; *Milan*, *Swingfire* ATGW; FV 102 *Striker*, 178 FV 438/FV 712 AFV with *Swingfire* ATGW.
AD: Blowpipe, 108 *Rapier/Blindfire* SAM.
Air: Beaver ac; 100 *Scout*; 7 *Alouette* II, 155 *Gazelle*, 90 *Lynx* AH-1 hel, some with *TOW*.
14 landing craft (2 tk, 12 med).
(On order: 243 *Challenger* MBT; 1,900 MCV-80 MICV; 18 M-109A2 SP how; 102 27mm MLRS, *LAW-80* RL; *Milan*, *TOW* ATGW; 50 SP *Rapier*, 48 *Blowpipe* SAM; 25 *Gazelle*, 24 *Lynx* hel (6 with *TOW*).)

DEPLOYMENT (see also *Forces Abroad*, below): *United Kingdom Land Forces* (UKLF): 1 inf div HQ; 1 Regular, 2 TA bdes (to reinforce Germany); United Kingdom Mobile Force (UKMF): 2 inf bde HQ, each with 3 regular, 2 TA inf bns and log spt gp; Home Defence: 1 inf bde with 3 regular, 2 TA bns; 1 bn gp (for ACE Mobile Force (Land), 1 SAS regt (part), 1 Gurkha inf bn.
HQ Northern Ireland: 9,128; 3 inf bde HQ, 1 armd recce regt, variable number of major units in inf role,[3] 1 SAS, 3 engr sqns, 2 army aviation sqns.

RESERVES: 217,200: Regular Reserves 139,600. Territorial Army (TA) 70,200 (to be 86,000 by 1990); 2 inf bdes, 2 armd recce regts, 38 inf bns, 2 SAS, 5 fd, 3 lt AD, 7 engr regts. Ulster Defence Regiment 7,400: 11 bns. Home Service Force (4,500) to form from September 1982.

Navy: 73,000 (incl Fleet Air Arm, Royal Marines, 3,960 women, and 360 enlisted outside Britain); 63 major surface combat vessels (being reduced).
Submarines, attack: 27.
11 SSN (6 *Swiftsure*, 3 *Churchill*, 2 *Valiant*), 16 diesel (13 *Oberon*, 3 *Porpoise*).
Surface Ships:
3 ASW carriers: 2 *Invincible* with 5 *Sea Harrier* V/STOL, 9 *Sea King* hel, 1 × 2 *Sea Dart* SAM (1 with *Phalanx* AD system); 1 *(Hermes)* with 5 *Harrier* V/STOL, 12 *Sea King* hel, 2 × 4 *Seacat* SAM.
12 GW destroyers: 3 *County* with 1 *Wessex* ASW hel, 1 × 2 *Seaslug*, 2 × 4 *Seacat* SAM, 4 *Exocet* SSM; 1 Type 82 with 1 × 2 *Sea Dart* SAM, 1 *Ikara* ASW; 8 Type 42 with 1 × 2 *Sea Dart*, 1 *Lynx* ASW hel.
44 GP frigates: 4 Type 22 with 4 *Exocet* SSM, 2 × 6 *Sea Wolf* SAM, 2 *Lynx* hel; 6 Type 21 with 4 × 1 *Exocet* SSM, 1 × 4 *Seacat* SAM, 1 *Wasp/Lynx* hel; 26 *Leander* (3 to retire by end 1983) with 1 *Wasp/Lynx* (8 with 4 *Exocet*, 3 × 4 *Seacat*; 8 with *Ikara* ASW, 2 × 4 *Seacat*; 10 converting to 1 × 4 *Exocet*, 1 × 6 *Sea Wolf*); 8 *Rothesay* (2 to retire by end 1983) with 1 × 4 *Seacat*, 1 *Wasp* hel.

[1]See p. 101 for footnotes.

3 *Tribal* frigates (being reactivated).
1 Type 12 ASW frigate (trg).
34 minesweepers/minehunters: 3 *Hunt*, 2 *Venturer* (trg), 29 *Ton* (9 Reserves, 9 Fishery Patrol).
1 *Abdiel* MCM spt ship.
21 patrol craft: 7 *Island*, 2 *Castle*, 5 *Ton*, 4 *Bird* (2 trg), 2 *Loyal*, 1 *Ford* (trg).
2 assault ships (LPD): 4 LCM, 4 LCVP, 4 × 4 *Seacat* SAM.
Amphibious vessels incl: 1 hel spt ship, 4 landing ships, 16 LCM, 29 LCVP.
1 ice patrol, 1 Royal Yacht/hospital, 5 depot/spt ships, 14 tankers (1 trg).
3 hovercraft: 2 SRN-6, 1 BH-7.
Included in above refitting or in reserve are: 1 SSBN, 2 SSN, 5 diesel subs, 1 GW destroyer, 5 frigates, 1 MCM, 3 tankers.
(On order: 1 ASW carrier, 4 *Trafalgar* SSN, 4 Type 42 destroyers, 4 Type 22 frigates, 6 *Hunt* MCM, 1 fleet tender, 3 *Phalanx* 20mm AD systems, *Sea Eagle*, 350 *Harpoon* SSM, *Seawolf*, *Lightweight Seawolf* SAM.)

Bases: Chatham (to close), Devonport, Faslane, Portland, Portsmouth, Rosyth.

FLEET AIR ARM: 15 combat ac, 102 armed hel.
3 fighter sqns (1 trg) with 15 *Sea Harrier* FRS-1.
6 ASW hel sqns: 5 with 41 *Sea King* HAS-2/-5 (4 sqns embarked); 1 with 8 *Lynx* HAS-2.
48 hel flts: 25 with 28 *Lynx* HAS-2; 21 ASW (each 1 ac, plus 4 in HQ) with 23 *Wasp* HAS-1; 2 with 2 *Wessex* HAS-3.
2 cdo assault sqns: 1 with 8 *Sea King* HU-4, 1 with 18 *Wessex* HU-5.
7 SAR and trg hel sqns: 1 with 9 *Wessex* HAS-3; 2 with 24 *Wessex* HU-5; 1 with 14 *Sea King* HAS-2/-5; 1 with 11 *Wasp* HAS-1; 1 with 25 *Lynx* HAS-2; 1 with 18 *Gazelle* HT-2.
3 hel flts with *Wasp* (hydrography/recce).
2 *Sea Heron* C-2, 1 *Heron* C-4, 2 *Sea Devon* C-20, 2 *Chipmunk* T-10 ac.
1 observer trg sqn with 13 *Jetstream* T-2, 1 trg flt with 10 *Chipmunk* T-10.
1 fleet requirements unit with *Wessex* HU-5 hel.
ASM: *Sea Skua*.
(On order: 27 *Sea Harrier* FRS-1, 4 T-4 trg, 3 *Hunter* T-8M, 2 *Jetstream* T-2 ac; 18 *Sea King* HAS-5, 2 *Sea King* HU-4, 13 *Lynx* HAS-3 hel.)

ROYAL MARINES: 7,900.
1 cdo bde with 3 cdo gps; 1 cdo arty regt, 2 cdo/engr sqns (army); 1 lt hel sqn, 1 log regt, spt units.
1 Special Boat, 2 Raiding sqns.
Milan ATGW; *Blowpipe* SAM; 8 *Gazelle* AH-1, 6 *Scout* AH-1 hel.
(On order: 4 *Lynx*, 5 *Gazelle* hel.)

RESERVES (Navy and Marines): Regular 28,000; Volunteer 6,400: 1 Raiding sqn, 9 MCM vessels.

Air Force: 91,500 (incl 5,700 women); some 700 combat ac.
14 strike/attack sqns: 3 with some 54 *Vulcan* B-2/SR-2 (2 to be disbanded, 6 ac being converted to tankers); 1 with 12 *Tornado* GR-1 (1 more to form early 1983); 4 with some 50 *Buccaneer* S-2A/B; 6 with 72 *Jaguar* GR-1.
3 close support sqns with 44 *Harrier* GR-3/T-4 v/STOL.
9 interceptor sqns: 2 with 24 *Lightning* F-6/F-3 (24 more ac in reserve); 7 with 87 *Phantom* (5 with FGR-2, 2 with FG-1); (72 *Hawk* T-1 to be armed for role).
3 recce sqns: 2 with 24 *Jaguar* GR-1, 1 with 20 *Canberra* PR-9 (to be disbanded early 1983).
1 AEW sqn with 6 *Shackleton* AEW-2 (5 in reserve).
4 MR sqns with 28 *Nimrod* MR-1/-1A, MR-2 (*Harpoon* ASM being fitted).
2 tanker sqns with 16 *Victor* K-2.
1 strategic tpt sqn with 11 VC-10C1.
4 tac tpt sqns with 45 C-130H (4 being converted to tankers) incl 6 C-130HC3; 8 more C-130 in active reserve.
4 comms sqns with 6 HS-125 CC1/2, 4 *Andover*, 6 *Pembroke*, 13 *Devon* ac, 2 *Whirlwind*, 1 *Gazelle* hel.
Queen's Flt with 3 *Andover* ac, 2 *Wessex* hel.
3 ECM/target facilities/calibration sqns with 32 *Canberra*, 3 *Nimrod* MR-1, 5 *Andover* E-3/C-1.
12 OCU: 1 NATO with 21 Br, 22 FRG, 7 lt *Tornado* GR-1; 11 others with: 9 *Vulcan* B-2, 22 *Tornado* GR-1, 13 *Buccaneer* Mk 2, 24 *Phantom* FGR-2, 22 *Jaguar* GR-1/T-2, 27 *Harrier* GR-3/T-4 v/STOL, 3 *Nimrod* MR, 4 *Canberra* B-2/T-4, 5 C-130, 3 *Victor* K-2 ac; 4 *Wessex* HC-2, 5 *Puma* HC-1, 2 *Sea King* HAR-3, 6 CH-47 *Chinook* hel.
2 tac weapons units with 59 *Hunter* F-6/GA-9/T-7, 45 *Hawk* T-1, 2 *Jet Provost*.
7 hel sqns: 5 tac tpt (1 with 20 *Wessex*, 2 with 26 *Puma* HC-1, 1 (1 more forming) with 24 CH-47 *Chinook*); 2 SAR (1 with 18 *Wessex* HAR-2, 1 with 14 *Sea King*).
Trg units with 83 *Hawk* T-1, 148 *Jet Provost*, 11 *Jetstream* T-1, 112 *Bulldog* T-1, 60 *Chipmunk* T-10, 19 *Dominie* T-1, 1 *Husky* T-1 ac; 5 *Whirlwind*, 5 *Wessex* Mk 5, 24 *Gazelle* HT-3 hel.
AAM: *Sidewinder*, *Sparrow*, *Red Top*, *Firestreak*, *Sky Flash*.
ASM: *Martel*, *Harpoon*.
8 SAM sqns: 2 with 64 *Bloodhound* 2, 6 (RAF Regt) with 48 *Rapier*.
(On order: 23 *Harrier* GR-3, 60 GR-5 (AV-8B), 123 *Tornado* (out of 220 GR-1 FGA, 165 F-2 AD planned), 8 *Nimrod* AEW-3, 46 *Hawk*, 9 VC-10 tankers (4 K-2, 5 K-3); 7 *Puma*, 3 *Chinook* hel; AIM-9L *Sidewinder*, *Sky Flash* AAM; *Sea Eagle* ASM.)

ROYAL AIR FORCE REGIMENT:
4 wing HQ.
6 SAM sqns (*Rapier*) and 5 fd sqns (2 with AFV).
6 *Scorpion* lt tks; 15 *Spartan* APC; *Blowpipe* SAM.
(On order: 30 *Scorpion* lt tks, 75 *Spartan* APC.)

DEPLOYMENT:
The Royal Air Force includes an operational home command (Strike Command), responsible for the UK Air Defence Region and the Near and Far East, and 1 overseas command (RAF Germany).

RESERVES: Regular 29,500. Volunteer about 600: 3 def sqns, RAF Regt.

Forces Abroad:
Antarctica. Navy: 1 ice patrol ship.
Ascension Island. RAF: *Vulcan*, *Nimrod*, C-130 tpt, *Victor* tanker dets.
Belize 1,800. Army 1,400: 1 inf bn, 1 armd recce tp, 1 arty bty, 1 lt AD tp, 1 engr sqn (part), 1 hel flt (4 *Gazelle*). Navy: 1 destroyer/frigate (guard ship), 1 spt ship. RAF 200: 1 flt; 4 *Harrier* GR-3 FGA, 4 *Puma* hel, 1 *Rapier* AD det (4 units) RAF Regt.
Brunei. Army: 1 Gurkha inf bn.
Canada. Army training team.
Cyprus. Army 3,500: 1 inf bn less 2 coys, 1 armd recce sqn, 1 hel flt and log spt with UNFICYP (817); 1 inf bn plus 2 inf coys, 1 armd recce, 1 engr spt sqns, 1 hel flt in garrison at Sovereign Base Areas. RAF 1,400: 1 *Wessex* HC-2 sqn (incl 1 flt (4 ac) with UNFICYP), periodic dets of other ac, 1 fd sqn RAF Regt.
Egypt (Sinai MFO). 35 technical and administrative personnel.
Falkland Islands (Task Force, status uncertain). Army: 1 bde (3 bns), 2 para bns, spt tps. Navy: 1 SSN, 1 diesel sub, 2 ASW carriers, 1 Type 82, 1 *County*, 2 Type 42 destroyers, some 15 frigates, 2 LPD, 4 landing ships, spt and auxiliary ships. Marines: 1 bde: 3 bns, arty, engrs, special boat raiding sqns. RAF: *Harrier* dets, *Rapier* dets.
Germany. British Army of the Rhine (BAOR) 55,000: 1 corps HQ, 3 armd divs, 1 arty div, 8 armd bdes; Berlin Inf Bde: 3,100. RAF 10,300: 2 *Phantom* FGR-2, 2 *Buccaneer* (to be replaced by *Tornado*), 5 *Jaguar* (1 recce), 2 *Harrier*, 1 *Puma* (tpt), 1 *Bloodhound* (60 redeploy to Britain in 1983), 4 *Rapier* sqns, 1 fd sqn RAF regt.
Gibraltar. Army: 1 inf bn, 1 engr team, 1 arty surveillance tp. Navy: 1 destroyer, 1 spt ship, Base (to close 1983).
Hong Kong. Army 7,100: Gurkha Bde with 1 Br, 4 Gurkha inf bns, 1 each Gurkha engr, sigs, tpt regts, 1 hel sqn, indep engr sqn, spt units. Navy 300: 5 *Ton* patrol craft, 2 SRN-6 hovercraft, 1 Marine Raiding sqn. RAF 250: 1 *Wessex* sqn.
Indian Ocean (intermittent). 1–2 destroyers/frigates, 2 spt ships; Diego Garcia, 1 naval det.
Military Advisers 1,700. Bahrain, Brunei, Ghana, Kuwait, Mauritius, Nigeria, Oman (655), Qatar, Saudi Arabia, Sudan, Swaziland, UAE, Uganda, Zimbabwe.

Para-Military Forces: Royal Ulster Constabulary: 6,950, some 3,000 reserves.

CANADA

Population: 24,200,000.
Military service: voluntary.
Total armed forces: 82,858 (6,667 women).[4]
GDP 1981: $C 340.29 bn ($US 282.87 bn).
Defence expenditure 1982–3: $C 7.04 bn ($US 5.71 bn); NATO definition not available.
GNP growth: 0.0% (1980), 3.1% (1981).
Inflation: 11.2% (1980), 12.1% (1981).
$US 1 = $C 1.233 (1982), $C 1.203 (1981).

Army (Land Forces): 13,000.[4]
Mobile Command (about 16,000 land and air).[5]
2 bde gps each comprising:
1 armd regt, 3 inf bns, 1 arty regt (2 close spt, 1 AD btys), 1 engr regt, spt units.
1 special service force (4,000) comprising:
1 armd regt, 1 inf bn, 1 AB regt, 1 arty regt, 1 engr regt, 1 spt unit.
1 mech bde gp (under command Canadian Forces, Europe) comprising:
1 armd regt, 1 mech inf bns, 1 med SP arty, 1 mech engr regts, 1 spt unit, 1 lt hel sqn.
114 *Leopard* C-1 MBT; 100 *Lynx*, 195 *Cougar* AFV, 955 M-113, 269 *Grizzly* APC; 55 105mm pack, 159 105mm how, 50 M-109 155mm SP how; 810 *Carl Gustav* 84mm RCL; 149 *TOW* ATGW; 42 40mm AA guns; 103 *Blowpipe* SAM.
(On order: *Blowpipe* SAM.)

RESERVES: about 15,500 Militia; 131 combat arms units and spt units (all in Mobile Command), plus 1,560 in Communications Reserves.

Navy (Maritime): 5,500.[4]
Maritime Command (about 8,700).[5]
3 *Oberon* submarines.
23 ASW destroyers: 4 DD-280, each with 2 *Sea King* hel and 2 × 4 *Sea Sparrow* SAM; 2 *Annapolis*, 6 *St Laurent* with 1 hel; 4 *Improved Restigouche*, 4 *Mackenzie* with *ASROC*, 3 *Restigouche* (in reserve).
3 replenishment spt ships (2 with 3 *Sea King* hel each).
6 coastal patrol ships (trg).
6 small patrol craft.

DEPLOYMENT AND BASES
Atlantic: 3 subs, 13 surface (1 in reserve), 2 replenishment spt ships with 1 hel. Halifax.
Pacific: 10 surface (2 in reserve), 1 replenishment spt ship. Esquimalt.

RESERVES: about 3,250.

Air Force (Air): 15,300;[4] some 208 combat ac, 32 armed hel.
Air Command (23,000).[5]
1 Air Group (1 CAG, Germany).
3 fighter sqns with 42 CF-104/CF-104D (to get 54 CF-18).
1 hel sqn with 11 CH-136 (*Kiowa*).

Fighter Group (forming), NATO assigned: 2 FGA sqns with 20 CF-116 (F-5A), 4 CF-116D (F-5D).
1 Tactical Air Group (10 TAG, Canada) (disbanding on reorganization).
6 hel sqns with 31 CH-135 (UH-1N), 36 CH-136, 8 CH-147 *(Chinook)*.
Air Defence Group (NORAD-assigned: disbanding on reorganization; 7,800 military, 2,600 civilian).
3 AWX sqns and 1 OCU with 50 CF-101 *Voodoo*, 10 CF-104, 10 CF-104D (to get 84 CF-18).
1 ECM trg sqn with 3 CC-117 (*Falcon* 20, to be 6); 16 CT-133.
4 main, 17 auxiliary sites of Distant Early Warning *(DEW)* Line.
24 long-range radar sites (*CADIN/Pine Tree Line*).
1 Space tracking and identification site.
Maritime Air Group:
3 maritime patrol sqns, with 19 CP-140 *Aurora*, (4 in reserve).
1 MR and 1 reserve sqns with 18 CP-121 *Tracker* (to get DHC-8).
2 ASW hel sqns and 1 trg sqn with 32 CH-124 *(Sea King)* (3 in reserve).
2 utility sqns with 9 T-33, 3 CP-121 ac and 2 CH-135 hel.
Air Transport Group:
5 tpt sqns: 3 with 27 CC-130E/H; 1 with 5 CC-137 (Boeing 707); 1 with 7 CC-109 *Cosmopolitan*, 4 CC-117 *Falcon*, 2 CC-132 (DHC-7R) (getting 4 CC-144 *Challenger*).
4 tpt/SAR sqns with 11 CC-115 (DHC-5), 8 CC-138 (DHC-6) ac; 3 CH-113 *Labrador*, 7 CH-113A *Voyageur*, 3 CH-135 *(Twin Huey)* hel.
1 SAR unit with 3 CH-113 *Labrador*.
4 base flts with 9 CH-118 *Iroquois*, 2 CH-135.
Training Group:
1 trg sqn with 14 CF-116 (F-5A), 21 CF-116D (F-5D) to go to fighter group.
3 schools: 1 with 18 CT-134 *(Musketeer)* ac, 14 CH-139 hel; 1 with 89 CT-114 *Tutor*; 1 with 2 CT-134, 17 CT-114; 2 CC-129 (C-47).
1 demonstration unit with 11 CT-114.
(On order: 138 CF-18A/B *Hornet* fighters; 4 CC-144 (Canadair *Challenger*).)

RESERVES: 950. Air Reserve Group; 2 wings with 16 CH-136 hel. Other ac incl 26 CF-104, 8 CF-104D, 3 CC-129.

Forces Abroad:
Europe: 5,400; 1 mech bde gp of 3,200 with 59 *Leopard* 1 MBT, 375 M-113 APC/recce, 24 M-109 155mm SP how, 40 *TOW* ATGW, 50 40mm AA guns, 70 *Blowpipe* SAM, 11 CH-136 hel. (Plus about 1,300 HQ and spt tps, 2,500 additional tps in Canada as reinforcements.)
1 Air Group: 764: 3 fighter sqns with 42 CF-104/CF-104D; 1 hel sqn with 11 CH-136 hel; 1 det with 2 CC-132, 4 CT-133 liaison ac.
Cyprus (UNFICYP): 515.
Syria/Israel (UNDOF): 220.
Other Middle East (UNTSO): 20.

Para-Military Forces:
Coast Guard: 18 icebreakers, 13 patrol craft, 2 DHC-7R ac, 35 hel; 3 SRN-5/-6 hovercraft.
Canadian Rangers 6,561 (civilian-manned): 1,300.

DENMARK

Population: 5,125,000.
Military service: 9 months.
Total armed forces: 31,200 (670 women; 9,500 conscripts).
GDP 1981: Kr 410.165 bn ($57.58 bn).
Defence expenditure 1982: Kr 8.977 bn ($1.102 bn); NATO definition $1.148 bn.
GNP growth: −0.9% (1980), −1.0% (1981).
Inflation: 10.9% (1980), 12.2% (1981).
$1 = 8.146 kroner (1982), 7.123 (1981).

Army: 18,000 (6,700 conscripts).
2 div HQ.
5 mech inf bdes, each with 1 tk, 2 mech, 1 arty bns, 1 AD bty, 1 engr coy, spt units.
3 regimental combat teams, each with 2 inf, 1 arty bns, 1 ATK gp, indep recce bns.
120 *Leopard* 1, 88 *Centurion* MBT; 48 M-41 lt tks; 650 M-113, 68 M-106 mor-armed APC; 24 155mm guns; 144 105mm, 96 155mm, 12 M-115 203mm how; 72 M-109 155mm SP how; 81mm, 120mm mor; 400 *Carl Gustav* 84mm, 252 106mm RCL; *LAW* RL; 84 *TOW* ATGW; 36 L/60 40mm AA guns; *Hamlet (Redeye)* SAM; 15 Saab T-17 lt ac; 12 Hughes 500A hel.

RESERVES: Augmentation Force 6,000, subject to immediate recall; Field Army Reserve 43,000, comprising 12,000 Covering Force Reserve (to bring units to war strength and add 1 mech bn to each bde) and 31,000 to provide combat and log spt; Regional Defence Force 16,000 (being reorganized into 7 regimental combat teams) with 21 inf, 2 tk, 7 arty bns, ATK sqns, spt units; Army Home Guard 57,300 (7,600 women).

Navy: 5,800 (1,300 conscripts).
5 submarines: 2 *Narhvalen*, 3 *Delfinen*.
5 frigates with 8 *Harpoon* SSM, *Sea Sparrow* SAM: 2 *Peder Skram*, 2 *Niels Juel*.
5 *Hvidhjørnen* fishery-protection frigates, each with 1 hel.
10 *Willemoes* FAC(M) with *Harpoon* SSM.
6 *Søløven* FAC(T) (some in reserve).
22 large patrol craft: 8 *Daphne*, 3 *Agdleq*, 2 *Maagen*, 9 *Barsø*.
5 *Botved* coastal patrol craft(.
7 minelayers: 4 *Falster*, 2 *Lindormen*, 1 *Langeland*.
6 ex-US Type 60 coastal minesweepers.
Coastal defence unit:
8 *Lynx* hel.
(On order: 4 Type 210 submarines. 15 *Harpoon* SSM, *Sea Sparrow* SAM.)

Bases: Copenhagen, Korsør, Frederikshavn.

RESERVES: 4,200; Navy Home Guard 4,900 (1,400 women): 37 coastal patrol craft.

Air Force: 7,400 (1,500 conscripts); 112 combat aircraft.
4 FGA sqns: 1 with 16 F-35XD *Draken*, 1 with 8 F-100D/F, 2 with 32 F-16.
2 interceptor sqns each with 20 F-104G.
1 recce sqn with 16 RF-35XD *Draken*.
1 tpt sqn with 3 C-130H, 3 *Gulfstream* III.
1 SAR sqn with 8 S-61A hel.
Trainers: 8 F-16B, TF-35XD, 16 Saab T-17.
2 SAM bns: 1 with 18 *Nike Hercules*, 1 with 24 *Improved HAWK*.
AAM: *Sidewinder*. ASM: *Bullpup*.
(On order: 18 F-16A/B fighter ac.)

RESERVES: 10,100; Air Force Home Guard 11,900 (3,400 women).

Forces Abroad:
Cyprus (UNFICYP): 1 bn (326).

FRANCE

Population: 53,874,000.
Military service: 12 months; 18 months for overseas.
Total armed forces: 492,850[6] (12,300 women; 255,500 conscripts).
GDP 1981: fr 3,100.7 bn ($570.51 bn).
Defence expenditure 1982: fr 122.855 bn ($19.295 bn); NATO definition: $22.677 bn.
GDP growth: 1.6% (1980), 0.9% (1981).
Inflation: 13.6% (1980), 14.0% (1981).
$1 = 6.367 francs (1982), 5.435 (1981).

Strategic Nuclear Forces: (19,700; some 2,800 Army, 5,500 Navy, 10,600 Air Force, 800 *Gendarmerie*.)
SLBM: 5 SSBN, each with 16 M-20 msls (1 more building) (M-4 msl to replace M-20), 1 experimental/trials diesel boat with 4 SLBM tubes.
IRBM: 18 SSBS S-3 msls in 2 sqns.
Aircraft:
Bombers: 6 sqns with 34 *Mirage* IVA (AN-22 nuclear bombs); 15 to convert to theatre role with ASMP nuclear weapon.
3 trg sqns: 1 with 4 *Mirage* IVA; 1 with 4 *Mirage* IIIB/BRV; 1 with 5 *Noratlas* N-2501/SNB.
Tankers: 1 wing (3 sqns) with 11 KC-135F.
Reserve: 10 *Mirage* IVA (4 recce).
(On order: 1 SSBN, 16 M-4 SLBM, ASMP ASM.)

Army: 314,200, incl Army Aviation, 6,600 women (198,000 conscripts).
1 army HQ, 3 corps HQ.
8 armd divs.
2 mech inf, 2 motor rifle divs.
1 alpine div (9,800): 3 regts, 5 bns, 1 engr coy.
1 para div (16,950): 12 regts, 1 bn.
1 air portable marine div (9,230): 7 motor inf/inf/para regts, 1 coy.
1 lt armd bde (overseas intervention).
Berlin sector force (1 armd regt, 1 inf regt).
Army corps regts: 5 recce, 2 drone, 3 motor rifle, 6 arty, 5 arty (SSM) with 42 *Pluton*, 7 SAM (3 (11 btys) with 60 *HAWK*, 4 with 24 *Roland* I/II and twin 30mm AA guns), 1 para, 3 AA arty, 7 engr, 10 sigs, 2 CW defence, 8 tpt.
3 log bdes.
Indep regts: 6 sigs, 1 EW, 2 para, 4 engr.
AFV: 1,140 AMX-30/-30B2 MBT; 780 AMX-13 lt tks; 65 AMX-10RC, 250 Panhard EBR hy, 10 ERC-90S, 500 AML lt armd cars; 620 AMX-10P MICV, 1,050 AMX-13 VTT, 1,100 VAB APC.
Arty: 155 HM-2, 112 BF-50 105mm towed, 145 AU-50 105mm, 173 F-3 155mm SP how; 6 GCT 155mm SP guns; 42 *Pluton* SSM; 250 120mm mor.
ATK: 220 SS-11, 1,180 *Milan*, 86 *HOT*, *ENTAC* ATGW, 7,950 89mm RL.
AD: 140 20mm, 390 30mm and 40mm towed, 56 twin 30mm SP AA guns; 66 *HAWK*, 60 *Roland* SAM.
Air: R-20, CL-89 recce drones.

ARMY AVIATION (ALAT): (6,700).
6 combat hel regts: 7 lt gps, 5 overseas sqns, 2 schools. 158 *Alouette* II, 66 *Alouette* III with AS-11 ATGW; 118 SA-330 *Puma*, 154 SA-341F and 42 SA-342M *Gazelle* hel with *HOT*; 20 *Broussard*, 40 L-19 lt ac.
(On order: 240 AMX-30/-30B MBT; 47 AMX-10RC, 100 ERC-90S armd cars; 155 AMX-10 MICV, 270 VAB APC; 230 155mm GCT SP guns; 160 TR 155mm how; 45 120mm mor; 38 *HOT*, 140 *Milan* ATGW; 60 twin 20mm AA guns; 21 *Roland* II SAM; 18 SA-341/-342 hel.)

RESERVES: 281,000 (14 inf divs, 4 formed from military schools; unit equivalents of 50 regts). 63 AMX-13/90 lt tks; 82 AML armd cars; 46 AMX-13 VTT APC; 180 75mm, 328 106mm RCL; 318 81mm mor.

Navy: 68,000 incl Naval Air, 18,000 conscripts (700 women); 46 major surface combat vessels. 4 comds: 2 home (CECLANT, CECMED), 2 overseas.
21 attack submarines: (1 nuclear *Rubis*; 4 *Agosta*, 9 *Daphne*, 1 *Arethuse*, 6 *Narval*).
2 *Clemenceau* carriers: 1 attack with 36 ac (2 flts with 16 *Super Etendard*, 1 with 10 F-8E, 1 with 7 *Alizé*), 1 det with 3 *Etendard* IVP, 2 hel); 1 ASW with 40 hel.
1 *Jeanne d'Arc* hel carrier (trg ship, capacity 8 *Lynx* hel) with 6 × 1 *Exocet* SSM.
1 command cruiser with 4 × 1 *Exocet* SSM, 1 × 2 twin *Masurca* SAM.
19 destroyers: 5 AA (2 *Suffren* with 4 × 1 *Exocet*, 1 *Malafon* ASW/SSM, 2 × 1 *Masurca* SAM; 3 T-47 with 1 *Tartar* SAM); 14 ASW (3 C-70 with 4 *Exocet*, 1 × 8 *Crotale*, 2 hel; 3 F-67 with 6 *Exocet*, 1 × 8 *Crotale*, 1 *Malafon*, 2 *Lynx* hel;

1 T-56 with 1 *Malafon*, 1 hel; 1 T-53 with 4 *Exocet*, 1 *Lynx* hel; 5 T-47 with 1 *Malafon*; 1 C-65 with 4 *Exocet*, 1 *Malafon*).
23 frigates: 8 *Rivière* with 4 *Exocet*; 14 Type A-69 (8 with 2 *Exocet*); 1 *Balny*.
5 FAC(M): 4 *Trident* with 6 SS-12; 1 *La Combattante* with 1 × 4 SS-12 SSM.
10 large patrol craft: 4 *Sirius*, 4 ex-Can *La Dunkerquoise*, 1 *Mercure*, 1 *Stern*.
2 *Eridan*, 5 *Circe* minehunters, 5 ex-US *Aggressive* ocean minehunters.
19 coastal minesweepers: 5 *Berliamont*, 5 Type D, 9 MSC-60.
4 assault ships: 2 *Ouragan* (with 3 *Super Frelon* or 10 *Alouette* hel, 18 LCM or 2 LCT), 2 *Batral*.
5 LST, 11 LCT, 26 LCM.
7 ocean-going tankers, 5 maintenance/log ships.
(On order: 4 SSN, 5 C-70 destroyers (3 ASW, 2 AA), 3 frigates, 8 FAC(M), 13 minehunters, 2 *Batral* assault ships, 2 ocean tankers, 11 fishery protection vessels.)

Bases: Cherbourg, Brest, Lorient, Toulon.

DEPLOYMENT: *Atlantic Fleet:* 10 subs, 1 hel carrier, 22 surface combatants; *Mediterranean Fleet:* 11 subs, 2 carriers, 14 surface combatants.
See also *Forces Abroad*, column 2, below.

NAVAL AIR FORCE: (13,000); 141 combat ac, 32 armed hel.
3 strike sqns with 36 *Super Etendard* (AN-52 nuclear weapons).
1 interceptor sqn with 16 F-8E (FN) *Crusader*.
2 ASW sqns with 16 *Alizé* (mod).
5 MR sqns: 4 with 27 *Atlantic*, 1 with 6 SP-2H *Neptune*.
1 recce sqn with 8 *Etendard* IVP.
1 OCU with 12 *Etendard* IVM, 12 *Magister*, 5 *Alizé*.
3 ASW hel sqns with 19 *Lynx*.
2 assault hel sqns with 13 *Super Frelon*.
1 overseas section with 3 SP-2H *Neptune*, one tpt det with 2 C-47D.
4 comms sections: 1 with 8 *Paris* 8, 3 *Falcon* 10MER; 3 with 11 *Navajo*, 12 Nord 262, 2 *Falcon* 10MER, DC-6A.
2 comms/SAR/trg hel sections with 24 *Alouette* II/III.
1 trials unit with 6 *Alouette* II/III, 2 *Lynx*, 2 *Super Frelon*.
2 trg units: 1 with 8 Nord 262; 1 with 15 C-47D.
3 liaison/trg sections with 15 *Rallye* 100S, 6 CAP-10.
ASM: AM-39 *(Exocet)*, AS-11/-12/-30, AS-37 *Martel*. AAM: R-530, *Sidewinder*, R-550 *Magic*.
(On order: 10 *Super Etendard* fighters, 42 *Atlantic* NG, 5 *Gardian* (HU-25A) MR; 16 EMB-121 *Xingu* tpt ac, 14 *Lynx* HAS-4 hel.)

COMMANDOS: 4 assault units (1 reserve), 1 submarine spt unit.

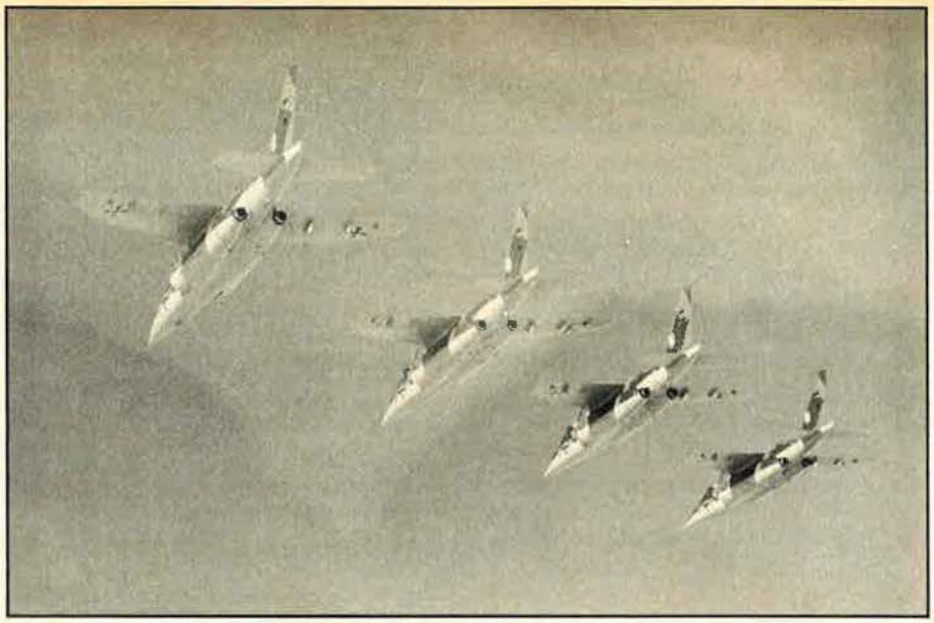
RESERVES: 64,000.

Air Force: 100,400 (38,500 conscripts, 5,000 women); 519 combat aircraft.
Air Defence Command (CAFDA): (10,700).
10 interceptor sqns: 2 with 30 *Mirage* IIIC (1 in Djibouti), 8 with 120 *Mirage* F-1C, 1 OCU with 15 *Mirage* F-1B.
4 liaison flts with 30 *Magister* T-53 and *Broussard*.
Air-defence system: automatic *STRIDA* II, 10 radar stations.
10 SAM sqns with 21 *Crotale* (1 trg).
104 AA btys with 20mm guns.
AAM: R-530, Super 530, R-550 *Magic*, *Sidewinder*.
Tactical Air Force (FATAC): (15,000).
5 strike sqns: 3 with 45 *Jaguar*, 2 with 30 *Mirage* IIIE (AN-52 nuclear weapons).
12 FGA sqns: 5 with 75 *Mirage* IIIE, 2 with 30 *Mirage* 5F, 5 with 75 *Jaguar* A (23 *Jaguar* A, 12 E in reserve).
3 recce sqns with 45 *Mirage* IIIR/RD (2 sqns to be replaced by *Mirage* F-1CR).
2 OCU: 1 with 21 *Mirage* IIIB/BE, 1 with 38 *Jaguar* A/E.
1 trg unit with *Mystère* 20.
8 liaison flts with *Magister*, *Broussard*.
AAM: *Sidewinder*, R-550 *Magic*, R-530.
ASM: AS-30/-30L, AS-37 *Martel*.
Attached to COTAM:
1 AEW sqn with 8 *Noratlas*.
1 liaison sqn with 10 *Magister*, 3 *Broussard*, 4 *Paris*.
1 hel sqn with 13 *Alouette* II/III.
Air Transport Command (COTAM): (7,000).
1 hy tpt sqn with 4 DC-8F.
6 tac tpt sqns: 4 with 46 Transall C-160, 2 with 25 *Noratlas*, DHC-6.
14 lt tpt/liaison sqns with 140 ac, incl 23 Nord 262, 8 *Mystère* 20, 1 *Mystère* 50, 20 *Paris*, 23 *Broussard*, 4 DHC-6, 3 C-160, 4 *Caravelle*.
1 OCU with 10 *Noratlas*, 8 *Paris*.
5 hel sqns with 32 *Alouette* II, 23 *Alouette* III, 21 *Puma*.
1 hel OCU with 19 *Alouette* II, 10 *Alouette* III, 5 *Puma*.
Training Command (CEAA): (16,000).
Some 400 aircraft, incl some 100 *AlphaJet*, 167 *Magister*, 35 MD-312 *Flamant*, *Noratlas*, 8 EMB-121, 8 *Xingu* (replacing MD-312), 51 CAP-10B/-20, 20 Jodel.
Trials Units: 1 sqn with *Mirage* F-1/-III, *Jaguar*; 1 sqn with 4 *Noratlas*, 4 *Breguet* 941.
Base Defence Force: (6,900); 50 VIB APC.
(On order: 5 *Mirage* F-1B, 32 F-1C, 30 F-1R, 73 *Mirage* 2000 fighters; 4 E-2C *Hawkeye* AEW; 64 *AlphaJet* trg ac; 24 Transall C-160 tpts; 17 *Xingu*, 150 *Epsilon* trg ac; 10 hel, 56 20mm AA guns; SATCP SAM.)

RESERVES: 112,000.

Forces Abroad:
Europe. *Germany:* 48,500; 3 armd divs. *Berlin:* 2,700; 1 armd regt, 1 inf regt.
Overseas Dependencies: 16,500; Army 9,800, Navy 2,000, Air 1,700, *Gendarmerie* 3,000. Four inter-service overseas commands: Antilles-Guyana (1 marine, 3 inf regts, 1 inf bn); South Indian Ocean (1 para, 1 inf, 1 marine regts, 1 inf coy); New Caledonia (1 marine inf regt); Polynesia (1 marine, 1 inf regts). Two naval commands: Indian Ocean (ALINDIEN: 3,500, 22 ships) and Pacific (ALPACI). (160 lt tks, 8 surface combatants, 9 patrol vessels, 10 *Mirage* IIIC, 7 MR, 15 tpt ac, 64 hel.)
Other Overseas: some 7,220 from all services (numbers vary according to local circumstances). Eqpt incl 120 AFV, 15 combat, 18 spt vessels, 25 combat and 25 tpt ac, 43 hel.
Deployed:
Central African Republic (1,500). Para, Legion marine units; armd cars, 120mm mor, *Milan* ATGW; 1 hel sqn with 7 *Puma*; 2 C-160 tpt ac.
Djibouti (3,250). 3 inf coys, 2 armd sqns, 2 arty (1 AA) btys; 1 sqn with 10 *Mirage* IIIC; naval elms.
Gabon (450). 1 marine inf bn; 4 *Jaguar*, 3 C-160, 1 *Atlantic* ac.
Ivory Coast (450). 1 marine inf bn.
Lebanon (UNIFIL) (1,338). 1 inf bn, engr coy, log unit.
Saudi Arabia (80). Technical advisers.
Senegal (1,170). 1 marine inf bn.
Zaire (128). Trg team.

Para-Military Forces: Gendarmerie 83,000 (5,400 conscripts; to be reinforced by 2,000 from Navy, Army, Air Force): 907 territorial units, 155 traffic units, 130 mobile squadrons, 225 overseas units; 36 AMX-13/75 lt tks, 120 AML armd cars, 33 AMX-13 VTT, 155 VRBG APC, 280 81mm mor, 6 patrol boats, 6 Cessna 206C ac, 42 *Alouette* II/III, 1 *Ecureuil* hel (on order: 36 VBC-90 armd cars, 4 hel). *Service de Santé* 6,900 (230 conscripts).



The German-French AlphaJet, shown here in formation over Bavaria, combines trainer and attack capabilities in a single airframe. More than half a dozen nations are acquiring it.

GERMANY: FEDERAL REPUBLIC

Population: 61,665,000 (incl West Berlin).
Military service: 15 months (to be 18 months).
Total armed forces: 495,000 (70 women, 229,000 conscripts);7 on mobilization about 1,250,000.
GDP 1981: DM 1,552.9 bn ($687.12 bn).
Defence expenditure 1982: DM 44.26 bn ($18.44 bn); NATO definition $22.68 bn.
GNP growth: 1.8% (1980), −0.5% (1981).
Inflation: 5.5% (1980), 6.3% (1981).
$1 = DM 2.40 (1982), DM 2.26 (1981).

Army: 335,500 (180,000 conscripts).
HQ Support Elements: General Army Office subordinate echelon and spt tps, Federal Armed Forces Supreme Command: 32,500.
Field Army: 265,000.
3 corps: 12 divs (6 armd, 4 armd inf, 1 mountain, 1 AB):
36 bdes: 17 armd (each with 3 tk, 1 armd inf, 1 armd arty bns), 15 armd inf (each with 1

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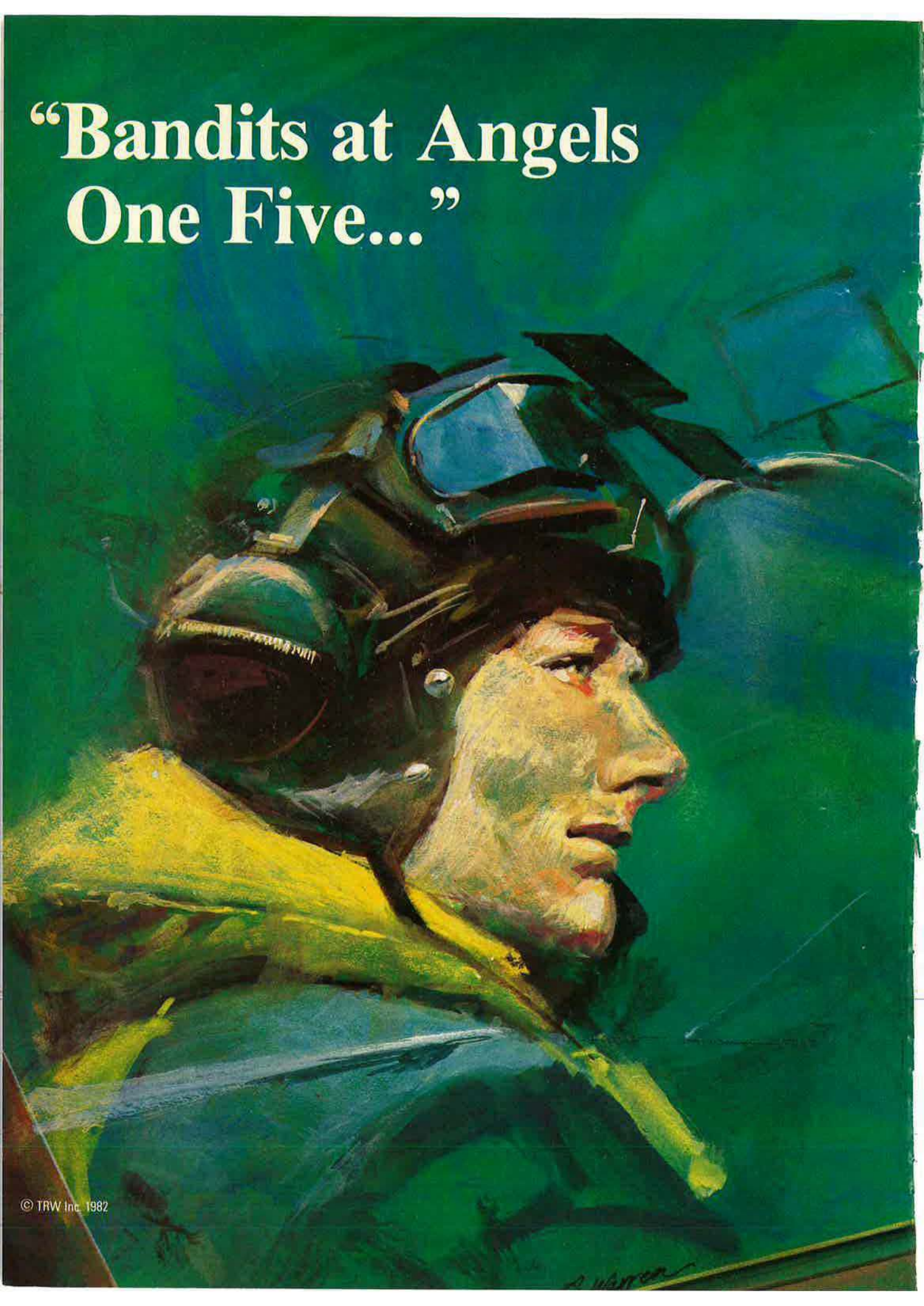


In the terrible summer of 1940, the Battle of Britain was fought with blood, sweat, and electronics. Tears were incidental as the men and women of the RAF battled to dominate their home skies... or be swept to defeat by the Luftwaffe.

Their radars were primitive but, knowing the altitude (an "angel" meant 1,000 feet), direction, and approximate number of "bandits," at long range, gave precious minutes of early warning. Britain's few squadrons of Hurricanes and Spitfires wasted little time patrolling. Their pilots stood ready to scramble the instant an alert was sounded. Men and machines were used so efficiently that Fighter Command's force effectiveness was multiplied many times.

Technology has come a long way since what Winston Churchill called the "wizard war." Today, digital techniques are used to sort avalanches of intelligence data so that commanders in all the services can review battlefield situation maps almost in real time. The force multiplication factor is more vital than ever, as recent events have shown.

That's why TRW is continually building its staffs of computer scientists, mathematicians, and engineers. They are developing advanced sensors, data links, high-speed computers, and complex software to provide increasingly intelligent command, control, and communications networks for the military and other government agencies. With one of the world's largest and most advanced capabilities in system development and integration, TRW is a key factor in the nation's commitment to quality in military systems. Specifically:

Tactical C^3I Systems

In 1981, TRW delivered BETA, a highly automated, tactical intelligence data fusion test bed, to the Army. A fixed-base version of this system, LOCE, is now in Europe to serve allied command and control centers. Our work on these projects has given us a solid technological base for the forthcoming Joint Tactical Fusion program.

TRW/ESL has developed a series of highly automated digital direction-finding systems that locate hostile emitters with lightning speed and pinpoint accuracy. They include the aircraft-mounted GUARDRAIL for Corps areas and higher echelons; the heliborne QUICKFIX II; and the land-mobile TRAILBLAZER, which operates close to the forward line of troops.

We are now focusing major system engineering capabilities on a key, new program: SHORADS C^2 Integration, which will solve the difficult problems of netting and controlling short-range air defense for the Army.

Avionics Systems

Since 1975, we have helped the Air Force to develop DAIS, the Digital Avionics Information System. It enables planners to analyze existing and proposed avionic systems to improve performance and reduce life-cycle costs by standardizing hardware and software. We are now involved in the next phase of digital avionics development for the Air Force, called Pave Pillar.

We have also been helping the Air Force to make fuller use of embedded computer systems. Our in-depth knowledge of integrated support techniques is enhancing Air Force systems, from navigation to electronic warfare. TRW is now prepared to develop the Area Reprogramming Capability, which will provide operational Air Force commands an automated capability to reprogram mission data in airborne electronic warfare systems.

Space Systems

As a pioneer in space surveillance command and control systems, TRW built the GEODSS deep-space surveillance system for AFESD and it is now in operational use by Strategic Air Command. Under development for the Tactical Applications Center is the Global Subsurface System for detection of seismic disturbances. We are developing software for AFESD/General Electric's over-the-horizon backscatter radar system and, for Air Force Space Division, TRW is the integration contractor on the Consolidated Space Operations Center. We are also supporting Ford Aerospace as a major subcontractor for the proposed Space Defense Operations Center.

TRW provides the Defense Communications Agency with systems engineering for the Worldwide Military Command and Control System (WWMCCS) and the Minimum Essential Emergency Communications Net. We plan to apply this background to AFESD's forthcoming WIS Integration project.

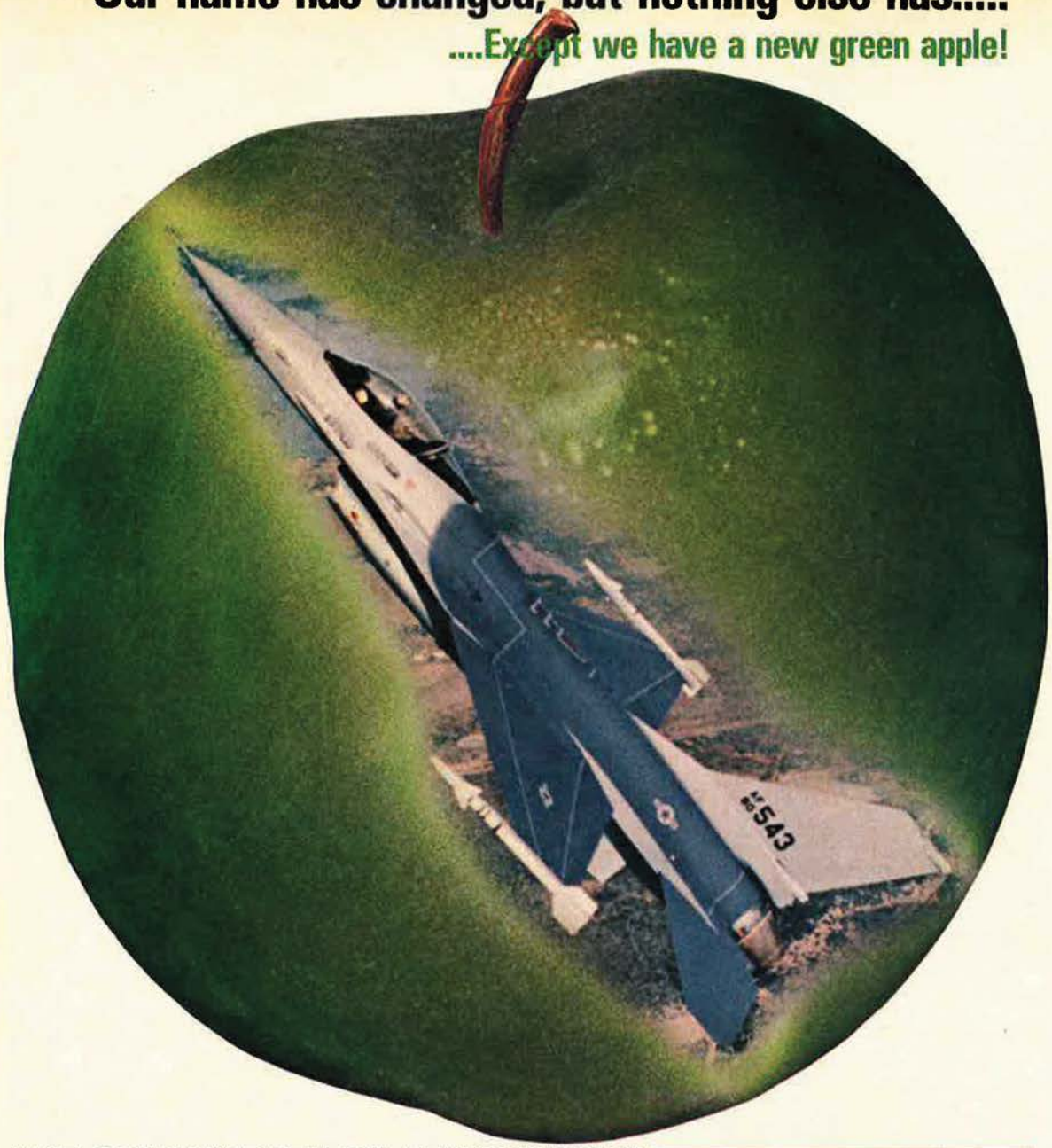
For the future we are already combining many technical disciplines to support the newly formed Air Force Space Command.

For further information, contact:
TRW Defense Systems Group,
E2/3042, Redondo Beach, CA 90278

TRW

Our name has changed, but nothing else has.....

....Except we have a new green apple!



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tk, 3 armd inf, 1 armd arty bns), 1 mountain, 3 AB.
Total: 67 tk, 62 armd inf, 9 para bns.
3 AD regts with *Roland* II SAM.
11 AA regts with *Gepard* 35mm SP guns.
4 SSM bns with *Lance*.
3 army aviation comds, each with 1 lt, 1 med tpt hel regt; 1 ATGW hel regt.

Territorial Army: 38,000.
3 Territorial Commands, 5 Military Districts:
6 Home Defence bdes (each with 2 tk, 2 inf, 1 arty bns and manned, on average, at 60%).
6 more Home Defence bdes planned (each with 1 tk, 2 inf, 1 fd arty bns): weapons storage units only in peacetime.
Security troops: 15 Home Defence Regiments (with 45 mot inf bns), 150 coys, 300 security platoons; defensive, comms, military police, and service units on mobilization.

AFV: 1,232 M-48A2/A2G2, 2,437 *Leopard* 1, 269 *Leopard* 2 MBT; 411 SPz-2 *Luchs*, 824 SPz 11-2, 108 SPz 12-3 (HS-30) armd cars; 2,136 *Marder* MICV, 245 TPZ-1, 4,016 M-113 APC.

Arty: 191 105mm, 216 FH-70 155mm how; 586 M-109 155mm how, 149 M-107 175mm guns (being rebarrelled with 203mm in 1982), 77 M-110 203mm SP how; 955 120mm mor (500 SP); 209 *LARS* 110mm MRL; 26 *Lance* SSM.

ATK: 770 JPz 4-5 90mm SP ATK guns (some converting to *TOW*); 204 106mm RCL; 55 SS-11, 1,936 *Milan*, 346 *TOW* ATGW, 261 RJPz-*(HOT) Jaguar* 1 ATGW veh.

AD: 1,745 20mm, 200 40mm towed, 426 *Gepard* 35mm SP AA guns; 800 *Redeye*, 43 *Roland* SAM.

Air: 190 UH-1D, 180 *Alouette* II/III, 84 PAH-1 (BO-105P with *HOT*), 42 BO-105M, 107 CH-53G hel.

(On order: 1,531 *Leopard* 2 MBT; 751 TPZ-1 APC; 39 *Milan* ATGW, 55 RJPz-*(HOT) Jaguar* 1, 162 RJPz-*(TOW) Jaguar* 2 ATGW veh; 100 *Roland* II SAM; 128 PAH-1, 58 BO-105M hel.)

Navy: 36,400, incl naval air (11,000 conscripts).
24 submarines (18 Type 206, 6 Type 205).
7 destroyers: 3 *Adams* with 1 *Tartar* SSM and 8 *ASROC* (being retired); 4 *Hamburg* with 2 × 2 *Exocet* SSM.
7 frigates: 1 *Bremen* with 2 × 4 *Harpoon* SSM, 1 × 8 *Sea Sparrow* SAM, 2 *Lynx* hel; 6 *Köln*.
6 corvettes: 5 *Thetis*, 1 *Hans Bürkner*.
30 FAC(M) with 4 *Exocet* SSM: 10 Type 143, 20 Type 148.
9 Type 142 FAC(T) (T-143A FAC(M) to replace).
18 *Lindau* MCM: 12 Type 331 coastal minehunters (MHC), 6 Type 351 *Troika* drone control minesweepers (MSCD), 18 F-1 drone vessels (MCD).
21 *Schütze* coastal minesweepers.
18 inshore minesweepers: 4 Type 393/394B, 14 Type 393/394A.
10 *Rhein* depot, 8 *Lüneberg* spt ships, 6 tpts, 9 tankers.
22 Type 520 LCU, 28 Type 521 LCM.
(On order: 6 Type 122 frigates, 10 Type 143A FAC(M).)

Bases: Flensburg, Wilhelmshaven, Kiel, Olpenitz.

NAVAL AIR ARM: 107 combat ac; 12 armed hel.
3 attack sqns with 54 F-104G, 7 *Tornado* (2 sqns converting).
1 recce sqn with 27 RF-104G.
2 MR sqns with 14 *Atlantic*, 5 ELINT *Atlantic*.
1 SAR hel sqn with 22 *Sea King* Mk 41.
1 ASW hel sqn with 12 *Sea Lynx* Mk 88.
1 utility sqn with 20 Do-28-2 ac.
Trg: 12 TF-104F, 4 IAI *Westwind* target simulation ac.
ASM: AS-20, AS-30, AS-34 *Kormoran*.
(On order: 105 *Tornado* MRCA.)

Air Force: 105,900 (38,000 conscripts); 548 combat aircraft.
Tactical Command (GAFTAC): 473 combat ac.
12 FGA sqns: 8 with 144 F-104G; 4 with 60 F-4F.
7 lt FGA sqns: 5 with 125 *AlphaJet*; 2 will complete conversion from G-91 to 36 *AlphaJet* by Oct. 1982.
4 interceptor sqns with 59 F-4F.
4 recce sqns with 60 RF-4E.
1 OCU with 15 *Tornado*, 18 TF-104G, 5 HFB-320 *Hansa Jet* ECM trg.
8 SSM sqns with 72 *Pershing* 1A.
3 SAM regts (each of 2 bns of 4 btys) with 216 *Nike Hercules* launchers.
3 SAM regts (each of 3 bns of 4 btys) with 216 *Improved HAWK* launchers.
4 aircraft control and warning regts.
AAM: *Sidewinder*.
Transport Command (GAFTC).
4 tpt sqns with 86 Transall C-160 (some in reserve).
5 hel sqns with 114 UH-1D.
1 special air mission wing with 4 Boeing 707-320C, 3 C-140 *Jetstar*, 6 HFB-320 *Hansa Jet*, 3 VFW-614, 6 Do-28-2 *Skyservant* ac, 4 UH-1D hel.
Training: 79 combat ac.
Combat trg wing (Luke Air Force Base US) with 30 F-104G (+ 10 in store), 17 TF-104G (+ 10 in store).
Combat trg: trinational *Tornado* trg det (Cottesmore, Britain) with 22 *Tornado*.
OCU (George Air Force Base US): 10 F-4E.
Pilot trg wing (Sheppard Air Force Base US) with 35 T-37B, 41 T-38A.
Primary trg unit with 34 P-149D.
Miscellaneous liaison, range, and base flts with 21 G-91R3 (reserve), 92 Do-28D.
(On order: 173 *Tornado*, 28 *AlphaJet* FGA, 500 AGM-65B *Maverick* ASM.)

RESERVES: 750,000 (all services).

Para-Military Forces: Border Police (Ministry of Interior): 20,000. FV-601(D) *(Saladin)* armd cars; Mowag SW-1/-2 APC; 2 P-149D, 1 Do-27A-3 ac, 21 *Alouette* II hel.

GREECE

Population: 9,700,000.
Military service: Army 22, Navy 26, Air Force 24 months.
Total armed forces: 206,500 (834 women; 152,000 conscripts).
GDP 1981: dr 2,217.6 bn ($40.02 bn).
Estimated defence expenditure 1981: dr 104.6 bn ($1.887 bn); NATO definition $2.27 bn.
GDP growth: 1.6% (1980), −0.2% (1981).
Inflation: 26.2% (1980), 22.5% (1981).
$1 = 55.41 drachmas (1981).

Army: 163,000 (125,000 conscripts).
3 Military Regions, 4 corps HQ.
1 armd div.
1 mech div.
11 inf divs.
1 para-cdo div (1 para, 1 cdo bdes and 1 marine, 1 cdo bns).
3 armd bdes.
1 marine inf bde.
13 fd arty bns (1 more to form).
3 AA arty bns.
3 SSM bns with 12 *Honest John*.
2 SAM bns with *Improved HAWK*.
14 army aviation coys, 1 indep flt.
AFV: 100 M-26, 350 M-47, 818 M-48, 285 AMX-30 MBT; 190 M-24 lt tks; 180 M-8, 130 M-20 armd cars; 240 AMX-10P MICV, 160 *Leonidas*, 120 M-2, 460 M-3 half-track, 460 M-59, 820 M-113 APC.
Arty: 600 25-pdr, 36 M-107 175mm guns; 108 75mm pack, M-56 105mm, 180 M-101 105mm, 270 M-114A1 155mm, 72 M-115 203mm towed, 126 M-52A1 105mm, 54 M-44, 60 M-109A2 155mm, 20 M-110 203mm SP how; 36 *Honest John* SSM; M-18 57mm, 200 M-20 75mm, M-67 90mm, 700 106mm RCL.
ATK: 64 M-18, 32 *Kuerassier* SP ATK guns; SS-11, 400 *Cobra*, 1,431 *TOW*, *Milan* ATGW.
AD: RH-202 twin 20mm, 40mm AA guns; *Improved HAWK* (108 msls), *Redeye*, 37 *Chaparral* (600 msls) SAM.
Air: 1 *Super King Air*, 2 *Aero Commander*, 50 U-17A ac; 8 CH-47C, 5 Bell 47G, 22 UH-1D, 50 AB-204B/-205 hel.
(On order: 55 AMX-30, 106 *Leopard* 1A4 MBT, 12 M-113A2, M-56 105mm pack, 48 M-109A2 155mm SP how, 48 *Kuerassier* SP ATK guns, 350 90mm RCL; 8 CH-47, 8 AH-1 hel with *TOW*, 50 *TOW* launchers.)

RESERVES: about 350,000, incl some 100,000 National Guard, 3 Territorial, 17 Sub-Commands: 12 indep inf bdes, some 100 Home Guard bns (mainly coastal defence); lt tks, M-20 armd cars, M-2, M-3 half-track, 75mm pack, 25-pdr, 105mm guns/how, M-18 57mm, 200 M-20 75mm, 106mm RCL, 40mm AA guns.

Navy: 19,500 (12,000 conscripts); 18 armed hel.
10 submarines: 8 Type 209, 2 ex-US *Guppy*.
16 ex-US destroyers: 7 *Gearing* (5 with 1 × 8 *ASROC*), 8 *Fletcher*, 1 *Sumner*.
6 frigates: 1 *Kortenaer* (8 *Harpoon* SSM, *Sea Sparrow* SAM), 4 ex-US *Cannon*, 1 ex-*Rhein* (trg).
14 *La Combattante* II/III FAC(M) (8 with 4 *Exocet*, 6 with 6 *Penguin* SSM).
11 FAC(T): 6 *Jaguar*, 5 *Nasty*(.
9 coastal patrol craft (6().
2 coastal minelayers, 13 coastal minesweepers (9 MSC-294, 4 ex-US *Adjutant*).
1 LSD, 7 LST, 5 LSM, 2 LCT, 8 LCU, 13 LCM, 14 LCA, 34 LCVP.
2 ASW hel sqns: 1 with 13 AB-212, 1 with 5 *Alouette* III.
(On order: 2 *Kortenaer* frigates, 63 LCA, 48 *Harpoon* SSM, *Aspide* SAM.)

Bases: Patrai, Salamis, Thessaloniki, Suda Bay, Mitilini.

RESERVES: about 24,000.

Air Force: 24,000 (15,000 conscripts); 367 combat aircraft.
Tactical Air Force: 7 combat wings: 1 tpt wing.
11 FGA sqns: 3 with 54 A-7H, 6 TA-7H; 2 with 36 F/RF-4; 2 with 40 F/TF-104G; 2 with 42 F-5A/B/RF-5; 2 (reserve) with 54 F-84F.
5 interceptor sqns: 1 with 18 F-4E; 1 with 21 F-5A/B; 2 with 36 *Mirage* F-1CG; 1 with 24 F-104S.
1 FGA/recce sqn with 2 F-84F, 8 RF-4E, 18 RF-84F.
1 MR sqn with 8 HU-16B *Albatross* ac.
3 tpt sqns with 12 C-130H, 6 YS-11, 8 C-47, 21 *Noratlas*, 1 *Gulfstream*, 7 CL-215.
9 base flts with 6 C-47, 48 T-33A ac, 8 AB-205A hel.
3 hel sqns with 6 AB-205A, 2 AB-206A, 10 Bell 47G, 8 UH-19D, 2 AB-212, 8 CH-47C.
Air Training Command:
3 sqns: 1 with 20 T-41A; 1 with 24 T-37B/C; 2 sqns 36 T-2E.
AAM: *Sparrow*, *Sidewinder*, *Super Sidewinder*, *Falcon*, R-550 *Magic*.
ASM: *Maverick*, *Bullpup*.
1 SAM wing: 1 bn with 36 *Nike Hercules*; 1 with 36 *Nike Ajax*.
(On order: 280 AIM-7M *Sparrow*, 300 *Super Sidewinder* AAM, 200 *Maverick* ASM, 40 *Skyguard* AD systems plus 4 extra twin 35mm AA guns.)

RESERVES: about 30,000.

Forces Abroad: Cyprus: 1,300 incl 350 cdos; 450 officers/NCOs seconded to Greek-Cypriot forces.

Para-Military Forces: Gendarmerie: 25,000; Mowag *Roland*, 15 UR-416 APC. Coastguard and Customs: 4,000; some 100 patrol craft.

ITALY

Population: 57,300,000.
Military service: Army and Air Force 12, Navy 18 months.
Total armed forces: 370,000 (242,000 conscripts).
GDP 1981: L 398,125 bn ($350.154 bn).
Defence expenditure 1982: L 10,148 bn ($7.711 bn); NATO definition $9.115 bn.
GDP growth: 4% (1980), −0.2% (1981).
Inflation: 21.2% (1980), 18.2% (1981).
$1 = 1,316 lire (1982), 1,137 lire (1981).

Army: 257,000 (190,000 conscripts).
3 corps HQ.
1 armd div (2 armd, 1 mech bdes).
3 mech divs (each of 1 armd, 2 mech bdes).
2 indep mech bdes.
4 indep mot bdes.
5 alpine bdes.
1 AB bde.
2 amph bns.
1 msl bde (1 *Lance* SSM, 3 *Improved HAWK* SAM bns).
550 M-47, 350 M-60A1, 910 *Leopard* 1 MBT; 4,200 M-106, M-113, M-548 and M-577, AMX-VC1 APC; 1,080 how, incl 320 105mm pack, 724 155mm (incl 90 FH-70 towed and 190 M-109E SP), 36 203mm; 81mm, 107mm, 120mm mor; *Lance* SSM; 57mm, 106mm RCL; *Cobra*, SS-11, *TOW*, *Milan* ATGW; 40 *Improved HAWK* SAM.
(On order: 120 *Leopard* 1 MBT; 410 M-113 APC; 180 FH-70 155mm towed, SP-70, M-109 155mm SP how; 3,127 *TOW*, *Milan* ATGW.)

ARMY AVIATION: 20 units with 76 SM-1019, 30 O-1E lt ac, 100 AB-205A, 140 AB-206A/A1, 22 CH-47C, 5 A-109 *Hirundo*, 38 AB-204B, 70 AB-47G/J hel. (On order: 60 A-129 *Mangusta*, 10 AB-212 hel.)

RESERVES: 550,000.

Navy: 44,000, incl 1,500 air arm, 750 marines and 23,700 conscripts.
9 submarines: 3 *Sauro*, 4 *Toti*, 2 ex-US *Tang*.
1 *Vittorio Veneto* hel carrier with 9 AB-212 ASW hel, 1 × 2 *Terrier* SAM.
2 *Andrea Doria* cruisers: 4 ASW hel, 1 × 2 *Terrier*.
4 GW destroyers: 2 *Audace* with 2 ASW hel, 1 *Standard* SAM; 2 *Impavido* with 1 *Standard*.
1 *Impetuoso*-class destroyer.
11 frigates: 1 *Maestrale* with 4 *Otomat* SSM, 1 × 8 *Albatross/Aspide* SAM, 1 hel; 4 *Lupo* with 8 *Otomat*, 1 × 8 *Sea Sparrow* SAM, 1 hel; 2 *Alpino* with 2 hel; 2 *Bergamini* with 1 hel; 2 *Centauro* (to retire).
8 corvettes: 4 *De Cristofaro*, 4 *Albatross*.
3 *Sparviero* hydrofoils with 2 *Otomat* SSM.
4 FAC: 2 *Freccia* (1 with 1 × 5 *Sea Killer* SSM), 2 *Lampo*.
4 ex-US *Aggressive* ocean, 3 ex-US *Adjutant* and 13 *Agave* coastal, 5 *Aragosta* inshore minesweepers; 6 ex-US *Adjutant*, 1 *Agave* minehunters.
2 ex-US *De Soto County* LST, 19 ex-US LCM.
2 *Stromboli* replenishment tankers.
1 Marine inf gp with 30 VCC-1, 10 LVTP-7 APC, 16 81mm, 8 106mm RCL, 6 *Milan* ATGW.
(On order: 1 hel carrier, 2 *Audace* destroyers, 7 *Maestrale* frigates, 4 *Lerici* minehunters, 4 *Sparviero* hydrofoils.)

Bases: La Spezia, Taranto, Ancona, Brindisi, Augusta, Messina, La Maddalena, Cagliari, Naples, Venice.

NAVAL AIR ARM: (1,500); 88 combat hel.
5 ASW hel sqns: 2 with 24 SH-3D; 1 with 18 AB-204AS; 2 with 46 AB-212. (On order: 5 AB-212, 3 SH-3D hel.)

RESERVES: 221,000.

Air Force: 69,000 (28,300 conscripts); some 302 combat aircraft.
6 FGA sqns: 1 with 18 F-104G (getting *Tornado*), 3 with 54 F-104S, 2 with 36 G-91Y.
3 lt attack/recce sqns with 54 G-91R/R1/R1A.
6 interceptor sqns with 72 F-104S.
2 recce sqns with 24 F/RF-104G.
2 MR sqns with 14 *Atlantic* (Navy assigned).
1 ECM/recce sqn with 12 G-222, 6 PD-808.
1 OCU with 12 TF-104G.
3 tpt sqns: 2 with 32 G-222, 1 with 10 C-130H.
4 comms sqns with 26 P-166M, 32 SIAI-208M, 8 PD-808, 2 DC-9 ac; 2 SH-3D, 20 AB-47 hel.
4 SAR sqns with 15 AB-204, 20 HH-3F hel.
1 combat trg det (Cottesmore, Britain) with 7 *Tornado*.
6 trg sqns with 70 G-91T, 100 MB-326/-339A, 14 P-166M, 20 SF-260M ac; 35 AB-47J, 5 AB-204B hel.
AAM: AIM-7E *Sparrow*, AIM-9B *Sidewinder*, *Aspide* 1A.
8 SAM groups with 96 *Nike Hercules*.
(On order: 90 *Tornado* MRCA, 187 AMX FGA, 100 MB-339 trg, 12 G-222 tpt ac, *Kormoran* ASM.)

RESERVES: 28,000; some additional aircraft.

Forces Abroad:
Egypt (Sinai MFO): 90; 3 minesweepers.
Lebanon (UNIFIL): 34.

Para-Military Forces: Carabinieri 90,000: 1 mech bde with 13 bns, 1 AB bn, 2 cav sqns with 37 M-47 MBT, Fiat 6616, 80 M-6, M-8 armd cars, 470 Fiat 242/18AD, 240 M-113 APC, 23 AB-47, 2 A-109, 5 AB-205, 23 AB-206 hel. Public Security Guard 67,927: 12 mobile units with 40 Fiat 6614 APC, 3 P-64B ac, 1 AB-47J, 6 A-109, 13 AB-206A1, 4 AB-212 hel. Finance Guards 46,780, with 10 AB-47J, 67 NH-500M hel, patrol craft.
(On order: 2 AB-212 hel.)

LUXEMBOURG

Population: 364,000.
Military service: voluntary, 3 years.
Total armed forces: 690.
Estimated GDP 1981: fr 140.0 bn ($3.77 bn).
Estimated defence expenditure 1982: fr 1.44 bn ($32.32 m); NATO definition: $42.11 m.
$1 = 44.55 francs (1982), 37.18 (1981).

Army: 690.
1 lt inf bn.
1 indep coy.
5 V-150 *Commando* APC; *LAW* RL; *TOW* ATGW.

[**Air:** Luxembourg has no air force of its own, but for legal purposes all NATO's AWACS ac will have Luxembourg registration.
1 sqn with 1 E-3A (NATO standard).
(On order: 17 E-3A.)]

Para-Military Forces: Gendarmerie 500.

NETHERLANDS

Population: 14,178,000.
Military service: Army 14–16, Navy and Air Force 14–17 months.
Total armed forces: 103,957 (1,450 women; 50,192 conscripts).
GDP 1981: G 346.3 bn ($139.076 bn).
Defence expenditure 1982: G 12.124 bn ($4.575 bn); NATO definition: $4.565 bn.
GNP growth 1980: 0.6%.
Inflation: 6.7% (1980), 7.2% (1981).
$1 = 2.65 guilders (1982), 2.49 guilders (1981).

Army: 67,000 (43,250 conscripts, though see Reserves).
2 armd bdes.
4 mech inf bdes.
1 SSM bn with *Lance*.
3 hel sqns (Air Force manned).
468 *Leopard* 1, 343 *Centurion* MBT; 126 AMX-13 lt tks; 66 AMX-VC1, 745 M-113, 742 YP-408 (to retire), 1,051 YPR-765 APC; 44 105mm, 140 155mm, 28 203mm how; 75 AMX 105mm (being phased out), 136 M-109 155mm, 12 M-107 175mm (being replaced by 203mm), 24 M-110 203mm SP guns/how; 6 *Lance* SSM; 81mm, 194 107mm, 153 120mm mor; *Carl Gustav* 84mm, 106mm RCL; *LAW* RL; 350 *Dragon*, *TOW* ATGW; 131 L-40/70 40mm towed, 95 *Gepard* 35mm SP AA guns; 48 *Alouette* III, 24 BO-105 hel (Air Force crews).
(On order: 445 *Leopard* 2 MBT; 850 YPR-765 APC; 37 M-110A2 203mm SP how; 464 *Stinger* SAM.)

RESERVES: 145,000: 1 armd, 2 mech inf bdes, corps troops and 1 indep inf bde would be completed by call-up of reservists. A number of inf bdes could be mobilized for territorial defence.

Navy: 16,850, incl marines and naval air arm (2,000 conscripts).
6 submarines: 2 *Zwaardvis*, 2 *Potvis*, 2 *Dolfijn*.
2 *Tromp* GW destroyers (flagships) with 8 *Harpoon* SSM, 1 *Standard*, 8 *Sea Sparrow* SAM, 1 *Lynx* hel.
12 frigates with 8 *Harpoon* SSM: 6 *Kortenaer* with *Sea Sparrow* SAM, 1 *Lynx* hel; 6 *Van Speijk* with 2 quad *Seacat* SAM, 1 hel.
6 *Wolf* corvettes.
5 *Balder* large patrol craft.
3 *Onversaagd* MCM spt ships; 15 *Dokkum* coastal minehunters/sweepers; 16 *Van Straelen* inshore minesweepers.
2 *Poolster* fast combat spt ships.
10 LCA(.

Bases: Den Helder, Flushing, Curacao.

MARINES: (2,900).
2 amph combat gps.
1 mountain/arctic warfare coy.

NAVAL AIR ARM: (1,700); 11 combat ac, 17 armed hel.
2 MR sqns with 6 SP-13A *Atlantic*, 3 P-3C *Orion*, 2 F-27MPA.
2 ASW hel sqns with 17 *Lynx* HAS-27.
1 SAR hel sqn with 6 *Lynx* HAR-25.
(On order: 2 *Walrus* subs, 4 *Kortenaer*, 2 AD frigates, 15 *Alkmaar* minehunters, *Harpoon* SSM, 10 P-3C *Orion* II ASW ac.)

RESERVES: about 20,000; 9,000 on immediate recall.

Air Force: 19,000 (4,600 conscripts); 172 combat aircraft.
4 FGA sqns: 3 with 54 NF-5A; 1 with 18 F-104G (being replaced by F-16).
2 FGA/interceptor sqns with 36 F-16 (1 more converting (8 F-16)).
1 recce sqn with 18 RF-104G.
3 OCU: 1 with 18 NF-5B; 1 with 8 TF-104; 1 with 12 F-16A/B.
1 tpt sqn with 12 F-27.
1 SAR flt with 4 *Alouette* III.
AAM: AIM-9 *Sidewinder*.
11 SAM sqns with 66 *Improved HAWK* (8 in Germany).
4 SAM sqns with 16 *Nike Hercules*.
25 *Shorad/Flycatcher*, 40 L-70 AA systems.
(On order: 82 F-16 FGA, incl F-16B trainers.)

RESERVES: about 6,000.

Inter-Service Organization: 1,107 (342 conscripts).

Forces Abroad:
Germany: Army: 5,500; 1 armd bde, 1 recce, 1 engr bns, spt elements.
Lebanon (UNIFIL): Army: 810; 1 mech inf bn.
Egypt (Sinai MFO): 105.

NATO has taken delivery of its first AWACS. More are on order.

Netherlands Antilles: Navy: 1 destroyer, 1 amph combat det, 1 MR det with 2 F-27MPA ac.

Para-Military Forces: 8,700. Royal Military Constabulary *(Koninklijke Marechaussee):* 3,900 regulars, 500 conscripts; 3 divisions comprising nine districts with 87 brigades. Home Guard: 4,300; 3 sectors: inf weapons.

NORWAY

Population: 4,100,000.
Military service: Army 12, Navy and Air Force 15 months.
Total armed forces: 42,100 (28,900 conscripts).
GDP 1981: kr 283.36 bn ($49.37 bn).
Defence expenditure 1981: kr 9.45 bn ($1.65 bn);[8] NATO definition not available.
GDP growth 1980: 3.8%.
Inflation: 13.7% (1980), 11.9% (1981).
$1 = 5.739 kroner (1981).

Army: 24,400 (17,800 conscripts).
1 bde gp of 2 inf bns, 1 tk coy, 1 SP fd, 1 AA bty (North Norway).
1 all-arms gp: 1 inf bn, 1 tk coy, 1 SP fd, 1 AA bty (South Norway).
Indep armd sqns, inf bns, and arty regts.
78 *Leopard* 1, 38 M-48 MBT; 70 NM-116 (M-24/90) lt tks; M-113 APC; 250 105mm and 155mm how; 130 M-109 155mm SP how; 107mm mor; *Carl Gustav* 84mm, 106mm RCL; *ENTAC, TOW* ATGW; Rh-202 20mm, 40mm AA guns; RBS-70 SAM; 24 O-1E, 8 L-18 lt ac.

RESERVES: 122,000: 4 divs: 11 Regimental Combat Teams (bdes) of about 5,000 men each, spt units and territorial forces; 21 days refresher training each 3rd/4th year. Home Guard (all services) 85,000 (90 days initial service).

Navy: 9,400, incl 1,600 coast artillery (6,100 conscripts).
14 Type 207 submarines.
5 *Oslo* frigates with 6 *Penguin* SSM, 1 × 8 *Sea Sparrow* SAM.
2 *Sleipner* corvettes.
39 FAC(M) with *Penguin* SSM: 19 *Storm*, 14 *Hauk*, 6 *Snögg*.
8 *Tjeld* FAC(T) (in reserve).
1 *Vadsø* patrol craft.
2 *Vidar* minelayers, 9 ex-US MSC-60 minesweepers, 1 minehunter.
1 *Horten* depot ship.
7 LSM: 2 *Kvalsund*, 5 *Reinøysund*.
40 coast arty btys: 75mm, 105mm, 127mm, 150mm guns.

Bases: Horten, Bergen, Ramsund, Tromsø.

RESERVES: 16,000. Coastguard established as part of Navy; 3 *Nordcap* patrol vessels with 6 × 1 *Penguin* II SSM, 6 *Lynx* hel.

Air Force: 8,300 (5,000 conscripts); 114 combat aircraft.
4 FGA sqns: 3 with 51 F-5A; 1 with 16 CF-104G/D, 2 TF-104B.
1 interceptor sqn with 15 F-16A.
1 recce flt with 6 RF-5A.
1 MR sqn with 7 P-3B.
1 OCU with 13 F-5B, 4 F-16B.
1 ASW hel sqn with 6 *Lynx* (coastguard).
2 tpt sqns: 1 with 6 C-130H, 3 *Falcon* 20S; 1 with 4 DHC-6 ac, 8 UH-1B hel.
1 SAR hel sqn with 10 *Sea King* Mk 43.
2 utility hel sqns with 26 UH-1B.
16 *Safari* trg ac.
AAM: *Sidewinder.* ASM: *Bullpup.*
4 lt AA bns with L/70 40mm guns.
1 SAM bn (4 btys) with 128 *Nike Hercules.*
(On order: 44 F-16A, 8 F-16B fighters; RBS-70 SAM; *Penguin* III ASM.)

RESERVES: 20,000. 7 lt AA bns for airfield defence with L/60 40mm guns,

Forces Abroad: Lebanon (UNIFIL): 851; 1 bn, 1 service coy, 1 medical coy.

PORTUGAL

Population: 9,800,000.
Military service: Army 16, Navy 24, Air Force 21–24 months.
Total armed forces: 66,426 (18,700 conscripts).
GDP 1981: 1,358.0 bn escudos ($22.063 bn).
Estimated defence expenditure 1982: 49.87 bn escudos ($668.0 m); NATO definition: $844.2 m.
GDP growth 1980: 5.5%.
Inflation: 14.9% (1980), 23.9% (1981).
$1 = 74.65 escudos (1982), 61.55 escudos (1981).

Army: 41,000 (10,000 conscripts, 3 intakes a year, 4 months alternating service).
6 Territorial Commands (4 military regions, 2 island commands).
1 mixed bde.
2 cav regts.
12 inf regts, 1 indep inf bn.
1 cdo regt.
2 fd, 1 AA, 1 coast arty regts.
2 indep AA/coast arty bns.
2 engr regts.
1 sigs regt.
1 Special Forces, 4 spt, 1 MP bns.
62 M-47, 23 M-48A5 MBT; 11 M-24 lt tks; 33 Panhard EBR/ETT hy, 63 AML lt armd, 32 *Ferret* Mk 4 scout cars; 86 M-113, 82 *Chaimite* APC; 68 5.5-in (140mm) guns; 54 M-101A1 105mm towed, 6 M-109A2 155mm SP how; 54 107mm, 82 120mm mor; 82 90mm, 127 106mm RCL; 21 *TOW* ATGW; 39 150mm, 152mm, 234mm coast arty; 16 20mm twin, 351 40mm AA guns.

Navy: 13,426 incl marines (5,200 conscripts).
3 *Albacora* (Fr *Daphne*) submarines.
17 frigates: 4 *Andrade*, 6 *Coutinho*, 4 *Belo*, 3 *Silva*.
10 *Cacine* large patrol craft.
8 coastal patrol craft.
2 LCT, 11 LCM, 1 LCA.
(On order: 3 modified *Kortenaer* frigates.)

Base: Lisbon (Alfeite).

MARINES: (2,687; 1,000 conscripts).
3 bns (2 inf, 1 police), spt units; *Chaimite* APC, mor, amph craft.

Air Force: 12,000, incl 2,500 para (3,500 conscripts); 87 combat aircraft.
1 combat, 5 administrative wings:
3 FGA sqns: 1 with 20 A-7P; 1 with 20 G-91R3, 8 G-91T3; 1 with 21 G-91R4, 2 G-91T3.
1 recce sqn with 4 CASA C-212B.
1 OCU with 12 T-38 COIN ac.
3 tpt sqns: 1 with 5 C-130H; 2 with 16 C-212 *Aviocar.*
2 SAR hel sqns with 11 SA-330 *Puma.*
2 hel/utility sqns with 34 *Alouette* III.
2 liaison sqns with 24 Reims-Cessna FTB 337G.
3 trg sqns: 1 with 2 C-212A ac, 3 *Alouette* III hel; 1 with 24 T-37C; 1 with 30 *Chipmunk.*
1 para regt (3 bns).
(On order: 12 A-109A hel (4 with *TOW*).)

RESERVES (all services): 90,000.

Para-Military Forces: National Republican Guard 14,600: *Commando* Mk III APC. Public Security Police 16,124: Fiscal Guard: 7,519.

SPAIN

Population: 37,900,000.
Military service: 15 months.
Total armed forces: 347,000 (234,000 conscripts).
GDP 1981: pts 17,696 bn ($191.7 bn).
Defence expenditure 1981: pts 337.46 bn ($3.65 bn).
GDP growth 1980: 1.2%.
Inflation: 15.2% (1980), 14.5% (1981).
$1 = 92.31 pesetas (1981).

Army: 255,000 (190,000 conscripts).
Immediate Intervention Force:
1 corps HQ.
1 armd div, 1 mot div, 1 mech div } each with 2 bdes.
1 armd cav bde.
1 para bde (3 bns).
1 airportable bde.
1 arty bde.
1 locating, 1 fd rocket, 1 lt AA regts.
1 engr, 1 sigs, 1 chemical/nuclear defence regts.
Territorial Defence Force:
9 Military Regions, 4 overseas comds (see *Overseas Forces*).
2 mountain divs (each 1 bde + 1 cadre bde).
10 inf bdes (incl 1 Reserve bde).
1 high mountain bde.
1 arty bde (incl 1 *HAWK* SAM gp, 1 *Nike Hercules* bty).
2 hy arty regts.
7 coast/AA arty regts.
General Reserve Force:
1 ATK inf regt.
3 engr regts (incl 2 railway).
1 sigs regt.
Independent Units:
Army HQ inf gp.
Royal Guard Regt (incl inf, naval, air force coys and escort cav sqn).
Overseas Forces:
2 Commands: (Balearic, Canary Islands):
7 inf regts (1 cadre regt in Canaries).
3 Foreign Legion regts (9 bns, 1 lt cav gp).
6 coast/AA arty regts.
2 engr regts, 1 engr gp (2 bns), 1 engr bn.
2 armd cav regts, 2 lt cav gps.
4 *Regulares* inf gps.
2 cdo, 2 special sea coys.
Army Aviation (FAMET):
HQ with 1 hel, 1 spt, 4 trg sqns, 2 hel bns.
1 attack bn.
1 tpt bn: 1 med, 1 hy coys.
Trg wing: 2 sqns; LHR-12B, HT-17, HU-10B hel.
AFV: 210 AMX-30, 390 M-47E, 130 M-48 (105mm) MBT; 180 M-41 lt tks; 60 AML-60, 80 AML-90 armd cars; 100 BMR-600 *Pegaso* MICV, 500 M-113 APC.
Arty: 860 105mm (incl M-56 pack), 200 122mm, 80 155mm, 24 203mm towed, 48 M-108 105mm, 24 M-44, 24 M-109 155mm, 12 M-107 175mm, 4 M-110 203mm SP guns/how; 200 88mm, 200 6-in (152.4mm), 24 203mm, 12-in (305mm), 15-in (381mm) coast guns; 18 150mm, 24 203mm, 381mm MRL; 60mm, 1,200 81mm, 107mm, 400 120mm mor.
ATK: 106mm RCL; M-65 88.9mm RL; *Milan, Cobra, Dragon, HOT* ATGW.
AD: 54 35/90, 280 40/90, 120 90mm AA guns, *Nike Hercules, Improved HAWK* SAM.
Air: 3 *Puma*, 50 HU-8/-10B (UH-1B/H), 3 HA-16

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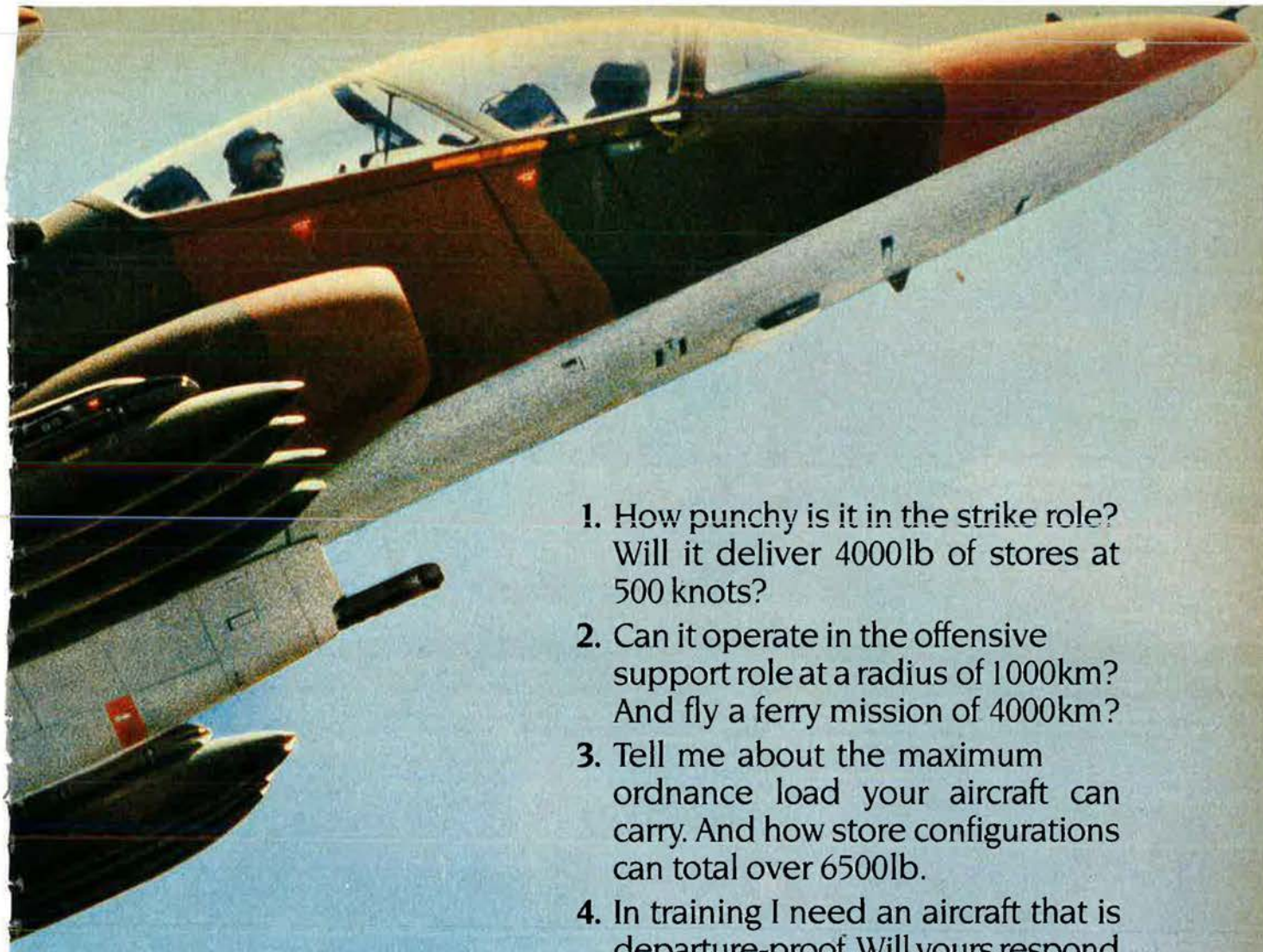

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KING®

(*Alouette* III), 30 HA-15 (BO-105), 1 AB-206A, 4 AB-212, 19 HE-7B (OH-13), 12 HR-12B (OH-58A), 10 HT-17 (CH-47) hel.
(On order: 100 AMX-30 MBT; 150 BMR-600 MICV, 180 M-113 APC; 18 M-109 155mm SP how; 113 *TOW* ATGW; 96 *Chaparral* SAM (1,760 msls); 28 *Skyguard* AD systems; 30 BO-105 (28 with *HOT* ATGW), 2 CH-47C, 18 OH-58A hel.)

DEPLOYMENT:
Balearic Islands: 5,800; 3 inf, 2 coast/AA regts, 1 engr bn, 1 lt cav gp, 1 cdo coy.
Canary Islands: 16,000; 3 inf, 1 Foreign Legion (incl 1 lt cav gp), 2 coast/AA regts, 1 engr gp (2 bns), 1 lt cav gp, 1 cdo coy.
Ceuta/Melilla: 19,000; 2 armd cav, 2 Foreign Legion, 2 coast/AA, 2 engr regts, 4 *Regulares* inf gps, 2 special sea coys.

Navy: 54,000, incl 11,000 marines (44,000 conscripts).
8 Commands: Combat, Escort, Amphibious, Naval Air, Submarine, Special Services and Patrol Units, Mine Warfare, Marines.
8 submarines: 1 *Agosta*, 4 *Daphne*, 3 ex-US *Guppy* IIA.
1 ex-US *Independence* ac carrier (7 AV-8A, 24 hel).
11 destroyers: 6 with 1 hel (1 *Marqués de la Enseñada*, 5 ex-US *Gearing* with 1 *ASROC*), 5 ex-US *Fletcher*.
20 frigates: 8 *Descubierta* with 1 × 8 *Sea Sparrow/Aspide* SAM; 5 *Baleares* with 16 *Standard* SAM, 1 × 8 *ASROC*; 1 *Audaz*, 1 *Alava*, 1 *Pizarro*, 4 *Atrevida*.
12 FAC(P): 6 *Lazaga*, 6 *Barcelo*.
20 large patrol craft (6 ex-minesweepers).
64 coastal and inshore patrol craft(.
3 ex-US *Aggressive* ocean, 6 *Jucar* coastal MCM.
2 attack tpts, 1 LSD, 3 LST, 7 LCT, 2 LCU, 18 LCM, 17 LCA, 43 LCVP.
(On order: 3 *Agosta* subs, 1 ac carrier, 3 FFG-7 frigates, *Harpoon* SSM, *Aspide* SAM.)

NAVAL AIR:
1 attack sqn with 9 AV-8A *Matador*, 2 TAV-8A.
1 comms sqn with 4 *Commanche*.
5 hel sqns with 15 SH-3D *Sea King*, 12 AB-212, 11 Bell 47G, 11 Hughes 500HM ASW, 4 AH-1G.
(On order: 8 AB-212, 18 SH-60B hel.)

MARINES: (11,000).
1 marine bde (3 inf bns and spt units).
5 marine lt inf regts.
32 M-48S MBT; 48 *Ontos* AFV, each with 6 106mm RCL; LVTP-7 amph APC; 48 105mm SP how (trials); 81mm mor; M-72 66mm RL; 72 106mm RCL; *TOW, Dragon* ATGW.

Bases: El Ferrol (Galicia), Cadiz (San Fernando), Cartagena.

Air Force: 38,000; some 210 combat ac (being reduced).
Air Defence Command (MACOM):
3 wings.
6 interceptor sqns: 2 with 36 F-4C, 4 RF-4C; 2 with 21 *Mirage* IIIEE, 6 IIIED; 2 with 47 *Mirage* F-1CE, 3 F-1CE/BE.
1 liaison flt with 6 Do-27.
Tactical Command (MATAC):
2 wings.
2 FGA sqns: 1 with 6 F-5A, 9 RF-5A, 3 F-5B; 1 with 20 HA-220 *Super Saeta*.
1 recce sqn with 9 AR-10C (HA-220).
1 MR sqn with 2 P-3A, 4 P-3C.
1 liaison flt with 6 O-1E, 12 Do-27, Do-28.
AAM: *Sparrow, Sidewinder*, R-550 *Magic*.
Air Command, Canary Islands (MACAN):
1 FGA sqn with 14 F-5/RF-5A, 3 F-5B.
1 SAR sqn with 3 F-27-400 MR ac, 8 AB-205 hel.
1 tpt sqn with 7 CASA C-212, 2 Do-27.
Transport Command (MATRA):
3 wings.
5 sqns with 8 C-130H, 4 KC-130H, 6 CASA-207 *Azor*, 25 C-212 *Aviocar*, 12 DHC-4, 5 Do-27.
Training Command (MAPER):
2 OCU with 23 F-5A/B, 2 Do-27.
14 sqns with 6 *Aztec*, 29 F-33C *Bonanza*, 36 CASA C-101, 14 C-212E, 1 *Navajo*, 49 T-33A, 45 T-6, 6 *King Air*, 3 *Baron*, BU-131A/CASA I-131.
2 hel sqns with 28 HE-7A (AB-47), AB-205, Hughes 300C and UH-1H hel.
Air Force HQ Group (ACGA):
2 tpt sqns with 2 DC-8-52, 4 *Mystère* 20, 1 *Navajo*, 4 CASA C-212.
2 spt sqns with 14 CL-215, 2 Do-27, 5 C-212.
1 utility hel sqn with 5 *Puma*.
2 SAR sqns with 4 CASA C-212, 4 Do-27 ac, 9 AB-205, 4 AB-206, 3 AB-47, 3 *Alouette* III hel.
1 trg sqn with 4 C-101, 2 C-212, 10 T-6.
(On order: 21 *Mirage* F-1B/EE fighters: 2 P-3C *Orion* MR; 4 C-212 SAR, CASA C-101 trg ac; 12 *Super Puma* SAR, 17 Hughes 300C hel; 96 *Improved Chaparral* SAM launchers, 1,760 msls; *Super Sidewinder* AAM.)

RESERVES (all services): 1,085,000. 1 ATK inf, 3 engr, 1 sigs regts.

Para-Military Forces: Guardia Civil 65,000: 26 inf regts, 3 reserve mobile comds, 1 railway security, 1 traffic security gps, 1 anti-terrorist special gp (UAR). *Policía Nacional* 40,000: 26 inf bns, 2 cav sqn gps, 3 cav tps, 1 special ops cdo gp (GEO), Civil security gps.

TURKEY

Population: 47,000,000.
Military service: 20 months.
Total armed forces: 569,000 (489,000 conscripts).
GDP 1980: 4,325.5 bn liras ($51.32 bn).
Defence expenditure 1981: 322.4 bn liras ($2.62 bn); NATO definition $2.63 bn.
GNP growth 1980: −0.7%.
Inflation: 86.2% (1980), 30.3% (1981).
$1 = 123.13 liras (1981), 84.29 (1980).

Army: 470,000 (420,000 conscripts).[9]
4 army HQ: 10 corps HQ.
2 mech inf divs.
14 inf divs.
6 armd bdes.
4 mech bdes.
11 inf bdes.
1 para bde. 1 cdo bde.
4 SSM bns with 18 *Honest John*.
Indep units: 8 armd recce, 32 arty, 8 AA arty bns, fortress defence regts.
AFV: 100 M-26, 50 *Leopard* 1A3, 500 M-47, 3,000 M-48 MBT; M-8 armd cars; 2,000 M-113, M-2/-3, 1,200 *Commando* APC; 60 M-59 115mm towed, 36 M-107 175mm SP guns; 954 M-116A1 75mm pack, some 140 M-101A1 105mm, 288 M-114A1 155mm, 116 M-115 203mm towed, 400 M-7/M-108 105mm, 210 M-46 155mm, 48 M-110 203mm SP how; 1,750 60mm, 81mm, 4.2-in (107mm), 120mm mor; 54 *Honest John* SSM.
ATK: 1,200 57mm, 390 75mm, 800 106mm RCL; M-18/M-36 76mm SP ATK guns; 85 *Cobra*, SS-11, *TOW* ATGW.
AA: 300 twin 20mm, 900 40mm, M-51 75mm, M-117/M-118 90mm AA guns.
Air: 2 DHC-2, 18 U-17, 6 Cessna 206, 3 Cessna 421, 15 Do-27, 9 Do-28, 20 *Baron*, 5 T-42, 40 *Citabria* 150S trg ac; 156 AB-204/-205, 20 Bell 47G, 48 UH-1D hel.
(On order: 20 *Leopard* 1A3 MBT; *TOW*, 2,500 *Milan* ATGW, 27 UH-1H hel.)

RESERVES: 700,000.

Navy: 46,000, incl marines (36,000 conscripts); 20 combat ac, 19 armed hel.
16 submarines (2 in reserve): 4 Type 209, 10 ex-US *Guppy*, 1 *Tang* (on loan), 1 ex-US *Balao*.
15 ex-US destroyers: 9 *Gearing* (2 leased, 5 with 1 × 8 *ASROC*), 4 *Fletcher*, 2 *Sumner*.
2 *Berk* frigates, each with 1 hel.
13 FAC(M): 4 *Dogan* (Lürssen FPB-57) with 2 × 4 *Harpoon* SSM; 9 *Kartal* (Type 141 *Jaguar*) with 4 *Penguin* 2 SSM.
8 FAC(T): 7 ex-FRG *Jaguar*, 1 *Girne*.
49 large patrol craft (incl 2 ex-US *Asheville*, 6 PC-1638, 4 PGM-71, 7 SAR-33 type), some with Gendarmerie.
4 83-ft coastal patrol craft(.
1 *Nusret*, 9 coastal minelayers.
26 minesweepers: 12 ex-US *Adjutant*, 4 ex-Can MCB, 6 ex-Ger *Vegesack* coastal, 4 ex-US *Cape* inshore.
4 LST (2 dual-purpose minelayers), 34 LCT, 16 LCU, 20 LCM, 1 LSM.
60 auxiliary ships incl 1 ex-Ger depot ship (trg), 9 tankers (5 fleet).
1 ASW sqn: 2 S-2A (in reserve), 18 S-2E ac; 3 AB-204B, 16 AB-212 ASW hel.
1 marine bde (5,000): HQ, 3 bns, 1 arty bn (18 guns), spt units.
(On order: 1 Type 209 sub, 4 Meko-360 frigates, 2 Lürssen FAC(M), *Harpoon* SSM.)

Bases: Gölcuk, Istanbul, Izmir, Eregli, Iskenderun.

RESERVES: 70,000.

Air Force: 53,000 (33,000 conscripts); 402 combat aircraft.
2 tactical, 1 administrative, 1 air training commands.
17 FGA sqns: 6 with 72 F-5A, 12 F-5B; 4 with 66 F-100C/D/F; 4 with 82 F-4E, 8 RF-4E; 3 with 62F/TF-104G.
3 interceptor sqns with 36 F-104S.
1 recce sqn with 16 RF-5A/F-5B.
6 tpt sqns: 2 with 7 C-130E, 20 C-160D; 3 with 30 C-47A; 1 (VIP) with 3 *Viscount* 794, 2 *Islander* ac, 12 UH-1D/H, 5 UH-19D hel.
1 VIP flt with 2 C-47A.
9 base flts with 40 T-33A, 2 C-47A ac, 2 UH-1H hel.
OCUs with 12 G-91T, 36 F-100C/F.
3 trg sqns with 24 T-34A, 25 T-37B/C, 60 T-38A, 20 T-41D.
AAM: *Sidewinder, Super Sidewinder, Sparrow, Falcon, Shafrir*.
ASM: AS-12, *Bullpup, Maverick*.
8 SAM sqns with 36 *Nike Hercules*, 36 *Nike Ajax*.
(On order: 33 F-104G, 14 F-100D/F fighters, C-160 tpt ac; 10 SAR, 4 ECM UH-1H hel; *Super Sidewinder, Sparrow* AAM.)

RESERVES: 66,000.

Forces Abroad:
Cyprus: 1 corps of 2 inf divs (24,000); 150 M-47/-48 MBT; M-113 APC; 212 105mm, 155mm, 203mm guns/how; 40mm AA guns.

Para-Military Forces: Gendarmerie 120,000 (incl 3 mobile bdes with *Commando* APC), large patrol craft. (On order: 7 SAR-33 FAC.)

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[1] Conscripts serve 8 months if posted to Germany, 10 months if serving in Belgium.

[2] NATO budget content is standardized and may differ from national.

[3] 5 resident inf bns, 4 units in inf role.

[4] The Canadian Armed Forces were unified in 1968. Of the total strength, some 49,058 are not identified by service.

[5] Mobile Command commands army combat forces, and Maritime Command all naval forces. Air Command commands all air forces, but Maritime Command has operational control of maritime air forces. Mobile Command has operational control of 10 TAG. HQ 4 ATAF in Europe has operational control of 1 CAG. There are also a Communications Command and a Canadian Forces Training System.

[6] Incl 10,250 on inter-service central staff.

[7] The military divisions of the Ministry of Defence, Central Military Agencies, and Central Medical Agencies comprise 11,200 military personnel. The overall strength of the armed forces includes 6,000 reserve duty training positions.

[8] Incl UNIFIL costs: kr 91.5 m ($15.94 m).

[9] About half the divs and bdes are below strength, much eqpt is unserviceable.

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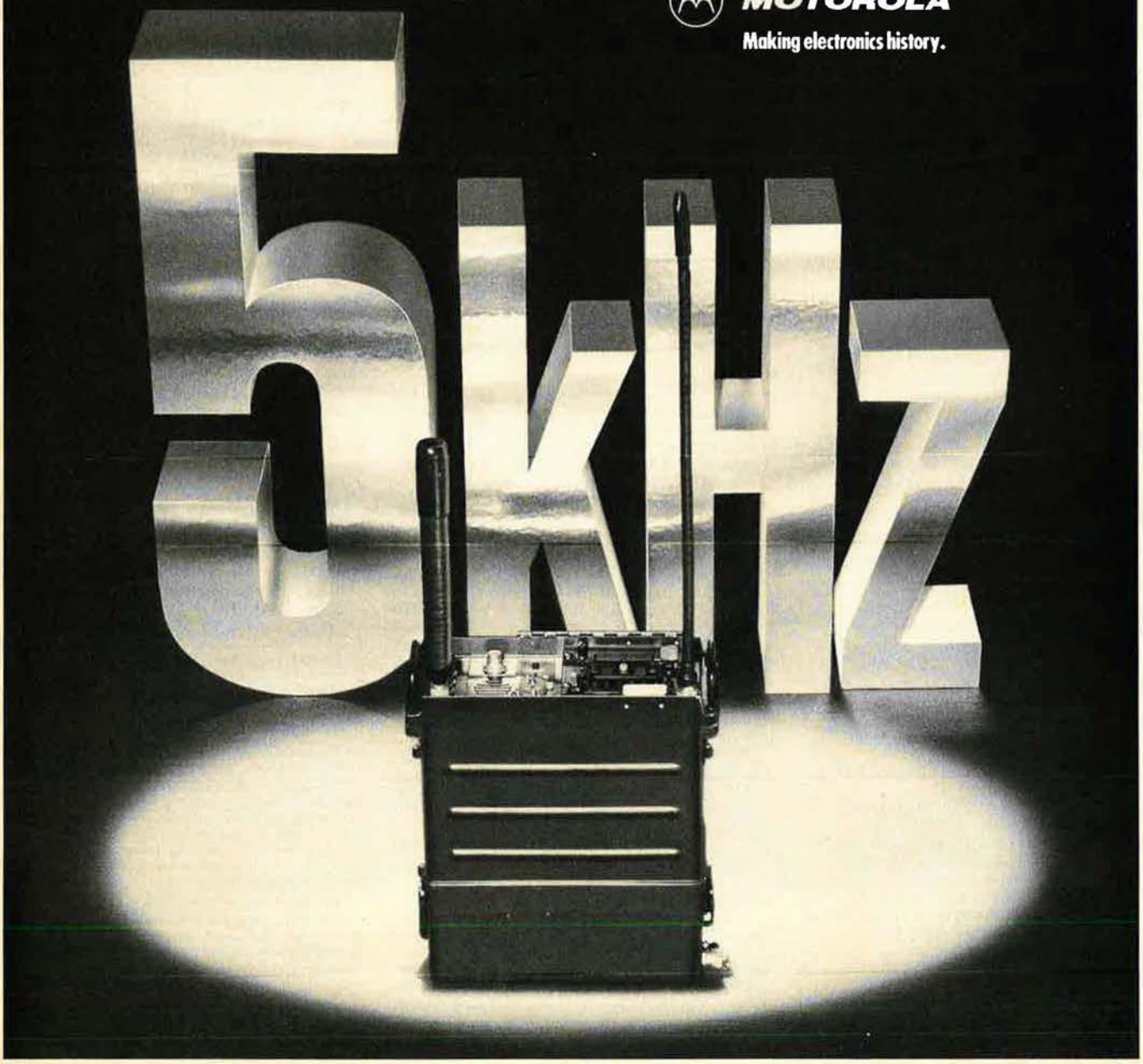


Other European Countries

Albania: Albania joined the Warsaw Pact in 1955 but left it in 1968, moving into a closer relationship with China. After Chairman Mao's death in 1976, Chinese aid was progressively reduced. Since 1978 little military aid has been received from any source. The Constitution precludes the establishment of foreign bases or the stationing of foreign troops in Albania.

Austria: The State Treaty of 1955, which re-established Austrian independence, prohibits Austria from acquiring 'nuclear weapons, long-range artillery, chemical and biological weapons, self-propelled missiles, submarines, assault craft, manned torpedoes, and sea mines'. Austria's constitution contains a declaration of permanent neutrality. A small indigenous arms industry supplies the armed forces and provides a few foreign sales.

Cyprus: Independent as a bi-national state in 1960, the Turkish occupation of the northern part of Cyprus since July 1974 has effectively produced two entities, each with its own small armed forces. Both Greece and Turkey are also entitled, under an associated Treaty of Alliance with the Republic of Cyprus, to maintain a contingent in the island. Britain—a signatory with Greece and Turkey of the 1959 Treaty of Guarantee which assures the independence, territorial integrity, and security of the Republic—maintains a garrison in two Sovereign Base Areas at Akrotiri and Dhekelia. The United States maintains a signals establishment. The United Nations has a peace-keeping force (UNFICYP) on the island.

Eire: Independent since 1922, Eire plays an active role in UN peace-keeping operations. With no significant arms industry, Eire has bought arms from many sources, *e.g.*, Britain, France, Sweden, and the US.

Finland: A 1948 Treaty of Friendship, Co-operation, and Mutual Assistance enables Finland to call upon the USSR for assistance to repel an aggressor. Finland has her own defence industry, but has tended to buy her major arms from the USSR and Sweden, together with some equipment from Britain, France, and the United States.

Malta: After independence in 1964, Malta had a defence agreement with Britain. The island became a NATO base in 1972; NATO and Italy bore part of the cost until the Treaty expired in 1979 and NATO troops were withdrawn. In September 1980 Malta undertook to remain neutral, outside any alliances, and banned foreign troops and bases, including Soviet warship docking facilities. Italy agreed to consultation if Malta was attacked and to guarantee her independence. In December 1981 France and Algeria also agreed to support and guarantee her neutrality.

OTHER EUROPEAN COUNTRIES

1. Albania
2. Austria
3. Cyprus
4. Eire
5. Finland
6. Malta
7. Sweden
8. Switzerland
9. Yugoslavia

Sweden: Neutral in both world wars. Sweden's permanent peace-keeping organization has provided personnel for UN duties since 1964. Her self-defence organization is largely supported by a domestic defence industry but some external purchases have been made, mainly from the United States.

Switzerland: Permanently neutral since 1815, Switzerland belongs to no defence organization. Her small arms industry produces most of her equipment, but Austria, France, Britain, and the US have also supplied material.

Yugoslavia: Expelled from the Cominform in 1948, she has since been a leading force in the Non-Aligned Movement, maintaining a balanced relationship with each bloc. She has no defence alliances, though a limited naval repair agreement exists with the USSR. She has her own defence industry but has bought most of her major military equipment from the USSR.

ALBANIA

Population: 2,730,000.
Military service: Army 2 years; Air Force, Navy, and special units 3 years.
Total armed forces: 43,100 (23,000 conscripts).
Estimated GNP 1978: 9.92 bn lekë ($1.85 bn).
Estimated defence expenditure 1981: 940 m lekë ($188 m).
$1 = 5.0 lekë (1981), 5.36 (1978).

Army: 30,000 (20,000 conscripts).[1]
1 tk bde.
5 inf bdes.
1 arty regt.
8 lt coastal arty bns.
70 T-34, 15 T-54, 15 T-59 MBT; 20 BA-64 armd, BRDM-1 scout cars; BTR-40/-50/-152, K-63 APC; 76mm (incl SU-76 SP), 85mm, 122mm, 152mm guns; 122mm, 152mm how; 82mm, 120mm, 160mm mor; Type-63 107mm MRL; T-21 82mm RCL; 45mm, 57mm, 85mm ATK guns; 37mm, 57mm, 85mm, 100mm AA guns.

RESERVES: 100,000.

Navy: 3,100 (1,000 conscripts).[1]
3 ex-Sov W-class submarines.
3 ex-Sov *Kronshtadt* large patrol craft.
44 FAC(T)(: 32 ex-Ch *Huchwan* hydrofoils, 12 P-4.
6 ex-Ch *Shanghai*-II FAC(G).
10 PO-2K patrol craft.
8 ex-Sov minesweepers: 2 T-43 ocean, 6 T-301 (2 in reserve) inshore.

Bases: Durres, Valona, Sazan Island, Pasha Liman.

Air Force: 10,000 (2,000 conscripts); 100 combat aircraft.[1]
6 fighter sqns with 20 MiG-15/F-2, 30 MiG-17/F-4, 30 MiG-19/F-6, 20 MiG-21/F-7.
1 tpt sqn with 4 Il-14, 10 An-2.
2 hel sqns with 30 Mi-4.
1 trg sqn with 10 MiG-15UTI.
SAM: Some 5 SA-2 sites.

RESERVES: 5,000.

Para-Military Forces: 13,000. Internal security force 5,000; frontier guard 8,000.

AUSTRIA

Population: 7,504,800.
Military service: 6 months, followed by 60 days during 15 years for reservists, additional 30–90 days for specialists.
Total armed forces: 49,350 (34,000 conscripts; total mobilizable strength 172,000). In addition some 70,000 reservists called up for trg during the year.
GNP 1981: 1,043.6 bn schilling ($65.5 bn).
Defence expenditure 1981: 12.23 bn schilling ($767.7 m).
GDP growth: 3.1% (1980), 0.1% (1981).
Inflation: 6.7% (1980), 6.4% (1981).
$1 = 15.93 schilling (1981).

Army: 44,950 (32,000 conscripts).
1 mech div of 3 mech bdes, incl 3 tk, 3 mech inf, 2 armd arty, 2 armd ATK, 1 AA, 1 engr, 1 sigs bns.
28 *Landwehrstammregimente* (trg regts) to train and form reserves.
3 ordnance (log) regts.
1 arty bn.
1 armd ATK bn.
2 SP AA arty bns.
2 engr bns.
5 sigs bns.
1 recce bn.

AFV: 50 M-60A3, 120 M-60A1 MBT; 467 Saurer 4K4F APC.
Arty: 300 M-68 105mm turret mounted, 36 SFKM2 155mm fortress guns; 108 IFH 105mm, 24 FHM-1 155mm, 38 M-109 155mm SP how; 18 Steyr 680M3 130mm MRL; 300 81mm, 100 M-2/M-30 107mm, 80 120mm mor; 334 20mm, 58 35mm towed, 38 M-42 40mm SP AA guns.
ATK: LAW, 74mm, 84mm, 397 M-40 106mm RCL; 240 M-52/M-55 85mm towed, 153 *Kuerassier* SK 105mm SP ATK guns.
(On order: 42 155mm SP how.)

RESERVES: Regular: some 15,000, immediate reaction forces. Mobile Militia (45,000): 8 reserve bdes (each of 3 inf, 1 arty, 1 engr/ATK, 1 cmd and spt bns); Stationary Militia: 26 inf regts *(Landwehr)* distributed among 8 regional military cmds. 930,000 have a reserve commitment.

Air Force:[2] 4,400 (2,000 conscripts); 32 combat aircraft.
4 FGA sqns with 32 Saab 105OE.
1 tpt wing with 2 *Skyvan*, 12 *Turbo-Porter*.
7 hel sqns with 13 AB-206A, 24 AB-212, 23 *Alouette* III, 12 OH-58B, 21 AB-204.
1 trg sqn with 18 Saab 91D.
Other ac incl 20 Cessna L-19, 2 DHC-2.
3 indep AD bns with 86 20mm *Oerlikon*, 87 35mm, 60 L/70 40mm towed (reserves), M-42 40mm SP AA guns; *Super-Bat* and *Skyguard* AD systems.

Forces Abroad: Cyprus (UNFICYP): 1 inf bn (314). Syria (UNDOF): 1 inf bn (532). Other Middle East (UNTSO): 13.

CYPRUS

Population: 650,000 (500,000 Greek, 150,000 Turkish Cypriots).

REPUBLIC OF CYPRUS:
Military service: 26 months.
Total armed forces: 10,000.
GNP 1980: £C 767.7 bn ($2.176 bn).
Defence expenditure 1981: £C 11.4 m ($27.2 m).
$1 = £C 0.4196 (1981), £C 0.3528 (1980).

Army: 10,000.[3]
1 armd bn.
2 recce/mech inf bns.
20 inf bns (understrength).
7 arty gps.
8 spt units.
10 T-34 MBT; 17 BTR-50 APC; 20 EE-9 *Cascavel*, 20 Marmon-Harrington armd cars; 120 100mm, 105mm and 25-pdr guns, and 75mm how; 40mm, 3.7-in AA guns; 1 30-ft patrol craft.
(On order: 20 EE-9 *Cascavel*.)

RESERVES: 30,000: 8,500 immediate; 21,500 second line.

Para-Military Forces: 3,000 armed police.

TURKISH FEDERATED STATE OF CYPRUS:
Defence expenditure 1982: 750 m Turkish lira ($4.98 m).
$1 = 150.56 Turkish lira (1982).

About 4,500 men, org in some 7 inf bns. Some T-34 MBT.

RESERVES: first-line 5,500, second-line 10,000.

EIRE

Population: 3,440,000.
Military service: voluntary.
Total armed forces: 16,424.
GNP 1981: £E 10.82 bn ($17.49 bn).
Defence expediture 1981: £E 172 m ($278.09 m).
GDP growth: 0.9% (1980), 1.7% (1981).
Inflation: 18.3% (1980), 23.3% (1981).
$1 = £E 0.6185 (1981).

Army: 14,697.
1 inf HQ (2 inf bns).
3 mixed bdes: each with 2 inf bns, 1 fd arty regt (2 btys), 1 motor recce sqn, 1 engr coy.
1 static bde (2 inf bns, 1 armd recce sqn, 1 AD regt, 1 Ranger coy).
Total units:
11 inf bns (3 with 1 armd car tp).
1 tk sqn.
1 armd, 3 mot recce sqns.
3 fd arty regts (each of 2 btys).
1 AD regt (1 regular, 3 reserve btys).
3 fd engr coys.
1 Ranger coy.
12 *Scorpion* lt tks; 28 AML-90, 32 AML-60 armd cars; 60 Panhard VTT/M3, 5 *Timoney* APC; 48 25-pdr gun/how; 12 105mm lt guns; 119 60mm, 250 81mm, 92 120mm mor; 447 *Carl Gustav* 84mm, 96 PV-1110 90mm RCL; 4 *Milan* ATGW; 24 L/60, 2 L/70 40mm AA guns; 4 RBS-70 SAM.
(On order: 81mm and 120mm mor.)

Among its seven helicopter squadrons, the Austrian Air Force has thirteen Agusta-Bell 206A JetRanger IIs for communications and other specialized duties.

[1] See p. 106 for footnotes.

RESERVES: 21,765. 720 first line, 21,045 second line. 4 second line Reserve Army Gps (garrisons): 2 Gps have 6 inf bns (1 has 4, 1 has 2), 2 fd arty regts (2 have 1); 3 Gps have 1 motor sqn, 1 engr, 1 supply/tpt coy, sigs sqn.

Navy: 832 (to be increased to about 1,500).
4 corvettes.
2 ex-Br *Ton* coastal MCM (fishery protection).
(On order: 1 P-31 frigate.)

Base: Cork.

RESERVES: 5 coys (390).

Air Force: 895; 14 combat aircraft.
1 COIN sqn with 6 *Super Magister.*
1 COIN/trg sqn with 8 SF-260WU, 2 *Chipmunk.*
1 liaison sqn with 8 Cessna 172H.
1 hel sqn with 8 *Alouette* III, 2 *Gazelle*, 1 *Puma* (leased) hel.
1 comms flt with 3 *King Air*, 1 HS-125-700.

Forces Abroad: Cyprus (UNFICYP): 6. Lebanon (UNIFIL): 1 bn+ (722), 4 AML-90 armd cars, 13 VTT/M3 APC. Other Middle East (UNTSO): 21.

The Finnish-designed and -built Valmet L-70 two-seat trainer was originally designated Leko-70, but has now been renamed "Vinka" ("Blast") by the Finnish Air Force.

FINLAND

Population: 4,810,000.
Military service: 8–11 months (11 months for officers and NCOs).
Total armed forces: 36,900 (27,200 conscripts; total mobilizable strength about 700,000).
GNP 1981: M 179.9 bn ($41.7 bn).
Defence expenditure 1981: M 2.874 bn ($666 m).
GDP growth: 5.1% (1980), 0.9% (1981).
Inflation: 13.8% (1980), 9.9% (1981).
$1 = 4.3153 markka (1981).

Army: 31,400 (24,000 conscripts).
7 Military Regions:
1 armd bde.
7 inf bdes.
3 fd arty regts.
2 coast arty regts.
7 indep inf bns.
2 indep fd arty bns.
3 indep coast arty bns (1 mobile).
1 AA arty regt.
4 indep AA arty bns.
1 SAM bn with SAM-79 (SA-3 *Goa*).
2 engr bns.
1 sigs regt, 1 bn.
T-54/-55 MBT; PT-76 lt tks; BTR-50P/-60 APC, BMP-1 MICV; 76mm, 105mm, 122mm, 130mm, 150mm, 152mm, 155mm guns/how; 81mm, 120mm mor; M-55 55mm, *Miniman* 74mm, 95mm RCL; SS-11 ATGW; 20mm, 23mm, 30mm, 35mm, 40mm, 57mm towed, ZSU-57-2 SP AA guns; SAM-79 (SA-3), SAM-78 (SA-7) SAM.

Navy: 2,500 (1,200 conscripts).
2 *Turunmaa* corvettes.
5 FAC(M) with MTO *(Styx)* SSM: 4 *Tuima* (ex-Sov *Osa*-II), 1 *Isku*.
13 FAC(G): 1 *Helsinki*, 11 *Nuoli* (7 to retire), 1 *Hurja*(.
5 large patrol craft: 3 *Ruissalo*, 2 *Rihtniemi*.
3 minelayers, 6 *Kuha* inshore minesweepers.
1 HQ/log/trg ship.
14 small LCU/tpts, 7 utility/spt ships.
(On order: 3 *Helsinki* FAC(G).)

Bases: Upinniemi (Helsinki), Turku.

Air Force: 3,000 (2,000 conscripts): 43 combat ac.
3 AD districts: 3 fighter wings.
2 fighter sqns with 22 MiG-21bis, 12 J-35S *Draken*.
1 OCU with 6 MiG-21U/UM, 3 J-35C.
1 tpt sqn: 5 C-47, 2 F-27-100 ac; 1 hel flt with 6 Mi-8, 2 Hughes 500.
Trainers incl 60 *Magister*, 15 *Hawk*, 22 Leko 70.
Liaison ac: 9 *Cherokee Arrow*, 2 Cessna 402.
AAM: AA-2 *Atoll*, RB-27, -28 *(Falcon)*.
(On order: 3 *Learjet* 35A tpts, 8 Leko 70, 35 *Hawk* trg, 4 Piper *Chieftain* liaison ac.)

RESERVES: (all services): about 700,000 (38,000 a year do training).

Forces Abroad: Cyprus (UNFICYP) 11. Syria (UNDOF) 390. Other Middle East (UNTSO) 21. Pakistan (UNMOGIP) 4.

Para-Military Forces: 3,600 Frontier Guards (incl 600 coastguard), 5 large, 9 coastal patrol craft, some 12 smaller patrol craft, 3 Mi-8 hel.

MALTA

Population: 355,000.
Military service: voluntary.
Total armed forces: 800.
Estimated GNP 1981: £M 465 m ($1.2 bn).
Defence expenditure 1981: £M 4.4 m ($11.4 m).
$1 = £M 0.386 (1981).

Army: 800.
1 inf bn (incl 1 arty coy, 40mm AA guns, RPG-7 RL).
1 task force.
1 marine section with 16 launches/patrol craft(.
1 air section with 1 AB-206, 3 *Alouette* III, 4 AB-47G hel.

Para-Military Forces: pioneers/labour corps 1,000.

SWEDEN

Population: 8,323,000.
Military service: Army and Navy 7½–15 months, Air Force 8–12 months.
Total armed forces: 64,500 (47,100 conscripts,[4] mobilizable to about 800,000 in 72 hours, excl 500,000 auxiliary orgs).
GNP 1981: Kr 561.4 bn ($110.9 bn).
Defence expenditure 1982–3: Kr 19.05 bn ($3.22 bn).
GDP growth: 1.9% (1980), –0.9% (1981).
Inflation: 14.0% (1980), 9.2% (1981).
$1 = 5.91 kronor (1982), 5.06 (1981).

Army: 45,000 (36,000 conscripts).[4]
Peace establishment:
50 non-operational armd, cav, inf, arty, AA, engr, and sig trg regts for basic conscript trg.
1 army aviation bn (35 hel).
11 arty aviation platoons (66 ac).
War establishment (700,000 on mobilization, incl 100,000 Home Guard):
5 armd bdes.
19 inf, 4 *Norrland* bdes.
50 indep inf, arty, and AA arty bns.
1 army aviation bn.
26 Local Defence Districts with 100 indep bns, 400–500 indep coys and home guard units.
340 Strv-101, Strv-102 *(Centurion)*, 330 Strv-103B MBT; 200 Ikv-91 lt tks; Pbv-302 APC; 105mm, 150mm, 155mm how; 155mm SP guns; 81mm, 120mm mor; *Miniman* 74mm, *Carl Gustav* 84mm, PV-1110 90mm RCL; RB-53 *Bantam* ATGW; 20mm, 40mm AA guns; RB-69 *(Redeye)*, RBS-70, RB-77 *(Improved HAWK)* SAM; 66 SK-61C *(Bulldog)* ac; 15 HKP-3 (AB-204B), 24 HKP-6 *(Jet Ranger)* hel.
(On order: FH-77 155mm how, 2,000 *TOW* ATGW.)

Navy: 10,000, incl coast arty (6,600 conscripts),[4] 10 combat hel.
12 submarines (3 *Näcken*, 5 *Sjöormen*, 4 *Draken*).
2 *Halland* destroyers with RB-08 SSM (1 trg, 1 reserve).
17 *Hugin* FAC(M) with 6 RB-12 *(Penguin)* SSM.
18 FAC(T): 12 *Spica* T-131, 6 *Spica* T-121.
7 *Hanö* large, 26 coastal patrol craft.
2 minelayers, 2 minelayer/trg ships.
9 coastal, 36 inshore minelayers.
11 *Arko* coastal, 20 inshore minesweepers.
9 LCM, 81 LCU, 54 LCA.
5 regts: 12 mobile, 45 static coastal arty btys with 75mm, 105mm, 120mm, 152mm, 210mm guns; RB-08, RB-52 SSM.
2 hel sqns with 8 HKP-2 (*Alouette* II) utility, 10 HKP-4 (Vertol 107) ASW/MCM, 10 HKP-6 liaison.
(On order: 4 A-17 submarines, 2 *Spica* III FAC(M), 4 coastal patrol craft, 2 M-80 minehunters, RBS-15 SSM.)

Bases: Stockholm, Karlskrona, Göteborg, Härnosand.

Air Force: 9,500 (4,500 conscripts);[4] 421 combat aircraft.
13 wings.
6 FGA sqns: 5 with 97 AJ-37 *Viggen*, 1 with 20 SK-60B/C (Saab 105).
13 AD sqns: 8 with 126 J-35F *Draken*, 3 with 54 J-35D, 2 with 36 JA-37 *Viggen*.
3 recce sqns with 54 SH/SF-37 *Viggen*.
2 OCU: 1 with 17 SK-37 *Viggen;* 1 with 17 SK-35C *Draken*.
2 tpt sqns with 8 C-130E/H, 2 *Caravelle*, 4 C-47.
5 comms sqns with 65 SK-60A.
Trainers incl 124 SK-60A/B/C, 57 SK-61, 24 J-32D *Lansen* (drone).

1 SAR sqn with 10 HKP-4 hel.
1 utility sqn with 9 HKP-2, 7 HKP-3 hel.
AAM: *Sidewinder*, RB-27 *(Falcon)*, RB-28 *(Improved Falcon)*, RB-71 *(Skyflash)*.
ASM: RB-04E, RB-05A, RB-75 *(Maverick)*.
Semi-automatic control and surveillance system, *Stril* 60, co-ordinates all AD components.
(On order: 113 JA-37 *Viggen* fighter ac, *Skyflash* AAM.)

Forces Abroad: Cyprus (UNFICYP): 1 inf bn (428). Lebanon (UNIFIL): HQ/log tps (144).

RESERVES (all services): 735,500; voluntary auxiliary organizations 500,000.

Para-Military Forces: Coast Guard (550): 4 Regions (15 districts), 2 stations per district; 2 TV-171 fishery protection vessels, 45 cutters, 65 environment protection vessels.
Air Arm: 2 Cessna 337G, 1 402C.

SWITZERLAND

Population: 6,370,000.
Military service: 17 weeks recruit training followed by reservist refresher training of 3 weeks for 8 out of 12 years for *Auszug* (20–32), 2 weeks for 3 years for *Landwehr* (33–42), 1 week for 2 years for *Landsturm* (43–50).
Total armed forces: about 1,500 regular and 18,500 recruits[5] (mobilizable to 625,000 in 48 hours).
GDP 1981: fr 196.05 bn ($100.03 bn).
Defence expediture 1981: fr 3.49 bn ($1.78 bn).
GDP growth 1980: 4%.
Inflation: 4.4% (1980), 6.6% (1981).
$1 = 1.96 francs (1981).

Army:
War establishment: 580,000 on mobilization.
3 fd corps, each of 1 mech, 2 inf divs.
1 mountain corps of 3 mountain inf divs.
17 indep bdes (11 frontier, 3 fortress, 3 redoubt).
Indep units: 3 hy arty, 2 engr, 2 sigs regts, 1 armd car bn.
325 Pz-55/57 *(Centurion)*, 150 Pz-61, 340 Pz-68 MBT; 1,250 M-113 APC; 1,000 105mm guns/how; M-50 155mm how; 260 PzHb-66 (M-109U) 155mm SP how; 3,000 81mm, 120mm mor; 2,000 90mm ATK guns, 106mm RCL; 20,000 83mm RL; 800 *Bantam*, *Dragon* ATGW; 700 20mm, 300 35mm AA guns.
(On order: 60 Pz-68 MBT, 225 M-113 APC, 207 M-109 155mm SP how, *Dragon* ATGW.)

Air Force:[6] 45,000 on mobilization (maintenance by civilians); 334 combat aircraft.
3 air regts.
12 FGA sqns: 3 with 60 *Venom* FB-50; 9 with 148 *Hunter* F-58/T-68.
4 fighter sqns with 71 F-5E/F.
2 interceptor sqns with 30 *Mirage* IIIS/BS.
1 recce sqn with 18 *Mirage* IIIRS, 7 *Venom* FB-54.
4 liaison/SAR sqns with 16 *Porter*, 24 *Turbo-Porter*, 6 Do-27, 3 *Twin Bonanza*.
4 hel sqns with 21 *Alouette* II, 78 *Alouette* III hel.
Trainers incl 47 Pilatus P-2, 68 P-3.
AAM: *Sidewinder*, A1M-26B *Falcon*. ASM: AS-30.
1 air force fd bde (3 regts, 1 para coy, 1 lt ac wing).
1 air base bde with 3 regts.
1 AD bde with 1 SAM regt of 2 bns (each with 32 *Bloodhound)* and 7 AA arty regts with 20mm and 35mm guns, *Skyguard* fire control systems.
3 comd and comms regts.
1 log regt.
(On order: 2 *Mirage* IIIB, 32 F-5E, 6 F-5F fighters; 40 PC-7 *Turbo-Trainer* ac; 60 *Rapier* SAM launchers; 500 AGM-65 *Maverick* ASM.)

RESERVES (all services): 605,000.

YUGOSLAVIA

Population: 22,650,000.
Military service: 15 months.
Total armed forces: 250,500 (154,000 conscripts).
GNP 1980: 1,740.4 bn dinar ($69.867 bn).
Estimated defence expenditure 1981: 101.89 bn dinar ($2.87 bn).
GDP growth: 2.4% (1980), 2.2% (1981).
Inflation: 37.8% (1980), 35.9% (1981).
$1 = 35.51 dinar (1981), 24.91 (1980).

Army: 190,000 (140,000 conscripts).
7 Military Regions:
8 inf divs.
8 indep tk bdes.
17 indep inf bdes (incl mech, 3 lt).
1 mountain bde.
1 AB bde (bn strength in peacetime).
12 fd, 12 AA arty regts.
12 AA arty regts.
6 ATK regts.
1,240 T-34/-54/-55, 60 M-47 MBT; PT-76 lt tks; M-3A1, M-8, BRDM-2 scout cars; M-980 MICV, 200 BTR-40/-50/-60/-152, some M-60 APC; 1,800 M-1955, SU-100 100mm SP, 122mm, M-46 130mm and 152mm guns; M-48 76mm, 105mm incl SP, 122mm incl M-1974 SP, 155mm how; 82mm, 120mm mor; 128mm MRL; *FROG*-7 SSM; 57mm, PAK-40 75mm, T-12 100mm towed, ASU-57, 300 M-18 76mm, M-36B2 90mm SP ATK guns; 57mm, 75mm, 82mm, 105mm RCL; *Snapper*, *Sagger* ATGW; 20mm, 30mm, 37mm, 40mm, 57mm, 85mm, 88mm, 90mm, 94mm towed, ZSU-23-4, M-53/59, ZSU-57-2 SP AA guns; SA-6/-7/-9 SAM.
(On order: 500 M-980 MICV.)

RESERVES: 500,000; mobile bdes, bns with arty and AA guns. (M-18 *Hellcat* 76mm, M-36B2 90mm SP ATK guns. T-34/-85, M-4 MBT are held in storage.)

Navy: 15,500 incl 1,500 marines (6,000 conscripts).
9 submarines: 2 *Sava*, 3 *Heroj*, 2 *Sutjeska*, 2 *Mala* midget.
1 *Koni* frigate with twin SA-N-4 SAM.
3 corvettes: 2 *Mornar*, 1 *Le Fougueux* (in reserve).
18 FAC(M): 16 with *Styx* (6 *Rade Koncar*, 10 ex-Sov *Osa*-I), 2 Yug with improved *Styx* (X-15) SSM.
15 ex-Sov *Shershen* FAC(T).
20 large patrol craft: 10 *Kraljevica*, 10 Type 131.
31 minesweepers: 4 *Vukov Klanac* coastal, 10 inshore (4 *Ham*, 6 M-117), 17 river (10 M-301, 7 *Nestin)*.
18 LCU/minelayers, 20 601-type LCA.
1 ASW hel sqn with Ka-25, Mi-8, *Partizan (Gazelle)*.
1 understrength marine bde (2 regts, each of 2 bns).
25 coast arty btys with *Samlet* SSM; M-44 85mm, ex-Ger 88mm, M-37 122mm, M-54 130mm, 152mm guns.
(On order: 6 FAC(M).)

Bases: Lora/Split, Pula, Sibenik, Kardeljevo, Kotor, Dubrovnik.

Air Force: 45,000 (8,000 conscripts); 400 combat aircraft.
2 air divisions: 4 air regions.
12 FGA sqns with 25 *Kraguj*, 160 *Galeb/Jastreb*.
9 interceptor sqns with 130 MiG-21F/PF/M/bis; 20 MiG-21U.
2 recce sqns with 35 *Galeb/Jastreb*.
1 OCU with 30 *Jastreb*.
2 tpt sqns: 15 C-47, 6 Yak-40, 12 An-12, 10 An-26, 2 Boeing 727-200, 2 DC-6, 12 Il-14M, 2 *Mystère*-50, CL-215.
Trainers incl 60 *Galeb/Jastreb*, 3 T-33, 30 UTVA-75 ac, 15 *Partizan* hel.
4 hel tpt sqns: 5 AB-205, 18 Mi-4, 50 Mi-8, 5 *Whirlwind*, 5 *Partizan*, 1 A-109 *Hirundo*.
AAM: AA-2 *Atoll*.
Air Defence Force: (Army personnel, eqpt, Air Force control):
24 AA regts.
8 SA-2, 6 SA-3 SAM bns.
(On order: 25 *Orao* FGA, Pilatús PC-6 tpt ac, 94 *Partizan* hel.)

Para-Military Forces: Frontier Guards 20,000. Territorial Defence Force (Partisan) 1–3 million. Civil Defence 2 million on mobilization. Workers' Militia State Police with APC.

The most widely used US-built supersonic fighter is the Northrop F-5. Switzerland's four fighter squadrons are equipped with seventy-one of the E/F models.

[1] Spare parts are in short supply; some equipment may be unserviceable.

[2] Austrian air units, an integral part of the Army, are listed separately for purposes of comparison.

[3] Greek-Cypriot National Guard, mainly Cypriot conscripts, but some seconded Greek Army officers and NCOs.

[4] There are normally some 95,500 more conscripts (70,000 Army, 4,500 Navy, 6,000 Air Force) plus 15,000 officer and NCO reservists doing 11–40 days refresher training at some time in the year. Obligation is 5 times per reservist between ages 20 and 47.

[5] Two recruit intakes a year (Jan/Jun) each of 17,000. Some 400,000 reservists a year do refresher training.

[6] Aviation Corps, an integral part of the Army.

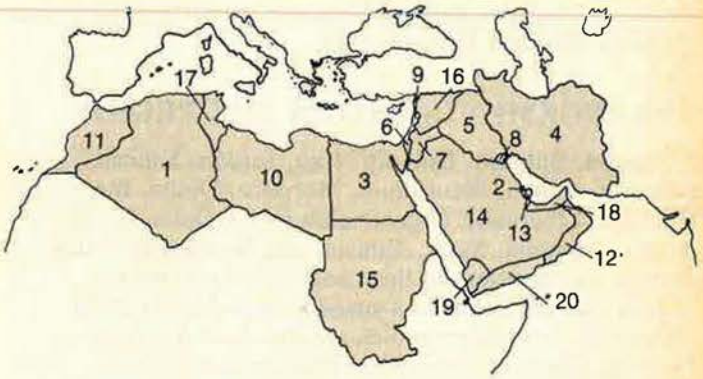
The Middle East and North Africa

BILATERAL AGREEMENTS WITH EXTERNAL POWERS

The Soviet Union signed a fifteen-year Treaty of Friendship and Co-operation with Iraq in April 1972, and a further agreement in December 1978. A similar treaty was signed with Syria on 8 October 1980. A Treaty of Friendship and Co-operation, signed with South Yemen in October 1979, was ratified in February 1980. Soviet naval units use Aden's facilities. All three countries have received significant Soviet arms deliveries. Despite this, Iraq has been seeking to broaden her contacts with the West, particularly with France and Italy, and to establish herself as a major non-aligned country. In November 1979 Iran unilaterally abrogated two paragraphs of a 1921 treaty under which Moscow reserves the right to intervene in Iran's internal affairs if a third country threatens to attack the USSR from Iranian territory. Moscow has refused to accept this. Egypt signed a Treaty of Friendship and Co-operation with the Soviet Union in May 1971 and abrogated it in March 1976; the Soviet Union, formerly a major supplier, has delivered no significant arms supplies to Egypt since. Some supplies may be still coming from other Warsaw Pact nations but spare parts made by Western nations, domestic manufacture, and modernization from Western suppliers are reducing the importance of this link.

The Defence Ministers of Bulgaria and the People's Democratic Republic of Yemen (South Yemen) signed a Protocol for Co-operation in April 1980 and a Treaty of Friendship and Co-operation on 14 November 1981. Similar agreements with Hungary were reported in April and November 1981.

The United States has varying types of security assistance programmes in the region. It concluded a mutual defence agreement with Israel in July 1952. A similar agreement with Egypt (April 1952) may have been in abeyance between 1971 and 1975. A 1981 agreement enables the US to use Egyptian bases. A similar agreement was reached with Morocco in May 1982. A 1959 mutual security agreement with Iran, though only an executive agreement, not a formally ratified treaty, has not been specifically abrogated. An agreement with Oman to provide economic and military aid in exchange for permission to use Salalah and Masirah as staging bases has been concluded. An agreement with Bahrain permits the US Navy to use port facilities. In November 1981 a strategic co-operation agreement was signed with Tunisia.



THE MIDDLE EAST AND NORTH AFRICA

1. Algeria
2. Bahrain
3. Egypt
4. Iran
5. Iraq
6. Israel
7. Jordan
8. Kuwait
9. Lebanon
10. Libya
11. Morocco
12. Oman
13. Qatar
14. Saudi Arabia
15. Sudan
16. Syria
17. Tunisia
18. United Arab Emirates (UAE)
19. Yemen Arab Republic (North)
20. Yemen: People's Democratic Republic (South)

China signed a Treaty of Friendship with North Yemen in 1964, under which some economic development took place and minor arms were provided. China has also supplied arms and spare parts to Egypt under an agreement signed in 1978/9. Arms supplied to Sudan and a military co-operation agreement signed in January 1982 suggest more will follow.

Britain concluded treaties of friendship with Bahrain, Qatar, and the United Arab Emirates (UAE) in August 1971. Iran ended her military purchases in January 1979. Britain has supplied arms to Bahrain, Egypt, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Sudan, and the UAE. British military personnel are serving with Oman's forces.

France has continuing arms supply arrangements with Egypt, Iraq, Lebanon, Libya, Morocco, Sudan, and Tunisia.

The United Nations withdrew the 4,000-man United Nations Emergency Force (UNEF) from the Sinai on 24 July 1979; its duties were assumed by the United Nations Truce Supervisory Organization (UNTSO), 298 officers, which has been active in the region since 1949.

The United Nations also deploys in the Golan Heights the 1,279-man Disengagement Observer Force (UNDOF), made up of contingents from Austria, Canada, Finland, and Poland.

The United Nations Interim Force in Lebanon (UNIFIL) consists of some 7,000 men from Eire, France, Fiji, Ghana, Italy, Nepal, Netherlands, Nigeria, Norway, Senegal, and Sweden.

The withdrawal of Israeli forces from the Sinai, occupied since 1967, was complete by 25 April 1982. The border is now patrolled by the 2,600-man Multinational Force and Observers (MFO), from the US (1,100), Australia (110), Britain (35), Colombia (361), Fiji (469), France (72), Italy (90), the Netherlands (105), New Zealand (40), and Uruguay (70).

ARRANGEMENTS WITHIN THE REGION

Algeria, Bahrain, Djibouti, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, the Palestine Liberation Organization (PLO), Qatar, Saudi Arabia, Somalia, Syria, Tunisia, and North and South Yemen are members of the League of Arab States (Egypt's membership was suspended in March 1979). Among its subsidiary bodies are the Arab Supreme Defence Council, comprising Foreign and Defence Ministers (set up in 1950), the Permanent Military Committee of army general staffs (1950), which is an advisory body, and the United Arab Command (1964).

Syrian forces, which had entered the fighting in Lebanon in April 1976, and which then totalled some 13,000, were augmented by a symbolic Lebanon Peacekeeping Force of Libyan, Saudi, and Sudanese troops. Fighting continued, and a 30,000-man Arab Deterrent Force, mostly Syrian, was approved at Riyadh on 18 October 1976. Subsequently this Force also included forces from Lebanon, Kuwait, the Palestine Liberation Army (PLA), Sudan, and the UAE. All but the Syrian and the PLA contingents have now been withdrawn and their position is uncertain.

The Palestine Liberation Organization was deployed in southern Lebanon until June 1982 and, despite splits and differences between and among its leaders, increased its stocks of weapons from the USSR, Hungary, North Korea and elsewhere and recruited and trained its own and some foreign guerrillas. It had much heavy equipment, including T-34 MBT, 122mm guns, and BM-21 122mm MRL.

Algeria and Libya signed a defence agreement in 1975. Egypt and Sudan signed another in 1977, which may be the authority for the Joint Defence Council and some joint training activity which exists. Saudi Arabia has long supported Morocco against *Polisario* guerrillas; a security pact was signed in February 1982. An understanding between Saudi Arabia and Iraq is believed to have been signed in 1979. Jordan and Iraq ratified a Defence agreement in March 1981. The Gulf Co-operative Council, created in May 1981 by Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE, is developing a mutual defence structure. It is being reinforced by pacts covering questions of internal security between Saudi Arabia and Bahrain, Qatar, Oman, and the UAE. A draft Gulf security agreement is now circulating among the members. Libya, South Yemen, and Ethiopia formed the Aden Treaty Tripartite Alliance in August 1981. It includes a joint defence commitment. North and South Yemen have agreed to a merger, the details of which are obscure. Libya has announced a merger with Algeria but, with no statement from Algeria, this union's status is in doubt. Jordan, Morocco, and North Yemen have announced the departure of unspecified numbers of volunteers to assist Iraq against Iran. Iraq has announced the presence of multinational composite units but numbers, roles, and equipment are obscure.

Arms movements in the region are complex. Egypt has supplied arms to Morocco, Sudan, and Iraq. Algeria and Libya reportedly supply arms to *Polisario*, and most countries have supplied arms to the Palestinian guerrillas. In some cases a third nation funds the recipient's foreign arms purchases. Iran reportedly received arms supplies and spares from France, Israel, North Korea, and Eastern Europe. Iraq apparently received arms from Egypt, the USSR, France, Portugal, and Brazil.

In 1975 an Arab Organization for Industrialization (AOI) was set up in Egypt to encourage indigenous Arab arms production. Initially under the aegis of Saudi Arabia, Qatar, the UAE, and Sudan, this project was ended following Egypt's rapprochement with Israel. Egypt is attempting to continue it with British, French, and US support. To replace the AOI, Iraq, Kuwait, Qatar, Saudi Arabia, and the UAE agreed in 1979 to set up an $8-bn arms industry in the UAE. This is now developing under the Gulf Co-operative Council.

ALGERIA

Population: 19,400,000.
Military service: 6 months.
Total armed forces: 168,000.
GNP 1981: 159.38 bn dinar ($36.8 bn).
Defence operating budget 1982: 3.89 bn dinar ($856.8 m).
GDP growth 1980: 6.5%.
Inflation 1980: 9.7%.
$1 = 4.54 dinar (1982), 4.33 dinar (1981).

Army: 150,000.
6 Military Regions.
2 armd bdes.
4 mech bdes.
6 mot inf bdes.
1 AB/special force bde.
3 indep tk bns.
20 indep inf bns.
2 para bns.
5 indep arty bns.
11 AD bns.
4 engr bns.
12 coys desert troops.
400 T-54/-55, 200 T-62, 30 T-72 MBT; 50 AMX-13 lt tks; 50 AML-60, 100 BRDM-2 armd cars; 500 BMP-1 MICV, 830 BTR-40/-50/-60/-152, *Walid* APC; 100 85mm, 350 SU-100 SP, 122mm incl ISU-122, 152mm SP guns; 122mm incl M-1974 SP how, 152mm guns/how; 150 BM-21 122mm, 140mm, and 240mm MRL; 230 75mm, 76mm, and 85mm ATK guns; 180 120mm and 160mm mor; 20 *Sagger*, 18 *Milan* ATGW; 440 37mm, 57mm, 85mm, 100mm, 130mm towed, 100 ZSU-23-4 and ZSU-57-2 SP AA guns; SA-6/-7/-9 SAM.

RESERVES: up to 100,000.

Navy: 6,000.
2 *Koni* frigates with 2 × 2 SA-N-4 SAM.
2 *Nanuchka* corvettes with 4 SS-N-2bis SSM, 2 × 2 SA-N-4 SAM.
6 ex-Sov SO-1 large patrol craft.
17 ex-Sov FAC(M) with *Styx* SSM: 3 *Osa*-I, 8 *Osa*-II, 6 *Komar*(.
10 ex-Sov P-6 FAC(T)((2 unarmed trg).
2 ex-Sov T-43 ocean minesweepers (in reserve).

1 ex-Sov *Polnocny* LCT.
(On order: *Nanuchka* corvettes, 4 FAC(M), 2 LST, 6 patrol craft.)

Bases: Algiers, Annaba, Mers el Kebir.

Air Force: 12,000; some 306 combat aircraft, 37 armed hel.
1 lt bbr sqn with 12 Il-28.
7 FGA sqns: 2 with 20 Su-7BM; 2 with 60 MiG-17; 3 with some 40 MiG-23BM, some 12 Su-20 (*Fitter* C), 8 MiG-19.
4 interceptor sqns: 3 with 95 MiG-21MF/F; 1 with 18 MiG-25 *Foxbat* A.
1 recce sqn with 4 MiG-25R *Foxbat* B.
1 COIN sqn with 26 *Magister.*
1 MR sqn with 7 F-27 (Navy-assigned).
1 OCU with 4 MiG-15.
1 tpt sqn with 8 An-12, 6 C-130H/H-30, 1 Il-18, 2 *Mystère-Falcon*, 3 *Caravelle*.
6 hel sqns with 4 Mi-6, 28 Mi-4, 12 Mi-8, 37 Mi-24, 5 *Puma*, 6 Hughes 269A, 4 *Alouette* II.
Other ac incl 6 *King Air*, 2 *Super King Air* T-200T (MR), 3 *Queen Air.*
Trainers incl MiG-15/-17/-21UTI, Su-7U, 2 MiG-23U, 3 MiG-25U, 6 T-34C.
1 SAM regt: 20 SA-2 (80 msls), some SA-3/-6.
AAM: AA-2 *Atoll.*
(In store: 16 Il-28 bbrs.)

Para-Military Forces: Gendarmerie 24,000. Coastguard: 2 P-6 FAC(T)(, 15 Baglietto FAC(G) (6 Gemini 36, 9 Type 20().

BAHRAIN

Population: 400,000.
Military service: voluntary.
Total armed forces: 2,550.
GNP 1980: 832.9 m dinar ($2.21 bn).
Defence expenditure 1981: 51.0 m dinar ($135 m).
Inflation 1980: 9.0%.
$1 = 0.377 dinar (1980, 1981).

Army: 2,300.
1 inf bn.
1 armd car sqn.
1 arty bty.
1 air wing.
8 *Saladin* armd, 8 *Ferret* scout cars; 20 AML-90 armd cars; 110 M-3 APC; 8 105mm lt guns; 6 81mm mor; 6 120mm RCL: 6 RBS-70 SAM, 12 AB-212 hel.
(On order: *Improved HAWK* SAM, 2,000 *TOW* ATGW.)

Navy: 150.
2 Lürssen 45-metre FAC(M) with 4 *Exocet* SSM.
2 Lürssen 38-metre FAC(G).

Air Force: 100.
1 FGA sqn with 4 F-5E, 2 F-5F (forming).
AAM: *Sidewinder.*

Para-Military Forces: Coastguard: 180; 17 coastal patrol craft, 1 hovercraft, 2 landing craft (1 *Loadmaster*, 1 60-ft). Police: 2,500; 2 Bell 412, 2 *Scout*, 3 BO-105, 2 Hughes 500D hel.

EGYPT

Population: 42,600,000.
Military service: 3 years (selective).
Total armed forces: 452,000 (255,000 conscripts).
GNP 1980: £E 14.4 bn ($20.6 bn).
Defence expenditure 1981–2: £E 1.47 bn ($2.10 bn).
GDP growth 1980: 9%.
Inflation 1981: 9%.
$1 = £E 0.699 (1980, 1981).

Army: 320,000 (180,000 conscripts).
2 corps HQ.
3 armd divs (each with 1 armd, 2 mech bdes).
4 mech inf divs (each with 2 mech, 1 armd bdes).
3 inf divs (each with 2 inf, 1 mech bdes).
2 Republican Guard Brigades.
2 indep armd bdes.
9 indep inf bdes.
2 airmobile bdes.
1 para bde.
12 arty bdes.
2 hy mor bdes.
6 ATGW bdes.
7 cdo gps.
2 SSM regts (12 *FROG*-7, 12 *Scud* B).
AFV: 1,250 T-54/-55, 600 T-62, 250 AM-60 (M-60A3) MBT; 30 PT-76 lt tks; 300 BRDM-1/-2 scout cars; 200 BMP-1 MICV, 2,500 OT-62, BTR-40/-50/-60/-152, *Walid*, 300 M-113A2 APC.
Arty: 1,500 85mm, 100mm (incl 200 SU-100), 122mm, 130mm, 152mm (incl SU-152), and 180mm guns; 122mm, 152mm how; 300 120mm, 160mm, and 240mm mor; about 300 122mm (incl *Saqr* 30), 132mm, 140mm, and 240mm MRL; 12 *FROG*-7, 12 *Scud* B SSM.
ATK: 900 57mm (incl SP), 76mm, and 100mm guns; 900 82mm and 107mm RCL; 1,000 *Sagger, Snapper, Swatter, Milan, Beeswing, Swingfire*, and *TOW* ATGW.
AD: 350 ZSU-23-4 and ZSU-57-2 SP AA guns; SA-7/-9, 16 *Crotale* SAM.[1]
(On order: 189 M-60A3 MBT; 750 M-113A2 APC; 52 M-901 SP *TOW* ATGW AFV; 100 M-106A2 and M-125A2 mor carriers; 200 *TOW* launchers, 4,000 msls (incl 2,500 Improved *TOW*), 2,000 *Swingfire* ATGW, 4 *Crotale* SAM.)

RESERVES: about 300,000.

Navy: 20,000 (15,000 conscripts).[1]
12 ex-Sov submarines: 4 W- (may be unserviceable), 8 R-class (2 ex-Ch).
5 destroyers: 4 ex-Sov *Skory* (1 with 1 × 2 *Styx* SSM), 1 ex-Br Z-class.
3 ex-Br frigates: 1 *Black Swan*, 1 *Hunt*, 1 *River* (sub spt ship).
19 FAC(M): 8 ex-Sov *Osa*-I with SA-7 SAM, 4 *Styx* SSM; 4 *Komar*(, 5 *October*-6 (P-6)(, 2 *Ramadan*(with 4 *Otomat* SSM.
12 ex-Sov SO-1 large patrol craft: 6 with BM-21 MRL, some with SA-7 SAM.
16 ex-Sov FAC(T): 2 *Shershen*, 10 P-6(, 4 P-4(.
14 ex-Sov FAC(G): 4 *Shershen* with BM-21 MRL, SA-7 SAM; 10 P-6(.
14 ex-Sov minesweepers: 10 ocean (6 T-43, 4 *Yurka*), 4 inshore (2 T-301, 2 K-8).
3 SRN-6 hovercraft (may be minelayers).
3 ex-Sov *Polnocny* LCT.
14 ex-Sov LCU (10 *Vydra*, 4 SMB1).
1 ASW hel sqn with 6 *Sea King* Mk 47.
Coastal defence unit (Army manpower, Navy control): SM-4-1 130mm guns, 30 *Otomat* and *Samlet* SSM.
(On order: 1 *October*-6, 4 *Ramadan* FAC(M), 14 SRN-6 hovercraft, *Otomat* SSM.)

Bases: Alexandria, Port Said, Mersa Matruh, Port Tewfig, Hurghada, Safaqa.

RESERVES: about 15,000.

Air Force: 27,000 (10,000 conscripts); 429 combat ac, 24 armed hel.
1 bbr regt with 14 Tu-16 (some with AS-5 ASM).
3 interceptor regts: 7 sqns with 142 MiG-21MF/U; 2 forming, 1 with 10 F-16A.
5 FGA regts: 2 with 35 F-4E, 47 Ch F-6; 2 with 50 MiG-17, 40 Su-7BM; 1 with 46 *Mirage* 5.
4 hel sqns with 60 *Gazelle* (24 with *HOT* ATGW).
2 recce sqns with 6 *Mirage* 5SDR, 12 MiG-21R, 20 Su-7.
1 MR sqn with 5 Il-28.
ELINT ac: 2 EC-130H.
1 tpt bde of 5 sqns with 18 C-130H, 18 Il-14, 10 An-12, 4 *Falcon* 20 VIP, 20 DHC-5D *Buffalo*, 1 Boeing 707, 1 Boeing 737.
8 utility hel sqns with 20 Mi-4, 55 Mi-8, 28 *Commando* (2 VIP), 15 CH-47C.
Trainers incl 30 MiG-15UTI, 80 L-29, 60 *Gomhouria*, 36 Yak-18, *Wilga* 35/80, 4 Ch FT-6, 5 *Mirage* 5SDD, 4 F-16B.
AAM: AA-2 *Atoll*, R-530, *Sparrow, Sidewinder.*
ASM: AS-1 *Kennel*, AS-5 *Kelt, Maverick, HOT.*
(Further ac in reserve incl up to 50 MiG-21, 17 MiG-23BN/U, 72 MiG-17, 47 Su-7, 40 Su-20, 43 F-6, 3 An-24 ac; 12 Mi-6 hel.)
(On order: 70 F-16A/B, 20 *Mirage* 2000, 16 *Mirage* 5E2 fighters; 45 *AlphaJet* (15 -A FGA, 30 -E trg); 6 C-130H tpt ac; 20 *Gazelle*, 4 AS-61 hel; *Sparrow*, 300 *Sidewinder* AAM; *Maverick* ASM.)

RESERVES: about 20,000.

Air Defence Command: 85,000 (50,000 conscripts).[1]
12 centres under construction.
2 AD divs: regional bdes.
100 msl and AA bns, radar bns; some 80 SA-2, 65 SA-3 sites. 360 SA-2, 200 SA-3, 75 SA-6, 6 *Improved HAWK*, 16 *Crotale* SAM; 2,500 20mm, 23mm, 37mm, 40mm, 57mm, 85mm, and 100mm AA guns; *Fan Song, Low Blow, Straight Flush* missile/gun and *Squint Eye, Long Track* EW radars.
(On order: Ch CSA-1, *Spada*, 6 btys *Improved HAWK* SAM.)

Forces Abroad: Oman, Sudan, Somalia, Zaire.

Para-Military Forces: 139,000: National Guard, 60,000; Frontier Corps, 12,000; Defence and Security, 60,000; Coast Guard, 7,000; 3 *Nisr*, 2 PO-2, 6 *Bertram* patrol boats, 2 fast launches. (On order: 6 *Crestitalia* patrol boats.)

IRAN

Population: 39,100,000.
Military service: 24 months.
Total armed forces: 235,000.
GNP 1980: 8,015.1 bn rial ($112.1 bn).
Defence expenditure 1981: 350 bn rial ($4.4 bn).[2]
GDP growth 1980: −10%.
Inflation: 25.8% (1980), 35% (1981).
$1 = 79.5 rial (1981), 71.5 rial (1980).

Army: 150,000 (100,000 conscripts).[3]
4 armd 'divs' (at least 2 are bdes).
4 inf 'divs' (at least 2 are bdes).
1 AB 'div' (bde).
4 SAM bns with *HAWK*.
Army Aviation Command.
190 T-54/-55/-62, 420 *Chieftain* Mk 3/5, 300 M-47/-48, 200 M-60A1 MBT; 100 *Scorpion* lt tks; EE-9 *Cascavel* armd cars, BMP MICV, about 220 M-113, 360 BTR-40/-50/-60/-152 APC; some 1,000 75mm pack, 85mm, M-101 105mm, 200 122mm, 130mm towed, M-107 175mm SP guns, M-114 towed, M-109A1 SP 155mm, M-115 towed, M-110 SP 203mm how; 65 BM-21 122mm MRL; 81mm, 4.2-in, 120mm mor; 57mm, 75mm, 106mm RCL; RPG-7 RL; *ENTAC*, SS-11/-12. *Dragon, TOW* ATGW; 1,800 ZU-23, ZSU-23-4 SP 23mm, 37mm, ZSU-57-2 SP 57mm, 75mm, and 85mm AA guns; *HAWK/Improved HAWK*, SA-7 SAM.
Ac incl 40 Cessna 185, 6 Cessna 310, 10 O-2A, 2 F-27, 5 *Shrike Commander*, 2 *Falcon.*
Hel incl 160 AH-1J, 270 Bell 214A, 35 AB-205A, 15 AB-206, 92 CH-47C.

RESERVES: 400,000.

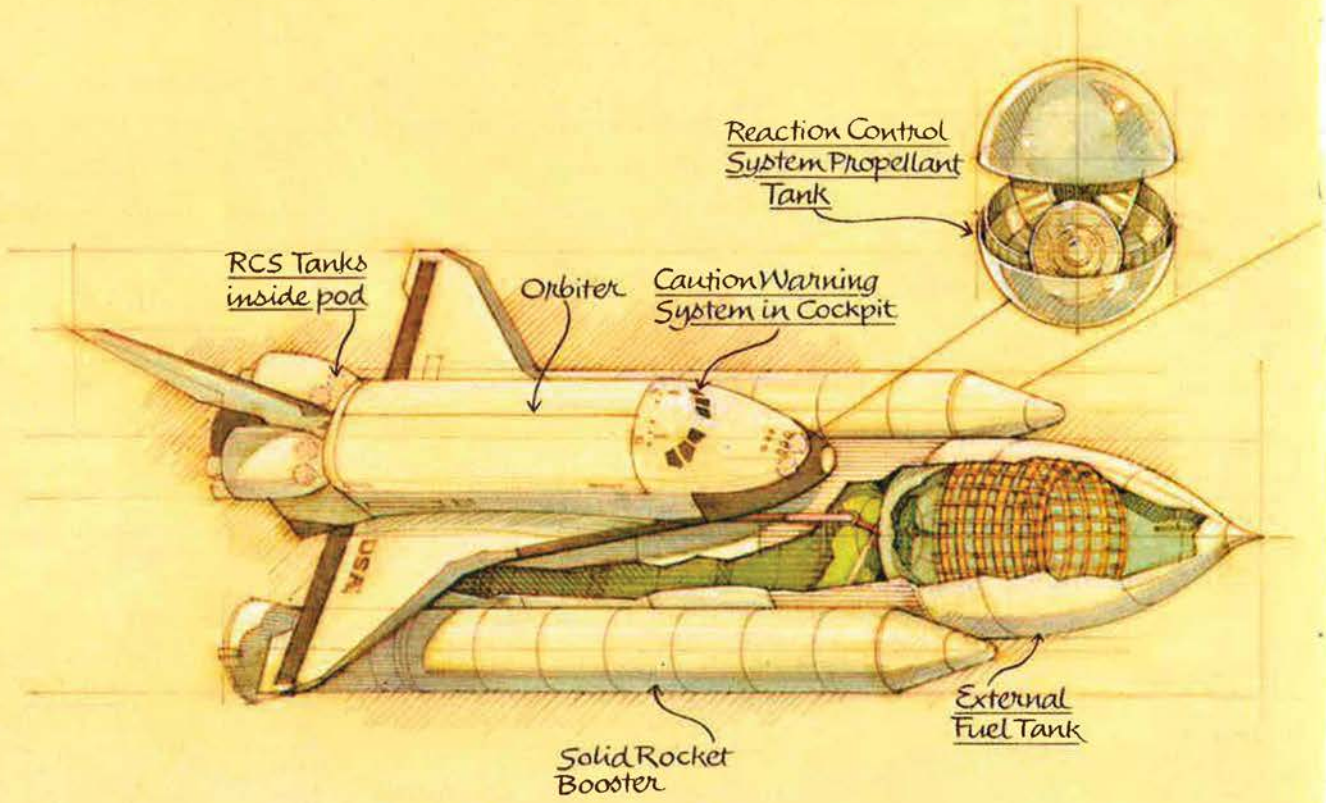
Revolutionary Guard Corps *(Pasdaran):* 40,000; small arms, spt weapons from Army inventory.

Navy: 10,000, incl naval air and marines.[3]
3 destroyers with 4 *Standard* SSM; 1 ex-Br *Battle* with 1 × 4 *Seacat* SAM; 2 ex-US *Sumner* with 1 hel.

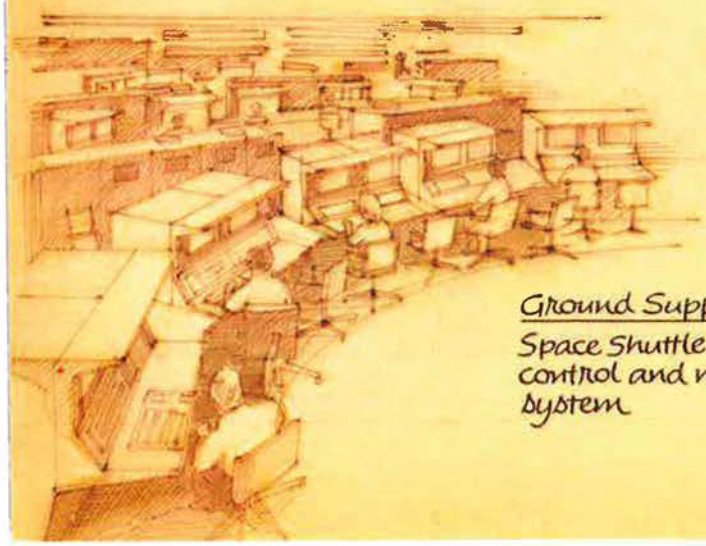
[1] See p. 116 for footnotes.

How do you help maintain U.S. leadership in space?

Help the Space Shuttle succeed.

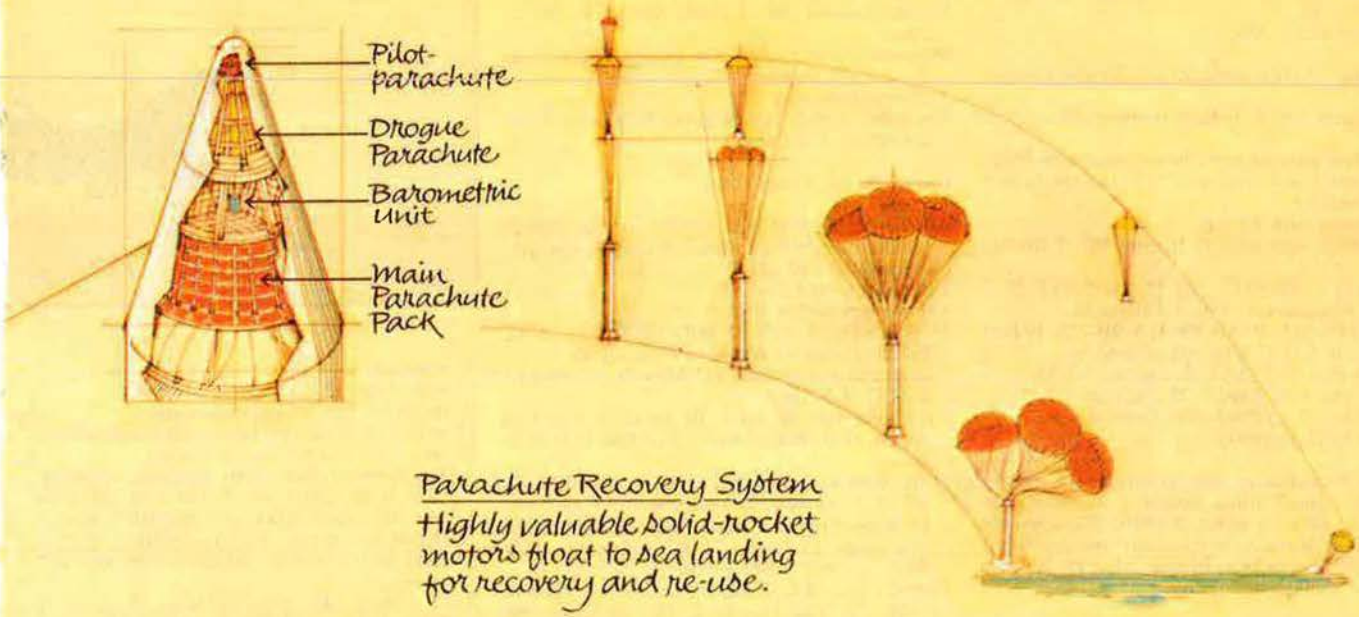


Space Shuttle



Ground Support

Space Shuttle checkout, control and monitoring system



Parachute Recovery System
Highly valuable solid-rocket motors float to sea landing for recovery and re-use.

The new era in man's exploration and use of space is here.

Its cornerstone is the Space Shuttle, the unusual manned vehicle that can fly satellites and scientific equipment into orbit, return to repair and resupply them, and later bring them back to Earth. Its cargo bay can be used as a research laboratory as well as to carry materials to build huge space stations.

Martin Marietta has been involved in Space Shuttle development from its inception, as a partner to both NASA and the Department of Defense. We supply the mammoth, 154-foot external tank to fuel the Shuttle's main engines at launch. In addition, we produce the parachute recovery system for the twin solid-rocket motors; an electronic warning system to alert astronauts to malfunctions; the fuel tanks for the craft's control thrusters; and the pyrotechnic controls to arm and fire the ordnance mechanisms.

For ground operations we produced the computerized checkout, control and monitor system for the launch control centers. And for the Department of Defense we act as payload integrator, ensuring that satellite and cargo designs are Shuttle-compatible, as well as performing ground services support for the West Coast launch site.

For orbital operations we've designed a backpack to allow astronauts to maneuver and work outside the Shuttle's main cabin.

The Space Shuttle is our country's major space vehicle for the decades ahead. Our broad involvement in space and defense programs has given us the knowledge, experience, and technical resources to help meet the nation's needs in this new era.

MARTIN MARIETTA

Martin Marietta Aerospace
6801 Rockledge Drive, Bethesda, Maryland 20817 U.S.A.

4 *Saam* frigates with 1 × 5 *Seakiller* SSM, 1 × 3 *Seacat* SAM (1 probably non-operational).
2 ex-US PF-103 corvettes.
10 *Kaman* (*La Combattante* II) FAC(M) with 4 *Harpoon* SSM.
7 large patrol craft; 3 Improved PGM-71, 4 *Cape*.
3 ex-US coastal, 2 inshore minesweepers.
14 hovercraft: 8 SRN-6, 6 BH-7.
2 landing ships, 1 ex-US LCU.
2 fleet supply ships.
3 Marine bns.
(On order: 1 replenishment ship.)

Bases: Bandar Lengel (Abbas), Booshehr, Kharg Island, Bandar-e-Enzli.

NAVAL AIR: 2 combat ac, 16 armed hel.[3]
1 MR sqn with 2 P-3F *Orion*.
1 ASW hel sqn with 10 SH-3D.
1 MCM hel sqn with 6 RH-53D.
1 tpt sqn with 4 *Shrike Commander*, 4 F-27, 1 *Mystère* 20.
Other hel incl 7 AB-212.

Air Force: 35,000; some 90 serviceable combat ac.[3]
10 FGA sqns with 90 F-4D/E (perhaps 30 serviceable).
8 FGA sqns with perhaps 50 serviceable F-5E/F.
4 interceptor/FGA sqns with 77 F-14A (perhaps 5 serviceable).
1 recce sqn with RF-4E.
2 tanker/tpt sqns with 12 Boeing 707, 7 Boeing 747.
5 tpt sqns: 4 with 53 C-130E/H; 1 with 18 F-27, 2 Aero *Commander* 690, 4 *Falcon* 20.
Hel: 10 HH-34F, 10 AB-206A, 5 AB-212, 39 Bell 214C, 10 CH-47 *Chinook*, 2 S-61A4.
Trainers incl 45 F33A/C *Bonanza*, 9 T-33.
5 SAM sqns with *Rapier*, 25 *Tigercat*.
AAM: *Phoenix*, *Sidewinder*, *Sparrow*.
ASM: AS-12, *Maverick*.

Para-Military Forces: Bassej volunteers, mostly youths, small arms, ancillary to main field forces. Gendarmerie (5,000); *Mujaheddin* (30,000); *Mostazafin* (Guards); Border Tribal Militia. Cessna 185/310 lt ac, AB-205/-206 hel, patrol boats.[3]

IRAQ

Population: 13,600,000.
Military service: basic 21–24 months, extended for war.
Total armed forces: 342,250 (263,200 conscripts).[4]
GNP 1980: 11.5 bn dinar ($38.98 bn).
Defence expenditure 1980: 879 m dinar ($2.98 bn).
GDP growth 1980: 10%.
$1 = 0.295 dinar (1980, 1981).

Army: 300,000 (250,000 conscripts).[4]
4 corps HQ.
6 armd divs (each with 2 armd, 1 mech bdes).
3 mech divs (each with 1 armd, 2 or more mech bdes).
4 mountain inf divs (2 additional HQ may have formed to command Reserve or militia bdes).
1 Republican Guard armd bde.
3 special forces bdes.
9 Reserve bdes.
10 Peoples Army/Volunteer inf bdes.
AFV: 2,300 T-54/-55/-62/-72 MBT; 100 PT-76 lt tks; about 3,000 AFV, incl BRDM, FUG-70, ERC-90, Mowag *Roland*, 200 EE-9 *Cascavel*, EE-3 *Jararaca* armd cars, BMP MICV, BTR-50/-60/-152, OT-62/-64, 100 VCRTH (with *HOT* ATGW), Panhard M-3, EE-11 *Urutu* APC.
Arty: 800 85mm, 100mm SU-100 SP, 122mm incl ISU SP, 130mm guns, M-56 105mm pack, 122mm including SP-74, 152mm (incl SP-73) how; FGT 108-R 108mm, BM-21 122mm MRL; 19 *FROG*-7, 9 *Scud* B SSM; 120mm, 160mm mor.
ATK: 107mm RCL; 75mm, 85mm, 100mm, 100 *Kuerassier* 105mm SP guns; *Sagger*, SS-11, *Milan*, *HOT* ATGW.
AD: 1,200 23mm, ZSU-23-4 SP, 37mm, 57mm, ZSU-57-2 SP, 85mm, 100mm, 130mm AA guns; SA-2/-3/-6/-7/-9 SAM.
(On order: T-62 MBT; 100 EE-9 *Cascavel*, EE-3 *Jararaca* armd cars; 80 EE-11 *Urutu* APC; SP-73 152mm SP how; X-40, *Scud* B SSM; SS-11 ATGW; *Roland* SAM).
(Some captured Iranian eqpt, incl tks, AFV, arty, ATGW, has been taken into service.)

RESERVES: 75,000.

Navy: 4,250 (3,200 conscripts).[4]
1 frigate (trg).
8 ex-Sov *Osa* FAC(M) with 4 *Styx* SSM.
Ex-Sov large patrol craft: SO-1, *Poluchat*(.
Ex-Sov P-6 FAC(T)(.
Ex-Sov coastal patrol craft: *Nyryat* II, PO-2, *Zhuk*.
Minesweepers: Yug *Nestin;* ex-Sov T-43 ocean, *Yevgenya*(inshore.
3 ex-Sov *Polnocny* LCT.
(On order: 4 *Maestrale* frigates, 6 Italian 650-ton corvettes, 1 spt ship.)

Bases: Basra, Umm Qasr.

Air Force: 38,000 incl 10,000 AD personnel (10,000 conscripts); some 330 combat aircraft, some 60 armed hel.[4]
1 bbr sqn with 9 Tu-22.
1 lt bbr sqn with 8 Il-28.
11 FGA sqns: 4 with 75 MiG-23BM; 6 with 80 Su-20; 1 with 12 *Hunter* FB-59/FR-10.
5 interceptor sqns with 115 MiG-21, 32 *Mirage* F-1EQ, 4 F-1BQ.
2 tpt sqns with 10 An-2, 10 An-12, 8 An-24, 2 An-26, 12 Il-76 (6 civilian), 2 Tu-124, 13 Il-14, 1 *Heron*.
11 hel sqns with 35 Mi-4, 15 Mi-6, 150 Mi-8, 41 Mi-24, 47 *Alouette* III (some with AS-12 ASM), 11 *Super Frelon*, 50 *Gazelle* (some with *HOT* ATK ASM), 13 *Puma*, 28 BO-105 (some with SS-11 ATGW), 7 *Wessex* Mk 52.
Trainers incl MiG-15/-21/-23U, Su-7U, *Hunter* T-69, 10 Yak-11, 40 L-29, 24 L-39, 48 AS-202/18A, 16 *Flamingo*, 5 PC-7 *Turbo-Trainer*.
AAM: AA-2 *Atoll*.
ASM: 360 *HOT*, AS-11/-12, *Swatter* ATGW, AM-39 *Exocet*.
(On order: 150 MiG-23/-25/-27, 24 *Mirage* F-1 fighters; 42 PC-7 *Turbo-Trainer*, 3 *Super Frelon*, 10 *Gazelle*, *Lynx*, 26 *Puma*, Mi-24, 6 AS-61TS, 8 AB-212 (ASW) hel; MPS-1 ASM: *Super* 530 AAM.)

Para-Military Forces: security troops 4,800; People's Army 7,000; 100 T-34 MBT. Perhaps 20,000 volunteers from Arab countries.

ISRAEL

Population: 4,000,000.
Military service: men 36 months, women 24 months (Jews and Druze only; Christians may volunteer). Annual training for reservists thereafter up to age 54 for men, 34 (or marriage) for women.
Total armed forces: 174,000 (120,300 conscripts); mobilization to 500,000, of which 100,000 can be mobilized in about 24 hours.
GNP 1981: 219.8 bn shekels ($21.1 bn).
Defence expenditure 1981: 62.99 bn shekels ($6.06 bn).
GDP growth 1980: 1.8%.
Inflation 1981: 101%.
$1 = S10.4 (1981).

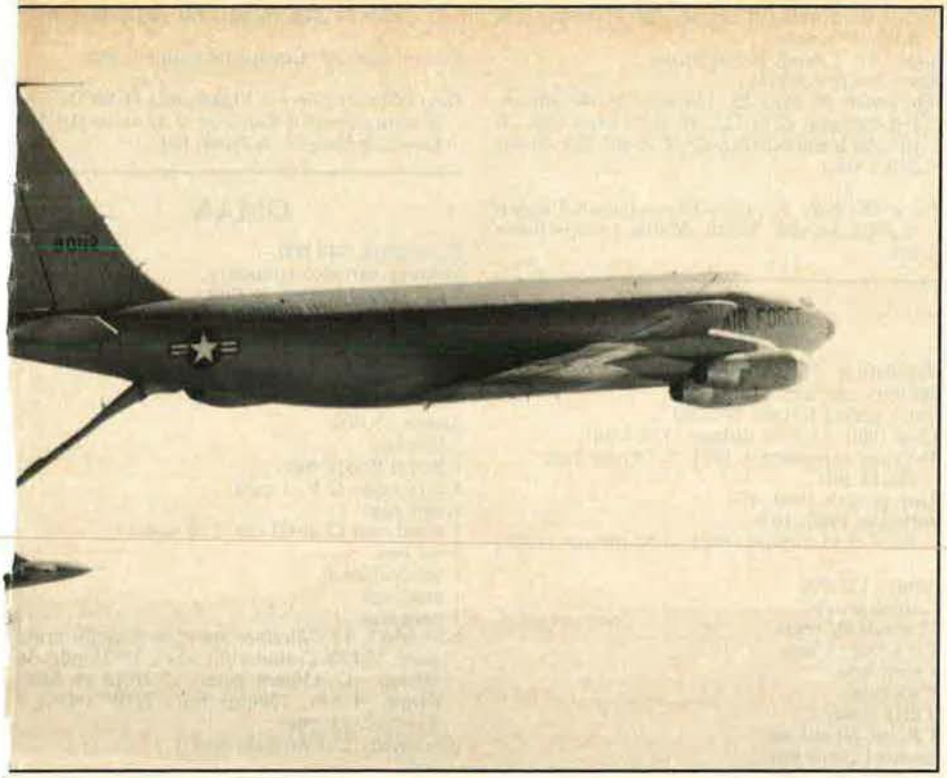
Army: 135,000 (110,000 conscripts, male and female), 450,000 on mobilization, incl civil defence units.

11 armd divs.
33 armd bdes (3 tk, 1 mech inf bns).
10 mech inf bdes (5 para-trained).
12 territorial/border inf bdes with *Nahal* militia.
15 arty bdes (each 5 bns of 3 btys).
AFV: 3,600 MBT, incl 1,100 *Centurion*, 650 M-48, 1,010 M-60, 250 T-54/-55, 150 T-62, 200 *Merkava* I/II; about 4,000 AFV incl RBY *Ramta*, BRDM-1/-2 recce vehs; *Shoet* Mk 2, M-2/-3, 4,000 M-113, OT-62, BTR-40/-50P/-60P/-152, *Walid* APC.
Arty: 130mm, 60 M-107 175mm SP guns; 30 M-101 105mm, 30 122mm, M-68/-71 155mm towed, 500 155mm L-33 and M-50, Soltam M-72, 120 M-109 155mm, 48 M-110 203mm SP how; 122mm, 135mm, 240mm, 290mm MRL; *Lance* SSM; 900 81mm, 120mm, and 160mm mor (some SP).
ATK: Ze'ev (Wolf) RL; 106mm RCL; *TOW*, *Cobra*, *Dragon*, *Picket*, *Milan* ATGW.
AA: 2 btys with 24 *Vulcan/Chaparral* 20mm gun/msl systems, 900 20mm, 30mm, and 40mm AA guns; *Redeye* SAM.
(On order: 125 M-60 MBT; 800 M-113 APC; 200 M-109A1B SP 155mm how, M-107 175mm SP guns; *Lance* SSM; *TOW*, *Dragon* ATGW.)

Navy: 9,000 (3,300 conscripts), 10,000 on mobilization.
3 Type 206 submarines.
2 *Aliya* (*Saar* 4.5) corvettes with 4 *Gabriel*, 2 *Harpoon* SSM, 1 hel.
27 FAC(M): 15 *Reshef* (*Saar* 4) with 4 *Gabriel* and 8 *Harpoon* SSM; 12 *Saar* 2/3 with 8 or 6 *Gabriel*.
1 *Flagstaff* 2 hydrofoil FAC(M) with 2 *Gabriel*, 2 *Harpoon* SSM.
43 coastal patrol craft(: 35 *Dabur*, 2 *Dvora*, 6 *Hawk*.
1 LST, 3 ex-US LSM, 3 LCU.
4 *Seascan* 1124N MR ac.
Naval cdo: (300).
(On order: 4 *Saar* 2, 3 *Reshef* FAC(M); 2 *Aliya* corvettes; 2 *Flagstaff* hydrofoils with 4 *Harpoon*, 2 *Gabriel* III SSM; 3 *Seascan* MR ac.)

Bases: Haifa, Ashdod, Sharm-el-Sheikh, Eilat.

Air Force: 30,000 (7,000 conscripts, mostly in AD), 37,000 on mobilization; 634 combat ac



A US Air Force KC-135 Stratotanker refuels General Dynamics F-16s during a delivery flight of the fighters to Israel.

(incl perhaps 270 in store), 42 armed hel.
13 FGA/interceptor sqns: 1 with 40 F/TF-15; 5 with 138 F-4E; 6 with 20 *Mirage* IIICJ/BJ, 160 *Kfir*-C1/C2; 1 with 66 F-16A, 8 F-16B.
6 FGA sqns: with 174 A-4E/H/M/N *Skyhawk*.
1 recce sqn with 14 RF-4E, 2 OV-1E; 4 E-2C AEW; 2 RU-21J, 2 C-130, 4 Boeing 707 ECM ac.
Tpts incl 7 Boeing 707, 22 C-130E/H, 21 C-47, 2 KC-130H, 2 KC-707 (tankers), 6 *Arava*, 5 *Islander* (3 leased).
Liaison: 15 Do-27, 11 Do-28D, 18 Cessna U-206, 23 Cessna 185, 3 *Westwind*.
Trainers incl 22 TA-4H, 50 *Kfir* (incl TC-2), 85 *Magister*, 12 *Queen Air*, 36 *Super Cub*.
Hel incl 8 *Super Frelon*, 33 CH-53D, 12 AH-1G/S, 2 S-65C, 29 Bell 206, 24 Bell 212, 25 UH-1D, 30 Hughes 500MD hel.
15 SAM bns with *Improved HAWK*.
AAM: *Sidewinder*, AIM-7E/F *Sparrow*, *Shafrir*.
ASM: *Luz*, *Maverick*, *Shrike*, *Walleye*, *Bullpup*.
(On order: 20 F-15, 75 F-16 fighters, 200 *Improved HAWK* SAM.)

RESERVES: (all services): 326,000.

Para-Military Forces: 4,500 Border Guards; BTR-152 APC. Arab Militia: small arms. Coastguard: 3 ex-US PBR, 3 other patrol craft⟨.

JORDAN

Population: 3,158,000.
Military service: voluntary.
Total armed forces: 72,800.
GNP 1980: 1.07 bn dinar ($3.6 bn).
Defence expenditure 1981: 138 m dinar ($424.6 m).[5]
GDP growth 1981: 4.7%.
Inflation: 3.3% (1980), 15% (1981).
$1 = 0.325 dinar (1981), 0.298 dinar (1980).

Army: 65,000.
5 armd bdes.
6 mech bdes.
2 inf bdes.
1 indep Royal Guards bde.
16 arty bns.
2 AA bdes, incl 6 SAM btys with 48 *Improved HAWK* SAM.
3 AB bns.
350 M-47/-48/-60, 30 *Khalid*, 189 *Centurion* MBT; 140 *Ferret* scout cars; 850 M-113, 32 *Saracen* APC; 17 M-59 155mm guns; 30 M-102 105mm, 38 M-114 towed, 23 M-44, 85 M-109A2 SP 155mm, 22 M-115 towed, 27 M-110 SP 203mm guns/how; 400 81mm, 107mm, and 120mm mor; 315 106mm and 120mm RCL; 330 *TOW*, 310 *Dragon* ATGW; 100 M-163 *Vulcan* 20mm, 200 M-42 40mm SP AA guns; *Redeye*, SAM-2/-7/-8, *Improved HAWK* SAM.
(On order: 248 *Khalid*, 40 M-60A3 MBT; 78 M-113 APC.)

Navy (Coast Guard): 300.
9 patrol craft⟨.
(On order: 3 patrol boats.)

Base: Aqaba.

Air Force: 7,500; 94 combat aircraft.
1 FGA sqn with 25 F-5E, 4 F-5F.
3 interceptor sqns with 25 F-5E, 4 F-5F, 16 *Mirage* F-1.
1 OCU with 15 F-5A, 5 F-5B.
1 tpt sqn: 3 C-130B/H, 2 *Sabreliner* 75A, 3 C-212A *Aviocar*.
1 hel sqn: 15 *Alouette* III, 4 S-76, 16 Hughes 500D.
Trainers: 14 T-37C, 9 *Bulldog*, 1 Boeing 727.
AAM: *Sidewinder*.
(On order: 20 *Mirage* F-1, 20 F-5E/F fighters; 5 *Bulldog* trg ac; 24 AH-1Q *Cobra* hel with *TOW*.)

RESERVES: 35,000 (all services).

Forces Abroad: Iraq: 3,000 (volunteers).

Para-Military Forces: 11,050. Mobile Police Force 3,550; Civil Militia 7,500.

KUWAIT

Population: 1,400,000.
Military service: 18 months.
Total armed forces: 12,400.
GNP 1981: 8.56 bn dinar ($30.7 bn).
Defence expenditure 1981: 366 m dinar ($1.3 bn).
GDP growth 1980: −9.4%.
Inflation 1980: 9.1%.
$1 = 0.279 dinar (1981).

Army: 10,000.
2 armd bdes.
3 mech inf bns.
1 SSM bn.
70 Vickers Mk 1, 10 *Centurion*, 160 *Chieftain* MBT; 100 *Saladin* armd, 80 *Ferret* scout cars; 97 M-113, 130 *Saracen* APC; 10 25-pdr guns; 80 AMX Mk F-3 155mm SP how; *FROG*-7 SSM; 81mm mor; *HOT*, *TOW*, *Vigilant* ATGW; SA-7 SAM.
(On order: *Scorpion* lt tks, 188 M-113 APC, 56 M-113 SP *TOW* veh, 4,800 *Improved TOW* ATGW.)

Navy: 500 (coastguard).
57 coastal patrol craft⟨ (15 armed).
3 88-ft landing craft.
(On order: 6 Lürssen TNC-45, 2 FPB-57 FAC.)

Air Force: 1,900;[6] 49 combat aircraft.
2 FB sqns with 30 A-4KU.
1 interceptor sqn with 17 *Mirage* F-1C, 2 F-1B.
Tpts: 2 DC-9, 1 L-100-20.
3 hel sqns with 23 SA-342K *Gazelle*, 9 *Puma*.
Trainers incl 9 *Strikemaster*.
1 SAM bn with *Improved HAWK*.
AAM: R-550 *Magic*, *Sidewinder*.
ASM: *Super* 530, SS-11/-12.
(On order: 4 L-100-30 tpt ac.)

Para-Military Forces: 18,000 Police.

LEBANON

Population: 3,100,000.
Military service: voluntary.
Total armed forces: 23,750.
Estimated GDP 1981: £L 18 bn ($4.19 bn).
Defence expenditure 1981: £L 1.0 bn ($232.6 m).[7]
$1 = £L 4.30 (1981).

Army: 22,250.[8]
1 mech inf bde (1 armd recce, 3 inf bns).
(5 inf bdes forming).
1 armd recce bn, 9 inf bns, 2 arty bns } below strength.
13 AMX-13 lt tks; 100 *Saladin* armd cars; 127 M-113, *Saracen*, 5 VAB APC; 10 122mm, 36 155mm guns; 200 81mm, 83mm, RPG-7 85mm, 88mm RL; 106mm RCL; *ENTAC*, 18 *Milan*, *TOW* ATGW; 20mm, ZU-23 23mm, 30mm towed, M-42 40mm SP AA guns.
(On order: M-48 MBT (ex-Jordanian), 228 M-113A2 APC.)

Navy: 250.
10 patrol craft⟨: 1 large, 9 inshore (6 *Aztec*, 3 *Byblos*).
1 LCU (trg).

Air Force: 1,250; 8 combat ac, 4 armed hel.
1 sqn with 8 *Hunter* F-70.
1 hel sqn with 11 *Alouette* II/III, 11 AB-212, 6 *Puma*, 4 *Gazelle* (with SS-11/-12 ASM).
Trainers: 6 *Bulldog*, 5 *Magister*.
Tpts: 1 *Dove*, 1 *Turbo-Commander* 690A.
(On order: 6 *Gazelle* hel.)

RESERVES: (none serviceable): 2 *Hunter* T-66, 9 *Mirage* IIIEL, 1 IIIBL ac, 5 *Alouette* hel, R-530 AAM.

Para-Military Forces: Internal Security Force: 7,500; 30 *Chaimite* APC. Customs: 2 *Tracker*(patrol craft.
Many private militias with small arms; strength unknown.

LIBYA

Population: 3,125,000.
Military service: conscription.
Total armed forces: 65,000.
Estimated GNP 1980: 11.57 bn dinar ($39.1 bn).
Defence expenditure 1980: 148.6 m dinar ($502 m).
$1 = 0.296 dinar (1980).

Army: 55,000.
20 tk bns.
30 mech inf bns.
1 National Guard bn.
10 arty, 2 AA arty bns.
2 special forces gps.
2 SSM bns.
2,600 T-54/-55/-62, 200 T-72, 100 OF-40 *(Lion)* MBT; 200 BRDM-2, 300 EE-9 *Cascavel* armd cars; 700 BMP MICV, 900 BTR-50/-60, OT-62/-64, 100 EE-11 *Urutu*, Fiat 6614, 160 M-113A1 APC; 360 130mm guns; some 600 M-101 105mm, 122mm incl M-1974 SP, 152mm incl M-1973 SP, 40 M-109 155mm SP how; some 600 BM-11 107mm, BM-21/RM-70 122mm, and M-51 130mm MRL; 200 106mm RCL; 450 81mm, 120mm, 160mm, and 240mm mor; 3,000 *Vigilant, Milan,* and *Sagger* ATGW; 48 *FROG*-7, 70 *Scud* B SSM; 450 23mm, ZSU-23-4 SP, 30mm incl M-53/59 SP, 57mm AA guns; SA-6/-7/-9 SAM.[9]
(On order: 100 *Lion*, 300 T-72 MBT; Fiat 6616 armd cars; 100 *Urutu* APC; 200 *Palmaria* 155mm SP how; *Scud* B/C SSM; SA-9 SAM.)

Navy: 5,000.
5 ex-Sov F-class submarines.
1 Vosper Mk 7 frigate (under refit) with 4 *Otomat* SSM, 4 *Albatros/Aspide* SAM.
6 corvettes: 4 *Wadi* with 4 *Otomat* SSM, 1 Vosper 440-ton, 1 ex-Sov *Nanuchka* II.
18 FAC(M): 12 ex-Sov *Osa*-II with 4 *Styx* SSM; 3 *Susa* with 8 SS-12M SSM; 1 Lürssen-type with SSM/SAM; 2 *La Combattante* with 4 *Otomat* SSM.
10 large patrol craft: 4 *Garian*, 6 Thornycroft.
2 ex-Sov *Natya* minesweepers.
1 LSD (log spt/HQ ship); 2 PS-700 LST; 3 *Polnocny*, 2 C-107 LCT.
1 Thornycroft repair ship.
(On order: 8 *La Combattante* II, 13 Lürssen-type FAC(M); 12 C-107 LCT, *Otomat* SSM.)

Bases: Tarabulus, Benghazi, Darnah, Tubruq, Bandiyah.

Air Force: 5,000; some 555 combat ac, 30 armed hel.[9]
1 bbr sqn with 7 Tu-22 *Blinder* A.
3 interceptor sqns and 1 OCU: 26 *Mirage* F-1ED, 6 F-1BD, 143 MiG-23 *Flogger* E, 50 MiG-25 *Foxbat* A, 72 MiG-21.
5 FGA sqns and OCU with 45 *Mirage* 5D/DE, 13 5DD, 14 *Mirage* F-1AD, 18 MiG-23BM *Flogger* F, 14 MiG-23U, 5 MiG-25U, some 100 Su-20/-22 *Fitter* E/F/J.
1 COIN sqn with 30 J-1 *Jastreb*.
1 recce sqn with 7 *Mirage* 5DR, 6 MiG-25R (Libyan and Soviet crews).
2 tpt sqns with 8 C-130H, 1 Boeing 707, 8 G-222, 2 *Mystère-Falcon*, 4 C-140 *Jetstar*, 2 CL-44, 8 Il-76, 1 *Corvette* 200, 2 *King Air*.
4 hel sqns with 10 *Alouette* III, 9 AB-47, 5 AB-206, 1 AS-61A, 2 AB-212, 8 *Super Frelon* (SAR), 19 CH-47C, 20 Mi-2, 2 Mi-8, 5 Mi-14, 25 Mi-24.
2 trg sqns with 61 *Galeb*.
Trainers incl 2 Tu-22 *Blinder* D, 100 L-39Z0, 12 *Magister*, 119 SF-260WL.
3 SAM bdes with 30 *Crotale* (60 systems), 300 SA-2/-3/-6 SAM.
AAM: AA-2 *Atoll*, R-550 *Magic*.
ASM: *Swatter* ATGW.
(On order: 50 MiG-25, 140 MiG-23, 40 *Mirage* F-1 fighters; 12 G-222, 10 *Twin Otter* tpts; 70 SF-260 trainers; *Gazelle*, 2 A-109 hel; Super 530 AAM.)

Para-Military Forces: Pan-African Legion (5,000); Muslim Youth. Militia cav div forming.

MOROCCO

Population: 21,200,000.
Military service: 18 months.
Total armed forces: 141,000.
GNP 1980: 71.3 bn dirham ($18.1 bn).
Defence expenditure 1981: 5.7 bn dirham ($1.11 bn).
GDP growth 1980: 4%.
Inflation 1980: 10%.
$1 = 5.15 dirham (1981), 3.93 dirham (1980).

Army: 125,000.
7 armd groups.
12 mech inf regts.
1 lt security bde.
1 para bde.
1 AA bde.
9 arty groups.
1 Royal Guard bn.
5 camel corps bns.
2 desert cav bns.
1 mountain bn.
3 cdo bns.
4 engr bns.
4 armd car sqns.
120 M-48, 15 T-54 MBT; 60 AMX-13 lt tks; 1,000 armd cars, incl 20 EBR-75, 15 AMX-10RC, 100 AML-90 and M-8; 364 M-113, 400 VAB, 40 M-3 half-track, 50 OT-62/-64, 15 UR-416, 80 *Ratel*, M-3, Steyr 4K-7FA APC; M-116 75mm, 76mm, 40 85mm, 20 SU-100 100mm SP, 20 M-101 105mm, 18 105mm lt guns; 12 130mm, 152mm, 20 M-114 155mm towed, 24 Mk-61 105mm, 36 Mk F-3 155mm, 36 M-109 155mm SP how; 300 60mm, 600 81mm, 70 82mm, 320 120mm mor; 36 BM-21 122mm MRL; 20 M-56 90mm, 121 *Kuerassier* 105mm SP ATK guns; 75mm, 106mm RCL; STRIM-89 RL, *Dragon, Milan, TOW* ATGW; 100 20mm, 37mm, 57mm, and 100mm AA guns; SA-7, 30 *Chaparral, Crotale* SAM; 4 *Alouette* II, 3 *Gazelle*, 6A-109 hel.
(On order: 108 M-60 MBT; AML-90, 76 AMX-10RC armd cars; 126 VAB APC; 40 M-163 *Vulcan* 20mm SP AA.)

Navy: 6,000 incl naval infantry.
2 PR-72, 3 *Cormoran*-class FAC(G).
3 large patrol craft.
12 coastal patrol craft.
1 minesweeper.
4 landing ships (3 *Batral*).
1 naval inf bn (600).
(On order: 1 *Descubierta* msl frigate; 1 *Cormoran* FAC(M) with 4 *Exocet* SSM; 6 P-32 coastal patrol craft(, *Aspide* SAM.)

Bases: Casablanca, Safi, Agadir, Kenitra, Tangier.

Air Force: 10,000; 97 combat aircraft.
5 FGA sqns: 3 with 27 *Mirage* F-1E, 18 F-1C; 2 with 5 F-5A, 9 F-5E, 5 RF-5A, 3 F-5B, 4 F-5F.
1 COIN/recce sqn with 22 *Magister*, 4 OV-10.
1 tpt sqn with 11 C-130H, 3 KC-130H, 1 *Gulfstream*, 8 *King Air*, 3 Do-28D, 6 *Broussard*.
2 hel sqns with 33 AB-205A, 5 AB-206, 13 AB-212, 27 *Puma*, 4 HH-43B SAR, 11 CH-47C.
Trainers: 11 T-34C, 11 AS-201/18 *Bravo*, 28 SF-260M, 24 *AlphaJet*.
AAM: *Sidewinder*, R-550 *Magic*.
(On order: 7 Do-28D, 2 C-130H tpt ac; 24 *Gazelle*, 19 AB-206 hel; 381 *Maverick* ASM.)

Forces Abroad: Equatorial Guinea: 400.

Para-Military Forces: 30,000, incl 11,000 *Sureté Nationale* with 2 *Rallye* ac; 5 *Alouette* II/III, 3 *Lama*, 6 *Gazelle*, 6 *Puma* hel.

OMAN

Population: 948,000.
Military service: voluntary.
Total armed forces: 18,000.[6]
Estimated GNP 1981: 1.35 bn rial ($3.91 bn).
Defence expenditure 1981: 582 m rial ($1.69 bn).
$1 = 0.345 rial (1981).

Army: 15,000.
2 bde HQ.
1 Royal Guard bde.
3 arty regts (2 lt, 1 med).
1 sigs regt.
1 armd regt (3 armd car, 2 tk sqns).
8 inf bns.
1 special force.
1 engr sqn.
1 para sqn.
6 M-60A1, 12 *Chieftain* MBT; 36 *Saladin* armd cars; V-150 *Commando* APC; 25 25-pdr, 36 105mm, 12 130mm guns; 12 155m SP how; 81mm, 4.2-in, 120mm mor; *TOW* ATGW; 4 ZU-23-2 AA guns.
(On order: 15 *Chieftain* MBT.)

RESERVES: National Volunteer Reserve Force.

Navy: 1,000.
1 corvette (Royal Yacht).
3 FAC(M): 1 *Province* with 2 × 3 *Exocet* SSM; 2 Brooke Marine with 2 *Exocet*.
4 Brooke Marine FAC(G).
1 log spt ship (amph).
5 LCU.
(On order: 2 *Province* FAC(M), 4 25-metre FAC(P), 3 *Skima*-12 hovercraft, 1 LCM.)

Bases: Muscat, Raysut, Ghanam Island.

Air Force: 2,000;[6] 37 combat aircraft.
1 FGA/recce sqn with 12 *Hunter* FGA-6, 4 T-7.
1 FGA sqn with 7 *Jaguar* S(O) Mk 1, 2 T-2.
1 COIN/trg sqn with 12 BAC-167.
3 tpt sqns: 1 with 3 BAC-111, 1 *Falcon* 10; 2 with 7 *Defender*, 15 *Skyvan*, 1 C-130H.
Royal flt with 1 *Gulfstream*, 1 VC-10, 1 DC-8 tpts; 2 AS-202 *Bravo* trainers; 4 AB-212 hel.
1 hel sqn with 15 AB-205, 2 AB-206, 5 AB-214B.
2 AD sqns with 28 *Rapier* SAM.
(On order: 12 Jaguar FGA; 2 C-130H, 2 DHC-5D tpts; 28 *Blindfire* radar.)

Para-Military Forces: tribal Home Guard *(Firqats)* 3,300. Police Marine Wing: 6 40-ft, 5 75-ft patrol boats; Air Wing: 1 *Learjet*, 2 *Turbo-Porter*, 2 *Merlin* IVA, 2 *Buffalo* ac; 5 AB-205, 3 AB-206 hel.

QATAR

Population: 240,000.
Total armed forces: 6,000.
Estimated GNP 1981: 24 bn rial ($6.58 bn).
Defence expenditure 1981: 3.26 bn rial ($893.1 m).
$1 = 3.65 rial (1981).

Army: 5,000.
1 tk bn.
1 Royal Guard regt.
5 inf bns.
1 arty bty.
24 AMX-30 MBT; 10 *Ferret* scout cars; 30 AMX-10P MICV, 25 *Saracen*, 136 VAB APC; 8 25-pdr guns, 6 155mm how; 81mm mor.

(On order: *HAWK* SAM.)

Navy: 700 incl Marine Police.
2 *La Combattante* FAC(M) with 4 *Exocet* SSM.
6 Vosper Thornycroft large patrol craft.
36 coastal patrol craft((2 75-ft, 2 45-ft, 7 P-1200 type, 25 *Spear*).
2 *Interceptor* fast assault/SAR craft.
(On order: 1 *La Combattante* FAC(M), 3 *Exocet* coast defence systems.)

Base: Doha.

Air Force: 300; 9 combat aircraft.
2 *Hunter* FGA-6, 1 T-79, 6 *AlphaJet* FGA/trg ac.
1 *Islander*, 1 Boeing 727, 2 707 tpt ac.
2 *Whirlwind*, 4 *Commando*, 3 *Lynx* hel.
SAM: *Tigercat*.
(On order: 14 *Mirage* F-1 fighters, *Puma* hel.)

Para-Military Forces: Police: 3 *Lynx* M-28; 2 *Gazelle* hel.

SAUDI ARABIA

Population: 8,100,000.
Military service: conscription, males aged 18–35.
Total armed forces: 52,200.
GNP 1981: 402.2 bn rial ($118.99 bn).
Defence expenditure 1981: 82.5 bn rial ($24.4 bn).
GDP growth 1980: 8.1%.
$1 = 3.38 rial (1981).

Army: 35,000.
2 armd bdes (1 cadre only).
2 mech bdes.
2 inf bdes.
1 AB bde (2 para bns, 1 special forces coy).
1 Royal Guard Regt (3 bns).
4 arty bns.
18 AA arty btys.
18 SAM btys: 16 with *Improved HAWK*; 2 with 12 *Shahine* (48 msls).
300 AMX-30, 150 M-60A1 MBT: 200 AML-60/-90 armd, 100 *Fox* scout cars; 250 AMX-10P (some with *HOT* ATGW), 600 M-113, Panhard M-3 APC; Model 56 105mm pack, M-101/-102 105mm, 18 M-198 towed and GCT 155mm, M-110 203mm SP how; 81mm, M-30 107mm mor; 75mm, 90mm, 106mm RCL; *TOW*, *Dragon*, *HOT* ATGW; M-163 *Vulcan* 20mm, AMX-30SA 30mm, 86 35mm, M-42 40mm SP AA guns; *Redeye*, *Shahine*, *Improved HAWK* SAM.
(On order: 150 M-60A3 conversion kits; Engesa armd cars; 60 AMX-10P MICV; 200 VCC-1 *TOW* AFV; 72 FH-70 155mm how; *Shahine* SAM.)

Navy: 2,200.
4 PCG-1 corvettes with 2 × 4 *Harpoon* SSM.
5 PGG-1 FAC(M) with 2 × 2 *Harpoon* SSM.
1 large patrol craft (ex-US coastguard cutter).
3 *Jaguar* FAC(T).
53 coastal patrol craft(.
4 MSC-322 coastal minesweepers.
2 ex-US LCU, 4 ex-US LCM-6.
(On order: 4 F-2000 frigates; 4 PGG-1 FAC(M); 2 log spt ships; 2 *Atlantic* II MR ac; 24 AS-365N *Dauphine* 2 hel (4 SAR, 20 with ASM), *Otomat* coast defence SSM, 200 AS-15TT ASM.)

Bases: Jiddah, Al Qatif/Jubail, Ras Tanura, Damman, Yanbo, Ras al Mishab.

Air Force: 15,000; 128 combat aircraft.
3 FGA sqns with 65 F-5E.
1 interceptor sqn with 15 *Lightning* F-53, 2 T-55; 1 more sqn with F-15 (forming).
2 OCU with 24 F-5F, 16 F-5B, 4 F-15C, 2 TF-15D.
3 tpt sqns with 39 C-130E, 24 C-130H, 6 KC-130H, 2 *Jetstar*.
2 hel sqns with 12 AB-206, 12 AB-205, 10 AB-212.
Other hel incl 2 *Alouette* III, 1 AB-206, 1 Bell 212.
Trainers: 46 BAC-167, 12 Cessna 172G/H/L.
AAM: *Red Top*, *Firestreak*, *Sidewinder*.
ASM: *Maverick*.
(In reserve: 17 *Lightning* F-53/T-55.)
(On order: 31 F-15, 4 F-5E fighters; 15 TF-15, 1 F-5F trainers; 10 RF-5E recce; 5 E-3A *Sentry* AWACS; 1 Boeing 747, 40 C-212-200 tpts; 6 Boeing KC-135 tankers; 1,177 *Sidewinder* AAM; 916 *Maverick* ASM.)

Para-Military Forces:
National Guard (25,000): Bde HQ; 4 all-arms, 16 regular inf, 24 irregular inf bns, 1 ceremonial cav sqn, spt units: 240 V-150 *Commando* APC, M-102 105mm how, 81mm mor; 106mm RCL, *TOW* ATGW, 20mm *Vulcan*, 90mm AA guns. (On order: 489 *Commando* incl V-300 APC, V-150 SP 20mm AA, SP *TOW*, 90mm armed AFV.)
Ministry of Interior: Counter-terrorist unit: hel. Frontier Force and Coastguard: 6,500; 90 small patrol boats, 8 SRN-6 hovercraft. (On order: MM-40 *Exocet* SSM.)
General Civil Defence Administration units.

SUDAN

Population: 19,310,000.
Military service: conscription.
Total armed forces: 58,000.
Estimated GDP 1981: £S 6.08 bn ($12.16 bn).
Defence expenditure 1981: £S 166.5 m ($333 m).
GDP growth 1980: −3%.
Inflation 1980: 13%.
$1 = £S 0.50 (1981).

Army: 53,000 (incl AD).
2 armd bdes.
7 inf bdes.
1 para bde.
3 arty regts.
1 engr regt.
Air Defence (3,000):
3 AA arty regts.
1 SAM regt with SA-2, *HAWK*.
70 T-54, 53 T-55, 17 T-34, 50 M-60A1 MBT; 55 M-41, 27 Ch Type-62 lt tks; 48 *Saladin* armd, 20 BTR-40, 55 *Ferret*, BRDM-1/-2 scout cars; 100 BTR-50/-152, 60 OT-62/-64, K-63, 49 *Saracen*, 45 V-150 *Commando*, M-113, *Walid* APC; 55 25-pdr, 40 100mm guns; 20 M-101 105mm, 18 122mm, 11 155mm F-3 SP how; 30 120mm mor; 30 85mm ATK guns; 80 37mm, 80 40mm, 100mm towed, 24 M-163 *Vulcan* 20mm SP AA guns; 20 SA-2, SA-7, *HAWK* SAM.
(On order: 80 M-113 APC; 12 M-114 155mm towed how; M-163 *Vulcan* 20mm SP AA guns; *HAWK* SAM.)

Navy: 2,000.
6 ex-Yug large patrol craft: 2 *Kraljevica*, 4 PBR.
6 ex-Yug '101' FAC(G).
3 70-ton coastal patrol craft.
2 ex-Yug DTK-221 LCT, 1 DTM-231 LCU(.

Base: Port Sudan.

Air Force: 3,000: 30 combat aircraft.
1 FGA/interceptor sqn: 2 F-5E, 2 F-5F, 8 MiG-21.
1 FGA sqn with 5 Ch F-5 (MiG-17PF), 13 F-6 (MiG-19).
1 tpt sqn with 6 C-130H, 1 *Mystère-Falcon*, 4 DHC-5D, 8 *Turbo-Porter*, 6 EMB-110P2.
1 hel sqn with 15 Mi-8 (unserviceable), 2 *Puma*, 10 BO-105.
Trainers incl 5 BAC-145, 4 *Jet Provost* Mk 55 (5 in storage), 3 MiG-15UTI, 2 MiG-21U, 2 Ch FT-5, 2 FT-6.
AAM: AA-2 *Atoll*.
(On order: 6 F-5E fighters; 2 C-130 tpts.)

Para-Military Forces: 3,500: National Guard 500; Republican Guard 500; Border Guard 2,500.

SYRIA

Population: 8,900,000.
Military service: 30 months.
Total armed forces: 222,500 (some 120,000 conscripts).
Estimated GNP 1981: £S 47.1 bn ($11.98 bn).
Defence expenditure 1981: £S 9.378 bn ($2.39 bn).
GDP growth 1980: 9.7%.
Inflation 1980: 25%.
$1 = £S 3.93 (1981).

Army: 170,000 (120,000 conscripts).
4 armd divs (each 2 armd, 1 mech bdes) (1 is Presidential Guard unit).
2 mech divs (each 1 armd, 2 mech bdes).
2 indep armd bdes.
4 indep mech bdes.
2 arty bdes.
5 cdo regts.
1 para regt.
2 SSM regts: 1 with *Scud*, 1 with *FROG*.
26 SAM btys with SA-2/-3/-6.
2,200 T-54/-55, 1,000 T-62, 790 T-72 MBT; BRDM recce vehs; BMP MICV, 1,600 BTR-40/-50/-60/-152, OT-64 APC; 2,600 122mm incl ISU-122 and M-1974 SP, 130mm, 152mm, and 180mm guns; 122mm, 152mm how; 122mm, 140mm, 240mm MRL; 24 *FROG*-7, 9 *Scud* SSM; 82mm, 120mm, 160mm, 240mm mor; 57mm, 85mm, 100mm ATK guns; 1,300 *Snapper*, *Sagger*, *Swatter*, *Spigot*, and *Milan* ATGW; 23mm, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-2/-3/-6/-7/-9 SAM; 40 *Gazelle* hel.
(On order: BMP-1, BTR-60 APC; M-1974 122mm, M-1973 152mm SP how; *Spigot* ATGW; SA-6/-8 SAM; *Gazelle* hel.)

Forces Abroad: Lebanon: (Arab Deterrent Force): 21,000; 1 armd, 2 mech bdes, cdo bns.

RESERVES: 100,000 (being reorganized).

Navy: 2,500.
2 ex-Sov *Petya* I frigates.
18 ex-Sov FAC(M) with *Styx* SSM: 6 *Osa*-I, 6 *Osa*-II; 6 *Komar*(.
8 ex-Sov P-4 FAC(T)(.
1 ex-Fr CH large patrol craft.
3 ex-Sov minesweepers: 1 T-43 ocean, 2 *Vanya* coastal.
(On order: FAC(M).)

Bases: Latakia, Tartus, Minet el-Baida.

RESERVES: 2,500.

Air Force: 50,000 (incl AD command); some 450 combat ac, some 16 armed hel.[10]
11 FGA sqns: 4 with 85 MiG-17; 1 with 18 Su-7; 2 with 40 Su-20; 4 with 62 MiG-23BM *Flogger* F.
12 interceptor sqns: 1 with 24 MiG-25 *Foxbat* A; 11 with 200 MiG-21PF/MF, 20 MiG-23 *Flogger* E.
2 tpt sqns with 3 An-24, 4 An-26, 4 Il-76, 8 Il-14, 4 Il-18, 2 *Mystère* 20F.
Trainers incl 40 L-39, 60 L-29, 10 MiG-15UTI, 50 MBB-223 *Flamingo*.
Hel incl 10 Mi-2, 75 Mi-8, 12 Mi-24, 4 Ka-25 (ASW), 49 *Gazelle*.
AAM: AA-2 *Atoll*.
ASM: AT-2 *Swatter* ATGW.
(On order: MiG-23 fighters; 18 AB-212, 21 *Super Frelon* hel; AAM.)

AIR DEFENCE COMMAND: (20,000).[11]
50 SAM btys with SA-2/-3; 25 with SA-6; AA arty, and radar.

Para-Military Forces: 9,800: 8,000 Gendarmerie, 1,800 Desert Guard (Frontier Force). 2 Palestine Liberation Army Brigades of 6,000 with some Syrian officers (nominally under PLO); 90 T-54/-55 MBT; 105mm how; AT-3 *Sag-*

ger ATGW; SAM. Workers Militia (People's Army).

TUNISIA

Population: 6,500,000.
Military service: 12 months selective.
Total armed forces: 28,600.
GDP 1980: 3.5 bn dinar ($8.6 bn).
Defence expenditure 1981: 104.4 m dinar ($211 m).
$1 = 0.494 dinar (1981), 0.405 dinar (1980).

Army: 24,000.
2 combined arms bdes (each with 1 armd, 2 mech inf bns).
1 Sahara bde.
1 para-cdo bde.
1 armd recce regt.
2 fd, 2 AA arty regts.
1 engr regt.
14 M-48 MBT; 55 AMX-13, 20 M-41 lt tks; 20 *Saladin*, 30 EBR-75, 10 AML armd cars; 30 M-113A1, Steyr 4K-7FA, V-150 *Commando* APC; 6 25-pdr, 40 105mm, 10 155mm how; 60mm, 81mm, 82mm, and 107mm mor; 54 *Kuerassier* 105mm SP ATK guns; STRIM-89 RL; *TOW*, *Milan*, SS-11 ATGW; 45 37mm and 40mm AA guns; RBS-70, 62 MIM-72 *Chaparral* SAM; 1 Hughes 500MD hel.
(On order: 54 M-60A3 MBT; STRIM-89 RL; 800 *TOW* ATGW.)

Navy: 2,600 (500 conscripts).
1 ex-US *Savage* frigate.
4 large patrol craft: 1 ex-Fr *Le Fougeux*, 3 P-48 with 8 SS-12 SSM.
2 Vosper Thornycroft 103-ft FAC(P).
2 ex-Ch *Shanghai*-II FAC(G).
2 ex-US *Adjutant* coastal minesweepers.
10 coastal patrol boats(.
(On order: 3 *La Combattante* III FAC(M) with *Exocet* SSM; 2 23-metre FAC.)

Bases: Tunis, Susa.

Air Force: 2,000 (500 conscripts); 8 combat ac.
1 COIN sqn with 5 MB-326K, 3 MB-326L.
1 C-130H tpt.
Trainers: 17 SF-260, 7 MB-326B, 12 T-6, 12 *Safir*.
Liaison ac: 4 S-208M.
1 hel wing: 7 *Alouette* II, 5 *Alouette* III, 4 UH-1H, 1 *Puma*, 18 AB-205, 6 Bell 205-A1, 6 AS-350B.
(On order: 6 F-5E FGA, 6 F-5F trg ac.)

Para-Military Forces: Gendarmerie 5,000: 3 bns; 110 Fiat 6614 APC. National Guard 3,500.

UNITED ARAB EMIRATES (UAE)

Population: 1,040,000.
Military service: voluntary.
Total armed forces: 48,500.[12]
GNP 1980: 109.8 bn dirham ($29.68 bn).
Defence expenditure 1980: 4.5 bn dirham ($1.2 bn).
GDP growth 1980: 1%.
$1 = 3.70 dirham (1980).

Army: 46,000.
1 Royal Guard 'bde'.
5 armd/armd car bns.
9 inf bns.
1 arty, 1 AD bde (each 3 bns).
100 AMX-30, 18 OF-40 *(Lion)* MBT; 60 *Scorpion* lt tks; 6 *Shorland*, *Saladin*, 90 AML-90, VBC-40 armd cars; 30 AMX VCI, VCRTT, 300 Panhard M-3, VAB APC, AMX-10P MICV; 50 105mm guns; M-56 105mm pack, 20 AMX 155mm SP how; 81mm mor; 84mm RCL; *Vigilant* ATGW; *Rapier*, *Crotale*, RBS-70 SAM.
(In store: 70 *Saladin* armd, 60 *Ferret* scout cars; 12 *Saracen* APC.)
(On order: OF-40 MBT; 20 *Scorpion* lt tks; 54 *TOW* ATGW, 7 *Improved HAWK* SAM btys, 343 msls.)

Navy: 1,000.
6 *Jaguar* II (TNC-45) FAC(M) (2 twin *Exocet* SSM).
6 Vosper Thornycroft large patrol craft.
3 Keith Nelson coastal patrol craft(.
(On order: 5 coastal patrol craft.)

Base: Abu Dhabi.

Air Force (Police Air Wing & Central Air Force): 1,500; 52 combat ac, 7 armed hel.
2 interceptor sqns with 25 *Mirage* 5 AD, 3 5RAD, 2 5DAD.
1 FGA sqn with 10 *Hunter* FGA-76, 2 T-77.
1 COIN sqn with 10 MB-326 KD/LD.
Tpts incl 3 C-130H, 1 L-100-30, 1 Boeing 720-023B, 1 G-222, 2 C-212 *Aviocar*, 5 *Islander*, 3 DHC-4, 4 DHC-5D, 1 Cessna 182.
Hel incl 6 AB-205, 6 AB-206, 3 AB-212, 7 *Alouette* III with AS-11, 9 *Puma*, 13 *Gazelle*.
Trg ac: 3 Pilatus PC-7.
AAM: R-550 *Magic*.
ASM: AS-11/-12.
(On order: 6 *AlphaJet* FGA/trg, 1 G-222, 2 C-212 tpts, 11 PC-7 trg ac; *Lynx* hel.)

Para-Military Forces: Coastguard: 45 coastal patrol boats/craft.

YEMEN ARAB REPUBLIC (NORTH)

Population: 7,200,000.
Military service: 3 years.
Total armed forces: 32,050 (20,000 + conscripts).
GNP 1980: 20.47 bn rial ($4.49 bn).
Defence expenditure 1980: 1.51 bn rial ($331 m).
$1 = 4.56 rial (1980).

Army: 30,000 (20,000 conscripts).
6 armd bdes (1 trg).
1 mech, 9 inf bdes (1 reserve).
1 para bde.
1 central guard force.
2 inf gps.
3 arty bdes.
3 AA arty, 2 AD bns.
150 T-34, 500 T-54/-55, 64 M-60 MBT; 50 *Saladin* armd, *Ferret* scout cars; 12 M-106 mor-armed, 90 M-113, 425 BTR-40/-60/-152, *Walid* APC; 250 76mm, 105mm, and 122mm towed, 50 SU-100 SP guns; 200 82mm and 120mm mor; 65 BM-21 122mm MRL; 75mm, 82mm RCL; *LAW* RL; 20 *Vigilant*, *TOW*, *Dragon* ATGW; ZU-23 23mm, 37mm, 57mm, 85mm towed, 24 ZSU-23-4, 72 M-163 *Vulcan* 20mm SP AA guns; SA-2/-7 SAM.

Navy: 550.
3 ex-Sov P4 FAC(T)(.
8 patrol craft(: 3 ex-US *Broadsword*; 5 ex-Sov (2 *Zhuk*, 3 *Poluchat*).
2 LCM.
(On order: 2 *Osa* FAC.)

Base: Hodeida.

Air Force: 1,500; 75 combat ac.[13]
5 fighter sqns: 2 with 30 MiG-21; 1 with 20 MiG-17F; 1 with 10 F-5E; 1 with 15 Su-22.
Tpts: 2 C-130H, 2 C-47, 2 *Skyvan*, 1 Il-14, 1 An-24, 3 An-26.
Trainers: 4 F-5B, 4 MiG-15UTI.
Hel: 1 Mi-4, 12 Mi-8, 6 AB-206, 6 AB-212, 2 *Alouette*.
1 AD regt with 12 SA-2 SAM.
AAM: AA-2 *Atoll*, AIM-9 *Sidewinder*.
(In storage: 17 MiG-21.)

Para-Military Forces: 20,000 tribal levies.

YEMEN: PEOPLE'S DEMOCRATIC REPUBLIC (SOUTH)

Population: 1,955,000.
Military service: 2 years.
Total armed forces: 26,000 (18,000 conscripts).
GNP 1980: 343.8 m dinar ($996.5 m).
Defence expenditure 1980: 42.7 m dinar ($123.7 m).
$1 = 0.345 dinar (1980).

Army: 22,000.
1 armd bde (trg).
1 mech bde.
10 inf bdes (some being mechanized).
1 arty bde.
1 rocket bde (trg) and 10 arty bns.
1 marine unit.
1 SSM bde with *FROG* and *Scud* B.
470 T-54/-55/-62 MBT; 10 *Saladin* armd, 10 *Ferret*, BRDM-2 scout cars; BMP MICV, 300 BTR-40/-60/-152 APC; 310 85mm, 100mm, 130mm guns (incl coastal); 122mm how; BM-21 122mm MRL; 120mm, 160mm mor; 12 *FROG*-7, *Scud* B SSM; 170 ZU-23-2 23mm, 37mm, 57mm, 85mm towed, and ZSU-23-4 SP AA guns; SA-2/-7 SAM.

Navy: 1,000.
1 ex-Sov corvette (converted T-58 minesweeper).
6 ex-Sov *Osa* FAC(M) with 4 *Styx* SSM.
2 ex-Sov SO-1 large patrol craft.
4 ex-Sov FAC(T): 2 *Mol*, 2 P-6(.
2 ex-Sov *Zhuk* FAC(P)(.
5 coastal patrol craft((with Public Security Force): 1 *Tracker* 2, 3 *Spear*, 1 *Interceptor*.
1 ex-Sov *Ropucha* LST; 3 ex-Sov *Polnocny* LCT; 3 ex-Sov T-4 LCA.

Bases: Aden, Mukalla, Riyan, Al-Aned.

Air Force: 3,000; 114 combat ac, 15 armed hel.[14]
1 lt bbr sqn with 8 Il-28.
4 FGA sqns: 2 with 30 MiG-17F; 1 with 10 MiG-21; 1 with 30 Su-20/-22.
3 interceptor sqns with 36 MiG-21F.
1 tpt sqn with 4 Il-14, 3 An-24.
1 hel sqn with Mi-4, 8 Mi-8, 15 Mi-24.
1 SAM regt with SA-2.
Trainers: 3 MiG-15UTI.
AAM: AA-2 *Atoll*.
ASM: AT-2 *Sagger*.

Forces Abroad: Syria 500: 1 inf bn.

Para-Military Forces: Popular Militia. Public Security Force: 15,000 (to be increased).

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[1] Spares for Soviet equipment are scarce: active holdings being reduced to ⅓ of listed total; replacement or reconstruction using Western material planned.

[2] One source estimates $13.3 bn for 1981–2 *(i.e.*, 41.6% of total budget).

[3] Losses and low serviceability make eqpt estimates tentative only.

[4] Losses make estimates tentative only.

[5] Excl foreign subventions: perhaps 140 m dinar ($430 m).

[6] Excluding expatriate personnel.

[7] Plus £L3 bn ($955 m) spread over 10 years to rebuild the armed forces.

[8] 1,500 serve with UNIFIL.

[9] Some eqpt, incl 1,400 MBT, 450 combat ac (Tu-22, MiG-21/-23/-25, Su-22) in storage. Soviet, Pakistani, and Palestinian pilots also fly Libyan aircraft.

[10] Some aircraft believed to be in storage. Casualties and reinforcements of Lebanon during June 1982 are difficult to estimate.

[11] Under Army Command, with Army and Air Force manpower.

[12] The Union Defence Force and the armed forces of the United Arab Emirates (Abu Dhabi, Dubai, Ras Al Khaimah, and Sharjah) were formally merged in May 1976.

[13] Some aircraft are believed to be in storage.

[14] Some eqpt believed in storage; some ac believed flown by Soviet and Cuban crews.

THE MILITARY BALANCE 1982/83

Sub-Saharan Africa

MULTILATERAL AGREEMENTS

The Organization of African Unity (OAU), constituted in May 1963 to include all internationally recognized independent African states except South Africa, has a Defence Commission—responsible for defence and security co-operation and the defence of the sovereignty, territorial integrity, and independence of its members. In 1979 this considered and approved in principle the establishment of an African Intervention Force and ordered planning for its formation, funding, and equipping. Little progress has been reported. It did agree in 1981 on a force for Chad, with troops provided by Nigeria, Senegal, and Zaire. Financing was inadequate, the force had little success, and is now being disbanded.

BILATERAL AGREEMENTS

The US has had mutual defence and assistance agreements with Ethiopia (1975), Ghana (1972), Kenya (1980), Liberia (1972), Mali (1972), Niger (1962), Senegal (1962), and Zaire (1972); most may now be in abeyance. Agreements have been negotiated with Somalia and Kenya to allow limited US access to naval and air facilities.

The Soviet Union has Treaties of Friendship and Co-operation with Angola (October 1976), Mozambique (March 1977), and Ethiopia (November 1978, ratified April 1979). Relations with the Congo Republic are close but no such agreement is known to exist. Military aid has been given to Angola, under an additional Military Co-operation Agreement, as well as to Ethiopia, Guinea, Guinea-Bissau, Mali, Mozambique, Nigeria, Somalia, Uganda, and Zambia (1980). The Soviet Navy uses facilities on Dahlak Island, Ethiopia.

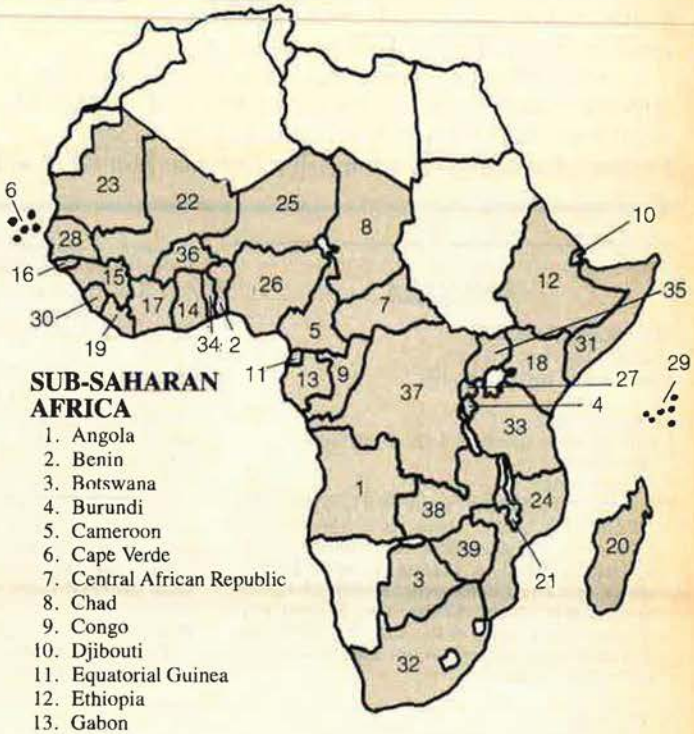
China has military assistance agreements with Cameroon, Equatorial Guinea, Guinea, Mali, and Tanzania, and has given aid to Mozambique and Zaire.

Britain maintains overflying, training, and defence agreements with Kenya, is helping Zimbabwe form and train her forces, and is making similar arrangements with Uganda.

France signed defence and/or military co-operation agreements with Benin, the Cameroons (February 1974), the Central African Republic, Chad (status obscure), Congo, Gabon (1974), Ivory Coast, Madagascar, Mali (since terminated), Mauritania, Niger, Senegal (March 1974), Togo, Upper Volta, and Zaire. The agreement with the Central African Republic was terminated briefly (May–September 1979) before the change of government there. In 1977 France concluded an agreement with Djibouti which permits her to station forces.

Belgium has a military co-operation agreement with Zaire.

Spain maintains close links with Equatorial Guinea.



SUB-SAHARAN AFRICA

1. Angola
2. Benin
3. Botswana
4. Burundi
5. Cameroon
6. Cape Verde
7. Central African Republic
8. Chad
9. Congo
10. Djibouti
11. Equatorial Guinea
12. Ethiopia
13. Gabon
14. Ghana
15. Guinea
16. Guinea-Bissau
17. Ivory Coast
18. Kenya
19. Liberia
20. Madagascar
21. Malawi
22. Mali
23. Mauritania
24. Mozambique
25. Niger
26. Nigeria
27. Rwanda
28. Senegambia
29. Seychelles
30. Sierra Leone
31. Somali Democratic Republic
32. South Africa
33. Tanzania
34. Togo
35. Uganda
36. Upper Volta
37. Zaire
38. Zambia
39. Zimbabwe

Cuba has some 18,000 men in Angola, training the Angolan armed forces and assisting with internal security, and 10,000 in Ethiopia. Cuban, Soviet, and East German advisers are present in a number of other African countries.

Some military links exist between South Africa and Israel, and between Mozambique and Angola and East Germany and Bulgaria. Hungary signed a Friendship Treaty with Ethiopia and with Mozambique in September 1980. North Korea signed a Treaty of Friendship and Co-operation with Togo in October 1981; she also had a 100-man training team with Zimbabwe's elite armoured brigade.

ARRANGEMENTS WITHIN THE REGION

In 1961 the Central African Republic, Chad, the Congo, and Gabon formed the Defence Council of Equatorial Africa, with French help. Chad's present position in relation to the Council is unclear.

In May 1981 the Economic Community of Western African States (ECOWAS) adopted a Protocol on Mutual Assistance on Defence Matters calling for a joint Defence Commission, comprising Defence Ministers and their Chiefs of Defence Staff, and a Defence Council of the Heads of State. It is intended to create a joint force, using assigned units of the national armies, which could serve as an intervention or peace-keeping force. Of the then 16 ECOWAS members (Benin, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo, and Upper Volta), 12 have signed, Cape Verde, Guinea-Bissau, and Mali declined, and Mauritania signed only after the Protocol was amended to call for the withdrawal of foreign troops once ECOWAS could guarantee mutual defence.

Kenya and Ethiopia signed a Treaty of Friendship and Co-operation in January 1979. Sierra Leone and Guinea signed a Defence Agreement in 1971 and a Mutual Defence Pact in August 1981. In December 1981 Senegal and Gambia signed a confederation pact which united the two countries as Senegambia and integrated their armed forces. Tanzania and Uganda signed a defence pact in August 1981 under which Tanzania provides instructors.

The only country in the area with an indigenous arms industry is South Africa, which builds equipment under licence and some also of her own design.

ANGOLA

Population: 7,000,000.
Military service: 2 years.
Total armed forces: 37,500.[1]

Army: 35,000.
2 mot inf bdes (each of 1 tk, 2 inf bns).
17 inf bdes.
4 AA arty bdes.
175 T-34, 150 T-54 MBT; some 50 PT-76 lt tks; 200 BRDM-1/-2, AML armd cars; 150 BTR-60/-152 APC; 200 guns/how, incl 76mm, 85mm, 100mm, SU-100 SP, 122mm, 130mm, 152mm; 500 82mm and 120mm mor; 50 BM-21 122mm MRL; 2,000 75mm, 82mm, and 107mm RCL; *Sagger* ATGW; ZPU-4 14.5mm, ZU-23 23mm, 37mm towed, ZSU-23-4, 40 ZSU-57-2 SP AA guns; SA-7 SAM.[2]

Navy: 1,000.
4 ex-Sov *Shershen* FAC(T).
5 ex-Port *Argos* large patrol craft.
9 coastal patrol craft(: 3 ex-Sov (1 *Zhuk*, 2 *Poluchat*), 6 ex-Port (1 *Jupiter*, 5 *Bellatrix*).
4 LCT: 3 ex-Sov *Polnocny*, 1 ex-Port *Alfange*.
5 ex-Sov T-4 LCM.

Bases: Luanda, Lobito, Moçâmedes.

Air Force: 1,500; 68 combat aircraft.[2]
2 FGA sqns with 40 MiG-21MF, 25 MiG-17F, 2 G-91R4 fighters.
MR ac: 1 F-27MPA.
2 tpt sqns: 6 *Noratlas*, 2 L-100-20, 3 C-47, 6 An-2, 16 An-26, 4 *Turbo-Porter*, 8 *Islander*, 10 Do-27, 1 F-27-400M, 1 FH-227.
2 hel sqns: 35 Mi-8, 13 *Alouette* III.
Trainers incl 1 MiG-15UTI, 6 Yak-11.
AAM: AA-2 *Atoll*.
SAM: 20 SA-3 *Goa*, some SA-6 *Gainful*.

Para-Military Forces: Militia infantry: 10,000; 11 bns (to increase to 15). 'Organization of Popular Defence': 500,000.

[1] See p. 122 for footnotes.

ETHIOPIA

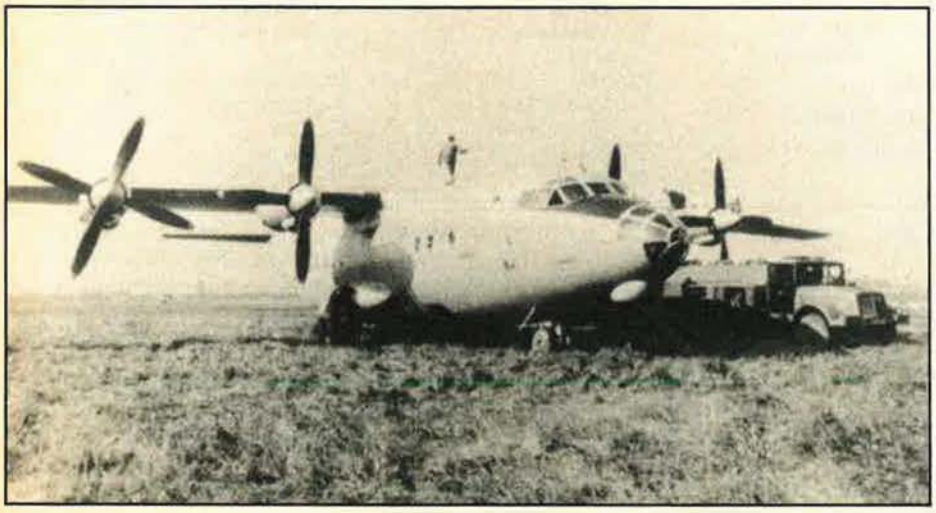
Population: 30,500,000.
Military service: selective conscription, term unknown.
Total armed forces: 250,500.[3]
GNP 1980: 8.47 bn birr ($4.09 bn).
Estimated defence expenditure 1980: 751 m birr[4] ($362.8 m).
$1 = 2.07 birr (official).

Army: 244,500.[5]
14 inf and 3 mot inf divs with some 20 tk bns.
2 mountain divs, each of 6 bdes.
1 lt div.
4 para/cdo bdes.
30 arty bns.
2 engr bns.
15 AD bns.
40 M-47, 150 T-34, 600 T-54/-55 MBT; 40 M-41 lt tks; 100 BRDM-1/-2 scout cars; 40 BMP-1 MICV, about 70 M-113, 600 BTR-40/-60/-152, V-150 *Commando* APC; some 700 guns/how, incl 75mm, 52 105mm, 250 122mm (incl SP), 130mm, 152mm, 12 155mm towed, 12 M-109 155mm SP; 60mm, 81mm, 82mm, 120mm, 280 M-2/-30 4.2-in (107mm), 120mm mor; BM-21 122mm MRL; *Sagger* ATGW; ZU-23 23mm, 37mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-2/-3/-7 SAM.[6]

Navy: 2,500.[6]
9 large patrol craft: 1 ex-Yug *Kraljevica*, 4 ex-US PGM, 4 105-ft *Swift*.
4 ex-Sov *Osa*-II FAC(M) with *Styx* SSM.
1 *Poluchat* coastal patrol craft.
1 *Polnocny* LSM.
(Non-operational: 1 ex-US *Barnegat* frigate, 1 ex-Neth *Wildervank* patrol ship, 2 ex-Sov *Mol* FAC(T), 4 *Stewart* 15-ton FAC(P), 4 LCM, 2 LCVP.)

Bases: Massawa, Assab.

Air Force 3,500; some 113 combat aircraft.[6]
6 FGA sqns; 1 with 7 F-5A/E; 1 with 10 MiG-17; 3 with 70 MiG-21; 1 with 20 MiG-23.
1 COIN sqn with 6 T-28A.
1 tpt regt with 14 An-12, 4 An-22, 3 C-47, 2 C-54, 6 C-119G, 2 *Dove*, 1 Il-14, 1 DHC-3, 3 DHC-6, 2 Do-28.



The Sub-Saharan African nations of Ethiopia and Madagascar include Soviet-built An-12 turboprop-powered transport aircraft in their air forces.

Trainers incl MiG-21U, 10 T-33A, 2 F-5B, T-28. Hel incl 6 AB-204, 3 *Alouette* III, 20 Mi-8, 12 Mi-24, 6 UH-1H.

RESERVES (all services): 20,000.

Para-Military Forces: 169,000. Mobile emergency police force 9,000. People's Militia 150,000: in 12 divs with mor, ATK guns. People's Protection bdes 10,000. Some national military training and 'civil defence' may have been instituted.

GHANA

Population: 12,000,000.
Military service: voluntary.
Total armed forces: 14,600.
GDP 1980: 29.425 bn cedi ($10.7 bn).
Defence expenditure 1981: 387.9 m cedi ($141.05 m).
GDP growth 1980: 2%.
Inflation: 88% (1980), 130% (1981).
$1 = 2.75 cedi (official).

Army: 12,000.
2 bdes (6 inf bns and spt units).
1 recce bn.
1 mor bn.
1 fd engr bn.
1 sigs bn.
1 AB coy.
Saladin armd cars; 100 Mowag *Piranha* APC; 81mm, 20 Tampella 120mm mor; 50 *Carl Gustav* 84mm RCL.

Forces Abroad: Lebanon (UNIFIL): 1 bn (697).

Navy: 1,200.
2 *Kromantse* ASW corvettes.
4 FAC(G); 2 FPB-57, 2 TNC-45.
2 *Sahene*, 2 ex-Br *Ford* patrol craft.
4 *Spear* II coastal patrol craft.

Bases: Sekondi, Tema.

Air Force: 1,400; 12 combat aircraft.
1 COIN sqn with 6 MB-326F, 6 MB-326KB.
2 tpt sqns with 8 *Islander*, 6 *Skyvan* 3M.
1 comms/liaison sqn with 5 F-27, 1 F-28.
Hel: 2 *Alouette* III, 2 Bell 212.
1 trg sqn with 11 *Bulldog*.

Para-Military Forces: Border Guard 5,000; 3 bns.

KENYA

Population: 17,000,000.
Military service: voluntary.
Total armed forces: 16,650.
GNP 1980: 50.5 bn shillings ($6.4 bn).
Defence expenditure 1980: 1.263 bn shillings ($160 m).
GDP growth 1980: 2.9%.
Inflation 1980: 13%.
$1 = 7.89 shillings (1980).

Army: 13,000.
2 bde HQ.
2 armd bns.
1 armd recce bn.
5 inf bns.
2 arty bns.
1 air cav bn.
2 engr bns.
1 tpt bn.
60 Vickers Mk 3 MBT; 12 *Fox*, 40 AML-60/-90, 8 *Shorland* armd cars; 50 UR-416, 4 Panhard M-3 APC, 40 lt, 16 pack 105mm guns; 20 81mm, 10 120mm mor; 50 *Carl Gustav* 84mm, *Wombat* 120mm RCL; *Milan*, 8 *Swingfire* ATGW; 32 Hughes 500 MD hel (15 *Scout*, 15 with *TOW* ATGW, 2 trg).
(On order: 12 Vickers Mk 3 MBT.)

Navy: 650.
4 Brooke Marine FAC(M) with *Gabriel* SSM (1 37.5-metre, 3 32.6-metre).
3 Vosper 31-metre *(Simba)* large patrol craft.
(On order: *Gabriel* SSM (for *Simba* patrol craft).)

Base: Mombasa.

Air Force: 3,000; 29 combat aircraft.
1 FGA sqn with 10 F-5E, 2 F-5F.
1 COIN sqn with 5 BAC-167 *Strikemaster*, 12 *Hawk* T-52.
2 lt tpt sqns: 1 with 5 DHC-4 *Caribou;* 1 with 6 DHC-5D *Buffalo*, 7 Do-28D.
1 trg sqn with 14 *Bulldog* 103.
Other ac incl 1 *Turbo Commander*, 1 *Navajo*.
Hel: 10 *Puma*, 2 Bell 47G.
AAM: *Sidewinder*.
(On order: 2 F-5F ac.)

Para-Military Forces: Police (General Service Unit) 1,800: Police Air Wing, 7 Cessna lt ac, 3 Bell hel.

MADAGASCAR

Population: 8,900,000.
Military service: 18 months.
Total armed forces: 20,900.
Estimated GDP 1980: 690 bn francs ($3.26 bn).
Defence expenditure 1981: 27.456 bn francs ($98.5 m).
$1 = 278.7 francs (1981), 211.3 francs (1980).

Army: 20,000.
2 bn gps.
1 engr regt.
1 sigs regt.
1 service regt.
7 construction regts.
8 M-8 armd, M-3A1, 10 *Ferret*, BRDM-2 scout cars; M-3A1 half-track APC; 12 ZIS-3 76mm guns; 81mm mor; 106mm RCL; 50 ZPU-4 14.5mm AA guns.

Navy: 400 (incl 150 marines).
1 Type-48 large patrol craft.
1 *Batram* landing craft with 8 SS-12 SSM.
5 LCM: 2 ex-N. Korean *Nampo*, 3 ex-US.
1 marine coy.

Air Force: 500; 12 combat ac.
1 FGA sqn with 4 MiG-17, 8 MiG-21FL.
1 tpt sqn with 2 Yak-40, 1 C-53D, 5 C-47, 1 *Defender*, An-12, 1 *Aztec*, 3 *Super Skymaster*, 5 lt ac.
1 hel sqn with 1 Bell 47, 3 *Alouette* II/III, 2 Mi-8.

Para-Military Forces: Gendarmerie 8,000, incl maritime police with 5 patrol craft.

MOZAMBIQUE

Population: 11,500,000.
Military service: 2 years (incl women).
Total armed forces: 21,600.[7]
Estimated GNP 1980: 81.17 bn metiça ($2.8 bn).
Estimated defence expenditure 1981: 5.6 bn metiça ($191.85 m).
$1 = 29.19 metiça (1981), 28.99 metiça (1980).

Army: 20,000.
1 tk bde.
10 inf bdes (each 3 inf, 2 mech, 1 arty bn, 1 AD gp, spt units).
1 Presidential Guard bde.
7 AD bns.
200 T-34 MBT; 35 BRDM-1/-2 recce; 200 BTR-60/-152 APC; 250 76mm, 85mm, 100mm, 122mm, 130mm guns; M-101 105mm how; BM-21 122mm MRL; 325 60mm, 82mm, and 120mm mor; 75mm, 82mm RCL; *Sagger* ATGW; 300 20mm, ZU-23, 23mm, 37mm, 57mm towed and ZSU-23-4 SP AA guns; 30 SA-3, SA-7 SAM.

Navy: 600.
15 coastal patrol craft(: 7 ex-Sov (6 *Zhuk*, 1 *Polnuchat*), 6 ex-Port (1 *Antares*, 3 *Jupiter*, 2 *Bellatrix*), 2 other.
1 ex-Port *Alfange* LCT.

Bases: Maputo, Beira, Nacala, Pemba, Metangula.

Air Force: 1,000; 25 combat aircraft, 4 armed hel.
2 sqns with 25 MiG-17.
1 hel sqn with 4 armed *Alouette* II/III.
1 tpt sqn with 1 Tu-134, 4 An-26, 6 *Noratlas*, 4 Cessna 182.
Trg ac: 7 Zlin.

Para-Military Forces: Border Guard 6,000: 4 bdes. People's Militia (village self-defence force).

NIGERIA

Population: 79,000,000.
Military service: voluntary.
Total armed forces: 138,000.
GDP 1981: 60.2 bn naira ($92.9 bn).
Defence expenditure 1981: 548 m naira ($845.6 m).
GDP growth 1980: 7%.
Inflation 1981: 20%.
$1 = 0.648 naira (1981).

Army: 125,000.
1 armd div (4 armd, 1 mech bdes).
1 composite div (incl 1 AB, 1 air portable, 1 amph bdes).
2 mech divs (each 3 mech bdes).
1 Guards bde.
4 arty bdes, 4 engr bns, 4 recce bns } organic to divs (1 each).
65 T-55 MBT, 50 *Scorpion* lt tks; 20 *Saladin*, 90 AML-90 armd, 55 *Fox* scout cars; 10 *Saracen*, 6 M-3 VPC, 4 AMX VTT, 26 Steyr 4K-7FA APC; 76mm, 200 122mm guns; 200 M-56 105mm pack how; 200 81mm mor; 20mm, 40mm towed, 30 ZSU-23-4 SP AA guns.[8]
(On order: 36 Vickers Mk 3 MBT; 57 Mowag *Piranha* APC; 25 *Palmaria* 155mm SP how; *Blowpipe*, 16 *Roland* SAM.)

Navy: 4,000.
2 ASW frigates: 1 *Meko* 360 with 2 × 4 *Otomat* SSM, 1 × 8 *Aspide* SAM, 1 hel; 1 *Nigeria* (trg).
4 corvettes: 2 Vosper Thornycroft Mk 9 *(Hippo)* with 2 × 3 *Seacat* SAM; 2 Mk 3.
6 FAC(M): 3 Lürssen Type-57 with 4 *Otomat* SSM; 3 *La Combattante* III with 2 × 2 *Exocet*.
8 large patrol craft: 4 Brooke Marine, 4 Abeking & Rasmussen.
2 RoRo 1300 (*Crocodile*-class) LST.
9 coastal patrol boats.
(On order: 12 coastal patrol boats, 2 LCT; 3 *Lynx* hel.)

Bases: Apapa (Lagos), Calabar.

Air Force: 9,000; 30 combat aircraft.[8]
3 FGA/interceptor sqns: 1 with 12 *AlphaJet;* 2 with 18 MiG-21MF.
2 tpt sqns with 6 C-130H, 5 F-27, 1 F-28 (VIP), 1 *Gulfstream* II (VIP).
1 SAR sqn with 20 BO-105C/D hel.
3 service sqns with 26 *Bulldog*, 14 Do-28.
Hel incl: 15 *Puma*, 10 *Alouette* II (in storage).
Trg ac incl: 2 MiG-15UTI, 2 MiG-21U, 20 L-29.
AAM: AA-2 *Atoll*.
(On order: 2 F-27MPA MR, 5 *Bulldog* lt ac, Hughes 300C hel.)

Forces Abroad: Lebanon (UNIFIL): 1 bn (696).

Para-Military Forces: Coastguard (forming): 18

FAC(P). (On order: 3 landing craft, 3 launches.)
Police: 1 hovercraft (1 more on order).

SENEGAMBIA

(Senegal and Gambia signed and ratified a Confederation Pact in December, 1981. The pre-Confederation organizations and inventories are shown separately below; the Gambian Army may now have been disbanded, and the other Services' roles taken over by civilians.)

SENEGAL
Estimated population: 5,900,000.
Military service: selective.
Total armed forces: 9,700.
GNP 1981: 525 bn francs ($2.23 bn).
Defence expenditure 1981: 14.14 bn francs ($60.1 m).
$1 = 235.26 CFA francs (1981).

Army: 8,500.
5 inf bns.
1 engr bn.
1 trg bn.
1 Presidential Guard (horsed).
1 recce sqn.
1 arty bty.
2 para coys.
3 construction coys.
10 M-8, M-20, 40 AML-60/-90 armd cars; 12 Panhard M-3, VXB-170 APC; M-3 half-track; M-116 75mm pack, 6 M-101 105mm how; 8 81mm mor; STRIM-89 RL; *Milan* ATGW; 40mm AA guns.

Navy: 700.
1 PR-72M, 3 P-48 large; 5 coastal patrol craft(; 1 LCT, 2 LCM.

Base: Dakar.

Air Force: 500.
1 EMB-111 MR; 1 Boeing 727-200, 5 C-47, 6 F-27-400M, 1 *Caravelle*, 2 *Broussard* tpts; 1 Cessna 337 lt ac; 2 *Magister* trg ac; 1 *Gazelle*, 2 *Puma*, 2 *Alouette* II hel.

Forces Abroad: Lebanon (UNIFIL): 1 bn (561).

Para-Military Forces: 6,800; 12 VXB-170 APC.

GAMBIA
Estimated population: 600,000.
Military service: voluntary.
Total armed forces: 475 (Para-Military).
Estimated GDP 1981: 515 m dalasi ($294.6 m).
Defence expenditure 1981: 5.2 m dalasi ($2.97 m).
$1 = 1.748 dalasi (1981).

Army: (Field Force): 400.
1 coy: 8 *Ferret* scout cars; 4 M-20, 3.5-in RL.

Navy: 50.
1 40-ton Keith Nelson, 1 31-ton *Tracker*, 1 17-ton *Lance* coastal patrol boats.

Base: Banjul.

Air: 25.
1 *Skyvan* 3M, 1 *Defender* tpts.

SOMALI DEMOCRATIC REPUBLIC

Estimates of population: 3.65–6.12 m.
Military service: voluntary.
Total armed forces: 62,550.

Army: 60,000.
3 corps, 7 div HQ.
3 tk/mech bdes.
20 inf bdes.
1 cdo bde.
1 SAM bde.
13 fd, 10 AA arty bns.
100 T-34/-54/-55, 40 *Centurion* MBT; BRDM-2 recce, 10 BTR-40/-50/-60, 100 BTR-152, V-150 *Commando*, 200 Fiat 6614/6616 APC/AFV; about 150 76mm, 85mm, 100mm, 60 122mm guns/how; 81mm, 120mm mor; 106mm RCL; 100 *Milan* ATGW; 250 14.5mm, ZU-23 23mm, 37mm, 57mm, and 100mm towed, 10 ZSU-23-4 SP AA guns; 30 SA-2/-3 SAM.[9]

Navy: 550.[9]
2 ex-Sov *Osa*-II FAC(M) with *Styx* SSM.
8 ex-Sov FAC(T): 4 *Mol*, 4 P-6(.
5 ex-Sov *Poluchat* large patrol craft.

ARMED FORCES (

Country	Estimated population (000)	Estimated GNP 1980 ($m)	Defence expenditure 1981 ($m)	Total armed forces	Army: Manpower and formations	Army: Equipment	Navy: Manpower and equipment	Air Force: Manpower and equipment	Para-militar forces
Benin	3,600	1,140	n.a.	3,160	**3,000** 3 inf bns 1 para/cdo bn 1 engr bn 1 service bn 1 armd sqn 1 arty bty	7 M-8, M-20 armd cars; BRDM-2 recce vehs; 4 M-101 105mm how; 60mm, 81mm mor	**60** 7 patrol boats: 2 P-6, 1 Fr, 5 *Zhuk* ((some inoperable)	**100** 2 C-47, 2 An-26, 1 F-27, 3 An-2, 1 *Falcon* 20, 1 Aero *Commander*, 1 *Corvette* 200, 2 *Broussard* tpts; 1 Cessna 337 lt ac; 1 Bell 47, 1 *Alouette* II hel	1,100
Botswana	900	604 (1979)	29.3 (1980)	3,000*	**2,850** 1 inf bn gp	*Shorland*, Cadillac Gage armd cars; 30 BTR-60 APC; 81mm mor; 84mm *Carl Gustav* RCL; SA-7 SAM	—	**150** 5 *Defender* COIN; 2 *Skyvan* tpts; 2 Cessna 152, 6 *Bulldog* lt ac	1,260 (Police)
Burundi	4,500	889	37.4	5,200*	**5,000** 2 inf bns 1 para bn 1 cdo bn 1 armd car coy	12 AML-60/-90, *Shorland* armd cars; 20 BTR, *Walid* APC; 15 75mm RCL; 83mm *Blindicide* RL; 18 82mm mor; 15 14.5mm AA guns	**50** 3 *Lambro* patrol boats (2 in reserve)	**150** 3 SF-260 COIN; 3 DC-3, 2 Do-27 tpts; 3 *Alouette* III hel	1,500
Cameroon	9,000	5,500	63	7,250	**6,600** 1 armd car bn 1 para bn 4 inf bns 1 engr bn 1 arty bty 1 AA bty Spt units	M-8 armd, *Ferret* scout cars; 18 *Commando* APC, M-3 half-track; 75mm pack, M-101 105mm how; 60mm, 20 81mm mor; 13 57mm ATK guns; 89mm ACL-STRIM ATK RL; 40 106mm RCL; *Milan* ATGW; 18 Type-58 14.5mm, 18 35mm, 18 Type-63 37mm, 18 40mm AA guns	**300** 2 *Shanghai*-II FAC(G); 1 PR-48, 10 coast patrol craft (; 1 LCM, 5 LCVP; 6 lt assault craft	**350** 1 mixed sqn, 1 Presidential flt: 6 *Alpha Jet* FGA; 4 *Magister* COIN; 2 C-130H, 3 C-47, 2 HS-748, 2 DHC-4, 2 DHC-5D, 2 Do-28, 2 Do-128-6 (MR), 7 *Broussard*, 1 Boeing 727-20 tpts; 1 *Puma*, 1 *Lama*, 3 *Alouette* II/III, 1 Mi-4, 4 *Gazelle* (2 with *HOT* ATGW) hel	5,000
Cape Verde	290	n.a.	15 (1980)	1,000	**900** 1 inf bn Spt elms	8 BRDM-2 recce vehs; mor; 3.5-in RL	**50** 2 *Shershen* FAC; 1 coast patrol craft	**50** 2 An-26 tpt ac	—
Central African Republic	2,400	550	13.3 (1980)	2,300	**2,000** 1 regt HQ 1 inf bn 1 engr coy 1 sigs coy 1 tpt coy	4 BRDM-2, 10 *Ferret* scout cars; 81mm mor; 10 106mm RCL; 9 river patrol craft (	—	**300** 10 AL-60, 2 *Rallye Guerrier*, 1 DC-4, 4 DC-3/C-47, 1 *Caravelle*, 1 *Corvette*, 6 *Broussard*, 2 *Skymaster* tpts; 1 *Alouette* II, 4 H-34 hel	1,500
Chad	4,500	n.a.	n.a.	3,200	**3,000** 3 inf bns (incl 5 para coys) 1 recce coy	AML-60/-90 armd cars; 90mm, 122mm guns; 81mm, 120mm mor; 68mm, 89mm ATK RL	—	**200** 10 AL-60, 3 C-54, 12 C-47, 1 *Noratlas*, 1 *Caravelle*, 2 PC-6, 3 *Broussard* tpts; 4 Cessna 337 lt ac; 11 *Alouette* II/III, 4 *Puma* hel	6,000
Congo	1,600	1,000	82.1	8,700	**8,000** 1 armd bn 1 inf bn 1 arty gp 1 engr bn 1 para/cdo bn	14 Ch T-62, 3 PT-76 lt tks; 15 BRDM-1/-2 scout cars; M-3, 20 BTR-50, 2 BTR-60, 44 BTR-152 APC; 6 75mm, 10 100mm, 8 122mm how; 82mm, 10 120mm mor; 13 57mm, 76mm, 100mm ATK guns; 57mm RCL; 28 37mm AA guns	**200** 1 *Shershen* FAC(T); 3 *Shanghai* FAC(G); 3 *Pirana* coastal, 4 river patrol craft (	**500** 1 MiG-15, 20 MiG-17 FGA; 1 F-28, 5 An-24, 5 Il-14, 3 C-47, 1 *Frégate*, 2 *Broussard* tpts; 4 L-39 trg ac; 1 *Puma*, 4 *Alouette* II/III hel	3,000
Djibouti	310	350	3.1 (1980)	2,700*	**2,600** 1 inf regt 1 armd sqn 1 spt bn 1 border cdo bn 1 para coy	12 BRDM-2, 2 AML-60, 8 AML-90 armd cars; 12 BTR-60 APC; 105mm pack how; 81mm, 4 120mm mor; 89mm RL; 106mm RCL	**20** 3 coast patrol boats (	**80** 1 *Rallye* 235; 1 *Mystère* 20, 2 *Noratlas* tpts; 1 Cessna 206G lt ac; 1 *Alouette* II hel	2,100
Equatorial Guinea	260	100	2.5 (est)	1,550	**1,400** 1 inf bn Spt unit	10 BRDM-2 recce vehs; 10 BTR-152 APC; mor	**100** 1 ex-Sov P-6 FAC; 1 *Poluchat* patrol craft	**50** 2 MiG-17, 1 Reims Cessna 337, 2 C-212, 1 Yak 40 ac; 2 *Alouette* III hel	2,000 (Police)
Gabon	660	3,700 (1981)	50 (est)	2,150	**1,500** 1 bn gp 8 inf coys 1 engr coy 1 para coy 1 service coy	16 *Cascavel*, 15 AML-90 armd cars; 6 *Commando*, M-3, 12 VXB-170 APC; 81mm mor; 106mm RCL; 10 37mm, 2 40mm AA	**150** 1 FAC(M) with 4 SS-12 SSM; 4 FAC(G); 2 patrol craft (; 1 LCM	**500** 7 *Mirage* 5G/DG FGA; 1 EMB-111P1 MR ac; 1 C-130H, 2 L-100-20/-30, 3 C-47, 1 DC-8-63, 2 EMB-110, 2 EMB-110P1K, 1 *Falcon*, 1 YS-11A, 3 Nord 262, 4 *Broussard* tpts; 2 Reims 337, 2 *Magister*, 4 T-34C lt ac; 4 *Puma*, 3 *Alouette* III hel	2,800 (Coast guard)
Guinea	5,300	1,500	n.a.	9,900	**8,500** 1 armd bn 5 inf bns 1 arty bn 1 engr bn 1 cdo bn 1 special force bn	30 T-34/-54 MBT, 20 PT-76 lt tks; 25 BRDM-1/-2 armd cars; 40 BTR-40/-50/-60/-152 APC; 76mm, 85mm, 105mm, 122mm guns/how; 57mm ATK guns; 37mm, 57mm, 100mm AA guns	**600** 6 *Shanghai*-II FAC(G); 3 *Shershen*, 4 P-6 FAC(T); 3 *Poluchat*, 2 MO-6, 5 other coastal patrol craft (; 1 T-58 minesweeper; 2 LCU	**800** 6 MiG-17F FGA; 5 Il-14, 4 An-14, 2 Il-18, 2 C-119, 1 Yak-40 tpts; 1 Reims F-337 lt ac; 2 MiG-15UTI, 5 Yak-18, 3 L-29 trg ac; 1 Bell 47G, 1 *Puma*, 1 *Gazelle*, 1 UH-12B hel	9,200

* All services form part of the Army † Serviceability doubtful

1 ex-Sov *Polnocny* LCT, 4 ex-Sov T-4 LCM(.

Bases: Berbera, Mogadishu, Kismayu.

Air Force: 2,000; 55 combat aircraft.[9]
1 lt bbr sqn with 3 Il-28.
2 FGA sqns with 9 MiG-17.
3 fighter sqns with 7 MiG-21MF, 30 ex-Ch F-6.
1 COIN sqn with 6 SF-260W.
1 tpt sqn with 2 An-24/-26, 3 C-47, 4 G-222.
1 hel sqn with 4 Mi-4, 2 Mi-8, 1 AB-204, 2 AB-212 (VIP).
Trainers incl 6 P-148, 2 MiG-15UTI.
Other ac: 9 SF-260W.

AAM: AA-2 *Atoll*.
(On order: SIAI S-211 COIN, 2 P-166-DL3 lt tpt ac; 2 AB-212 hel.)

Para-Military Forces: 29,500. Police 8,000, 2 Do-28 ac; border guards 1,500; People's Militia 20,000.

THER AFRICAN STATES

Country	Estimated population (000)	Estimated GNP 1980 ($m)	Defence expenditure 1981 ($m)	Total armed forces	Army: Manpower and formations	Army: Equipment	Navy: Manpower and equipment	Air Force: Manpower and equipment	Para-military forces
Guinea-Bissau	800	200	n.a	6,300	6,000 4 inf bns 1 engr unit 1 tk sqn	10 T-34 MBT; BTR-40/-50/-60/-152 APC; 85-mm, 105mm, 122mm guns; 120mm mor; 89mm RL; 75mm RCL; 23mm, 57mm AA guns; SA-7 SAM	250 1 ex-Sov *Shershen*, 1 P-6 FACT; 2 *Polnochat*, 2 other coast patrol craft (; 2 T-4 LCVP, LCU	50 2 Do-27, 2 Yak-40 tpts, 1 Cessna 337 lt ac; 2 *Alouette* III, 1 Mi-8 hel	5,000
Ivory Coast	8,300	10,300 (GDP)	235 (1980)	5,070	4,000 3 inf bns 1 marine inf bn 1 armd sqn 1 arty bty 1 AA arty bty 1 HQ coy 1 engr coy 1 spt coy 1 para coy	5 AMX-13 lt tks; 7 ERC-90 armd cars; 13 VAB, 22 M-3 APC; 4 105mm how; 81mm, 120mm mor; 89mm STRIM RL; 6 M-3 VDA 20mm SP, 10 40mm towed AA guns	500 4 Fr patrol boats (2 with 6 SS-12 SSM); 4 river patrol craft (; 1 lt tpt, 2 amph boats; 10 landing craft	570 5 *AlphaJet* FGA; 2 C-130H, 3 F-27, 2 F-28, 6 F-33C, 2 Reims F-337, 1 Cessna 421, 1 *King Air*, 2 RC-150, 1 *Falcon*, 1 *Gulfstream* tpts; 3 *Puma*, 3 *Alouette* II/III, 4 *Dauphin* hel	3,000
Liberia	2,000	1,060 (GDP)	16.5	5,400	4,900 5 inf bns 1 Guard bn 1 arty bn 1 engr bn 1 service bn	12 M-3A1 scout cars; 75mm pack, 8 105mm how; 20 60mm, 10 81mm, 4.2-in mor; 3.5-in RL; 57mm, 106mm RCL	250 3 50-ton patrol craft, 2 38-ton, 1 11-ton *Swift*	250 2 C-47 tpts; 14 Cessna lt ac (2 172, 1 185, 1 207, 10 337)	1,750
Malawi	6,200	982	40.6 (1980)	4,650*	4,500 3 inf bns 1 spt bn (incl 1 recce sqn)	10 *Fox*, BRDM-2 scout cars; 9 105mm guns; 81mm mor; 3.5-in RL; 57mm; 14 *Blowpipe* SAM	100 1 *Spear*, 3 lake patrol boats (	50 6 Do-27, 6 Do-28 tpts; 3 *Puma*, 1 *Alouette* III hel	1,000
Mali	7,000	1,100	33.4 (1980)	4,950	4,600 4 inf bns 1 arty bn 1 engr bn 1 para bn 1 special force bn 1 tk coy 1 SAM bty	37 T-34 MBT, 12 Type-62 lt tks; 20 BRDM-2 recce; 30 BTR-40, 10 BTR-152, BTR-60 APC; 85mm, 100mm guns; 81mm, 120mm mor; 37mm, 57mm AA guns; SA-3 SAM	50 3 river patrol craft (	300 5 MiG-17 FGA; 2 C-47, 3 An-2, 2 An-24, 1 *Corvette* 200 tpts; 1 MiG-15UTI, 6 Yak-11/-18 trg ac; 2 Mi-4, 1 Mi-8 hel	5,000
Mauritania	1,500	700 (GDP)	59.9	8,470	8,000 1 inf bn 1 arty bn 1 Camel Corps 3 armd recce sqns 1 AA bty 1 engr coy 1 para coy	15 EBR-75 hy, 39 AML-60, 14 AML-90 armd cars; 40 M-3 half-track, 4 M-3 APC; 81mm, 120mm mor; 57mm, 75mm, 106mm RCL; 14.5mm, ZU-23-2, 37mm AA guns; SA-7 SAM	320 8 patrol craft: 1 *Patra*, 2 ex-Sov *Mirny*, 3 *Barcelo*, 2 (	150 5 *Defender*, 2 Cessna 337 COIN; 2 Piper *Cheyenne* MR; 1 DHC-5D, 1 *Caravelle*, 1 *Skyvan*, 1 *Islander* tpts	2,500
Niger	5,800	2,700 (GDP)	17.6 (1980)	2,220	2,150 2 armd recce sqns 4 inf coys 1 engr coy 1 para coy 1 log/spt coy	10 M-8, 30 ERC-60-20 armd cars; 14 M-3 APC; 60mm, 81mm mor; 57mm, 75mm RCL; 10 M-3 VDA 20mm SP AA guns	—	70 1 C-54B, 2 C-47, 2 C-130H, 1 Boeing 737, 4 *Noratlas*, 3 Do-28D, 1 *Flamant*, 1 Aero *Commander* tpts; 2 Cessna 337 lt ac	2,060
Rwanda	5,400	1,053 (GDP)	21.9	5,150*	5,000 1 cdo bn 1 recce sqn 8 inf coys 1 engr coy	12 AML-60/-90 armd cars; M-3 APC; 6 57mm ATK guns; 8 81mm mor; 83mm *Blindicide* RL	—	150 2 C-47, 1 *Islander*, 2 *Defender* (COIN) tpts; 3 AM-3C liaison, 1 *Magister* trg ac; 2 *Alouette* III hel	1,200
Seychelles	66	82.7 (GDP)	n.a.	1,000*	750* 1 inf bn 1 arty tp Spt coy	6 BRDM-2, *Shorland* recce; 3 122mm guns; 6 82mm mor; RPG-7 RL; SA-7 SAM	150 1 *Zhuk*, 1 ex-Fr large patrol craft; 1 ex-Br patrol boat; 1 LCT	100 1 *Defender*, 1 *Islander*, 2 *Rallye* ac; 2 *Alouette* III hel	900
Sierra Leone	3,500	1,340 (GDP)	21 (1980)	3,150	3,000 2 inf bns 1 engr sqn	*Saladin* armd car; Mowag *Piranha* APC; 10 25pdr guns/how; 60mm, 81mm mor; M-20 3.5-in RL; *Carl Gustav* 84mm RCL; 1 BO-105 (VIP) hel	150 (coastguard) 1 *Tracker* 2 coast patrol boat	—	800
Togo	2,700	1,200	21	3,600*	3,400 1 mot inf bn 2 inf bns 2 para bns 1 cdo bn 1 arty bty 1 engr coy	10 M-8/-20, 3 AML-60, 7 AML-90 armd cars; 5 M-3, 30 UR-416 APC; 4 HM-2 105mm guns; M-18A1 57mm RCL	100 2 coastal patrol craft (	100 6 EMB-326GB COIN; 1 C-47, 1 Boeing 727, 1 *Gulfstream* II, 2 DHC-5D, 1 F-28 tpts; 5 *Magister* trg, 2 lt ac; 1 *Puma*, 1 *Lama* hel	1,500
Uganda	13,200	800 (GDP)	n.a.	5,000	5,000 3 bdes (9 inf bns)	10 T-34/-54/-55, M-4 MBT; 150 BTR-40/-152, OT-64 and *Saracen* APC; 60 76mm, 20 122mm guns; 40 *Sagger* ATGW; 40 23mm, 40mm AA guns; SA-7 SAM†	—	—	6,000
Upper Volta	6,200	1,000 (est)	n.a.	3,775*	3,700 3 inf regts 1 recce sqn 1 arty bty 1 para coy	15 AML-60/-90, 10 M-8, M-20 armd cars, 30 *Ferret* scout cars; M-3 APC; M-101, M-56 pack 105mm how; 60mm, 81mm mor; M-20 3.5-in RL; 75mm RCL	—	75 2 C-47, 2 Nord 262, 2 HS-748, 1 Aero *Commander*, 3 *Broussard*, 2 *Super Skymaster*, 1 Cessna 172 tpts	900

SOUTH AFRICA

Population: 29,500,000 total (of which 'homelands': 5,500,000).
Military service: 24 months, plus 12 years Active Reserve commitment.
Total armed forces: 81,400 (53,100 conscripts; total mobilizable strength 404,500).
GDP 1981: 72.4 bn rand ($81.1 bn).
Defence expenditure 1981: 2.465 bn rand ($2.76 bn).
GDP growth 1981: 4.7%.
Inflation 1981: 14%.
$1 = 0.8928 rand (1981).

Army: 67,400 (10,000 White, 5,400 Black and Coloured regulars, 2,000 women, 50,000 conscripts); 9 territorial commands.
2 div HQ (1 armd, 1 inf).
1 armd bde (2 tk, 2 APC-borne inf bns).[10]
1 mech bde (1 tk, 3 APC-borne inf bns).[10]
4 mot bdes (each 3 inf bns, 1 armd car bn).[10]
1 para bde (3 para bns).[10]
1 special recce unit (cdo).
9 fd, 4 med, 7 lt AA arty regts.[10]
1 AA missile regt (2 *Crotale* btys, 3 *Tigercat* btys).
15 fd engr sqns.[10]
3 sigs regts, 3 sigs sqns.
Some 250 *Centurion/Olifant* MBT; 1,400 AML *Eland* Mk IV armd cars; 1,200 *Ratel* AFV; 500 lt APC, incl *Buffalo, Hippo, Rhino;* 65 25-pdr, 75 5.5-in towed, 50 *Sexton* 25-pdr SP, 40 G-5 155mm towed how; 127mm MRL; 81mm, 200 120mm mor; 900 6-pdr (57mm) and 17-pdr (76mm), M-67 90mm ATK guns; 106mm RCL; SS-11, 120 *ENTAC* ATGW; 20mm, 55 K-63 twin 35mm, 25 L/70 40mm, 15 3.7-in AA guns; 24 *Cactus (Crotale)*, 54 *Tigercat* SAM.

RESERVES: Active Reserve 130,000. Reservists serve for 12 years, in which they spend 720 days on duty. They then transfer to the Active Citizen Force and may be recalled up to age 60, when transfer to the Commandos may occur.

Navy: 5,000, incl 900 marines, 2,100 conscripts.
3 *Daphne* submarines.
1 *President* (ex-Br *Whitby*) ASW frigate with 1 *Wasp* hel.
6 *Minister (Reshef)* FAC(M) with 6 *Skerpioen (Gabriel)* SSM.
5 ex-Br *Ford*, 2 *Ton* large patrol craft.
6 ex-Br *Ton* minesweepers, 2 *Ton* minehunters.
1 fleet replenishment ship.
(On order: 6 *Minister* FAC(M).)

MARINES: (900; 600 conscripts); 9 local harbour defence units.

Bases: Simonstown, Durban.

RESERVES: 2,000 Citizen Force.

Air Force: 9,000 (1,000 conscripts); 211 combat aircraft (incl 96 with Citizen Force), at least 12 armed hel.
Main Threat Area Command:
2 lt bbr sqns: 1 with 5 *Canberra* B(I)12, 3 T-4; 1 with 6 *Buccaneer* S-50.
4 FGA sqns: 1 with 32 *Mirage* F-1AZ; 3 with 82 MB-326 M/K *Impala* I/II.
2 FGA/interceptor/recce sqns: 1 with 16 *Mirage* IIICZ, 6 RZ/R2Z; 1 with 13 F-1CZ.
4 hel sqns with 5 *Super Frelon*, 35 *Puma*, 40 *Alouette* II.
3 tpt sqns: 1 with 7 C-130B, 9 Transall C-160Z; 1 with 4 DC-4, 12 C-47; 1 with 4 HS-125

Mercurius, 1 *Viscount* 781, 7 *Merlin* IVA (1 air ambulance).
3 liaison sqns with 15 AM-3C *Bosbok*, 25 C-4M *Kudu*.
Southern Air Command:
2 MR sqns: 1 with 5 *Shackleton* MR-3; 1 with 18 Piaggio P-166S.
2 attack sqns with 25 *Impala* I/II.
1 ASW hel sqn with 11 *Wasp* HAS-1.
2 utility hel sqns with 7 *Super Frelon*, 15 *Puma*, 25 *Alouette* III.
1 tpt sqn with 12 C-47B.

Western Air Command:
Namibia; no integral operational sqns.
Training Command:
6 Training schools with 100 T-6G *Harvard;* 60 *Impala* I/II; 26 *Mirage* III (16 EZ, 10 D2Z); 12 C-47 ac; 30 *Alouette* II/III hel.
AAM: *Sidewinder*, R-530, R-550 *Magic*, V-3.
ASM: AS-20/-30.

RESERVES: Active Citizen Force 25,000. 15 L-100 *(Hercules)* in civil airline service.

South West Africa Territory Forces (SWATF):
Formed 1 Aug 1980 as a separate force under South African control. Conscription: 24 months (all race groups), selective. Four sectors (Northern, Eastern, Central, and Southern) comprising 26 *Area Force* units organized similarly to the Commandos in South Africa, 1 engr, 1 sigs bns. Air element (one sqn) with lt ac manned by Citizen Force. Northern sector has six Regular SWATF lt inf bns, one mounted Specialist Unit.
Mobile Reserve: 1 mot inf bde (3 mot inf bns, 1 armd car regt, 1 arty regt, support units). 1 mot inf bn regulars; rest Citizen Force.
Para-military: Industrial Defence units.

Para-Military Forces: Commandos 90,000: inf bn-type protective units in formations of 5+; 12 months initial, 19 days annual trg. 13 Air Commando sqns with private ac. South African Police 35,500 (19,500 White, 16,000 Non-white), Police Reserves 20,000.

TANZANIA

Population: 19,000,000.
Military service: voluntary.
Total armed forces: 40,350.
GNP 1980: 40.3 bn shillings ($4.9 bn).
Defence expenditure 1980: 1.48 bn shillings ($180 m).
$1 = 8.21 shillings (1980).

Army: 38,500.
2 div HQ.
8 inf bdes.
1 tk bn.
2 fd arty bns, 2 AA arty bns (6 btys).
2 mor bns.
1 SAM bn with 9 SA-3, SA-6.
2 ATK bns.
2 sigs bns.
30 ex-Ch Type-59 MBT; 30 ex-Ch Type-62, 36 *Scorpion* lt tks; 20 BRDM-2 scout cars; 50 BTR-40/-152 APC; 40 76mm, 200 122mm, 50 D-30 130mm guns; 350 82mm and 120mm mor; 540 M-20 75mm RCL; 50 BM-21 122mm MRL; 280 ZPU-2/-4 14.5mm, 40 ZU-23, 120 37mm AA guns; SA-3/-6/-7 SAM.

Forces Abroad: Seychelles: 250.

Navy: 850.
10 FAC(G): 6 ex-Ch *Shanghai* II, 4 ex-GDR P-6(.
8 FAC(T)(: 4 ex-Ch *Huchwan* hydrofoils, 4 ex-N. Korean P-4.
13 coastal patrol craft(: 1 ex-Sov *Poluchat*, 2 ex-GDR *Schwalbe*, 2 ex-FRG 40 ton, 4 ex-Ch *Yulin;* 4 Vosper Thornycroft 75-ft in Zanzibar.
2 ex-Ch LCM.

Bases: Dar es Salaam, Zanzibar.

Air Force: 1,000; 29 combat aircraft.
3 fighter sqns with 11 MiG-21/F-7, 15 MiG-19/F-6, 3 MiG-17/F-4.
1 tpt sqn: 1 An-2, 3 HS-748, 6 DHC-5D.
Trainers: 2 MiG-15UTI, 6 *Cherokee*, 6 Cessna 310, 2 404.
Hel: 2 Bell 47G, 5 AB-205, 6 AB-206.

Para-Military Forces: 1,400 Police Field Force, Police Marine Unit; 50,000 Citizen's Militia.

ZAIRE

Population: 29,800,000.
Military service: voluntary.
Total armed forces: 26,000.
GNP 1980: 15.99 bn zaires ($5.71 bn).
Defence expenditure 1979: 92m zaires ($53.18 m).
GDP growth 1980: 2.5%.
Inflation 1980: 26.6%.
$1 = 2.80 zaires (1980), 1.73 zaires (1979).

Army: 22,000.
3 Military Regions.
1 div.
1 armd bde.
2 inf bdes (each 3 inf bns, 1 spt bn).
1 para bde (3 para bns, 1 spt bn).
1 special force (cdo) bde.
1 Presidential Guard bde.
60 ex-Ch Type-62 lt tks; 95 AML-60, 60 AML-90 armd cars; 12 M-113, K-63, 60 M-3, BTR-152, M-3 half-track APC; 75mm pack, 122mm, 130mm guns/how; 82mm, 4.2-in, 120mm mor; 83mm *Blindicide*, 107mm RL; 57mm ATK guns; 57mm, 75mm, 106mm RCL; 37mm, 40mm AA guns.
(On order: 120mm mor.)

Navy: 1,500 incl marines.
4 ex-Ch *Shanghai* II patrol boats.
35 patrol craft(: 4 *Huchwan*, 6 *Sewart*, 3 N. Korean P-4, 8 ex-US, 14 others.

MARINES: (600).

Bases: Matadi, Kalemie, Kinshasa, Banana.

Air Force: 2,500; 19 combat aircraft.
1 fighter sqn with 7 *Mirage* 5M/5DM.
2 COIN sqns with 6 MB-326K, 6 AT-6G.
1 liaison sqn with 20 Reims Cessna FTB-337.
1 tpt wing with 6 C-130H, 2 DC-6, 2 DHC-4A, 3 *Buffalo*, 8 C-47, 4 C-54, 2 MU-2, 1 *Falcon*-20.
1 hel sqn: 3 *Alouette* III, 5 *Puma*, 1 *Super Frelon*.
Trg ac incl 15 Cessna 310, 12 Cessna 150, 13 MB-326GB, 8 SF-260MC.
(On order: S-211 COIN/trg, 4 F-27-500 tpt ac.)

Para-Military Forces: Gendarmerie 22,000; 40 bns.

ZAMBIA

Population: 6,000,000.
Military service: voluntary.
Total armed forces: 14,300.
GNP 1980: 3.294 bn kwacha ($4.18 bn).
Defence expenditure 1979: 488.8 m kwacha ($617.2 m).
GDP growth 1980: 0.9%.
Inflation 1980: 11.4%.
$1 = 0.788 (1980), 0.792 kwacha (1979).

Army: 12,500.
1 armd regt (incl 1 armd recce bn).
6 inf bns.
3 arty btys, 2 AA arty btys.
1 engr, 2 sigs sqns.
4 T-34, 30 T-54/-55 and Type-59 MBT; 130 BRDM-1/-2 armd cars; 13 BTR-60 APC; 76mm, 35 130mm guns; 18 105mm pack, 25 122mm how; 50 BM-21 122mm MRL; M-18 57mm, *Carl Gustav* 84mm RCL; *Sagger* ATGW; 50 20mm, 40 37mm, 55 57mm, 16 85mm AA guns; SA-7 SAM.

Air Force: 1,800; 51 combat aircraft.
3 FGA sqns: 1 with 13 MiG-19/F-6; 1 with 6 *Jastreb;* 1 with 14 MiG-21 (forming).
1 COIN/trg sqn with 18 MB-326GB.
2 tpt sqns: 1 with 3 Yak-40, 5 DHC-4, 6 DHC-5D, 1 HS-748; 1 with 10 Do-28, 2 C-54.
Trainers incl 2 MiG-21UTI, 8 SF-260MZ, 20 Saab *Safari*, 6 DHC-2, 5 *Broussard*, 2 MiG-15/FT-3, 2 *Galeb*.
1 hel sqn with 3 AB-205A, 3 AB-206, 2 AB-212, 2 Bell 47G, 11 Mi-8.
1 SAM unit with 12 *Rapier*, 3 *Tigercat*, SA-3 *Goa*.

Para-Military Forces: 1,200. Police Mobile Unit (PMU) 700; 1 bn of 4 coys. Police Para-Military Unit (PPMU) 500; 1 bn of 3 coys.

ZIMBABWE

Population: 7,500,000.
Military service: selective.
Total armed forces: 63,000.[11]
Estimated GDP 1980: $Z 3.205 bn ($US 5.08 bn).
Defence expenditure 1981: $Z 350 m ($US 555 m).
$US 1 = approx $Z 0.63 (1980–81).

Army: 60,000.
5 bde HQ.
1 armd regt.
40 inf bns.
1 arty regt.
1 cdo bn, 1 para bn.
7 engr, 6 sigs sqns.
10 T-34, 18 T-54 MBT; 28 AML-90 *Eland* armd, 15 *Ferret*, BRDM-2 scout cars; 20 BTR-152, UR-416, *Buffalo, Hippo, Hyena, Leopard, Crocodile* APC; 18 25-pdr, M-56 105mm pack, 8 122mm, 8 5.5-in guns/how; 81mm mor; 106mm RCL; 8 SA-7 SAM.

Air Force: 3,000; some 41 combat aircraft.
1 lt bbr sqn with 5 *Canberra* B-2, 2 T-4.
2 FGA sqns: 1 with 9 *Hunter* FGA-9, 1 T-7; 1 with 5 *Vampire* FB-9.
1 COIN/recce sqn with 10 Cessna 337 (O-2) *Lynx*, 9 AL-60FS *Trojan*.
1 trg/recce/liaison sqn with 17 SF-260W/C *Genet*.
1 tpt sqn with 12 C-47, 6 *Islander*.
2 hel sqns with 27 *Alouette* II/III, 11 Bell/AB 205A.
2 AA sqns with 20mm, 23mm AA guns.
2 security sqns.
(On order: 8 *Hawk* COIN/trg ac.)

Para-Military Forces: Zimbabwe Republic Police Force 10,000. Police Support Unit 1,500. National Militia to be formed.

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[1] Some 18,000 Cubans and 450 E. Germans operate ac and hy eqpt. There are also Portuguese and some 700 Soviet advisers and technicians.
Forces opposed to the Angolan regime: UNITA: some 15,000: BM-21 122mm MRL; 82mm mor; 75mm RCL.

[2] Eqpt totals uncertain.

[3] Some 1,400 Soviet, 13,000 Cuban, and about 250 E. German technicians and advisers operate ac and hy eqpt. Some S. Yemeni troops may also serve.

[4] US estimates for 1980: 1.1 bn birr.

[5] Incorporating 150,000 People's Militia.

[6] War situation makes equipment data suspect: some ex-US eqpt now being refurbished.

[7] Chinese, Cuban, East German, Romanian, and Soviet advisers are reported with Mozambique's forces.

[8] There are additional unserviceable AFV and aircraft.

[9] Spares are short and much equipment is unserviceable. Combat losses make equipment data suspect. Ex-Ch F-6 believed to lack armament.

[10] Cadre formations completing the 2 divs when brought to full strength on mobilization of Citizen Force.

[11] Being cut to about 42,000 total.

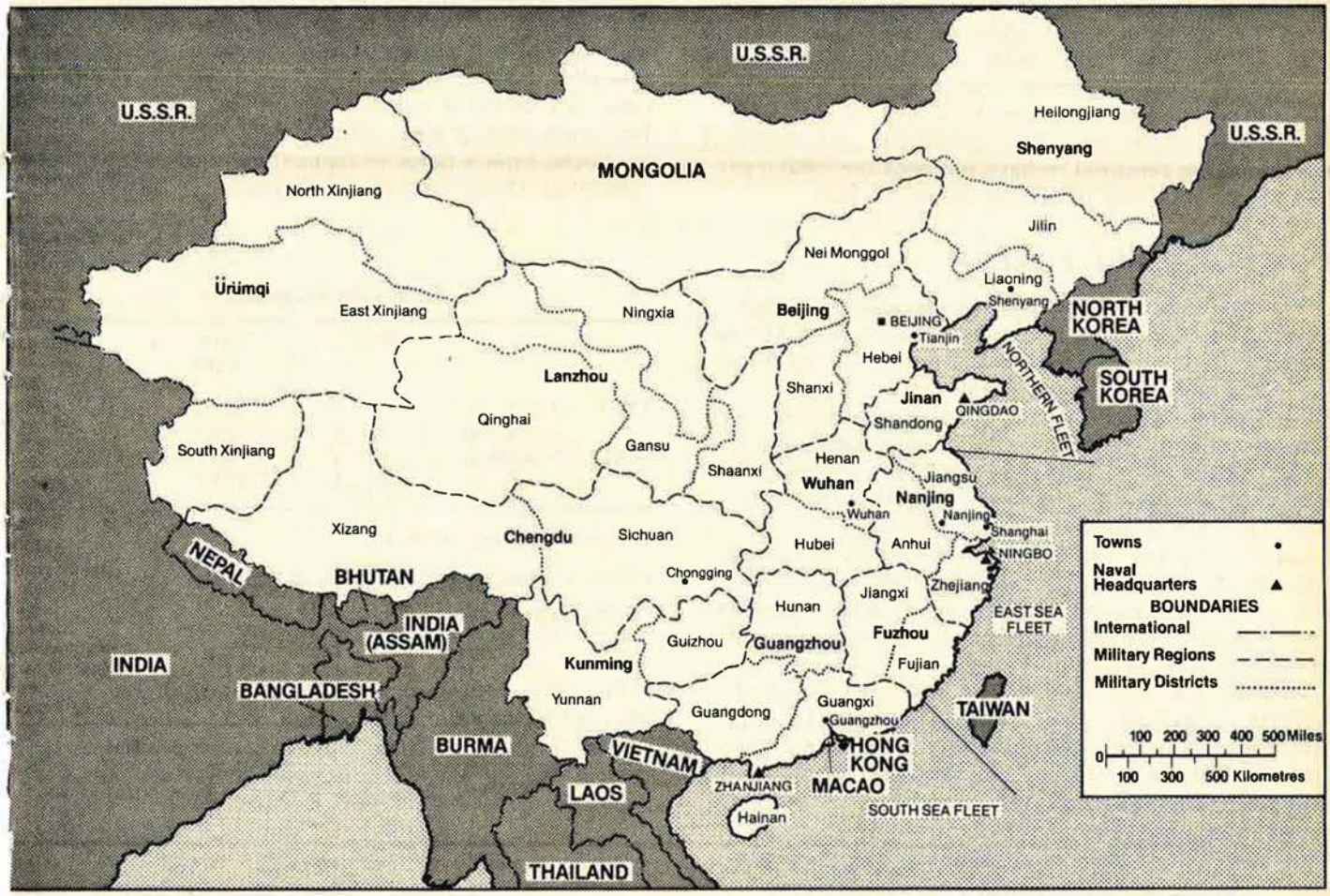
THE MILITARY BALANCE 1982/83

China

Chinese defence policy has for many years maintained a balance, at times uneasy, between the two concepts of nuclear deterrence and People's War. The former aims to deter strategic attack, the latter, by mass mobilization of the population, to deter or repel conventional land invasion. Despite changes in the political leadership, supporters of the strategic concept that mass manpower is the primary deterrent remain. However, efforts to develop more modern general-purpose forces in order to meet more limited military contingencies than the extremes of nuclear deterrence or mass war appear to be gaining ground.

The conventional arms inventory of the People's Liberation Army (PLA), generally behind that of nations with advanced technology, is being gradually updated under the Four Modernizations. Involved, in many cases, is the replacement of Soviet and Soviet-designed equipment by indigenous designs and Western technology and equipment. The June 1981 United States agreement in principle to sell China arms, in addition to the logistic and dual-use equipment and technology agreed under the Carter Administration, has added to China's potential sources of supply. But the current phase of economic readjustment has meant a succession

CHINESE MILITARY REGIONS AND DISTRICTS



of cuts in the defence budget, and modernization is likely to be quite slow *(see the section below on defence expenditure)*. Britain has sold aircraft engines, artillery and fire-control equipment, and radar, and the United States has sold computers and radars and is contemplating the sale of a much wider range of defensive and non-combat military equipment.

NUCLEAR WEAPONS

The research programme continues, but no nuclear test has been recorded since 1980. The total then was at least 26 since testing started in 1964. A nuclear force capable of reaching large parts of the Soviet Union and Asia is operational. The stockpile of weapons, both fission and fusion, is believed to amount to several hundreds and probably will continue to grow slowly. Fighter aircraft could be used for tactical delivery, and for longer ranges there are some 90 B-6/Tu-16 medium bombers, with a radius of action up to 3,000 km. MRBM with a range of some 1,100 km are operational and are being augmented by operational IRBM with ranges from 2,700 to 5,600 km. The missile forces are controlled by the Second Artillery, the missile arm of the PLA.

A multi-stage ICBM with a limited range of 6,000–7,000 km was first tested in 1976 and some have been deployed. An ICBM thought to have a range of some 13,000 km has also been under development, and it is believed that it is now being deployed. No indication has been received of the deployment of multiple warheads, but a missile has been successfully used (and thus tested) as a laucher for three space research satellites. China has one G-class nuclear submarine with 3 missile launching tubes, believed to be an experimental boat. A nuclear-powered submarine with 12 missile tubes may now also have been launched. So far all missiles have been liquid-fuelled. Solid propellants being developed are reported to have powered the 1980 ICBM test vehicle and may power the new T-5 ICBM.

CONVENTIONAL FORCES

The PLA embraces all arms and services, including naval and air elements. China is organized in 11 Military Regions (MR) with 29 Military Districts (MD) and divided into Main and Local Forces. Main Force (MF) divisions, which comprise the field army, are commanded by the Ministry of National Defence, although command is being transferred to the MR in which they are stationed and which are already responsible for their administration. They are available for operations in any region. Local Forces (LF), which include Border Defence and Internal Defence units, are predominantly infantry, are less well equipped, and are intended to defend their own Provinces together with para-military units. Command of them may be vested in the MR.

Artillery, engineer, and railway units are controlled directly by the Ministry of National Defence. Infantry units account for most of the ground-force manpower and 119 of the some 158 MF line divisions; there are only 12 armoured divisions.

The naval and air elements of the PLA have only about one-fifth of the total manpower, compared with about a quarter for their counterparts in the Soviet Union, but naval strength is increasing, and the equipment for both arms is also steadily being modernized. The PLA, essentially a defensive force, lacks facilities and logistic support for protracted large-scale operations outside China.

Major weapons systems produced include F-7/-8 and A-5 fighters, SA-2-type SAM, Type-59 MBT, Types-60/-63 amphibious and Type-62 light tanks, and K-63 APC. Two *Han*-class nuclear attack submarines are in service. These carry the CSS-N-4, about which no details are known, but which may be a cruise missile. R- and W-class medium-range diesel submarines are being built, together with SSM destroyers, frigates, and fast patrol boats.

BILATERAL AGREEMENTS

The 1950 Treaty of Alliance and Friendship with the Soviet Union, which contained mutual defence obligations, expired on 10 April 1980. There is a mutual defence agreement with North Korea, dating from 1961, and an agreement to provide free military aid. There are non-aggression pacts with Afghanistan, Burma, and Kampuchea. Chinese military equipment and logistic support have been offered to a number of countries. Major recipients include Albania, Egypt, Pakistan, and Tanzania.

GROSS NATIONAL PRODUCT AND DEFENCE EXPENDITURE

There are no official Chinese figures equivalent to Western data for GNP or National Income. An official 1980 figure for the total value of industrial and agricultural output, only in 1970 prices, is 661,900 m yuan. A GNP figure would include the service sector. Western estimates have varied greatly, and it is difficult to choose from a range of figures, variously defined and calculated. One recent British estimate for 1980 is $628 bn.

GNP/GDP Estimates

		British	Commercial bank	CIA
1980	Yuan (bn)	450.0[a]	485.1	828.195
	$ (bn)	300.0	323.4	552.13[b]
1981	Yuan (bn)	470.0[a]	540.26	996.773
	$ (bn)	276.47	317.8	568.69[b]

GDP growth range (1980): 4.0 – 7.1%.

Official exchange rates: $1 = 1.50 yuan (1980), 1.70 (1981).

[a] Constant 1980 yuan. [b] 1980 dollars.

The official Chinese defence expenditure figure, released in 1981 for the first time, at 20.170 bn yuan ($11.87 bn) was 20.7% of planned government expenditure. It was subsequently variously reported to have been cut to 16.5 bn yuan ($9.7 bn) and then only to 17.4 bn yuan ($10.2 bn). This figure is not comparable to Western defence estimates, since it excludes a number of items, notably pay and allowances for the troops.

Chinese pricing practices are not known in detail, but they are certainly different from those in the West. The official budget figure, in that it excludes a number of items normally included in defence budgets in Western countries, does not, therefore, provide an accurate indication of defence costs.

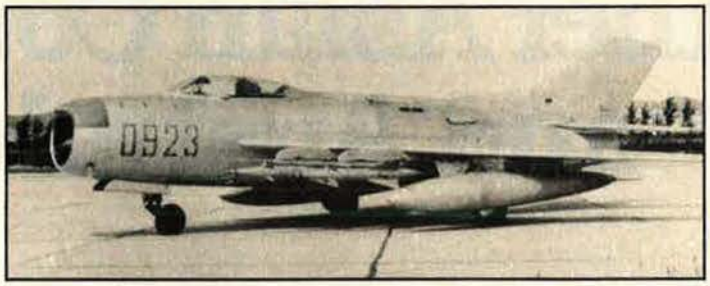
CHINA

Population: 1,024,890,000.
Military service: voluntary.
Total regular forces: 4,000,000 (incl railway troops).[1]
GNP and defence expenditure: see note above.

Strategic Forces:
OFFENSIVE:
(a) *Second Artillery* (under Army control):
ICBM: 4 T-5 (range 13,000 km), 5-MT warhead. (T-4 experimental only (10,000 km). 10-MT warhead tested.)
IRBM: 10 T-3 (range 4,800–5,600 km), 2–3 MT. 50 T-2 (range 2,700–3,200 km), 200 KT, 1 MT.
MRBM: Some 50 T-1 *Tong Feng (East Wind)* (range 1,100 km), 20 KT.
(b) *Aircraft* (under Air Force control):
3 regts with 90 B(Hong)-6 med bbrs.
(c) *Submarines:*
SSBN: 1 G-class, 3 launch tubes (experimental boat).

DEFENSIVE:
(a) Tracking station in Xinjiang and a limited shipborne capability.
(b) Ballistic missile EW phased-array radar complex.
(c) Air Force AD system, capable of limited defence of key urban and industrial areas, military installations, and weapon complexes, with over 4,000 naval and air force fighters, about 100 CSA-1 (SA-2) SAM units, and over 16,000 AA guns.
(d) A civil defence shelter and evacuation system in Beijing and other key cities.

Army: 3,150,000.[1]
Main Forces (Field Army):
11 Military Regions, 29 Military Districts (some reorganization is taking place).
Some 42 armies (46,300 men), each normally of 3 divs, 1 arty regt and spt tps (some have 1 indep tk regt, some have 1 arty, 1 AA regts), comprising:
12 armd divs.
119 inf divs.
Some 17 field arty divs.
4 ATK divs.
6 AA arty divs.
Some arty, ATK, AA regts.
Some 19 sigs, CW regts; 20 indep recce, engr, sigs, chemical bns (Army tps).
14 railway divs.
50 indep engr regts.
Local Forces (29 provinces):
97 inf divs (incl Local Force, garrison, and Internal Defence divs).
130 Indep regts (incl Border Guard).
Tks: 10,500 Sov IS-2 hy, T-34, T-54, Ch Type-59 and mod Type-59 (T-69) MBT, 600 Type-60 (PT-76), Type-62 amph and Type-63 lt.
AFV: 4,000 K-63 and Type-55/-56 (BTR-40/-152) APC.
Arty: 11,800 guns/how (Type-56 85mm, Type-60 122mm, Type-59-1 130mm towed, ISU-122, ISU-152 SP guns, Type-66 152mm towed gun/how, Type-54 122mm and 152mm towed, K-63 122mm SP how); 3,900 Type-63-1 107mm, 132mm, 140mm incl SP and 320mm SP MRL; *FROG*-type SSM; 13,500 82mm, Type-55 120mm, and Type-56 160mm mor.
ATK: 40mm, 57mm, 90mm RL; 7,800 57mm, 75mm, and 82mm RCL; 57mm, Type-54 76mm guns; *HOT*, AT-3 *Sagger*/*Sagger*-type ATGW.
AA: 10,000 37mm incl Type-63 SP, 57mm, 85mm, and 100mm guns.
DEPLOYMENT:
Excluding arty and engrs, MF and LF divs may be as follows:
North-east: Shenyang MR (Heilongjiang, Jilin, Liaoning MD): 3 armd, 18 inf; 16 LF.[2]
North: Beijing MR (Hebei, Nei Monggol, Shanxi MD): 4 armd, 25 inf; 15 LF.
North-West: Lanzhou MR (Gansu, Ningxia, Qinghai, Shaanxi MD): 1 armd, 9 inf; 4 LF.[2]
West: Urümqi MR (East, North, and South Xinjiang MD): 6 inf; 8 LF.[2]
South-west: Chengdu MR (Sichuan, Xizang MD): 8 inf; 6 LF.[2]
South: Kunming MR (Guizhou, Yunnan MD): 6 inf; 2 LF. Guangzhou MR (Guangdong, Guanxi MD, Hainan independent sub-MD, Hunan MD): 12 inf; 12 LF.[2]
Centre: Wuhan MR (Henan, Hubei MD): 2 armd, 10 inf, 3 AB (Air Force); 8 LF.
East: Jinan MR (Shandong MD): 1 armd, 9 inf; 7 LF. Nanjing MR (Anhui, Jiangsu, Zhejiang MD): 1 armd, 10 inf; 12 LF. Fuzhou MR (Fujian, Jiangxi MD): 6 inf; 7 LF.



Chinese aircraft designs are largely based on those of the Soviet Union. Here, a Chinese Air Force F-6 (Soviet designation MiG-19).

Navy: 360,000 incl 38,000 Naval Air Force and 38,000 Coast Defence Forces: 34 major surface combat ships, 103 attack subs.[1]
2 *Han* nuclear-powered cruise-missile subs (SSGN), 6 tubes, 'CSS-N-4-type' msl reported.
101 subs (78 R-, 21 W-class, 2 *Ming* trg).
13 destroyers: 9 *Lüda* (*Kotlin*-type) with 2 × 3 CSS-N-2 *(Styx)* SSM (2 more building); 4 *Anshan* (ex-Sov *Gordy*) with 2 × 2 CSS-N-2.
21 frigates: 16 msl: (9 *Jianghu* with 2 × 2 CSS-N-2, 3 *Jiangdong* with 2 × 2 SAM, 4 *Chendu* (ex-Sov *Riga*) with 1 × 2 CSS-N-2); 5 *Jiangnan* (*Riga*-type).
12 patrol escorts (9 ex-Jap, 2 ex-Br, 1 ex-Aus).
209 FAC(M) with CSS-N-2: 110 *Hola*/*Osa* (4 msls), 98 *Hoku* (, 1 *Homa* hydrofoil (2 msls).
44 patrol craft: 24 *Hainan*, 20 *Kronshtadt*.
350 FAC(G): 10 *Shanghai* I, 295 *Shanghai* II/III/IV/V, 3 *Haikou*, 40 *Swatow*(; 2 *Shandong* hydrofoils(.
270 FAC(T)(: 135 *Huchwan* hydrofoils, 70 P-6, 65 P-4 (40 in reserve).
About 120 coastal and river patrol craft(.
23 T-43 ocean minesweepers.
19 LST (14 ex-US 511-1152), 16 LSM, 4 inf landing ships, 321 LCU, 150 LCM.
5 sub, 2 other spt, 9 supply ships; 25 (3 fleet) tankers.
Coastal Defence Forces: (38,000): indep arty regts deployed near naval bases, offshore islands, and other vulnerable points; 85mm, 100mm, 130mm guns; CSS-N-2 (land-based) SSM.

DEPLOYMENT AND BASES:
North Sea Fleet: about 500 vessels (over half(), incl 2 sub sqns; from the Yalu River to south of Lianyungang. Qingdao (HQ), Lüda, Lüshun, Huludao, Weihai, Chengshan.
East Sea Fleet: about 750 vessels (about 400 (); from south of Lianyungang to Dongshan with air, AD, and coastal missile units. Ningbo (HQ), Zhoushan, Taohua Dao, Haimen, Wenzhou, Fuzhou.
South Sea Fleet: about 600 vessels (perhaps half(), incl 25 submarines, 4 destroyers, 1 frigate, 200 FAC, amph vessels; from Dongshan to the Vietnamese frontier; Zhanjiang (HQ), Shantou, Guangzhou, Haikou, Yulin, Beihai.
Some 800 ocean-going vessels and several thousand junks could augment the existing limited sealift capacity.

NAVAL AIR FORCE: (38,000); about 800 shore-based combat aircraft, org in 3 bbr, 6 fighter divs. Incl about 100 B(Hong)-5 torpedo-carrying and 50 Il-28 lt bbrs; some 600 fighters, incl F(Jian)-5/-6/-7 interceptors; F-6 recce and 10 ex-Sov Be-6 MR ac; 40 H(Zhi)-5, 13 *Super Frelon* hel; some 60 lt tpt ac. Naval fighters are integrated into the AD system.

Air Force: 490,000, incl strategic forces and 220,000 AD personnel; some 5,300 combat ac.[1]
8 Military Air Regions, 3 minor regional commands, HQ Beijing; combat elements in Armies of varied numbers of air divs. Fighter divs each with 3 regts of 3 sqns of 3 flts of 4 ac. Bbr and tpt ac may be in regts. Each sqn with spt and ground duties elements.
Med bbrs: 120 B(Hong)-6/Tu-16 *Badger*.
Lt bbrs: about 580 B-5/Il-28 *Beagle*.
FGA: about 500 F(Jian)-4 and A(Qiang)-5.
Fighters: some 4,000, incl 300 F-5, about 3,000 F-6, 280 F-7, 2 sqns of 30 F-8 *Finback* (MiG-23) to be formed.
Recce: Some 130 F-6, B-5.
Tpts: Some 550 fixed-wing, incl some 300 Y(Yun)-5/An-2, some Y-7, Y-8 (An-12), about 100 ex-Sov (Li-2, 50 Il-14 (to be retired), Il-18, some An-12/-24/-26), 18 *Trident*. (These could be supplemented by about 350 ac, incl some 150 hy tpts, from Civil Aviation Administration.)
Hel: 350: incl H(Zhi)-5/-6; the H-9 (Fr *Dauphin*) is under development.
Trainers: incl BT-5, MiG-15, FT-4/-5/-6.
AAM: AA-2 *Atoll*/*Atoll*-type.
Airborne tps: 1 corps of 3 divs, 1 indep div: 82mm, 120mm mor; 82mm RCL; 37mm AA guns.
20 AA arty divs, 28 indep AD regts (100 SAM units) with CSA-1 SAM, 16,000 57mm, 85mm, and 100mm guns.

Para-Military Forces: Some 12,000,000.
Militia. *Basic Militia:* some 4.3 million; men aged 16–40, women 16–35, who have had, or will have, military service, grouped in the Armed Militia; organized into about 75 cadre divisions and 2,000 regts. *Ordinary Militia:* up to 6 million (ages 17–48) including the Urban Militia; receive some basic training but are generally unarmed. Some play a local AD role.
Border security forces comprise 'Armed Border Security' forces (Militia) and 'Border Police' (Public Security Bureau): small arms only.

[1] The People's Liberation Army is one service; naval and air components are listed separately for purposes of comparison.
[2] There are 2–3 divs worth of border tps in this MR.

Other Asian Countries and Australasia

BILATERAL AGREEMENTS

The United States has mutual co-operation and security treaties with Japan (1960), the Republic of Korea (1954), and the Philippines (1951); military co-operation agreements with Australia (1951, 1963, 1974, and 1980); and a military aid agreement with Thailand. That with Taiwan lapsed on 1 January 1980, although some arms supply and production arrangements continue under the 1979 Taiwan Relations Act. The United States also provides military aid on either grant or credit basis to Indonesia, South Korea, Malaysia, Pakistan, the Philippines, and Thailand. There are major US bases in Japan, South Korea, and the Philippines, and air (B-52) and naval refuelling facilities in north and west Australia.

In 1965 Britain purchased the Chagos Archipelago, which includes Diego Garcia, from Mauritius for $3m and established it as the British Indian Ocean territory. A joint US/British base was constructed on Diego Garcia, and a small British naval contingent was deployed there. Treaties in 1972 and 1976 gave the US a 50-year tenure and provided for the development of the US naval communications station on the island into a major US naval and air support facility. Britain also has a Defence Agreement with Sri Lanka (1947).

The Soviet Union has Treaties of Friendship, Co-operation, and Mutual Assistance with Afghanistan (1978), India (1971), Mongolia (1966), North Korea (1961), and Vietnam (1978). The Soviet Union concluded a stationing of forces agreement with Afghanistan in April 1980. Bulgaria has Friendship Treaties with Cambodia (1960), Laos (1979), Mongolia (1967), and Vietnam (1979), as have Czechoslovakia with Laos and Vietnam (1980) and Afghanistan (1981), and East Germany with Vietnam (1977) and Kampuchea (1980).

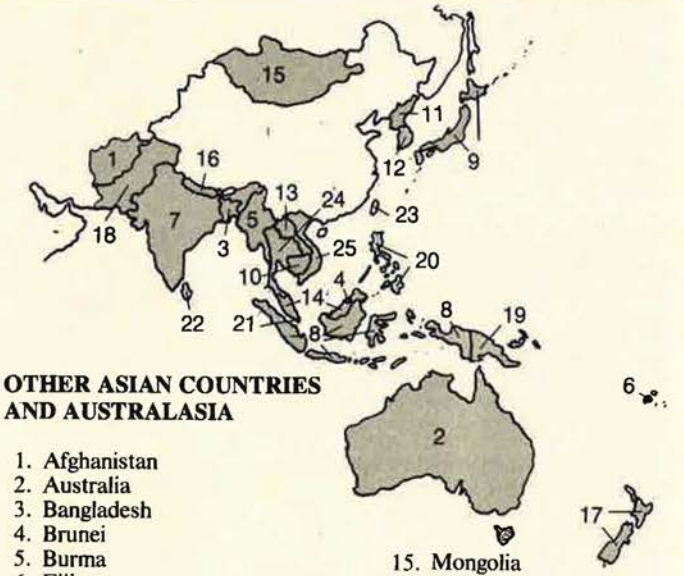
Australia has supplied defence equipment to Papua New Guinea, Singapore, and Indonesia.

In July 1977 Vietnam and Laos signed a series of agreements which contained military provisions and a border pact, and may have provided for the stationing of Vietnamese troops in Laos. A similar series of agreements seems to have been negotiated between Vietnam and the Heng Samrin regime in Kampuchea in February 1979.

MULTILATERAL AGREEMENTS

In 1951 Australia, New Zealand, and the United States signed a tripartite treaty (ANZUS), which is of indefinite duration. Each agrees to 'act to meet the common danger' in the event of attack on either metropolitan or island territory of any one of them, or on armed forces, public vessels, or aircraft in the Pacific. In February 1982 the US agreed to provide additional aid to New Zealand under this pact.

The Manila Pact, signed on 8 September 1954 by Australia, Britain, France, New Zealand, Pakistan, the Philippines, Thailand, and the United States, remains in force, though France and Pakistan subsequently withdrew, and the South East Asia Treaty Organization (SEATO), set up to implement it, was disbanded in 1977. The Pact calls for action by each Party to meet the common danger posed by armed aggression, and for consultation if any other threat is posed to the territory, sovereignty, or political independence of any Party. Since 1962 the US commitment to Thailand has been based on this Pact.



OTHER ASIAN COUNTRIES AND AUSTRALASIA

1. Afghanistan
2. Australia
3. Bangladesh
4. Brunei
5. Burma
6. Fiji
7. India
8. Indonesia
9. Japan
10. Kampuchea/Cambodia
11. Korea: Democratic People's Republic (North)
12. Korea: Republic of (South)
13. Laos
14. Malaysia
15. Mongolia
16. Nepal
17. New Zealand
18. Pakistan
19. Papua New Guinea
20. Philippines
21. Singapore
22. Sri Lanka
23. Taiwan
24. Thailand
25. Vietnam

Five-Power Defence Arrangements, relating to the defence of Malaysia and Singapore and involving Australia, Malaysia, New Zealand, Singapore, and Britain, came into effect on 1 November 1971. These stated that, in the event of any externally organized or supported armed attack or threat of attack against Malaysia or Singapore, the five governments would consult together for the purpose of deciding what measures should be taken, jointly or separately. Britain withdrew her forces in March 1976, but New Zealand troops remain in Singapore, as do Australian air forces in Malaysia.

AFGHANISTAN

Population: 15,300,000 (including exiles).
Military service: conscription to age 35; 3 years.
Total armed forces: 46,000.[1]
Estimated GNP 1981: 164.5 bn afghanis ($3.23 bn).
Estimated defence expenditure 1981: 4.93 bn afghanis ($97 m).
GDP growth 1981: 1.5%.
Inflation 1981: 10%.
$1 = 50.9 afghanis (1981).

Army: 40,000 (mostly conscripts).[1]
3 corps HQ.
11 inf divs.
3 armd divs (understrength bdes).
2 mountain inf bdes.
1 arty bde with 3 arty regts.
2 cdo regts.
1 para bn.
50 T-34, 700 T-54/-55, 100 T-62 MBT; 60 PT-76 lt tks; BMP-1 MICV, 800 BTR-40/-50/-60/-152 APC; 900 76mm, M-1944 100mm guns; M-30 122mm, D-1 152mm how; 82mm, 100 120mm, 160mm mor; 50 BM-13-16 132mm MRL; 82mm RCL; 76mm, 100mm ATK guns; *Snapper* ATGW; 350 23mm, 37mm, 57mm, and 100mm towed, 20 ZSU-23-4 SP AA guns; SA-7 SAM.

RESERVES: No viable reserve force identified; call-up from ex-servicemen, Youth League, and regional tribes from age 20 to age 40.

Air Force: 6,000 (includes Air Defence Command); perhaps 117 combat ac, some 30 armed hel.[1]
3 lt bbr sqns with 20 Il-28.
7 FGA sqns: 4 with 40 MiG-17, 2 with MiG-19, 1 with 12 Su-17 *Fitter* C.
3 interceptor sqns with 25 MiG-21.
2 tpt sqns with some 10 An-2, 15 An-26, 4 An-24, 2 Il-18D.
4 hel sqns with up to 14 Mi-4, 30 Mi-8, 30 Mi-24.
Trainers incl MiG-15/-17UTI/-21U, Il-28U, Yak-18, L-39C.
AAM: AA-2 *Atoll*.
1 AD div: 1 SAM bde (3 bns) with 120 SA-2, 115 SA-3; 1 AA bde (2 bns) with 37mm, 85mm, 100mm guns; 1 radar bde (3 bns).

Para-Military Forces: 30,000 Gendarmerie. Border forces (being absorbed by Army). Ministry of Interior: *Khad* (secret police); *Sarandoli* 'Defence of the Revolution' forces org in provincial regiments; Regional 'Revolution Defence Groups'; Pioneers; Afghan Communist Party Guards; Khalki Youth Militia (at least one bn); Pashtun Tribal Militia.

AUSTRALIA

Population: 15,065,000.
Military service: voluntary.
Total armed forces: 73,183.
GDP 1980: $A 122.43 bn ($US 142.03 bn).
Defence expenditure 1980–81: $A 3.646 bn ($US 4.229 bn).
GDP growth 1980: 2.4%.
Inflation 1980: 9.3%.
$US 1 = $A 0.862 (1980–81).

See p. 133 for footnotes.

Army: 32,850.
1 inf div with 3 bdes of 2 inf bns.
1 armd regt.
2 cav regts.
4 arty regts (1 med, 2 fd, 1 AD).
1 fd engr, 1 construction, 1 fd survey regts.
5 sigs regts.
1 Special Air Service regt.
1 aviation regt.
1 tpt, 1 air tpt spt regts.
103 *Leopard* 1A3 MBT; 790 M-113 APC, incl 63 recce AFV with 76mm gun (48 with *Scorpion*, 15 with *Saladin* turret); 34 5.5-in guns; 227 105mm how; 51 M-40 106mm RCL; *Redeye*, 20 *Rapier* SAM launchers; 16 *Porter*, 11 *Nomad* ac; 47 Bell 206B-1 hel; 37 watercraft, 87 LARC-5 amph vehs.
(On order: 36 M-198 155mm how.)

RESERVES: 31,738 (with trg obligations); 2 inf div HQ, 4 bde HQ, 188 fd, spt, log and trg units; 1 cdo bn, 1 regional surveillance force.

Navy: 17,626 (incl Fleet Air Arm).
6 *Oxley (Oberon)* submarines.
3 *Perth* (ex-US *Adams*) ASW msl destroyers with *Standard* SAM, 2 *Ikara* ASW.
1 modified *Daring* destroyer (trg).
2 *Adelaide* (FFG-7) frigates with 1 *Harpoon* SSM, 1 *Standard* SAM, 1 hel.
6 *River* frigates with 1 × 4 *Seacat* SAM/SSM, 1 *Ikara* ASW.
5 PCF-420 *Freemantle*, 11 *Attack* large patrol craft.
3 mod Br *Ton* coastal MCM.
6 LCT (1 trg).
1 hy amph tpt ship; 1 destroyer tender with *Seacat*, 1 hel; 1 training ship (ex-ocean ferry); 1 fleet tanker.

FLEET AIR ARM: (1,650); 20 combat ac, 6 armed hel.
1 attack sqn with 4 A-4G *Skyhawk*.
1 ASW sqn with 7 S-2G *Tracker*.
1 composite sqn with 7 S-2G, 2 HS-748 (ECM).
1 ASW hel sqn with 6 *Sea King* Mk 50.
1 utility/SAR hel sqn with 10 *Wessex* 31B, 4 Bell UH-1B, 4 Bell 206B.
1 trg sqn with 8 MB-326H, 1 TA-4G, 4 A-4G.
In storage: 5 S-2G ac, 9 *Wessex* 31B hel.
(On order: 1 ASW carrier, 2 FFG-7 frigates, 1 *Durance*-type replenishment ship, 10 PCF-420 large patrol craft, 2 minehunters, *Harpoon* SSM, *Phalanx* 20mm AA guns, 2 *Sea King* hel.)

Bases: Sydney, Melbourne, Jervis Bay, Brisbane, Cairns, Darwin, Cockburn Sound.

RESERVES: 1,090 (with trg obligations; list being reorganized).

Air Force: 22,707; 128 combat aircraft.
2 FGA/recce sqns with 16 F-111C, 4 F-111A, 4 RF-111C.
3 interceptor/FGA sqns with 53 *Mirage* IIIO.
2 MR sqns: 1 with 10 P-3B *Orion*; 1 with 10 P-3C.
1 OCU with 15 *Mirage* IIIO/D, 10 MB-326H.
1 forward air controller flt with 6 CA-25 *Winjeel*.
5 tpt sqns: 2 with 24 C-130E/H, 1 flt with 2 Boeing 707-320C; 1 with 4 DHC-4 ac, 3 UH-1B hel; 1 with 14 DHC-4 (C-7A); 1 with 2 BAC-111, 2 HS-748, 3 *Mystère* 20.
1 med tpt hel sqn with 8 CH-47 *Chinook*.
2 utility hel sqns with 32 UH-1B/H *Iroquois*.
Trainers incl 59 MB-326H, 8 HS-748T2, 49 CT-4 *Airtrainer*.
AAM: *Sidewinder*, R-530.
(4 *Chinook* hel in reserve.)
(On order: 75 F/A-18 FGA/interceptor/trg, 10 P-3C MR ac; R-550 *Magic* AAM; *Harpoon* ASM.)

RESERVES: 900 (with trg obligations) in 7 auxiliary sqns.

Forces Abroad: Egypt (Sinai MFO): 110; 8 UH-1H hel. India/Kashmir (UNMOGIP): 6. Malaysia/Singapore: 2 sqns with *Mirage* IIIO, 1 flt with DHC-4 ac, UH-1H hel.

Para-Military Forces: Bureau of Customs. (On order: 10 *Searchmaster* MR ac.)

BANGLADESH

Population: 93,000,000.
Military service: voluntary.
Total armed forces: 77,000.
GNP 1980: 170 bn taka ($10.4 bn).
Estimated defence expenditure 1980: 2.5 bn taka ($153 m).
GNP growth 1980: 7.6%.
Inflation 1980: 13.2%.
$1 = 16.34 taka (1980).

Army: 70,000.
5 inf div HQ.
12 inf bdes (27 inf bns).
2 armd regts.
10 arty regts.
6 engr bns.
30 T-54/-55 MBT; 6 M-24 *Chaffee* lt tks; 30 Model 56 pack, M-101 105mm, 5 25-pdr guns/how; 81mm, 50 120mm mor; 57mm (6-pdr) ATK guns; 106mm RCL.[2]
(On order: 36 Ch tks.)

Navy: 4,000.[2]
3 ex-Br frigates (1 Type 61, 2 Type 41).
4 ex-Ch *Shanghai* II FAC(G).
4 large patrol craft (2 ex-Yug *Kraljevica*, 2 ex-Ind *Akshay*).
5 *Pabna* river patrol boats(.
1 trg ship.

Bases: Chittagong (HQ), Dacca, Khulna, Chalna.

Air Force: 3,000; 26 combat aircraft.[2]
2 FGA sqns with 20 Ch F-6.
1 interceptor sqn with 6 MiG-21MF.
1 tpt sqn with 1 An-24, 6 An-26.
1 hel sqn with 4 *Alouette* III, 6 Bell 212, 6 Mi-8, some Mi-4.
Trainers incl 2 MiG-21U, 8 *Magister*, 12 Ch BT-6.
AAM: AA-2 *Atoll*.
(On order: 12 F-6 FGA.)

Para-Military Forces: 66,000: Bangladesh Rifles 30,000, Armed Police Reserve 36,000.

BURMA

Population: 35,000,000.
Military service: voluntary.
Total armed forces: 179,000.
Estimated GNP 1981: 35.6 bn kyat ($4.8 bn).
Defence expenditure 1981: 1.4 bn kyat ($189 m).
$1 = 7.42 kyat (1981).

Army: 163,000.
6 lt inf divs.

2 armd bns.
85 indep inf bns.
3 arty bns.
1 AA bty.
25 *Comet* MBT; 40 Humber armd, 45 *Ferret* scout cars; 50 25-pdr, 5.5-in guns/how; 120 76mm, 80 M-101 105mm how; 120mm mor; 50 6- and 17-pdr ATK guns; 10 40mm, 3.7-in AA guns.[3]

Navy: 7,000.[3]
1 ex-Br *Algerine* frigate.
4 corvettes: 2 ex-US (1 PCE-827, 1 *Admirable*), 2 *Nawarat*.
36 gunboats (15().
41 river patrol craft(.
1 ex-US LCU, 8 ex-US LCM.
(On order: 6 *Carpentaria* coastal patrol boats.)

Bases: Bassein, Mergui,Moulmein, Seikyi, Sinmalaik, Sittwo.

Air Force: 9,000; 16 combat aircraft.[3]
2 COIN sqns with 5 AT-33, 11 SF-260MB.
Tpts incl 1 F-27, 4 FH-227, 7 Pilatus PC-6/-6A, 1 An-26, 6 Cessna 180.
Hel incl 10 KB-47G, 2 KV-107/II, 7 HH-43B, 10 *Alouette* III, 14 UH-1.
Trainers incl 20 PC-7 *Turbo-Trainer*, 10 T-37C.
(On order: 9 SF-260MB, 6 Cessna 180, 12 PC-7.)

Para-Military Forces: 73,000. People's Police Force 38,000; People's Militia 35,000. Fishery Dept: 3 *Osprey*, 9 patrol boats(().

INDIA

Population: 688,600,000.
Military service: voluntary.
Total armed forces: 1,104,000.
Estimated GNP 1981: 1,409 bn rupees ($157.8 bn).
Defence expenditure 1981–2: 47 bn rupees ($5.26 bn).
GDP growth 1980: 8%.
Inflation 1981: 12.7%.
$1 = 8.93 rupees (1981).

Army: 944,000.
2 armd divs (being reorganized to bdes).
18 inf divs.
11 mountain divs.
5 indep armd bdes.
7 indep inf bdes.
1 para bde.
17 indep arty bdes, incl about 20 AA regts.
950 T-54/-55, 78 T-72, 1,100 *Vijayanta* MBT, 140 AMX-13 lt tks; BMP-1 MICV; 700 BTR-50/-60/-152, OT-62A/-64A APC; 75mm pack, 76mm, 25-pdr (retiring), 300 M-1944 100mm, 105mm, 550 M-46 130mm (some SP), 5.5-in (retiring), S-23 180mm guns; 75mm pack, 75/24 mountain, 105mm (incl pack, *Abbot* SP) how; 500 120mm, 160mm mor; M-18 57mm, *Carl Gustav* 84mm, 106mm RCL; SS-11-B1, *Harpon* ATGW; 57mm ATK guns; 40mm 3.7-in towed, ZSU-23-4 SP AA guns; SA-6, SA-9, 40 *Tigercat* SAM.
(On order: 130 T-72 MBT; BMP-1 MICV; *Milan* ATGW launchers, 3,700 msls.)

RESERVES: 200,000. Territorial Army 40,000.

Navy: 47,000, incl naval air force.
8 ex-Sov F submarines.
1 ex-Br *Majestic* aircraft carrier (capacity 18 *Sea Hawk*, 4 *Alizé*).
1 ex-Br *Fiji* cruiser (trg).
2 ex-Sov *Kashin* destroyers with 4 *Styx* SSM, 2 × 2 SA-N-1 SAM, 1 hel.
21 frigates: 6 *Leander* with 2 × 4 *Seacat* SAM, 1 hel; 2 ex-Br *Whitby* with 2 *Styx* SSM; 9 ex-Sov *Petya* II; 4 trg (3 ex-Br *Leopard*, 1 *Black Swan*).
3 ex-Sov *Nanuchka* corvettes with 4 SS-N-2 SSM, 1 SA-N-4 SAM.
16 ex-Sov *Osa*-I/II FAC(M) with 4 *Styx* SSM.
1 *Abhay*, 3 SDB-2 large patrol craft.
6 ex-Sov *Natya* ocean, 4 ex-Br *Ton* coastal, 4 ex-Br *Ham* inshore minesweepers.
1 ex-Br, 6 ex-Sov *Polnocny* LCT, 4 LCU.
(On order: 4 Type 209 submarines, 6 *Godevari* (modified *Leander*) frigates, 2 *Nanuchka* corvettes, 6 *Polnocny* LCT.)

Bases: Western Fleet: Bombay, Goa, Cochin. Eastern Fleet: Vishakapatnam, Calcutta, Port Blair.

NAVAL AIR FORCE: (2,000); 35 combat ac, 26 armed hel.
2 attack sqns with 20 *Sea Hawk* (10 in carrier).
1 ASW sqn with 5 *Alizé* 1050 (4 in carrier).
2 MR sqns with 5 *Super Constellation*, 5 Il-38 *May*.
5 ASW hel sqns with 10 *Sea King*, 5 Ka-25, 11 *Alouette* III.
1 SAR/liaison hel sqn with 10 *Alouette* III.
3 trg/comms sqns with 7 HJT-16 *Kiran*, 4 *Vampire* T-55, 10 *Islander*, 1 *Devon*, 2 *Sea Hawk* ac; 4 Hughes 300 hel.
(On order: 8 *Sea Harrier* fighters, 1 Il-38 MR, 6 *Islander* trg ac.)

Air Force: 113,000; 635 combat aircraft.
4 lt bbr sqns with 45 *Canberra* B(I)58, B(I)12 (to be replaced by *Jaguar*).
10 FGA sqns: 3 with 48 Su-7BM/KU; 3 with 48 *Hunter* F-56/-56A (to be replaced by *Jaguar*); 1 with 16 *Jaguar* GR-1, 2 T-2; 2 with 50 HF-24 *Marut* (being replaced by *Ajeet*); 1 with 10 MiG-23BN/UM *Flogger* H/C (2nd forming).
19 AD sqns: 15 with 300 MiG-21FL/PFMA/MF/bis/U; 4 with 100 *Ajeet* (*Gnat* Mk II).
2 recce sqns with 8 *Canberra* PR-57 (being replaced), 8 MiG-25.
4 hel sqns with some 60 *Cheetah (Lama)*.
3 trg and conversion sqns with 12 *Canberra* T-4/T-13/T-67, 40 *Hunter* F-56/T-66, 40 MiG-21U.
10 tpt sqns: 2 with An-32 (replacing 46 C-119G); 2 with 30 An-12; 2 with 20 DHC-3; 3 with An-32 (replacing 36 C-47); 1 with 16 DHC-4, 2 Boeing 737-248 (leased).
1 comms sqn with 16 HS-748M.
2 liaison flts with 16 HS-748, 4 C-47.
5 tpt hel sqns with 60 Mi-8.
3 liaison hel sqns with 100 *Chetak* (*Alouette* III), some with 4 SS-11 ATGW.
Trainers incl 65 HT-2, 90 *Kiran* 1/1A, 15 *Marut* Mk 1T, some HPT-32 (replacing HT-2) 45 TS-4 *Iskra*, 27 HS-748 ac, *Chetak* hel.
AAM: AA-2 *Atoll*.
ASM: AS-30.
30 SAM sqns with 180 SA-2/-3.
(On order: 150 *Mirage* 2000, 85 *Jaguar* (45 to be locally assembled), 62 MiG-23BM, 13 MiG-23UM, MiG-21bis, 40 *Ajeet* fighters; 40 An-32, 10 HS-748 tpts; 40 *Iskra*, 90 *Kiran* Mk 2, 140 HPT-32 trg ac; Mi-8, Mi-24, 45 *Chetak* hel.)

Para-Military Forces: Border Security Force 85,000; 175,000 in other organizations. Coastguard: 2 ex-Br Type 14 frigates, 2 FAC(P), 5 *Poluchat* FAC(P), 5 *Defender* ac, 6 *Alouette* III hel.
(On order: 3 offshore, 9 inshore patrol vessels, 9 lt tpt ac, 3 hel.)

INDONESIA

Population: 156,000,000.
Military service: selective.
Total armed forces: 269,000.
GNP 1980: 42,424 bn rupiahs ($67.66 bn).
Estimated defence expenditure 1981: 1,714 bn rupiahs ($2.69 bn).
GDP growth 1980: 9.6%.
Inflation: 17.1% (1980), 12.3% (1981).
$1 = 636.67 rupiahs (1981), 626.99 (1980).

Army: 200,000.[4]
1 armd cav bde (10 cav bns, spt units).[5]
13 inf bdes (39 inf bns).[5]
2 AB inf bdes (6 bns).[5]
1 fd arty regt.[5]
1 AA arty regt.
4 Special Warfare Gps.[5]
2 construction engr regts (4 bns).
8 fd engr bns.
37 indep inf, arty, engr bns.
Army Aviation:
1 composite sqn; 1 hel sqn.
93 AMX-13, 41 PT-76 lt tks; 75 *Saladin* armd, 60 *Ferret* scout cars; 200 AMX-VCI MICV, 60 *Saracen*, 60 V-150 *Commando*, BTR-40/-152 APC; 180 76mm, 18 105mm (incl lt) guns/how; 480 80/81mm mor; 480 90/106mm RCL; 20 20mm, 90 40mm, 200 57mm AA guns; 2 Aero *Commander* 680, 1 Beech 18 ac; 6 Bell 205, 2 *Alouette* III, 16 BO-105 hel.
(On order: 133 M-101A1 105mm how (replacing 76mm); 6 Bell 212 hel.)

RESERVES: National Strategic Command: HQ only to command Special Reserve forces in strategic operations. Incl army, KOSTRAD, AB, naval forces incl marines, combat and tpt ac.

Navy: 40,000: incl naval air and marines.[5]
4 submarines: 2 Type 209, 2 ex-Sov W (1 trg).
10 frigates: 3 *Fatahilla* with 4 *Exocet* SSM, 1 with 1 *Wasp* hel; 4 ex-US *Jones*; 3 ex-Sov *Riga*.
15 large patrol craft: 5 ex-Sov *Kronshtadt*, 5 ex-Yug *Kraljevica*, 1 *Kelabang*, 3 *Attack*, 1 ex-US PGM-39.
4 PSSM Mk 5 FAC(M) with 4 *Exocet* SSM.
3 Lürssen TNC-45 FAC(T).
1 Boeing hydrofoil.
8 coastal patrol craft(: 2 *Spear*, 6 Aus *Carpentaria*.
4 ex-Sov T-43 ocean minesweepers.
1 comd/spt ship; 1 trg ship with 4 *Exocet*, 1 hel.
13 LST, 3 LCU, 38 LCM.
(Plus in reserve: 1 *Pattimura* frigate; 1 *Kronshtadt*, 1 *Kelabang*, 2 PGM-39 patrol craft; 1 R-class coastal minesweeper; 1 comd/spt ship.)
(On order: 2 Type 209 subs, 2 minehunters, 4 LST.)

Bases: Jakarta, Surabaya.

NAVAL AIR: (1,000); 8 combat ac, 10 armed hel.
1 ASW hel sqn with 10 *Wasp*.
3 MR sqns: 2 with 6 *Nomad*, 1 C-130H-MP, 1 Boeing 737-200.
Other ac incl 5 HU-16, 5 C-47, 4 Aero *Commander* ac; 4 Bell 47G, 6 *Alouette* II/III, 3 BO-105 hel.
(On order: 2 *Nomad*, 2 Boeing 737-200 MR ac, 8 BO-105 hel.)

MARINES: (12,000).
2 inf regts (6 bns); 1 close spt regt; 3 amph assault, 1 arty, 1 AA bns.[5]
30 PT-76 lt tks; 3 VPX-10 PAC 90 armd cars; 38 APC, incl 6 AMX-10P; 40mm AA guns.
(On order: 37 VPX-10/90 armd cars, AMX-10P APC.)

Air Force: 29,000; 45 combat aircraft.[4]
2 FGA sqns with 13 A-4E, 2 TA-4H *Skyhawk*.
2 interceptor sqns with 11 F-5E, 4 F-5F.
1 COIN sqn with 15 OV-10F.
3 tpt sqns: 2 with 18 C-130H-30/-30B, 1 L-100-30; 1 with 1 C-140 *JetStar*, 12 C-47, 1 SC-7 *Skyvan*, 8 F-27, 10 CASA C-212, 1 Transall C-160F.
1 liaison sqn with 2 DHC-3, 12 Cessna 207/401/402.
1 hel sqn with 2 Bell 204B, 1 S-61A, 6 *Puma*.
1 trg sqn: 2 T-6, 12 T-34C1, 6 *Hawk* T-53, 20 AS-202 *Bravo*.
(On order: 16 A-4E FGA; 6 C-212, 2 C-160F tpt ac.)

Para-Military Forces: Police mobile bde 12,000 (getting 2 BO-105 hel). About 70,000 Militia. Coastguard: 7 patrol boats. Customs: 7 28-metre, 8 57-metre Lürssen patrol boats.

JAPAN

Population: 118,519,000.
Military service: voluntary.
Total armed forces: 245,000 (to increase to 270,184).
Estimated GNP 1981: 264,800 bn yen ($1,153 bn).
Estimated defence expenditure 1981: 2,399.9 bn yen ($10.45 bn).
GNP growth 1981: 2.9%.
Inflation 1981: 4.4%.
$1 = 229.59 yen (1981).

Army: 155,000.
1 armd div.
12 inf divs (7–9,000 men each).
1 AB bde.
2 composite bdes.
1 arty bde, 2 AD arty bdes.
1 sigs bde.
5 engr bdes.
8 SAM gps (each of 4 btys) with 192 *HAWK/Improved HAWK*.
Army Aviation:
1 hel wing and 24 sqns.
AFV: 560 Type 61, 350 Type 74 MBT; 530 Type SU-60 and Type 73 APC.
Arty: 650 105mm, 155mm, and 203mm guns/how; 130 Type 74 105mm and Type 75 155mm how; Type 30 SSM; 1,320 81mm and 107mm mor (some SV and SX SP); 30 Type 75 130mm MRL.
ATK: 1,600 57mm, 75mm, *Carl Gustav* 84mm, 106mm (incl Type 60 SP) RCL; 230 Type 64, 15 Type 79, *TOW* ATGW.
AA: 210 35mm twin, 37mm, 40mm incl M-42 SP, 75mm AA guns; 54 *Improved HAWK* SAM.
Air: some 27 ac and 372 hel: 15 LR-1, 2 TL-1, 10 L-19 ac; 2 AH-1S, 55 KV-107, 70 UH-1H, 65 UH-1B, 30 TH-55, 140 OH-6J/D, 2 H-13, 8 KH-4 hel.
(On order: 57 Type 74 MBT; 4 Type 73 APC, 24 Type 75 155mm, 6 M-110A2 203mm SP how; 8 Type 75 130mm MRL; 9 Type 79, *MAT* ATGW; 219 84mm RCL; 14 *Stinger*, 4 *Tan*, 54 *Improved HAWK* SAM; 1 LR-1 ac; 8 OH-6D, 5 UH-1H, 10 *TOW*-armed AH-1S hel.)

RESERVES: 43,000.

Navy: 45,000 (including naval air).
14 submarines: 3 *Yushio*, 7 *Uzushio*, 4 *Asashio*.
33 destroyers: 2 *Shirane* with *Sea Sparrow* SAM, 1 × 8 *ASROC*, 3 ASW hel; 2 *Haruna* with 1 × 8 *ASROC*, 3 ASW hel; 2 *Tachikaze* with *Standard* SAM, 1 × 8 *ASROC*; 1 *Amatsukaze* with 1 *Standard* SAM, 1 × 8 *ASROC*; 4 *Takatsuki* with 1 × 8 *ASROC*; 1 *Hatsuyuki* with 2 × 4 *Harpoon* SSM, 1 *Sea Sparrow*, 1 × 8 *ASROC*, 1 hel; 6 *Yamagumo* with 1 × 8 *ASROC*; 3 *Minegumo* with 1 × 8 *ASROC*; 2 *Akizuki*; 3 *Murasame*; 7 *Ayanami* (2 trg).
16 frigates: 1 *Ishikari* with 2 × 4 *Harpoon* SSM; 11 *Chikugo* with 1 × 8 *ASROC*; 4 *Isuzu*.
5 large patrol craft: 3 *Mizutori*, 2 *Umitaka*.
5 FAC(T).
9 coastal patrol craft(.
3 MCM spt ships, 31 coastal minesweepers (7 *Hatsushima*, 19 *Takami*, 5 *Kasado*), 6 *Nanago* MCM boats.
1 *Katori* trg, 1 *Azuma* trg spt ships.
6 LST (3 *Miura*, 3 *Atsumi*); 2 LCU; 37 landing craft.

Bases: Yokosuka, Kure, Sasebo, Maizuru, Ominato.

NAVAL AIR ARM: (14,000); 110 combat ac, 61 armed hel.
6 Air Wings.
7 MR sqns with 68 P-2J, 28 S-2F-1, 14 PS-1.
6 ASW hel sqns with 54 HSS-2/-2A/-2B.
1 MCM hel sqn with 7 KV-107.
1 tpt sqn with 4 YS-11M, 1 B-65.
1 test sqn with 4 P-3C, 3 P-2J, 5 PS-1, 3 UP-2J ac; 3 HSS-2A/B hel.
7 SAR flts with 7 US-1 ac, 12 S-61A/-62B hel.
5 trg sqns with 7 YS-11T, 11 TC-90, 14 B-65, 31 KM-2, 19 P-2J ac; 3 OH-6J, 6 Bell 47G, 13 HSS-2 hel.
(On order: 3 *Yushio* submarines, 8 *Hatsuyuki* destroyers, 2 *Yubari* frigates; 4 *Hatsushima* MCM; 14 P-3C, 1 KM-2, 1 US-1, 4 TC-90 ac; 8 HSS-2B, 1 S-61A hel; 3 *Phalanx* 20mm AD systems.)

RESERVES: 600.

Air Force: 45,000; 314 combat aircraft.
6 combat air wings; 1 composite air div; 1 recce sqn.
3 FGA sqns with 60 F-1.
11 interceptor sqns: 6 with 130 F-4EJ; 4 with 90 F-104J, 10 F-104DJ; 1 OCU with 10 F-15J/DJ.
Recce Air Group: HQ sqn; aerobatic team; 1 recce sqn with 14 RF-4E.
3 tpt sqns with 30 C-1, 10 YS-11.
1 SAR wing (9 dets) with T-34A, MU-2 ac; 6 V-107, S-62 hel.
1 air test wing with F-4EJ, F-15J, F-104J, T-1, 11 T-2, 10 T-3, T-33A, C-1, 1 E-2C.
1 weather group with YS-11, MU-2J, T-33A.
5 trg wings: 10 sqns with 50 T-1A/B, 70 T-2, 50 T-3, 60 T-33A.
AAM: *Sparrow*, *Falcon*, *Sidewinder*.
6 SAM gps: 19 sqns with 180 *Nike-J*.
A Base Defence Ground Environment with 28 control and warning units (new system planned).
(On order: 38 F-15J, 4 TF-15DJ, 7 F-1 fighters, 4 C-130H tpt, 10 T-2 trg, 7 E-2C AEW ac; *Sidewinder* AAM; 6 *Stinger*, 2 *Tan* SAM launchers.)

Para-Military Forces: Coast Guard: 41 large patrol vessels, 4 with 1 hel; 47 med, 76 small patrol vessels (61(); 1 C-130HMP, 5 YS-11, 2 *Skyvan*, 2 *King Air* ac, 5 Bell 212 hel.

KAMPUCHEA/CAMBODIA

Population: 5,100,000.
Military service: conscription, term unknown.
Total armed forces: some 20,000.

Armed Forces:
4 inf divs (perhaps 3 bdes, 3 bns each).
Some 50 indep units incl cav (recce), arty.
(On order: tks, arty, ships, ac, 2 Mi-8 hel—details unknown.)

Para-Military Forces: Militia; Regional Armed Forces/Self Defence forces (org in coys); People's Police force.[6]

KOREA: DEMOCRATIC PEOPLE'S REPUBLIC (NORTH)

Population: 18,600,000.
Military service: Army, Navy 5 years; Air Force 3–4 years.
Total armed forces: 784,000.
Estimated GNP 1981: 33.6 bn won ($18.8 bn).
Estimated defence expenditure 1982: 3.2 bn won ($1.7 bn).[7]
$1 = 1.88 won (1982), 1.79 won (1981).

Army: 700,000.
9 corps HQ.
2 armd divs.
3 mot inf divs.
35 inf divs.
5 armd bdes.
4 inf bdes.
Special forces (100,000): 1 corps HQ: 20 bdes (incl 3 amph cdo), AB element.
2 indep tk, 5 indep inf regts.
250 arty bns.
80 rocket bns.
5 SSM bns with 54 *FROG*.
5 river crossing regts (13 bns).
300 T-34, 2,200 T-54/-55/-62, 175 Type-59 MBT; 100 PT-76, 50 Type-62 lt tks; 140 BA-64 armd cars, 1,000 BTR-40/-50/-60/-152, K-3 APC; BMP-1 MICV; 4,100 76mm, M-46 85mm, 100mm, 122mm, 130mm towed, SU-76, SU-100 SP guns; 122mm, ML-20 152mm how; 11,000 82mm, 120mm, and 160mm mor; 2,000 107mm, 122mm, 140mm, 200mm, and 240mm MRL; 1,500 B-10 82mm RCL; 45mm, 57mm, Type-52 75mm ATK guns; AT-3 *Sagger* ATGW; 54 *FROG*-5/-7 SSM; 8,000 23mm, 37mm, 57mm, 85mm, and 100mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-7 SAM.

RESERVES: 260,000, 23 divs (cadre).

Navy: 33,000.
19 submarines (4 ex-Sov W-, 4 ex-Ch R-class, 11 local-built).
4 *Najin* frigates (2 may be in reserve).
18 ex-Sov FAC(M) with *Styx* SSM: 8 *Osa*-I, 10 *Komar*(.
33 large patrol craft: 3 ex-Sov (2 *Tral*, 1 *Artillerist*), 15 SO-1, 3 *Sariwan*, 6 ex-Ch *Hainan*, 6 *Taechong*.
151 FAC(G): 20 ex-Sov MO-IV(; 23 ex-Ch (15 *Shanghai* II, 8 *Shantou*(), 4 *Chodo*, 4 K-48, 64 *Chaho*(, 36 *Chong-Jin*(.
180 FAC(T): 78 ex-Sov (4 *Shershen*, 62 P-6(, 12 P-4(); 102((9 *Sinpo*, 15 *Iwon*, 6 *An Ju*, 72 *Ku Song/Sin Hung*).
30 coastal patrol craft((10 ex-Sov KM-4, 20 misc gunboats).
9 LCU, 15 LCM, 75 *Nampo* landing craft(.
Samlet coast defence msls; 2 sites.

RESERVES: 40,000.

Bases: Wonsan, Nampo.

Air Force: 51,000; some 700 combat aircraft.
3 lt bbr sqns with 70 Il-28.
13 FGA sqns: 1 with 20 Su-7; 9 with some 290 MiG-15/-17; 3 with 72 MiG-19.
12 interceptor sqns with 120 MiG-21, 120 MiG-19.
Tpts incl 180 An-2, 40 An-24, 5 Il-14, 4 Il-18, 1 Tu-154.
Hel incl 20 Mi-4, 20 Mi-8.
Trainers incl 20 Yak-11, 70 Yak-18, 100 MiG-15UTI/-19UTI/-21U, Il-28, 30 BT-6.
AAM: AA-2 *Atoll*.
4 SAM bdes (12 bns, 40 btys) with 250 SA-2 in 40 sites.

Forces Abroad: Madagascar, 400.

Para-Military Forces: security forces and border guards: 38,000. Workers-Farmers Red Guard (civilian militia): 760,000, with small arms, some AA arty.

KOREA: REPUBLIC OF (SOUTH)

Population: 38,900,000.
Military service: Army and Marines 30 months, Navy and Air Force 3 years.
Total armed forces: 601,600.
GNP 1981: 42,900 bn won ($63.1 bn).
Defence expenditure 1981: 2,700 bn won ($3.97 bn).
GNP growth 1981: 7.1%.
Inflation 1981: 12.6%.
$1 = 680 won (1981).

Army: 520,000.
3 Army, 6 corps HQ.
1 mech inf div (3 bdes: 3 mech inf, 3 mot, 3 tk, 1 recce bns, 1 fd arty bde).
20 inf divs (each 3 inf regts, 1 recce, 1 tk, 1 engr bn, arty gp).
3 AB divs (3 bdes: 4 AB, 1 recce, 1 hel bns, arty gp).
2 special forces bdes.

2 AA arty bdes.
2 SSM bns with 12 *Honest John*.
2 SAM bdes: 3 *HAWK*, 2 *Nike Hercules* bns.
1 army aviation bde.
1,000 M-47/-48 (incl A5) MBT; M-8 armd cars; 500 M-113/-577, 350 Fiat 6614 APC; 2,000 M-59 155mm, 12 M-107 175mm SP guns; M-101 towed, M-52 SP 105mm, M-114 towed, 76 M-109A2 SP 155mm, M-115 and 16 M-110 SP 203mm how; M-10 126mm MRL; 5,300 81mm and 107mm mor; 12 *Honest John* SSM; 80 M-18 76mm, 100 M-36 90mm SP ATK guns; *LAW* RL; 57mm, 75mm, 106mm RCL; *TOW* ATGW; 66 *Vulcan* 20mm, 40 40mm AA guns; 80 *HAWK*, 100 *Nike Hercules* SAM; 14 O-2A ac; 100 UH-1B, 100 OH-6A, 5 KH-4, 25 Hughes 500MD *Defender* hel with *TOW*; 90 *Scout*.
(On order: 37 M-109 155mm SP how; *TOW* ATGW; *Stinger*, 28 *Improved HAWK* SAM kits; 56 OH-6A, 25 Hughes 500MD hel with *TOW*.)

RESERVES: 1,100,000; 23 inf divs (cadre). (Another 2.4 m have some reserve obligation.)

Navy: 49,000 incl marines.
11 ex-US destroyers: 7 *Gearing* with 8 *Harpoon* SSM (2 with 1 *Alouette* III hel), 2 *Sumner*, 2 *Fletcher*.
7 ex-US frigates: 1 *Rudderow*, 6 *Lawrence*/*Crosley*.
3 ex-US *Auk* corvettes.
8 FAC(M) with SSM: 6 with *Standard* (5 PSMM Mk 5, 1 ex-US *Asheville*), 2 *Kist* with 2 *Exocet*.
8 ex-US *Cape* large patrol craft.
28 coastal patrol craft(: 6 CPIC FAC(P); 13 Sewart (9 65-ft, 4 40-ft), 9 *Schoolboy* I/II.
8 MSC-268/-294 coastal minesweepers, 1 minesweeping boat(.
28 ex-US landing ships (8 LST, 10 LSM, 10 LCU).
(On order: 1 sub, 1 frigate, 20 FAC(M), 75 *Harpoon* SSM.)

Bases: Chinhae, Cheju, Inchon, Mokpo, Pukpyong, Pohang, Pusan.

RESERVES: 25,000.

MARINES: (24,000).
2 divs, 1 bde; LVTP-7 APC.

RESERVES: 60,000.

Air Force: 32,600; some 434 combat ac, 10 armed hel.
7 combat, 2 tpt wings.
18 FGA sqns: 14 with 250 F-5A/B/E; 4 with 70 F-86F.
3 AD sqns with 60 F-4D/E.
1 COIN sqn with 24 OV-10G, some A-37.
1 recce sqn with 10 RF-5A.
2 ASW sqns: 1 with 20 S-2A/F ac; 1 with 10 Hughes 500MD hel.
1 SAR hel sqn with 6 UH-19, 20 UH-1B/H.
5 tpt sqns with 10 C-54, 20 C-123J/K, 2 HS-748, 6 C-130H, Aero *Commander*.
Trainers incl: 20 T-28D, 40 T-33A, 14 T-37C, 20 T-41D, 35 F-5B, 61 F-5F.
AAM: *Sidewinder, Sparrow*.
(On order: 30 F-16A, 6 F-16B, 36 F-5E, 32 F-5F fighters; AIM-9Q *Sidewinder* AAM; *Maverick* ASM.)

RESERVES: 55,000.

Para-Military Forces: Homeland Reserve Defence Force, 3,300,000; Civilian Defence Corps, 4,400,000; Student Homeland Defence Corps, 1,820,000. Coastguard: 25 small craft, 9 Hughes 500D hel.

LAOS

Population: 3,200,000.
Military service: conscription, 18 months.
Total armed forces: 48,700.
Estimated GNP 1980: 3 bn kip ($300 m).
Estimated defence expenditure 1980: 210 m kip (21 m).[8]
$1 = 10 kip (1980, official).

Army: 46,000 (Regional forces only).
1 armd bn.
70 inf bns.
4 arty, 4 AA arty bns.
11 inf coys.
1 lt ac liaison flt.
10 M-24, 25 PT-76 lt tks; 8 BTR-40, BTR-152, M-113 APC; 80 M-116 75mm, 105mm, 155mm how; 81mm, 82mm, 107mm, 4.2-in mor; 107mm RCL; M-1939 37mm AA guns; 4 U-17A lt ac.[9]

Navy: 1,700.[9]
6 ex-Sov *Shmel*; 28 other river patrol craft (many in reserve).
7 LCM, 7 tpts((many in reserve).

Air Force: 1,000; 36 combat aircraft.[9]
1 interceptor sqn with 20 MiG-21.
1 COIN sqn with 12 T-28A/D, 4 AC-47 gunships.
2 tpt sqns with 1 Yak-40, 7 C-47, 5 C-123, 6 An-24, 3 An-26, 1 Aero *Commander*, 1 DHC-2.
1 hel sqn with 8 UH-34; 7 Mi-8.
Trainers: 6 T-41D.
AAM: AA-2 *Atoll*.

Para-Military Forces: Militia, Self-Defence forces.

MALAYSIA

Population: 14,661,000.
Military service: voluntary.
Total armed forces: 99,100.
GNP 1981: 57.07 bn ringgits ($24.81 bn).
Estimated defence expenditure 1981: 4.73 bn ringgits ($2.05 bn).
GDP growth 1980: 7.8%.
Inflation 1981: 8.7%.
$1 = 2.30 ringgits (1981).

Army: 80,000 (110,000 planned).
1 corps, 4 div HQ.
12 inf bdes, (one more to form) consisting of 38 inf bns, 3 cav, 4 fd arty, 1 APC regts, 2 AA arty btys, 1 special service unit, 5 engr, 5 sigs regts, and administrative units.
140 AML armd, 60 *Ferret* scout cars; AT-105, 200 V-150 *Commando* APC; 12 5.5-in guns, 92 Model 56 105mm pack how; 81mm mor; M-20 89mm RL; 5 120mm RCL; SS-11 ATGW; 35 40mm AA guns.
(On order: 38 *Scorpion* lt tks; 165 SIBMAS AFV; 20 *Stormer*, 450 *Condor* APC; 18 *Scorpion* SP AA guns.)

RESERVES: Territorial Army, Local Defence Corps, 30,000.

Navy: 8,100 (being expanded).
2 frigates: 1 *Yarrow* (1 × 4 *Seacat* SAM); 1 Type 41.
8 FAC(M) with *Exocet* SSM: 4 *Spica*, 4 *Perdana*.
8 *Jerong* FAC(G).
22 large patrol craft: 4 *Kedah*, 4 *Sabah*, 14 *Kris*.
4 ex-Br *Ton* coastal minesweepers.
3 ex-US 511-1152 LST.
1 spt ship.
(On order: FS-1500 frigate, 2 msl corvettes, 6 FAC(P), 4 minehunters.)

Bases: Woodlands, Kuantan, Labuan, Lumut.

RESERVES: 1,000.

Air Force: 11,000 (being expanded); some 37 combat aircraft.
2 FGA sqns with 13 F-5E, 4 F-5F, 1 RF-5E.
2 COIN/trg sqns with 15 CL-41G *Tebuan* (to be replaced by A-4).
1 MR sqn with 3 PC-130H.
4 tpt/liaison sqns: 1 with 6 C-130H; 1 with 2 HS-125, 2 F-28, 12 Cessna 402B; 2 with 15 DHC-4A.
2 tpt hel sqns with 37 S-61A; 2 liaison sqns with 25 *Alouette* III.
2 trg sqns: 1 with 11 *Bulldog* 102 ac; 1 with 9 Bell 47, 4UH-1H hel.
AAM: *Sidewinder*.
(On order: 54 A-4 FGA, 14 TA-4 trg (status of additional 20 for spares in doubt), 1 *Super King Air*, 4 NC-212 *Aviocar* tpts, 44 Pilatus PC-7 trg ac; 10 BO-105 hel; *Super Sidewinder* AAM.)

Para-Military Forces: 90,000. Police Field Force 19,000; 21 bns (incl 2 Aboriginal), *Shorland* armd cars and SB-301 APC, 40 patrol boats. Customs and Excise: (On order: 6 32-metre patrol craft.) People's Volunteer Corps (RELA), over 350,000.

MONGOLIA

Population: 1,700,000.
Military service: 3 years.
Total armed forces: 34,600.
Estimated defence expenditure 1981: 802.6 m tugrik[10] ($239.6 m).
$1 = 3.35 tugrik (1981–2).

Army: 31,500.
3 inf bdes (may be forming a div).
T-54/-55/-62 MBT; BMP MICV, BTR-60 APC; 76mm, 100mm, 122mm, 130mm guns; 152mm how; SU-100 SP guns; *Snapper* ATGW; 37mm, 57mm AA guns.

RESERVES: 40,000.

Air Force: 3,100 (1,000 conscripts); 12 combat aircraft.
1 fighter sqn with 12 MiG-21.
2 tpt sqns with 20 An-2, 6 Il-14, 4 An-24.
1 hel sqn with 10 Mi-4.
Trainers: Yak-11/-18, 3 PZL-104 utility.
1 SAM bn with 18 SA-2.

Para-Military Forces: Ministry of Public Security (10,000): Militia (Police), internal security troops, frontier guards.

NEPAL

Population: 14,600,000.
Military service: voluntary.
Total armed forces: 25,000.
GDP 1980: 23.87 bn rupees ($1.99 bn).
Estimated defence expenditure 1981: 288 m rupees ($22.2 m).
$1 = 12.96 rupees (1981), 12.0 (1980).

Army: 25,000.
5 inf bdes (1 Palace Guard, 1 cav sqn, 1 garrison bn).
1 arty bn.
1 engr bn.
1 sigs bn.
1 para bn.
1 tpt bn.
1 air sqn (1 comms flt, 1 Army flt).
AMX-13 lt tks; 4 3.7-in mountain how; 4 4.2-in, 18 120mm mor; 2 40mm AA guns; 2 *Skyvan*, 1 HS-748, 1 *Twin Otter*, 1 *Turbo-Porter* tpt ac; 3 *Alouette* III, 2 *Puma* hel.

Forces Abroad: Lebanon (UNIFIL): 460; 1 bn.

Para-Military Forces: police force 15,000.

NEW ZEALAND

Population: 3,160,000.
Military service: voluntary, supplemented by Territorial Army service: 12 weeks basic, 20 days per year.

Total armed forces: 12,913.
GNP 1981: $NZ 25.41 bn ($US 21.19 bn).
Defence expenditure 1981: $NZ 555.47 m ($US 463.28 m).
$1 = $NZ 1.199 (1981).

Army: 5,675.
2 inf bns.
1 arty bty.
5 M-41 lt tks; 72 M-113 APC; 10 5.5-in guns; 44 105mm (incl pack) how; 23 106mm RCL.
(On order: 26 *Scorpion* lt tks.)

RESERVES: 1,412 Regular, 5,934 Territorial. 6 Territorial inf bns, 1 fd arty regt (3 btys), 2 APC sqns.

Navy: 2,843.
4 frigates: 2 *Leander* (1 × 4 *Seacat* SAM, 1 *Wasp* hel), 2 Type 12 (1 with 1 × 4 *Seacat*, 1 trg).
4 *Lake* large patrol craft.
(On order: 2 *Leander* frigates, SAR hovercraft, 2 *Wasp* hel.)

Base: Auckland.

RESERVES: 958 Regular, 280 Territorial.

Air Force: 4,395; 32 combat ac.
1 FGA sqn with 9 A-4K, 2 TA-4K *Skyhawk*.
1 OCU with 16 BAC-167 *Strikemaster*.
1 MR sqn with 5 P-3B *Orion*.
2 med tpt sqns with 5 C-130H, 6 *Andover*, 2 Boeing 727-100C, 3 Cessna 421.
1 tpt hel sqn with 6 *Sioux*, 3 *Wasp*, 9 UH-1D/H.
1 comms sqn with 4 *Andover*, 3 Cessna 421C, 3 F-27.
Trainers: 4 *Airtourer* ac; 3 *Sioux* hel.

RESERVES: 1,039 Regular, 158 Territorial.

Forces Abroad: Singapore: 1 inf bn with log spt; 1 spt hel unit (3 UH-1). Egypt (Sinai (MFO)): 40.

PAKISTAN

Population: 88,950,000 (Afghan refugees *not* incl).
Military service: voluntary.
Total armed forces: 478,600.
GNP 1981: 270.2 bn rupees ($27.3 bn).
Defence expenditure 1981: 18.7 bn rupees ($1.89 bn).
GDP growth 1981: 7.4%.
Inflation 1981: 14%.
$1 = 9.9 rupees (1981).

Army: 450,000 (incl 29,000 *Azad Kashmir* tps).
7 corps HQ.
2 armd divs.
16 inf divs.
4 indep armd bdes.
5 indep inf bdes.
7 arty bdes.
2 AA arty bdes.
6 armd recce regts.
9 SAM btys with 18 *Crotale*.
1 Special Services Group.
M-4, 250 M-47/-48 (incl A5), 35 T-54/-55, 1,000 Type-59 MBT; 15 PT-76, Type-60/-63, 50 M-24 lt tks; 550 M-113, K-63 APC; some 1,000 25-pdr, 100mm, 130mm, 5.5 in, and 155mm guns; 75mm pack, 105mm incl pack and 12 M-7 SP, 155mm towed and M-109 SP how; 270 107mm, 120mm mor; 57mm, 100mm ATK guns; 75mm, 83mm, 3.5-in RL; 106mm RCL; *Cobra* ATGW; 37mm, 60 40mm, 57mm AA guns; 18 *Crotale* SAM.
Army Aviation:
1 liaison sqn with 45 Saab *Supporter* lt ac; 4 hel sqns.
Indep army observation flts: 45 O-1E, Cessna 421, *Turbo Commander*, *Queen Air* ac; 16 Mi-8, 35 *Puma*, 23 *Alouette* III, 13 Bell 47G hel.
(On order: 100 M-48A5 MBT; M-113 APC; 75 M-198 towed 155mm, 100 M-109A2 SP 155mm, 40 M-110 SP 203mm how; *TOW* ATGW launchers (incl 24 M-901 SP); 10 AH-1S hel.)

RESERVES: 500,000.

Navy: 11,000.
11 submarines: 2 *Agosta*, 4 *Daphne*, 5 SX-404 midget.
1 ex-Br *Dido* cruiser (cadet trg/AA ship).
9 destroyers: 1 ex-Br *County* with 1 *Sea Slug*, 2 × 4 *Seacat* SAM, 1 hel; 4 ex-US *Gearing* with 1 × 8 *ASROC* ASW; 4 ex-Br (1 *Battle*, 1 CH, 2 CR).
5 large patrol craft: 1 *Town*, 4 ex-Ch *Hainan*.
12 ex-Ch *Shanghai*-II FAC(G).
4 ex-Ch *Huchwan* hydrofoil FAC(T)(.
3 coastal patrol craft: 1 *Spear*, 2 M-55 Type.
6 ex-US *Adjutant* and 268 coastal MCM.
1 ex-US *Mission* underway replenishment tanker.

NAVAL AIR: 3 combat ac, 6 armed hel.
1 ASW/MR sqn with 3 *Atlantic* with AM-39 *Exocet* ASM.
ASW/SAR hel sqns with 6 *Sea King* ASW with AM-39, 4 *Alouette* III.
ASM: AM-39 *Exocet*.

Base: Karachi.

RESERVES: 5,000.

Air Force: 17,600; 219 combat aircraft.
1 lt bbr sqn with 11 B-57B *(Canberra)*.
3 FGA sqns: 1 with 17 *Mirage* IIIEP; 2 with 34 *Mirage* 5PA/DP.
8 interceptor/FGA sqns with 144 MiG-19/F-6 (one converting to *Mirage* 5PA).
1 recce sqn with 13 *Mirage* IIIRP/R2P.
2 tpt sqns: 1 with 13 C-130B/E, 1 L-100; 1 with 1 *Falcon* 20, 1 F-27, 1 *Super King Air*, 1 *Bonanza* ac, 1 *Puma* hel.
1 SAR hel sqn with 10 HH-43B, 16 *Alouette* III.
1 utility hel sqn with 4 *Super Frelon*, 12 Bell 47G.
1 trg sqn with 25 T-33A, 4 MiG-15UTI.
Other trainers incl 3 *Mirage* IIIDP, 87 *Supporter*, 35 T-37C, 15 Shenyang FT-5 (MiG-17U), 10 FT-6, 24 Reims FTB-337.
AAM: *Sidewinder*, R-530, R-550 *Magic*.
(On order: 40 F-16, 35 *Mirage* 5DA/DPA, 18 *Mirage* III, 42 Ch A-5 FGA; 30 *Supporter*.)

RESERVES: 8,000.

Para-Military Forces: 109,100: National Guard 22,000; Frontier Corps 65,000; Pakistan Rangers 15,000; Coastguard 2,000; Frontier Constabulary 5,100.

PHILIPPINES

Population: 50,350,000.
Military service: selective.
Total armed forces: 112,800.
GNP 1981: 309.2 bn pesos ($39.5 bn).
Estimated defence expenditure 1981: 6.75 bn pesos ($862 m).
GNP growth 1981: 4.9%.
Inflation 1981: 12.7%.
$1 = 7.83 pesos (1981).

Army: 70,000.
4 lt inf divs.
1 Special Services bde.
2 engr bdes.
1 lt armd regt.
4 arty regts.
1 army air bde (3 bns) forming.
28 *Scorpion*, 7 M-41 lt tks; 80 M-113, M-3 half-track, 20 *Chaimite* APC; 120 105mm (incl pack), 10 M-114 155mm how; 81mm, 40 107mm mor; M-20 75mm, M-67 90mm, M-40 106mm RCL; 60 UH-1H, 8 Hughes 500D, 6 BO-105 hel.
(On order: 45 MICV; 95 105mm how; 10 Hughes 500D hel.)

RESERVES: 96,000, 6 divs.

Navy: 26,000 (6,800 marines, 250 naval engrs).
8 ex-US frigates: 1 *Savage*, 3 *Cannon*, 4 *Barnegat* (ex-seaplane tenders).
10 ex-US corvettes: 2 *Auk*, 7 PCE-827, 1 *Admirable*.
11 large patrol craft: 4 *Katapangan*, 5 PGM-39/-71, 2 ex-US PC-461.
59 coastal patrol craft(.
28 ex-US landing ships (21 LST, 4 LSM, 3 spt), 61 LCM, 7 LCVP, 3 LCU.
1 SAR sqn with 9 *Islander* ac, 3 BO-105 hel, 3 patrol boats.
2 marine bdes (each with 7 bns) with LVT-4, LVTP-5, 55 LVTP-7 APC; 105mm how.
(On order: 6 PSMM FAC(M), 12 LST.)

Base: Sangley Point.

RESERVES: 12,000.

Air Force: 16,800; 131 combat ac, 18 armed hel.
1 FGA sqn with 24 F-8H.
1 AD sqn with 19 F-5A, 3 F-5B.
1 fighter/trg sqn with 25 T-34A.
5 COIN sqns: 1 with 16 SF-260WP; 2 with 32 T-28D; 1 with 12 AC-47 ac; 1 with 18 UH-1D hel.
1 SAR /recce sqn with 4 HU-16B, 3 F-27 MR ac.
1 SAR hel sqn with 27 UH-1H.
1 Presidential tpt sqn with 1 Boeing 707, 1 BAC-111, 1 F-28, 4 YS-11 ac; 2 S-62A, 4 UH-1, 1 *Puma* hel.
6 tpt sqns: 1 with 4 C-130H, 4 L-100-20; 1 with 5 C-47; 1 with 8 F-27; 1 with 12 *Nomad;* 1 with 12 *Islander* ac; 1 with 18 UH-1H, 4 BO-105 hel.
1 liaison sqn with O-1E, 20 Cessna U-17A/B, 8 *Beaver* (being withdrawn).
3 trg sqns: 1 with 10 T/RT-33A; 1 with 12 T-41D; 1 with 30 SF-260MP.
1 weather sqn with 3 Cessna 210.
AAM: *Sidewinder*.
(On order: 11 F-5E fighters, 18 OV-10 *Bronco* COIN, T-160 *Cali (Super Pinto)* trg ac; 5 BO-105 hel.)

RESERVES: 16,000, 14 F-8H fighters.

Para-Military Forces: 110,500; 43,500 Philippine Constabulary (1 bde, 12 bns), 65,000 Civil Home Defence Force. Coastguard: 2,000.

SINGAPORE

Population: 2,400,000.
Military service: 24–36 months.
Total armed forces: 42,000.
Estimated GNP 1981: $S 26.3 bn ($US 12.4 bn).
Defence expenditure 1981: $S 1.50 bn ($US 707.6 m).
GDP growth 1981: 9.9%.
Inflation 1981: 9%.
$US 1 = $S 2.12 (1981).

Army: 35,000.
1 div HQ.
1 armd bde (1 recce, 1 tk, 2 APC bns).
3 inf bdes (each 3 inf bns).
6 arty bns.
1 cdo bn.
6 engr, 3 sigs bns.
200 AMX-13 lt tks; 500 M-113, 250 V-150/-200 *Commando* APC; 30 155mm how; 60mm, 81mm, 60 120mm mor; 89mm RL; 84mm *Carl Gustav*, 60 106mm RCL; 20mm AA guns.
(On order: 120 AMX-13 lt tks.)

RESERVES: 120,000; 16 inf, 6 arty, 3 engr, 1 sigs bns.

Navy: 3,000.
6 TNC-45 FAC(M) with 5 *Gabriel* SSM.
6 Vosper FAC(G): 3 Type A, 3 Type B.
2 large patrol craft (trg ships).
2 ex-US *Reawing* coastal minesweepers.

6 ex-US 511-1152 LST (1 in reserve), 6 landing craft(.
(On order: 12 *Capricornia* coastal patrol boats.)

Base: Singapore.

Air Force: 4,000; 93 combat aircraft.
2 FGA sqns with 32 A-4S, 5 TA-4S *Skyhawk*.
2 FGA/recce sqns with 35 *Hunter* (24 FGA-74, 4 FR-74, 7 T-75).
1 AD sqn with 18 F-5E, 3 F-5F.
1 tpt/SAR sqn with 6 C-130B/H, 6 *Skyvan*.
1 hel sqn with 25 UH-1B/H, 3 AB-212.
3 trg sqns: 1 with 20 BAC-167, 5 *Jet Provost;* 1 with 6 SF-260W, 8 SF-260MS; 1 with 12 T-33A.
2 SAM sqns: 1 with 28 *Bloodhound* 2; 1 with 10 *Rapier.*
AAM: *Sidewinder.*
(On order: 40 A-4, 6 F-5E fighters, 5 SF-260MS COIN/trg ac; *Rapier/Blindfire*, *Improved HAWK* SAM; 200 AGM-65 *Maverick* ASM.)

Para-Military Forces: police/marine police 7,500 with 10 patrol craft; Gurkha guard units; some 30,000 Peoples Defence Force.

SRI LANKA

Population: 14,900,000.
Military service: voluntary.
Total armed forces: 16,425.
GNP 1980: 67.23 bn rupees ($4.07 bn).
Estimated defence expenditure 1981: 566 m rupees ($29.42 m).
$1 = 19.24 rupees (1981), 16.53 rupees (1980).

Army: 11,000.
5 inf bdes (each with 1 regular, 2 reserve bns).
2 armd recce regts (bns), 1 fd arty, 1 AA regts, 1 engr regt (each with one regular and one reserve unit).
1 sigs bn.
Support services.
18 *Saladin* armd, 15 *Ferret* scout cars; 10 BTR-152 APC; 14 76mm, 12 85mm guns; 12 82mm, 8 4.2-in (107mm) mor; 24 40mm, 24 3.7-in (94mm) AA guns.

RESERVES: 15,000; 10 bns, plus supporting services and a Pioneer Corps.

Navy: 2,825.
7 *Sooraya* (ex-Ch *Shanghai*-II), 1 ex-Sov *Mol* FAC(G).
19 coastal patrol craft(.

Bases: Trincomalee, Karainagar, Colombo, Tangalla, Kalpitiya.

RESERVES: Naval Volunteer Force 1,100.

Air Force: 2,600.
1 tpt sqn with 1 HS-748, 2 DC-3, 2 Riley, 1 *Heron*, 3 Cessna 337, 1 421C.
1 hel sqn with 7 Bell 206, 2 Bell 47G, 2 SA-365.
Trainers incl 6 Cessna 150, 6 *Chipmunk*, 3 *Dove*.
(Ac in storage: 3 MiG-17F, 1 MiG-15UTI, 2 *Jet Provost* Mk 51.)

RESERVES: 1,000; 3 sqns Air Force Regt, 1 sqn Airfield Construction Regt.

Para-Military Forces: Police Force 17,000; Volunteer Force 5,000.

TAIWAN

Population: 18,200,000.
Military service: 2 years.
Total armed forces: 464,000.
GNP 1980: $NT 1,368 bn ($US 38 bn).
Estimated defence expenditure 1980: $NT 115.1 bn ($US 3.2 bn).
GNP growth 1980: 6.6%.
Inflation 1980: 22.2%.
$US1 = $NT 36.0 (1980).

Army: 310,000.
3 Army, 6 Corps HQ.
12 hy inf divs.
6 lt inf divs.
6 armd/inf bdes.
3 AB bdes.
4 tk gps.
20 fd arty bns.
5 SAM bns: 2 with *Nike Hercules*, 3 with *HAWK*.
6 army aviation sqns.
310 M-48 MBT; 325 M-24 (90mm gun), 795 M-41 lt tks; M-8 armd cars; M-3 half-track, 1,100 M-113, 150 V-150 *Commando* APC; 300 M-59 155mm guns/how; 350 M-116 75mm pack, 550 M-101 (T-64) 105mm, 90 M-114 (T-65) 155mm, 10 M-115 203mm towed, 225 M-108 105mm, 125 M-109 A-1 155mm, 75 M-110 203mm SP how; 81mm mor; *Kung Feng* towed and SP 127mm MRL; *Hsiung Feng* coastal defence SSM, *Ching Feng* SSM/SAM; 150 M-18 76mm SP ATK guns; 500 106mm RCL; *Kun Wu TOW* (some SP) ATGW; 300 40mm AA guns (some M-42 SP); 400 *Nike Hercules*, 800 *HAWK*, 20 *Chaparral* SAM; 118 UH-1H, 2 KH-4, 7 CH-34 hel.
(On order: 125 M-109 155mm, 75 M-110A 203mm SP how; 1,000 *TOW, Kun Wu* ATGW; 370 *Improved HAWK* SAM.)

DEPLOYMENT: *Quemoy:* 60,000; *Matsu:* 20,000.

RESERVES: 1,500,000: 9 divs; an additional 1.3 million have some reserve obligation.

Navy: 38,000.
2 ex-US *Guppy*-II submarines.
23 ex-US destroyers: 10 *Gearing* with 1 hel (1 with 3 *Hsiung Feng* (*Gabriel*-type) SSM, 9 with 1 × 8 *ASROC*); 1 *Gearing* radar picket with 3 *Hsiung Feng;* 8 *Sumner* (1 with 1 × 3, 2 with 2 × 3 *Hsiung Feng*); 4 *Fletcher* with 1 × 2 *Sea Chaparral* SAM.
9 ex-US frigates: 8 *Lawrence*, 1 *Crosley*.
3 ex-US *Auk* corvettes.
21 FAC(M) with *Hsiung Feng* SSM: 2 *Lung Chiang* with 4 × 1, 19 *Tzu Chiang (Dvora)* with 2 × 1.
6 FAC(T): 4 ex-US 71-ft/79-ft, 2 Japanese-built.
14 ex-US *Adjutant* and 268 coastal MCM.
2 LSD, 22 LST, 4 LSM, 22 LCU.
1 repair ship; 2 tpts; 7 tankers.
(On order: 2 *Zwaardvis* subs, 1 *Gearing* destroyer, *Tzu Chiang* FAC(M), *Harpoon, Gabriel* SSM, *ASROC* ASW, 284 *Improved Sea Chaparral* SAM.)

Bases: Tsoying, Makung (Pescadores), Keelung.

RESERVES: 45,000.

Marines: 39,000.
3 divs.
LVT-4/-5 APC; 105mm, 155mm how; 106mm RCL.

RESERVES: 35,000.

Air Force: 77,000; some 484 combat ac, 12 armed hel.
5 combat wings.
13 FGA sqns: 9 with 92 F-5A, 226 F-5E, 22F-5F; 2 with 42 F-100A/D; 2 with 40 F-104G/D.
1 interceptor sqn with 19 F-104A.
1 recce sqn with 4 RF-104G.
1 MR sqn with 9 S-2A, 30 S-2E.
(1 electronic warfare sqn with 16 F-104S forming.)
1 ASW hel sqn with 12 Hughes *Defender* 500MD.
1 SAR sqn with 8 HU-16B ac, 10 UH-1H hel.
6 tpt sqns with 50 C-47, 5 C-54, 1 C-118B, 40 C-119, 10 C-123, 1 Boeing 720B.
Trainers incl 55 PL-1B *Chien Shou*, 50 T-CH-1, 32 T-33, 30 T-28, F-5B/F, 3 TF-104G, 6 F-104D, F-100F.
2 hel sqns with 7 UH-19, 10 Bell 47G.
AAM: *Sidewinder, Shafrir.*
ASM: *Bullpup.*
(On order: F-5E/F, 16 F-104S fighters; 50 YAT-3 trg ac, *Shafrir* AAM, *Maverick* ASM.)

RESERVES: 90,000.

Para-Military Forces: Taiwan Garrison Command, 25,000. Police use Hughes 300C/D hel.

THAILAND

Population: 49,000,000.
Military service: 2 years.
Total armed forces: 233,100.
GNP 1980: 659.3 bn baht ($31.1 bn).
Defence expenditure 1981: 27.72 bn baht ($1.31 bn).
GDP growth: 5.8% (1980), 7.6% (1981).
Inflation: 16.4% (1980), 13% (1981).
$1 = 21.22 baht (1980–81).

Army: 160,000.
4 Regions.
1 cav div (2 cav, 1 arty regts).
1 armd div (1 tk, 1 cav, 1 mech regts).
7 inf divs (5 with 1 tk bn).
2 AA arty regts.
11 engr bns.
8 indep inf bns.
4 special forces bns.
4 recce coys.
50 M-48A5 MBT; 200 M-41, 144 *Scorpion*, M-24 lt tks; 32 *Shorland* Mk 3 recce; 300 M-113, M3A1 half-track, 120 V-150 *Commando*, 20 *Saracen* APC; 300 M-116 75mm pack, M-101 105mm, 80 M-114 155mm how; 81mm, 120mm mor; M-72 *LAW* RL; 57mm, M-20 75mm, 215 106mm RCL; *TOW, Dragon* ATGW; 80 40mm AA guns, incl M-42 SP; *Redeye* SAM.
Army Aviation:
2 airmobile coys, some hel flts.
80 O-1, 1 Beech 99 lt ac; 80 UH-1B/H, 4 CH-47A, 10 OH-13H, 6 OH-23F, 28 KH-4 hel.
(On order: 100 M-48A5, 16 M-60A3 MBT; 56 *Cascavel* armd cars; 40 M-113, 164 V-150 APC; 34 M-114 155mm how; 24 M-167A1 20mm *Vulcan* AA; *Blowpipe*, SAM.)

RESERVES: 500,000.

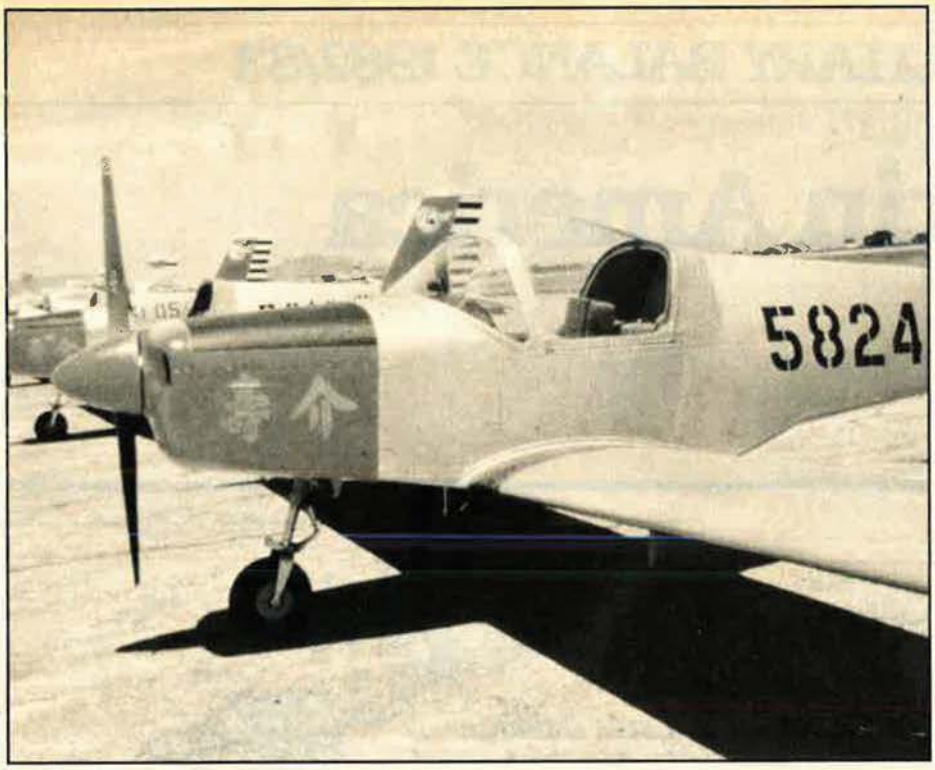
Navy: 30,000, incl naval air and marines.
6 frigates: 1 *Yarrow*-type with 1 × 4 *Seacat* SAM; 2 PF-103; 2 ex-US *Tacoma;* 1 *Cannon*.
6 FAC(M): 3 50-metre with 4 *Exocet* SSM; 3 45-metre with 5 *Gabriel* SSM.
28 ex-US large patrol craft: 7 PC-461, 10 PGM-71, 7 *Liulom*, 4 *Cape*.
19 coastal, 40 river patrol craft(.
2 *Bangrachan* coastal minelayers.
4 ex-US *Bluebird* coastal minesweepers, 5 minesweeping boats(.
1 MCM spt ship.
5 LST, 3 LSM, 2 LSIL-351, 1 LCG, 6 LCU, 25 LCM (all ex-US), LCA, 8 LCVP.
3 trg ships: 2 ex-Br (1 *Algerine*, 1 *Flower*), 1 *Maeklong*.
(On order: 3 400-ton FAC(G).)

NAVAL AIR: some 11 combat ac.
1 MR/ASW sqn with 9 S-2F MR.
1 MR/SAR sqn with 2 HU-16B, 2 CL-215, 10 C-47.
1 trg/SAR hel sqn with 8 Bell 212, 4 UH-1H.
1 observation sqn with 7 T-37B *Skymaster*, 10 U-17, 1 O-1G.

MARINES: (10,000).
1 bde: 2 inf, 1 arty regts; 1 amph assault bn; 40 LVTP-7 amph APC, 24 M-68 155mm guns/how, support weapons.

Bases: Bangkok, Sattahip, Songkla, Phangnga.

Air Force: 43,100; some 176 combat aircraft.
1 FGA sqn with 14 F-5A/B, 1 RF-5A.
2 AD sqns with 30 F-5E, 6 F-5F.
10 COIN sqns: 3 with 40 T-28D; 2 with 31 OV-10C;



PL-1B Chien Shou *primary trainers of the Taiwanese Air Force.*

1 with 16 A-37B; 2 with 31 AU-23A *Peacemaker;* 1 with AC-47; 1 with 4 T-33A, 3 RT-33.
3 tpt sqns, incl Royal flt: 1 with 5 C-47, 4 *Merlin* IVA; 2 with 30 C-123B, 3 C-130H; 2 HS-748.
3 liaison sqns with 5 U-10A, 6 NC-212, 24 O-1.
2 hel sqns with 20 CH-34C, 18 S-58T, 49 UH-1H, 13 UH-19.
Trainers incl 10 *Chipmunk*, 16 T-33, 14 T-37B, 4 T-41A, 12 SF-260MT, 15 CT-4.
AAM: *Sidewinder.*
Airfield defence troops: 4 bns, *HAWK* SAM.
(On order: 8 F-5E fighters, 14 OV-10C COIN, 20 NC-212 *Aviocar,* 2 C-130H-30 ac; 12 UH-1H hel.)

Para-Military Forces: Volunteer Defence Corps 33,000. Marine Police 1,700. Police Aviation 500. Border Police 1,500. Special Action force 3,800. Rangers 13,000. Village Scouts. National Defence Volunteers. 20 V-150 *Commando* APC, 1 Coastguard cutter, 3 *Skyvan,* 4 *Turbo-Porter,* 3 DHC-4, 3 Do-28, 5 AU-23, 1 CT-4 ac; 15 Bell 205, 4 206, 10 204B hel. (On order: 20 *Nomad.*)

VIETNAM

Population: 56,000,000.
Military service: 3 years. Specialists longer; some ethnic minorities 2 years.
Total armed forces: 1,029,000.
Estimated GNP 1980/81: estimates range from $9.5 bn to $16 bn.
$1 = 2.18 dong (1982).

Army: 1,000,000.
16 Corps HQ.
1 armd div.
57 inf divs.[11]
2 marine divs.
7 engr, 15 economic construction divs.
5 indep fd, 4 indep AA arty bdes.
4 indep engr bdes.
6 indep armd regts.
1,500 T-34/-54/-55/-62, Type-59, 400 M-48, T-10 MBT; 450 PT-76 and Type-60/63, 150 M-41 lt tks; M-8, M-20 armd cars; BRDM-2 recce, 1,500 BTR-40/-50/-60/-152, Type-56, K-63, 800 M-113, V-100 *Commando* APC; 300 76mm, 85mm, 100mm, 122mm, 200 130mm, M-107 175mm guns; 75mm pack, M-101/-102 105mm, 122mm, 100 152mm, M-114 155mm how; 90 SU-76, SU-100, ISU-122, 200 M-109 155mm, and M-110 203mm SP how; Type-63 107mm, BM-21 122mm, BM-14-16 140mm MRL; 82mm, 107mm, 120mm, 160mm mor; 75mm, 82mm, 107mm RCL; *Sagger* ATGW; 4,000 23mm, 30mm, 37mm, 40mm, 57mm, 85mm, 100mm, and 130mm towed, Type-63 37mm, M-42 40mm, ZSU-23-4, ZSU-57-2 SP AA guns; SA-2/-3/-6/-7/-9 SAM.[12]

Navy: 4,000.[12]
5 frigates: 4 ex-Sov *Petya,* 1 ex-US *Barnegat.*
8 ex-Sov *Osa*-II FAC(M) with Styx SSM.
23 large patrol craft: 4 ex-Sov SO-1, 19 ex-US PGM-59/-71.
17 FAC(T): 3 ex-Sov P-4, 6 ex-Ch P-6, 8 *Shershen.*
22 ex-Ch FAC(G): 8 *Shanghai,* 14 *Swatow.*
6 *Zhuk,* 2 PO-2 coastal patrol craft.
3 510-1152 LST, 3 *Polnocny* LCT.
1 SAR hel sqn with 10 Mi-4.

Air Force: 25,000; 470 combat ac (many in store).[12]
1 lt bbr sqn with 10 Il-28.
20 FGA sqns with 90 MiG-17/F-4, 60 MiG-19/F-6, 60 Su-7/-20, 15 F-5A, 25 A-37B.
12 interceptor sqns: 4 with 60 MiG-21bis; 8 with 150 MiG-21F/PF.
Tpts incl 35 An-2 and Li-2, An-12, 9 An-24, 12 Il-14, 4 Il-18, C-130.
Hel incl 15 Mi-4, 16 Mi-6, 50 Mi-8, 10 CH-47, 45 UH-1.
About 60 trainers incl Yak-11/-18, MiG-15UTI/-21U.
AAM: AA-2 *Atoll.*

Air Defence Force: (strength unknown, possibly included in Air Force).
25 SAM regts: 10 with 180 SA-2, 10 with 180 SA-3, 5 with 45 SA-6.

Forces Abroad: Laos: 45,000; 3 inf divs and spt tps (numbers fluctuate). Kampuchea/Cambodia: 170,000 (20 army, 2 marine divs plus spt tps, fighter ac incl MiG-21).

Para-Military Forces: Frontier, Coast Security, and People's Armed Security Forces 70,000; Regional Armed Militia of about 1,500,000; includes draft age persons and ex-servicemen org in coys, platoons, and squads.

[1] Actual strength suspect due to defections. All units well below establishment. Divs reported to average 2,500 (*i.e.*, about a quarter strength). The Soviet High Command in Afghanistan now effectively controls the Afghan forces, and it is not possible to differentiate between Soviet and Afghan holdings of identical equipment.

Resistance to Soviet presence involves many among male population, and perhaps 90,000 guerrillas (perhaps 20,000 intermittently active) supported by some 15 exile political groups, six of them active. Equipment: mainly small arms, 60mm, 2-in, 82mm mor; RPG-7 RL; 75mm, 82mm RCL; 12.7mm, 14.5mm AA machine guns, SA-7 SAM, and ATK mines.

[2] Spares are short: some equipment, incl 1 DC-6, 4 DHC-3, 1 DHC-4, 2 F-27, 1 Yak-40, is unserviceable.

[3] Spares are short: some equipment is unserviceable.

[4] Some armed forces elements are engaged in rural aid administrative duties.

[5] KOPKAMTIB (Operational Command for the Restoration of Law and Order): no forces assigned.

KOSTRAD = Strategic Reserve Command: army command (16,500–19,000 men) under direct control of the Minister of Defence and Security. Incl ground combat command (1 armd, 3 inf bdes, 1 arty regt), air combat command (with 2 AB bdes).

KOPNESANDHA = Special Forces Command 4,000: 4 special para/cdo gps.

[6] Forces opposed to the regime: Democratic Kampuchean Government (*Khmer Rouge*): some 30,000 org in bdes and bns. *Sereika:* some 6,000, small arms, incl mor, RCL. *Moulinaka:* perhaps 1,000. Merging.

[7] It is uncertain whether this covers all defence expenditure, and there is no consensus on a suitable exchange rate for the dollar conversion.

[8] Estimates for 1980 range upward to 520 m kip.

[9] Equipment serviceability unknown.

[10] Official figure.

[11] Inf divs, normally totalling 8–10,000 men, include 1 tk bn, 3 inf, 1 arty regts, and spt elements.

[12] Some US eqpt may be inoperable through lack of spares.

Armed Forces of Other Asian Countries

Country	Estimated population (000)	Estimated GNP 1981 ($m)	Defence expenditure 1981 ($m)	Total armed forces	Army: Manpower and formations	Army: Equipment	Navy: Manpower and equipment	Air Force: Manpower and equipment	Paramilitary forces
Brunei	230	n.a.	195 (est.)	3,200*	2,750 2 inf bns 1 armd recce sqn 1 lt AA arty bty (forming) 1 engr tp	16 *Scorpion* lt tks; 24 Sankey AT-104 APC; 16 81mm mor	350 3 *Waspada* FAC(M) with 2 *Exocet* SSM; 3 *Perwira* coastal, 3 river patrol craft (; 2 *Loadmaster* landing craft, 24 assault boats, 1 special boat sqn	100 1 HS-748 tpt, 2 *Cherokee* lt ac, 2 Bell 206, 6 BO-105 COIN, 11 Bell 212 (1 VIP), 1 HS-76 (VIP) hel	1,750 (Police)
Fiji	645	1,529	11.3 (est.)	2,051	1,924 2 inf bns 1 engr sqn 1 arty tp Spt units	4 25-pdr guns/how; 10 81mm mor	127 3 ex-US *Bird*-class coastal mine-sweepers; 3 marine survey vessels	–	1,488 (Police)
Papua New Guinea	3,200	2,682	38.0	3,775*	3,400 2 inf bns 1 engr bn Log units	–	300 4 *Attack*-class large patrol craft; 2 310-ton landing craft	75 1 tpt sqn with 4 C-47, 6 *Nomad* MR ac	400 (Police)

* All services form part of the Army.

Latin America

CONTINENTAL TREATIES AND AGREEMENTS

The Act of Chapultepec. Signed by Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the US, Uruguay, and Venezuela in March and April 1945, this Act declared that if any aggression across boundaries established by treaty occurred, or was threatened, the signatories would consult and agree upon measures up to and including the use of armed force to prevent or repel such aggression.

The Inter-American Treaty of Reciprocal Assistance (Treaty of Rio). Signed in September 1947 by all parties to the Act of Chapultepec except Ecuador and Nicaragua, this Treaty expands the Act, constrains signatories to the peaceful settlement of disputes among themselves, and provides for collective self-defence should any member party be subject to external attack. Since coming into force on 3 December 1948, it has been invoked some 12 times. Cuba withdrew in March 1960.

The Charter of the Organization of American States (OAS). Dated April 1948, this embraces declarations based upon the Treaty of Rio. The members of the OAS—the signatories to the Act of Chapultepec plus Antigua and Barbuda, Barbados, Dominica, El Salvador, Grenada, Jamaica, St Lucia, St Vincent, Suriname, and Trinidad and Tobago—are bound to peaceful settlement of internal disputes and to collective action in the event of external attack upon one or more signatory states. Amendments (Rio, 1965; Bogotá, 1966) reiterated the goal of peaceful settlement of disputes. In 1965–6 an Inter-American Peace Force was formed for service in the Dominican Republic. Subsequent attempts to create a permanent force have failed, but an Inter-American Defence Board has been formed to co-ordinate planning. Declarations condemning Communism in the Western Hemisphere, signed in Bogotá in 1948 by 17 nations (Brazil, Chile, the Dominican Republic, and the US abstaining), were reiterated at Caracas (1954, 1973), San José (1960), Punta del Este (1962), and Washington (1972). In 1962 the Foreign Ministers and, later, the Council excluded Cuba. In 1975 the OAS agreed to normalize relations with Cuba.

Treaty for the Prohibition of Nuclear Weapons in Latin America (The Tlatelolco Treaty). This was signed in February 1967 by 25 Latin American countries, 24 of which have ratified it (Argentina has not). Brazil and Chile will not implement it until all other Latin American states have done so. Cuba and Guyana have not signed it. The Treaty is not, therefore, in force for those five countries. Britain and the Netherlands have ratified it for the territories within the Treaty area for which they are internationally responsible and, with France and the US, have signed Protocol I (which commits states outside the region to accept, for their territories within it, the Treaty restrictions regarding the emplacement or storage of nuclear weapons); Britain, China, France, the USSR, and the US have signed Protocol II (an undertaking not to use or threaten to use nuclear weapons against the parties to the Treaty). The parties have set up an Agency to monitor compliance with the Treaty.

OTHER AGREEMENTS

The 1903 treaty with the Republic of Panama, granting the United States virtual sovereign rights over

the Canal Zone in perpetuity, was renegotiated, and the resulting 1977 Treaties came into force in October 1979. About 40% of the former Canal Zone will remain under US control until 31 December 1999. Panama received 11 of 14 US bases. Defence of the Canal will be the joint responsibility of both nations, with Panama assuming an increasing role until the total accession of the Canal to her sovereignty.

Belize (British Honduras) became independent on 21 September 1981. Britain agreed to leave troops as protection and for training the Belizean defence forces 'for an appropriate time'. The US is providing aid and training. Britain, Barbados, Bahamas, Canada, Guyana, Jamaica, and Trinidad and Tobago will meet and consult in the event of a threat to Belize's independence.

In July 1965 El Salvador, Guatemala, Honduras, and Nicaragua agreed to form a military bloc, with a Defence Council, reportedly to co-ordinate measures against possible Communist aggression. This may now be in abeyance. In November 1981 El Salvador, Guatemala, and Honduras agreed an informal alliance against Cuba, Nicaragua, and domestic guerrilla movements in each. What mutual action is to be taken is unclear. A similar regional grouping, *Communidad Democrática Centroamericana*—Costa Rica, Honduras, and El Salvador—agreed in January 1982 to provide mutual aid in case of external aggression. Colombia, Venezuela, and the US are 'observer' members.

The United States has had a bilateral agreement with Cuba for jurisdiction and control over Guantánamo Bay since 1934. In 1960 the US stated that it could be modified or abrogated only by mutual agreement and that she had no intention of giving such an agreement. In 1941 it leased 2.3 square miles from Bermuda for a naval and air base. This lease continues.

The United States has bilateral military sales arrangements at varying levels with most countries of the region and concluded a status of forces agreement with Antigua in 1977/8. The Soviet Union has no formal defence agreements with any of the states in the area.

Argentina and Brazil design and manufacture for export their own military equipment; some is sold in Latin America. Chile assembles *Mirage* 50 aircraft and light AFV under licence.

ARGENTINA

Population: 28,000,000.
Military service: Army and Air Force 1 year, Navy 14 months.
Total armed forces: 180,500 (118,000 conscripts).
GNP 1981: 548,576 bn pesos ($124.6 bn).
Estimated defence expenditure 1981: 44,400 bn pesos ($10.08 bn).[1]
GDP growth 1981: 6.1%.
Inflation: 87.6% (1980), 131.3% (1981).
$1 = 4,402.7 pesos (1981).

Army: 125,000 (90,000 conscripts).
5 army corps.
2 armd cav bdes (6 armd cav regts).
3 mech inf bdes (2 more forming), each with 3 regts, plus armd, arty, and engr bns.
3 mountain bdes.
1 jungle bde.
1 AB bde.
10 arty groups.
4 indep armd cav regts (1 Guard).
1 mech recce gp (regt sized).
1 AD gp (regt) of 4 AD bns.
1 engr gp (regt), 4 engr bns.
1 aviation bn (4 dets).
125 M-4 *Sherman*, 160 *TAM* MBT; 50 M-41, 60 AMX-13 lt tks; VBC-90 armd cars;[1] 300 AMX-VTP, some 100 *TAM* VCPT MICV; 75 M-3, 250 M-113, 120 Mowag *Roland*, 5 BDX APC; 20 M-59 155mm towed guns,[1] 200 105mm incl pack,[1] 70 M-114 155mm towed,[1] 20 105mm, 24 Mk F3, 6 M-109 155mm SP how; 81mm, 120mm mor; 127 *Kuerassier* 105mm SP ATK guns; 75mm, 89mm, 90mm, 105mm RCL; SS-11/-12, *Bantam*, *Cobra*, *Mamba* ATGW; 30mm, 40mm, 90mm AA guns; *Tigercat*, *Blowpipe*, 4 *Roland* SAM.[1]
Aircraft and hel: 3 G-222, 3 DHC-6, 5 *Turbo-Commander* 690A, 1 *Sabreliner*, 4 *Navajo*; 3 *Turbo-Porter*, 4 *Merlin* IIIA, 4 *Queen Air*; Cessna: 15 182, 20 U-17A/B, 5 207, 1 *Citation*, 5 T-41 ac; 7 A-109;[1] Bell: 7 206, 20 UH-1H,[1] 4 47G, 4 212; 6 FH-1100, 1 CH-47C, 2 SA-315B *Lama*, 8 SA-330 *Puma* hel.[1]
(On order: 85 *TAM* MBT; 7 Puma, 9 A-109 hel.)

RESERVES: 250,000: National Guard, 200,000; Territorial Guard 50,000.

Navy: 36,000 (18,000 conscripts), incl naval air force and marines.
3 submarines: 2 Type 209, 1 ex-US *Guppy*.
1 ex-Br *Colossus* aircraft carrier (capacity 14 A-4, 6 S-2 ac; 4 S-61 hel).
8 destroyers: 2 Type 42 with 4 *Exocet* SSM, 1 × 2 *Sea Dart* SAM, 1 *Lynx* hel; 6 ex-US (3 *Sumner*, 1 *Gearing* with 4 *Exocet*; 2 *Fletcher*).
3 ex-Fr A-69 corvettes with 2 *Exocet* SSM.[1]
6 patrol ships: 2 ex-US *Cherokee*, 2 *King* (1 trg), 2 ex-US *Sotoyomo*.
1 large patrol vessel.
2 TNC-45 FAC(G).
4 *Dabur* FAC(P).
2 ex-US *Higgins* FAC(T)(.
6 ex-Br *Ton* coastal minesweepers/hunters.
1 LSD, 2 LST, some LCVP, 4 LCM(.
1 14,000-ton fleet tanker, 1 fleet spt, 1 tpt ships.
(On order: 4 TR-1700, 2 TR-1400 submarines, 4 *Meko* 360 destroyers, 6 *Meko* 140 corvettes.)

Bases: Buenos Aires, Río Santiago, Puerto Belgrano, Mar del Plata, Ushuaia.

NAVAL AIR FORCE: (3,000); 28 combat aircraft.[1]
1 attack sqn with 11 A-4Q, 4 *Super Etendard*.[1]
1 MR sqn with 5 S-2E, 5 SP-2H, 3 P-95 (EMB-111) *Bandeirante* (on loan).
1 tpt sqn with 3 *Electra*, 1 HS-125, 3 F-28.
1 liaison sqn with 8 *Super King Air*, 5 *Queen Air*, 3 *Turbo-Porter*.
Hel incl 7 S-61D/NR, 9 *Alouette* A-103(III), 4 WG-13 *(Sea Lynx)*.
3 trg sqns with 7 EMB-326GB, 15 T-34C, 12 T-28, 10 MB-339A.[1]
ASM: AM-39 *Exocet*.[1]
(On order: 8 *Super Etendard* fighters, 6 WG-13 hel.)

MARINES: (10,000).
2 Fleet Forces (each one weak bde), 1 amph spt force:
5 marine inf bns.
1 cdo bn.
1 amph bn.
1 fd arty bn.
1 AD bn.
1 sigs bn.
1 service bn.
6 indep inf coys.
20 LVTP-7,[1] 15 LARC-5, 6 Mowag *Roland* APC; 105mm how;[1] 81mm, 106mm mor; 75mm, 105mm RCL; *Bantam* ATGW; 30mm AA guns; 10 *Tigercat* SAM.
(On order: 12 Panhard ERC-90 *Lynx* armd cars.)

Air Force: 19,500 (10,000 conscripts); some 97 combat ac, 20 armed hel.[1]
6 air bdes.
1 bbr sqn with 7 *Canberra* B-62, 2 T-64.[1]
5 FGA sqns: 3 with 40 A-4P *Skyhawk*; 2 with 15 MS-760A *Paris* II.[1]
3 FGA/interceptor sqns: 1 with 12 *Mirage* IIIEA, 2 IIIDA; 2 with 6 *Dagger (Nesher)*.[1] (Some 31 of these are reported destroyed.)
2 COIN/trg sqns with 31 IA-58A *Pucará*.[1]
1 COIN hel sqn with 14 Hughes 500M, 6 UH-1H.
1 SAR hel sqn with 6 *Lama*, 2 S-58T.
5 tpt sqns with 1 Boeing 707-320B, 6 C-130E/H, 1 *Sabreliner*, 3 *Learjet* 35A, 5 C-47, 12 F-27, 7 F-28, 6 DHC-6, 15 IA-50 *Guaraní* II, 2 *Merlin* IVA ac.
1 Antarctic sqn with 2 DHC-2, 3 DHC-3, 1 LC-47 ac; 3 S-61R/NR, 6 UH-19, 3 CH-47C (SAR); Bell: 4 UH-1D, 4 47G, 8 212 hel.
1 comms sqn with 14 *Shrike Commander*.
Trainers incl 24 *Paris*, 48 T-34C,[1] 35 Cessna 182.
AAM: R-530. ASM: AS-11/-12.
(On order: 10 *Mirage* 5, 24 *Skyhawk* FGA; 11 IA-58 *Pucará* COIN; 16 *Turbo-Commander* tpts; 10 MB-339 trg ac.)

Para-Military Forces: 43,000. Gendarmerie 12,000: *Shorland* armd cars, 40 M-113 APC, 20 lt ac, 10 hel under Army command, mainly for frontier duties. Argentine Naval Prefecture (coastguard) 9,000: 4 large, 20 coastal patrol craft (5 corvettes on order), 13 ac incl 5 C-212, 4 *Skyvan*, 6 Hughes 500M, 3 *Puma* hel. Federal Police 22,000: APC, 4 hel.

BOLIVIA

Population: 5,600,000.
Military service: 12 months, selective.
Total armed forces: 26,600.
GNP 1981: 181.37 bn pesos ($7.4 bn).
Defence expenditure 1981: 4.356 bn pesos ($177.7 m).
GDP growth 1980: 0.6%.
Inflation: 23.9% (1980), 35.0% (1981).
$1 = 24.51 pesos (1981).

[1] See p. 140 for footnotes.

Army: 20,000.
3 corps, 10 div HQ.
4 cav regts (horsed).
2 mech regts (each 2 bns).
13 inf regts (incl 1 Presidential Guard, 1 mountain), each with 2 bns.
3 arty regts.
1 armd (ATK) bn.
2 ranger bns.
1 para bn.
6 engr bns.
10 *Scorpion* lt tks; EE-9 *Cascavel* armd cars; 18 M-113, 10 V-100 *Commando*, 20 Mowag *Roland*, 24 EE-11 *Urutu* APC; 26 75mm guns; 25 M-116 75mm pack, 25 M-101 105mm how; 60mm, 80mm mor; 36 *Kuerassier* 105mm SP ATK guns.

Navy: 2,600.
1 transport.
36 lake and river patrol craft (35().

Bases: Tiquina, Puerto Suárez, Riberalta, Trinidad, Puerto Villarroel, Guaramerin.

Air Force: 4,000; 22 combat ac.
1 fighter/trg sqn with 12 T-33A/N.
2 COIN sqns with 10 AT-6G.
1 SAR hel sqn with 8 SA-315B *Gaviao (Lama)*.
Tpts incl 1 DC-6B, 1 *Electra*, 1 L-100-30, 1 C-130H, 1 *Sabreliner*, 1 *Learjet*, 5 *Arava*, 3 CV-440, 3 CV-580, 6 C-47, 1 *Super King Air*, 6 F-27.
Liaison ac incl 1 *Turbo-Porter;* 25 Cessna: 3 *Turbo-Centurion*, 11 185, 9 *Stationair*, 1 402, 1 421.
2 trg sqns with 10 T-6G, 6 T-41D, 18 T-23 *Uirapuru*, 6 SF-260M, 20 PC-7 *Turbo-Trainer*.
1 para bn.
1 airbase defence regt (Bofors L/40mm AA guns).
(On order: 52 F-104 *Starfighter* ac; 3 *Lama* hel.)

Para-Military Forces: 5,000. *Carabineros*, National Police.

BRAZIL

Population: 125,000,000.
Military service: 12 months.
Total armed forces: 272,850 (133,900 conscripts).
GNP 1980: 12,700 bn cruzeiros ($240.98 bn).
Defence expenditure 1980: 106.44 bn cruzeiros ($2.02 bn).
GDP growth: 8% (1980), −3.5% (1981).
Inflation: 110% (1980), 95.2% (1981).
$1 = 52.7 cruzeiros (official).

Army: 182,750 (132,000 conscripts).
2 army, 2 regional comds, 8 military regions, 7 div HQ.
1 armd car bde.
3 armd inf bdes.
5 mech cav bdes.
1 mech inf bde.
11 motor inf bdes.
1 mixed, 1 para bdes.
2 lt 'jungle' inf bdes.
2 engr gps.
75 M-4 MBT; some 250 M-3A1, some 300 M-41 lt tks; 138 EE-9 *Cascavel*, M-8 armd cars; some 120 EE-11 *Urutu*, some 60 M-59, some 600 M-113 APC; 500 M-116 75mm pack, 413 105mm, 135 M-114 155mm towed, some 60 M-7 and M-108 105mm SP how; some 240 57mm to 304.8mm (12-in naval) coast arty guns; 81mm, 4.2-in, 120mm mor; SS-60 108mm MRL; 240 M-18A1 57mm RCL; 3.5-in RL; 106mm RCL; 300 *Cobra* ATGW; 30 35mm, 30 40mm, some 180 57mm, 90mm AA guns; 4 *Roland* II SAM.
(On order: 50 X-1A2 lt tks; SS-60 (FGT-X40) 300mm MRL.)

RESERVES: Trained first line 1,115,000: 400,000 subject to immediate recall. Second line (limited trg) state military police schools, centres: 225,000.

Navy: 47,300 incl naval air force, marines (1,900 conscripts).
8 submarines: 3 *Oberon*, 5 ex-US *Guppy* II/III.
1 ex-Br *Colossus* aircraft carrier (capacity 20 ac, incl 7 S-2A ASW ac; 4 *Sea King* hel).
12 ex-US destroyers: 5 *Sumner* (1 with 1 × 4 *Seacat* SAM, 4 with 1 *Wasp* hel); 2 *Gearing* with ASROC, 1 *Wasp* hel; 5 *Fletcher*.
6 *Niteroi* frigates with 2 × 3 *Seacat* SAM, 1 *Lynx* hel: 2 with 2 × 2 *Exocet* SSM, 4 with *Ikara* ASW.
10 *Imperial Marinheiro* patrol vessels.
5 river patrol ships; 2 *Pedro Teixeira*, 3 *Roraima*.
1 river monitor with 1 × 3-in, 2 × 40mm, 6 × 20mm guns.
6 *Piratini* large patrol craft.
6 *Schütze* coastal minesweepers.
2 ex-US LST; 4 ex-US 1610 LCU.
3 tp, 1 river tpts.
1 repair, 1 spt, 2 tanker, numerous auxiliary ships.
(On order: 1 submarine, 4 corvettes.)

Bases: Rio de Janeiro, Aratu (Salvador), Val-de-Caes (Belem), Natal, Ladario (Mato Grosso).

NAVAL AIR FORCE: (13,100); 13 combat hel.
2 ASW sqn with 4 SH-3D *Sea King*, 9 *Lynx* Mk-89 hel.
1 liaison sqn with 9 *Wasp*, 7 AB-206B, 6 AS-350M *Esquilo* hel.
1 trg sqn with with 10 AB-206B hel.

MARINES: (14,500).
Fleet Force: 1 amph div (1 comd, 3 inf, 1 service bns, 1 arty gp).
1 Reinforcement Comd: 5 bns incl 1 engr, 1 special operations, supply.
Internal Security Force: 9 Regional Gps.
EE-9 *Cascavel* armd cars; EE-11 *Urutu* APC; 105mm how.

Air Force: 42,800; 227 combat ac.
Air Defence Command: (15 combat ac)
1 interceptor sqn with 13 *Mirage* IIIEBR, 2 DBR.
Tactical Command: (183 combat ac)
2 FGA sqns with 32 F-5E, 4 F-5B.
8 COIN/recce sqns with 139 AT-26 *Xavante* (11 RT-26 recce); 8 RC-95 (photo/lt observation).
Maritime Command: (29 combat ac)
1 ASW sqn with 8 S-2E, 9 S-2A (7 in carrier).
1 MR sqn with 12 P-95 (EMB-111).
4 SAR sqns with 3 RC-130E, 8 SC-95 ac; 2 Bell 47G, 6 SA-330 *Puma* hel.
Transport Command:
1 hel sqn with 9 UH-1D.
13 tpt sqns with 2 Boeing 737, 31 EMB-810C (U-7/A) *Seneca* II, 9 C-130E/H, 2 KC-130H, 8 HS-125, 1 *Viscount*, 12 HS-748, 19 DHC-5, 98 EMB-110 *Bandeirante* (58 C-95, 20 C-95A, 20 -B), 5 EMB-121 (VU-6) *Xingu*, 5 C-47 ac.
3 liaison sqns with 62 U/LU-42 *Regente* ac; 23 UH-1H hel.
Training Command:
50 T-23 *Uirapuru* (being replaced by 100 YT-17), 86 T-25 *Universal* (being replaced by T-27), 59 AT-26 ac; 16 Bell 47 (H-13J) hel.
1 calibration unit: 2 HS-125, 2 C-95A, 4 EC-95.
AAM: R-530, *Piranha*.
(On order: 88 AM-X, 12 EMB-120 *Brasilia* tpts, 100 YT-17 *Tangara*, 115 T-27 *Tucano* (EMB-312) trg ac, 8 UH-1H *Iroquois* hel.)

Para-Military Forces: Some 185,000 Public Security Forces; state, private militias in addition.

CHILE

Population: 11,300,000.
Military service: 1 year (Army and Navy only).
Total armed forces: 97,000 (31,600 conscripts).
GDP 1980: 1,095 bn pesos ($28.08 bn).
Estimated defence expenditure 1980: 56 bn pesos ($1.436 bn).
GDP growth 1980: 6.5%.
Inflation 1980: 31.2%.
$1 = 39.00 pesos (1980), 37.25 pesos (1979).

Army: 53,000 (30,000 conscripts).
6 div HQ.
2 armd regts.
8 cav regts (2 mech, 6 mot).
24 inf regts (18 with 2 bns, 6 mountain with 1 bn each).
12 arty bns (6 fd, 6 mountain).
7 engr bns.
1 hel-borne ranger unit.
2 btys *Cactus (Crotale)* SAM.
140 mod M-4, 21 AMX-30 MBT; 10 M-3, 50 M-41, 47 AMX-13 lt tks; 30 EE-9 *Cascavel* armd cars; 75 M-113, 30 EE-11 *Urutu*, 20 *Piranha* APC; 30 M-56 105mm pack, 115 105mm how; 8 Mk F3 155mm SP how; 81mm, 120mm mor; 106mm RCL; *Milan* ATGW; 20mm, 35mm AA guns; 12 *Cactus* SAM; 6 CASA C-212 tpts, 2 *Cherokee*, 4 *Navajo*, 4 O-1E, 18 R-172 *Hawk* XP, 1 *Skymaster* liaison/trg ac; 14 *Puma*, 10 *Lama*, 2 AB-206 hel.
(On order: *Piranha* APC.)

RESERVES: 160,000.

Navy: 29,000 (1,600 conscripts), incl naval air, and marines.
3 submarines: 2 *Oberon*, 1 ex-US *Balao*.
3 cruisers: 1 ex-Swed *Gota Lejon;* 2 ex-US *Brooklyn* with 1 hel.
7 destroyers: 1 ex-Br *County* with 4 *Exocet* SSM, 1 × 2 *Seaslug*, 2 × 4 *Seacat* SAM; 2 *Almirante* with 4 *Exocet*, 2 × 4 *Seacat;* 2 ex-US *Sumner* with 1 hel; 2 ex-US *Fletcher*.
5 frigates: 2 *Leander* with 4 *Exocet* SSM, 1 × 4 *Seacat* SAM, 1 hel; 3 ex-US *Lawrence* with 2 LCU.
2 *Reshef* FAC(M) with 6 *Gabriel* SSM.
4 Lürssen-type FAC(T).
6 large patrol craft: 4 ex-US (2 *Sotoyomo*, 1 *Cherokee*, 1 PC-1638), 2 25-metre.
26 coastal patrol craft(, incl 4 *Dvora*, 10 *Anchova*.
2 511-1152 LST, 2 *Batral*-class lt tpts, 2 LCM, 11 LCVP.
2 tankers, 5 transports.
(On order: 2 Type 209 submarines; 1 *County* destroyer; 4 LST; 1 tanker.)

Bases: Talcahuano, Valparaiso, Puerto Montt, Punta Arenas, Puerto Williams, Iquique.

NAVAL AIR FORCE: (500); 6 combat aircraft.
1 ASW sqn with 6 EMB-111.
1 SAR/liaison sqn with 3 EMB-110C(N) *Bandeirante*, 4 CASA C-212, 1 *Navajo*.
1 SAR/liaison hel sqn with 10 *Alouette* III, 2 S-58, 4 Bell 206, 12 Bell 47G.
Trainers: 8 PC-7 *Turbo-Trainer*.

MARINES: (5,000).
1 bde.
1 embarked bn.
Coast-defence units.
5 dets.

Air Force: 15,000; 84 combat aircraft.
3 FGA sqns with 16 *Hunter* F-71, 4 *Hunter* T-77, 15 F-5E, 3 F-5F.
3 COIN sqns with 32 A-37B.
1 fighter sqn with 8 *Mirage* 50C.
1 SAR hel sqn with 6 S-55.
1 tpt sqn with 1 Boeing 727, 2 C-130H, 1 DC-6B, 5 C-47.
2 utility sqns with 16 DHC-6, 3 *Twin Bonanza*.
1 hel sqn with 1 *Puma*, 10 UH-1H.
4 trg sqns with 30 T-34A, 25 T-37B, 8 T-41, 9 Beech 99, 1 CASA C-101, 10 T-25 *Universal*, 5 Piper *Pillan*.
AAM: *Sidewinder, Shafrir*. ASM: AS-11/-12.
1 AA arty regt.

(On order: 12 *Mirage* 50 fighters, 20 T-25, 7 C-101 *Aviojet*, F-8L *Falco* trg ac.)

Para-Military Forces: 27,000 *Carabineros*, with 15 Mowag MR-8 APC, 14 Cessna 310, 4 *Metroliner* ac, 6 BO-105, 1 FH-1100 hel. (On order: 10 lt patrol craft.)

COLOMBIA

Population: 27,520,000.
Military service: 2 years.
Total armed forces: 67,800 (28,500 conscripts).
GNP 1980: 1,548 bn pesos ($32.74 bn).
Defence expenditure 1980: 14.235 bn pesos ($301.1 m).
GDP growth 1980: 4.0%.
Inflation 1980: 24.6%.
$1 = 47.28 pesos (1980).

Army: 57,000 (28,500 conscripts).
10 inf bdes ('Regional Bdes') each 3 inf, 1 arty, 1 engr gp, 1 mech or horsed cav gp.
1 trg bde, incl Presidential Guard.
M-4A3 MBT,[2] 12 M-3A1 lt tks[2]; M-8 armd cars; 45 M-3A2, M-113A1 APC; 48 M-101 105mm how; mor; 40mm AA guns.
(On order: MBT; EE-3 *Jararaca*, 200 EE-9 *Cascavel* armd cars; EE-11 *Urutu* APC; fd arty; 12 UH-1H hel.)

RESERVES: 70,000.

Navy: 7,000 incl 3,000 marines.
2 Type 209 submarines.
2 SX-506 midget submarines (in reserve).
3 destroyers: 2 *Halland* (1 in reserve), 1 ex-US *Sumner*.
1 ex-US *Courtney* frigate.
3 large patrol craft (ex-US *Cherokee*).
4 gunboats: 3 *Arauca*, 1 *Barranquilla*.
2 coastal, 8 river patrol craft(.
3 marine bns.
(On order: 4 FV-1500 corvettes.)

Bases: Cartagena, Buenaventura.

Air Force: 3,800; 28 combat ac, 10 armed hel.
1 fighter/recce sqn with 12 *Mirage* 5COA, 4 5COR/D.
1 COIN sqn with 12 AT-33A.
1 recce hel sqn with 10 Hughes 500C (OH-6A).
Tpts incl 2 C-130E, 4 C-54, 20 C-47, 2 HS-748, 3 *Arava*, 1 F-28, 10 DHC-2.
Other hel incl 10 UH-1B/H, 12 Hughes 500M.
Trainers incl 8 T-37C, 27 T-41D, 3 RT-33, 12 T-33A, 25 T-34A/B, 10 A-37B ac; 8 Bell 47 (OH-13) hel.
AAM: R-530.
(On order: 12 *Kfir* C-2 FGA; 1 HS-748-2B, *Arava* tpt ac; AAM; ASM.)

Para-Military Forces: 50,000 National Police Force, 1 HS-748 ac, 30 hel; Coastguard, 9 craft.

CUBA

Population: 9,900,000.
Military service: 3 years.
Total armed forces: 127,500.
Estimated GNP 1980: $18.4 bn.
Estimated defence expenditure 1980: 811 m pesos ($1.126 bn).
$1 = 0.72 pesos (1980).

Army: 100,000.
9 inf divs (some mech).
Some arty bdes.
60 IS-2, 400 T-34, 200 T-54/-55, T-62 MBT; PT-76 lt tks; BRDM-1/-2 armd cars; BMP MICV, 400 BTR-40/-60/-152 APC; 76mm, 85mm, 122mm, 130mm, 152mm guns/how; 100 SU-100 SP guns; 50 *FROG*-4 SSM; 57mm ATK guns; 57mm RCL; *Sagger*, *Snapper* ATGW; ZU-23, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4, 30mm M-53 (twin)/BTR-60P SP AA guns; SA-7 SAM.

RESERVES: Ready Reserves 190,000; to fill out Regular and 18 Reserve inf (some mech) divs.

Navy: 11,500.
3 ex-Sov submarines: 2 F-, 1 (non-operational) W-class.
1 ex-Sov *Koni*-frigate.
10 ex-Sov large patrol craft: 9 SO-1, 1 *Kronshtadt*.
26 ex-Sov FAC(M) with *Styx* SSM: 5 *Osa*-I, 13 *Osa*-II, 8 *Komar*(.
24 ex-Sov FAC(T): 6 *Turya*, 6 P-6(, 12 P-4(.
16 ex-Sov *Zhuk* FAC(P)(; 12 coastal patrol craft(.
9 ex-Sov minesweepers; 2 *Sonya*, 7 *Yevgenya*(.
7 T-4 LCM.
Some 50 *Samlet* coast-defence SSM (may not be operational).

Bases: Cienfuegos, Cabanas, Havana, Mariel, Punta Ballenatos, Banes.

Air Force: 16,000, incl air defence forces; 189 combat ac, 12 armed hel.
4 FGA sqns: 2 with 30 MiG-17; 2 with 20 MiG-23BN *Flogger* F.
14 interceptor sqns: 2 with 30 MiG-21F; 3 with 34 -21PFM; 2 with 20 -21PFMA; 6 with 70 -21bis; 1 with 15 MiG-23 *Flogger* E.
4 tpt sqns: 20 Il-14, 12 An-2, 2 An-24, 20 An-26.
7 hel sqns: 60 Mi-4, 40 Mi-8, 12 Mi-24.
Trainers incl 2 MiG-23U, 10 MiG-21U, some An-2, 30 Zlin 326.
AAM: AA-1 *Alkali*, AA-2 *Atoll*, AA-8 *Aphid*.
30 SAM bns with 200 SA-2/-3/-6.

Forces Abroad: Angola 18,000; Congo 750; Ethiopia 13,000; Mozambique 750; Other Africa 500; S. Yemen 800; Nicaragua 2,000; Grenada 300.

Para-Military Forces: State Security 15,000. Frontier Guards 3,500, 20 craft. Youth Labour Army 100,000. Territorial Militia 50,000.

DOMINICAN REPUBLIC

Population: 5,900,000.
Military service: voluntary.
Total armed forces: 24,500.
GNP 1981: 7.1 bn pesos ($7.1 bn).
Defence expenditure 1981: 117.8 m pesos ($117.8 m).
$1 = 1 peso (1981).

Army: 14,000.
3 inf bdes.
1 arty bn.
1 mixed armd bn.
1 Presidential Guard bn.
1 engr bn.
20 AML armd cars; 6 V-150 *Commando*, 25 M-3A1 half-track APC; 20 M-101 105mm how.

Navy: 4,500, incl naval inf.
1 ex-Can *River* frigate.
5 ex-US corvettes: 2 *Admirable* (ex-minesweepers), 3 *Cohoes*.
5 large patrol craft (3 ex-US *Argo*, in reserve).
8 coastal patrol craft(.
1 LSM, 1 LCU.
1 naval inf bn.
(On order: PTF-23 patrol boats.)

Bases: Santo Domingo, Bani, Haina.

Air Force: 6,000; 13 combat aircraft.
1 fighter/trg sqn with 10 F-51D *Mustang*, 3 A-37B.
1 tpt sqn with 6 C-47, 1 Aero *Commander*.
Hel incl 1 SA-365 *Dauphin* 2, Bell 205, 3 *Alouette* II/III, 2 H-19, 2 UH-1, 2 UH-12E, 7 OH-6A.
Trainers incl 3 Cessna 170, AT-6, 4 T-41, T-34.
1 para gp.

Para-Military Forces: Gendarmerie 10,000.

ECUADOR

Population: 8,350,000.
Military service: 2 years, selective.
Total armed forces: 38,800.
GNP 1980: 271.05 bn sucres ($10.84 bn).
Defence expenditure 1980: 4.85 bn sucres ($194 m).
$1 = 25.0 sucres (1980).

Army: 30,000.
1 armd bde.
7 inf bdes.
1 para bde.
5 mech recce gps.
4 arty bns.
40 M-3, 130 AMX-13 lt tks; 45 AML-60/-90 armd cars; 15 M-113, 25 AMX-VCI APC; M-56 pack, 18 M-101 105mm towed, 10 Mk F3 155mm SP how; 28 M-167, 10 40mm AA guns; *Blowpipe* SAM; *Turbo-Porter*, 1 *Learjet*, 3 DHC-5D tpt ac; 20 hel.

Navy: 4,000 incl 1,000 marines.
2 Type 209 submarines.
2 ex-US *Gearing* destroyers.
1 ex-US *Lawrence* frigate.
3 Lürssen-type FAC(M) with 4 *Exocet* SSM.
3 *Manta* FAC(M) with *Gabriel* SSM.
2 ex-US PGM-71 large, 5 coastal patrol craft(.
1 511-1152 LST, 2 LSM (all ex-US).
1 *Super King Air*, 1 *Arava*; Cessna: 4 T-37G, 2 T-41, 1 320, 1 177, 3 T-34C ac; 2 *Alouette* III hel.
3 marine bns, one on garrison duties.
(On order: 6 *Esmeraldas* corvettes, *Exocet* SSM.)

Bases: Guayaquil, San Lorenzo, Galápagos Is.

Air Force: 4,000; 40 combat aircraft.
1 lt bbr sqn with 3 *Canberra* B-6.
1 FGA sqn with 5 *Jaguar* S, 2 *Jaguar* B, 10 *Kfir*.
1 interceptor sqn with 15 *Mirage* F-1JE, 2 F-1JB.
1 COIN sqn with 5 A-37B.
1 COIN/trg sqn with 8 BAC-167 *Strikemaster*.
Tpts incl 1 Boeing 727-2T3, 1 737, 4 *Electra*, 1 C-130H, 3 DC-6B, 5 HS-748 ac; 2 *Puma*, 6 *Alouette* hel.
Trainers incl 20 T-34C, 10 T-41.
AAM: R-550 *Magic*.
1 para sqn.
(On order: 10 F-5E, 2 F-5F fighter ac.)

Para-Military Forces: 5,800, National Civil Police.

EL SALVADOR

Population: 4,800,000.
Military service: conscription, selective, 1 year.
Total armed forces: 16,000.[3]
GNP 1981: 8.33 bn colones ($3.33 bn).
Defence expenditure 1981: 290.5 m colones ($116.2 m).
$1 = 2.50 colones (1981).

Army: 14,900 (being reorganized).
5 inf bdes (each 2 bns).
1 mech cav regt.
1 arty regt (2 bns).
1 engr bn.
1 AA arty bn.
1 para bn.
2 special forces gps.
12 AMX-13 lt tks; 12 AML-90 armd cars; 10 M-113, 20 UR-416 APC; 30 M-101 105mm how; 81mm mor; 57mm RCL; *LAW* RL.

Navy: 100.
4 armed patrol boats(.

Air Force: 1,000; 27 combat ac, 14 armed hel.

1 FGA sqn with 4 *Ouragan*, 6 A-37.
1 lt COIN sqn with 7 *Magister*, 6 *Rallye*.
1 recce unit with 4 O-2.
1 tpt sqn with 1 C-47, 25 *Arava*.
2 COIN hel sqns with 14 UH-1H hel.
Trg ac incl: 3 T-34, 10 T-6, 6 T-41.
Other hel: 1 *Alouette* III, 1 FH-1100, 1 *Lama*.
1 para bn.
(On order: 3 C-123 tpt ac; 6 UH-1H hel.)

Para-Military Forces: National Guard 4,000; National Police 3,000; Treasury Police 2,000; territorial civil defence committees 60–80,000.

GUATEMALA

Population: 7,260,000.
Military service: conscription; 24–30 months.
Total armed forces: 18,550 (being increased).
GNP 1981: 7.9 bn quetzal ($7.9 bn).
Defence expenditure 1981: 90.7 m quetzal ($90.7 m).
$1 = 1.0 quetzal (1981).

Army: 17,000.
4 Regional bde HQ.
1 Presidential Guard bde.
1 armd bn.
15 inf bns.
4 fd arty gps (12 btys).
1 para/special forces bn.
1 engr bn.
4 recce sqns.
10 M-41, 7 M-3A1 lt tks; 15 M-8, 10 RBY-1, M-3A1 armd cars; M-3 half-track, 10 M-113, 7 V-150 *Commando* APC; 12 75mm pack, 36 105mm how; 81mm, 12 4.2-in mor.

Navy: 950 incl 650 marines (4 coys).
15 coastal patrol craft(.
1 LCM.
2 small tp carriers.
6 *Zodiac*-type assault boats (marines).

Bases: Santo Tomás de Castillas, Sipacate.

Air Force: 600; 16 combat ac, 4 armed hel.
1 COIN sqn with 10 A-37B, 6 PC-7 *Turbo-Trainer*.
1 tpt sqn with 1 DC-6B, 10 C-47, 9 *Arava*, 1 *Super King Air* 200 (VIP).
1 maintenance sqn with Cessna: 12 172, 2 180, 4 U-206C, 1 310.
1 hel sqn with 4 armed UH-1H, 3 Bell 212, 6 412, 8 206B, 6 206L-1, 3 *Lama*, 4 *Alouette* III.
1 trg sqn with 5 PC-7 *Turbo-Trainer*, 12 T-41.

Para-Military Forces: National Police 9,500; Treasury Police 2,100.

HONDURAS

Population: 4,000,000.
Military service: conscription; 18–24 months.
Total armed forces: 11,700.
GNP 1981: 4.546 bn lempiras ($2.27 bn).
Defence expenditure 1981: 82.6 m lempiras ($41.3 m).
$1 = 2 lempiras (1981).

Army: 11,500.
1 armd car regt.
11 indep inf bns.
3 arty bns.
1 engr bn.
1 special forces unit.
17 *Scorpion* lt tks; 12 M-116 75mm pack, 12 M-101 105mm how; 81mm, 120mm mor; 57mm RCL.
(On order: 105mm how.)

Navy: 300.
6 *Swift* patrol craft: 2 105-ft fast, 4 65-ft coastal(.
(On order: 1 *Swift* 105-ft patrol craft.)

Base: Puerto Cortés.

Air Force: 1,200; 25 combat aircraft.
1 FGA sqn with 12 *Super Mystère* B2.
1 COIN sqn with 4 F-86F *Sabre*, 6 A-37B.
1 recce sqn with 3 RT-33A.
Tpts incl 2 C-54, 2 C-45, 1 C-47, 3 *Arava*, 1 *Westwind*.
1 liaison sqn with 2 Cessna 180, 2 185.
Hel: 2 UH-19D, 10 UH-1H.
1 trg sqn: 6 T-6, 24 T-28F, 5 T-41A.
(On order: A-37B COIN, T-37B trg ac.)

Para-Military Forces: 3,000 Civil Guard.

MEXICO

Population: 71,500,000.
Military service: voluntary, with part-time conscript militia.
Total armed forces: 119,500 regular, 250,000 part-time conscripts.
GNP 1981: 5,615 bn pesos ($229.04 bn).
Defence expenditure 1981: 34.4 bn pesos ($1.403 bn).
GDP growth 1980: 8.3%.
Inflation: 29.8% (1980), 28.7% (1981).
$1 = 24.515 pesos (1981).

Army: 95,000 regular, 250,000 conscripts.
1 inf div HQ.
1 mech bde gp (Presidential Guard) (3 bns).
2 inf bde gps (each of 2 inf, 1 armd recce, 1 arty bns).
1 para bde (2 bns).
1 recce regt.
1 armd bn.
35 Zonal Garrisons incl:
28 indep cav (being mech), 3 arty regts, 64 indep inf bns.
AA, engr, and support units.
40 M-3, M-5 lt tks; 70 M-3A1, M-8, 15 MAC-1 armd cars; 50 HWK-11, M-3 APC; M-116 75mm pack, M-101 105mm towed; 80 M-8 75mm, M-7 105mm SP how; 1,600 60mm, 81mm, and 120mm mor; 37mm ATK guns; 40 12.7mm AA guns.
(On order: 40 Panhard ERC-90 *Lynx* armd cars, AMX-10P MICV.)

Navy: 20,000, incl naval air force and marines.
4 ex-US destroyers: 2 *Fletcher*, 2 *Gearing*.
6 frigates: 4 ex-US *Lawrence/Crosley*, 1 *Durango*, 1 ex-US *Edsall* (trg ship).
34 ex-US patrol ships: 18 *Auk*, 16 *Admirable* ex-minesweepers.
32 *Azteca* large patrol craft.
15 patrol craft(: 4 *Polimar*, 2 *Azueta*, 1 *Guanajuato* coastal, 8 river.
3 tpts incl 2 ex-US 511-1152 LST; 1 repair ship, 6 fleet tugs.
(On order: 5 large patrol craft, 6 *Hawk* FAC.)

Bases: Gulf: Vera Cruz, Tampico, Chetumal, Ciudad del Carmen, Yukalpetén. Pacific: Acapulco, Ensenada, La Paz, Puerto Cortés, Guaymas, Mazatlán, Manzanillo, Salina Cruz, Puerto Madero, Lázaro Cárdenas.

NAVAL AIR FORCE: (350); 11 combat aircraft.
1 MR sqn with 11 HU-16 *Albatross*.
1 liaison sqn with 1 *Learjet* 24D, 1 DC-3, 2 F-27, 6 *Bonanza*, 4 *Baron;* Cessna: 4 150, 8 152, 1 337, 1 402; 1 Stearman N-2-55.
1 hel sqn with 1 *Alouette* II, 4 *Alouette* III, 5 Bell 47G, 2 UH-1H.
Trainers: 2 T-34B.

MARINES: (3,810).
3 bn HQ.
19 security coys.

Air Force: 4,500; 14 combat aircraft.
1 FGA sqn with 4 F-5E, 3 F-5F forming.
1 COIN sqn with 7 AT-33A.
1 SAR sqn with 18 LASA-60 ac; 7 *Alouette* III, 1 Hiller 12E hel.
1 Presidential (tpt) sqn with 2 Boeing 727, *Jetstar*, 1 BAC-111, 2 C-47.
4 tpt sqns with 5 Boeing 737, 1 DC-7, 2 C-118, C-54, 1 *Electra*, 25 C-47, 3 *Sabreliner*, 1 HS 125-400, 3 *Skyvan*, 12 *Islander*, 10 *Arava*, 2 Aero *Commander*, 1 DHC-5D.
1 hel sqn with: 5 *Puma*, 1 Bell 47G, 5 206B, 3 212, 10 205.
6 trg sqns: 2 with 20 T-6G; 4 with 45 T-28D.
Trainers incl 1 *Baron*, 20 Beech F-33-9, 34 *Musketeer*, 14 PC-7 *Turbo-Trainer*.
1 para bn.
(On order: 6 F-5E fighters.)

NICARAGUA

Population: 2,700,000.
Military service: regulars, voluntary; emergency conscription for militia.
Total armed forces: 21,500 (to be increased).
GNP 1981: 29.14 bn cordobas ($2.9 bn).
$1 = 10.05 cordobas (1981).

Army: 20,000 (plus Border Guard).
2 armd bns.
10 inf bns (being reorganized).
1 fd arty gp (2 btys).
1 engr bn.
1 AA arty bty.
3 M-4, 25 T-54/-55 MBT; 30 *Staghound* armd cars; 12 BTR-60 APC; 12 105mm how; 100 68mm *SARPAC* RL; 24 120mm mor; 48 ZIS-2 37mm AA guns.

Navy: 200.
4 *Dabur*, 1 Sewart, 9 other coastal patrol craft; 1 LCM.
(On order: 2 ex-Fr patrol craft.)

Air Force: 1,500, incl Air Defence; 8 combat ac.
4 T-33A, 4 T-28D COIN; 2 *Aviocar*, 1 *Arava*, 4 C-47 tpt ac; 1 OH-6A, 1 Hughes 500 hel.
AA units: 90 14.5mm, 23mm, and 37mm guns, SA-7 SAM.
(On order: 2 *Alouette* III hel.)

RESERVES: (all services): 60,000.

Para-Military Forces: Border Guard, some 5,000 (under Army). Civilian Militia, perhaps 50,000. Ministry of Transportation, 2 Mi-8 hel.

PARAGUAY

Population: 3,300,000.
Military service: 18 months; Navy 2 years.
Total armed forces: 16,000.
GNP 1981: 671.5 bn guaranies ($5.33 bn).
Defence expenditure 1981: 11.04 bn guaranies ($87.6 m).
$1 = 126 guaranies (1981).

Army: 12,500.
3 corps HQ.
1 cav div (bde) (2 mech cav regts, 1 inf bn, 1 arty bty).
7 inf divs (bn gps).
2 indep horsed cav regts.
2 indep inf bns.
1 Presidential Guard bn.
1 spt comd with arty, engrs, sigs.
14 M-4 med, 15 M-3A1 lt tks; 12 M-8 (mod) armd cars; 12 M-3 (mod) APC; 25 M-116 75mm pack, 48 M-101 105mm how; 20mm, 40mm AA guns.

Navy: 2,500 incl 500 marines and naval air.
2 *Humaita* river defence vessels.
3 corvettes (ex-Arg *Bouchard* minesweepers).
9 patrol craft: 1 large, 8 coastal(.
1 ex-US LSM.
1 marine 'regt' (bn).
1 C-47, 3 Cessna U-206, 1 Cessna 150M, 2 AT-6 trg ac; 4 OH-13 hel.

Bases: Asunción/Puerto Sajonia, Bahía Negra.

The Uruguayan Navy operates one Spanish-built C-212/200 Aviocar aircraft in a maritime reconnaissance role.

Air Force: 1,000; 28 combat aircraft.
2 COIN sqns: 1 with 8 EMB-326 *Xavante;* 1 with 20 AT-6G *Texan.*
1 tpt sqn with 3 DC-6B, 1 CV-131, 25 C-47, 1 *Dove,* 2 DHC-2.
1 liaison flight with 3 Cessna 185, 1 Cessna 337.
1 hel sqn with 7 OH-13A, 1 FH-1100, 2 UH-12E.
1 trg sqn with 8 T-23 *Uirapuru,* 10 T-6.
1 para regt (bn).
(On order: 10 EMB-110 tpts.)

Para-Military Forces: 4,000: civil police, internal security forces.

PERU

Population: 18,300,000.
Military service: 2 years, selective.
Total armed forces: 135,500 (51,000 conscripts).
GNP 1981: 8,316.8 bn soles ($19.5 bn).
Estimated defence expenditure 1981: 170 bn soles ($398.5 m).
GDP growth 1980: 3%.
Inflation: 60.8% (1980), 72.7% (1981).
$1 = 426.59 soles (1981).

Army: 75,000 (51,000 conscripts).
3 armd divs (bdes).
1 cav div: 2 horsed regts.
7 inf divs (bdes), each of 4 bns, 1 arty gp.
1 para-cdo div (bde).
1 jungle div (bde).
1 AA gp, 1 SAM gp.
4 engr bns.
3 armd recce sqns.
2 air sqns: 1 liaison, 1 hel.
350 T-54/-55, 25 M-4 MBT; 110 AMX-13 lt tks; M-8 armd, 50 M-3A1, 15 Fiat 6616 scout cars; 200 M-113, 40 *Chaimite,* 10 UR-416 APC; M-56 pack, 90 M-101 105mm, 122mm incl SP, 130mm, 155mm guns/how; 120mm mor; 40 40mm, 76mm towed, ZSU-23-4 SP AA guns; SA-3/-7 SAM; 41 Mi-8, 4 *Alouette* III hel.
(On order: 50 M-48A2 med tks; 100 SPz-12-3 MICV, 10 Fiat 6614, 150 M-113 APC; 2 *Nomad* lt tpt ac.)

Navy: 20,500 incl naval air, 1,400 marines; 12 combat aircraft, 10 armed hel.
10 submarines: 4 Type 209, 6 ex-US (2 *Guppy* 1, 4 *Abtao).*
3 cruisers: 2 ex-Neth *De Ruyter* (1 with 4 *Exocet* SSM, 3 hel), 1 ex-Br *Ceylon.*
9 destroyers: 2 ex-Br *Daring* with 8 *Exocet* SSM; 1 ex-US *Fletcher;* 6 ex-Neth (1 *Holland,* 5 *Friesland).*
2 *Carvajal* frigates with 8 *Otomat* SSM, 1 × 8 *Aspide* SAM, 1 hel.
6 PR-72P FAC(M) with 4 *Exocet* SSM.
5 river gunboats, 5 river, 4 lake patrol craft(.
3 ex-US LST, 2 ex-US LSM.
2 tpts, 3 replenishment, 3 spt tankers.
1 ASW sqn with 9 S-2E *Tracker.*
1 ASW hel sqn with 4 SH-3D, 6 AB-212.
1 MR sqn with 2 F-27MPA, 1 CASA C-212.
1 hel utility sqn with 10 Bell 206B, 6 UH-1D/H, 2 *Alouette* III.
Tpts: 3 C-47, 1 *Aztec.*
Trg: 6 T-34C ac; 4 Bell 47G hel.
1 Marine bde (1,400): 3 bns with amph veh, armd cars, twin 20mm AA guns, 84mm RL.
(On order: 2 Type 209 submarines, 2 frigates, 3 C-212 MR ac.)

Bases: Callao, San Lorenzo, Talara, Iquitos (river), Puno (lake), Madre de Dios (river).

Air Force: 40,000; 114 combat aircraft.
2 lt bbr sqns with 20 *Canberra* B-2/B(I)-8/B(I)-56.
5 FGA sqns: 2 with 14 *Mirage* 5P; 3 with 52 Su-22.
2 COIN sqns with 25 A-37B.
1 OCU with 2 *Canberra* T-4, 1 *Mirage* 5DP.
6 tpt sqns: 8 L-100-20, 1 DC-8-62, 16 An-26, 1 F-28, 10 DHC-6, 15 DHC-5, 6 *Turbo-Porter,* 5 C-47.
2 liaison sqns with 18 *Queen Air.*
4 hel sqns: 1 with 6 *Alouette* III; 1 with 15 Bell 47G; 1 with 17 Bell 212; 1 with 8 Mi-6, 7 Mi-8.
Trainers incl 4 Su-22UTI, 19 T-41, 26 T-37B/C.
ASM: AS-30.
(On order: 14 MB-339A COIN, 1 DC-8-62 tpt ac.)

Para-Military Forces: Guardia Civil: 25,000 with Mowag *Roland* APC; Coastguard with 11 large, 15 other patrol craft.

URUGUAY

Population: 3,000,000.
Military service: voluntary.
Total armed forces: 29,700.
GNP 1980: 89.5 bn pesos ($9.77 bn).
Estimated defence expenditure 1979: 1.676 bn pesos ($211.6 m).
$1 = 9.16 pesos (1980), 7.92 pesos (1979).

Army: 22,000.
4 div HQ (regional).
4 cav bdes.
3 inf bdes, each with 3 bns.
1 arty bde.
17 M-24, 29 M-3A1, 22 M-41 lt tks; FN-4-RM-62, 10 M-3A1 scout cars; 15 M-113 APC; 10 75mm guns; 25 M-101 105mm how.
(On order: 15 *Scorpion* lt tks.)

Navy: 4,700 incl naval air, naval infantry.
3 ex-US frigates: 1 *Dealey,* 2 *Cannon.*
1 *Auk* corvette.
4 large (1 *Adjutant,* 3 *Vigilante*), 7 coastal patrol craft(.
2 ex-US LCM, 3 LCU.
3 S-2A/G, 1 CASA C-212/200 *Aviocar* MR ac, 1 *Super King Air,* 6 SNB-5 (C-45) tpts, 2 SNJ-4/6, 9 T-28, 1 T-34B ac; 2 Bell 47G, 2 OH-13, 4 SH-34J, 1 Bell 222 SAR hel.
1 naval inf bn.
(On order: 6 S-2G *Tracker* MR ac.)

Base: Montevideo.

Air Force: 3,000; some 24 combat aircraft.
1 COIN sqn with 5 AT-33A, 8 A-37B, 5 IA-58B *Pucará.*
1 recce/trg sqn with 8 T-6G.
1 SAR sqn: 7 U-17A ac; 2 Bell 212, 6 UH-1B, 3 UH-1H, 2 H-23F hel.
3 tpt sqns with 4 C-212, 2 F-27, 3 Cessna 182A/D, 7 *Queen Air,* 6 EMB-110B/C, 2 FH-227 ac, 1 Bell 212 hel.
Trainers incl 6 T-41D, 25 T-34B.
(On order: IA-58B *Pucará* COIN ac.)

Para-Military Forces: Coastguard: 1,500 with 6 coastal patrol craft(.

VENEZUELA

Population: 17,000,000.
Military service: 18 months, selective.
Total armed forces: 40,800.
GNP 1980: 259.42 bn bolivares ($60.43 bn).
Estimated defence expenditure 1980: 3.703 bn bolivares ($862.7 m).
GDP growth 1980: −1.2%.
Inflation: 19.6% (1980), 14.0% (1981).
$1 = 4.2925 bolivares (1980).

Army: 27,000.
5 div HQ (regional), 10 bde HQ.
1 armd bde (2 med, 1 lt tk bns).
1 Ranger bde.
1 cav regt (horsed).
26 inf bns.
4 arty gps, 1 AA arty gp.
5 engr bns.
75 AMX-30 MBT, 40 AMX-13 lt tks; AML-60/-90, 12 M-8 armd cars; AMX-VCI, V-100 APC; 75mm pack, M-56 105mm pack, 35 M-101 105mm towed, 20 Mk F3 155mm SP how; 81mm, 120mm mor; 40 M-18 76mm SP ATK guns; 106mm RCL; SS-11, AS-11 ATGW; 40mm AA guns.
Army Aviation:
1 tpt sqn with 2 *Arava,* 1 *Islander,* 1 *Queen Air,* 2 *King Air.*
1 hel sqn with 3 Bell 206B, 6 UH-1D/H.

Navy: 9,000 incl naval air and marines.
3 submarines: 2 Type 209, 1 ex-US *Guppy* II.
2 ex-US *Sumner* destroyers (1 with 1 hel).
6 frigates: 4 *Sucre* with 8 *Otomat* SSM, 1 × 8 *Aspide* SAM, 1 hel; 2 *Almirante Clemente*.
3 Vosper Thornycroft FAC(M) with 2 *Otomat* SSM.
3 Vosper Thornycroft FAC(G).
2 LST, 2 LSM, 2 transports, 12 LCVP (all ex-US).
(On order: 2 Type-209 submarines, 2 *Sucre (Lupo)* frigates.)

NAVAL AIR: 6 combat aircraft, 6 armed hel.
1 ASW sqn with 6 S-2E.
1 ASW hel sqn (afloat) with 6 AB-212.
1 SAR sqn with 2 C-212/200 MR.
1 tpt sqn: 1 HS-748, 1 *King Air* ac, 6 Bell 47J hel.
(On order: 4 AB-212 ASW hel.)

MARINES: (4,500).
3 bns.
1 AA coy.
1 amph coy.
M-48A1 MBT, APC, M-42 SP 40mm AA guns.

Bases: Caracas, Puerto Cabello, La Guaira, Puerto de Hierro.

Air Force: 4,800; 87 combat aircraft.
2 lt bbr/recce sqns with 20 *Canberra* (12 B-82, 5 B(I)-82, 1 PR-83, 2 T-84).
1 FGA sqn with 16 *Mirage* (9 IIIEV, 5 5V, 2 5DV).
2 interceptor/FGA sqns: 1 with 14 CF-5A, 4 CF-5B; 1 with 18 F-86K.
1 COIN sqn with 15 OV-10E.
1 Presidential (tpt) sqn with 1 Boeing 737, 1 DC-9, 1 HS-748, 1 Cessna *Citation* ac.
2 tpt sqns with 1 HS-748, 8 C-130H, 12 C-123A.
2 utility/liaison sqns with 1 *King Air*, 9 *Queen Air*, 12 Cessna 182N, 2 Cessna 310R.
2 hel sqns: 1 with 13 *Alouette* III, 20 UH-1D/H; 1 with 9 UH-19, 2 Bell 212, 2 214ST, 2 412.
Trg Command: 12 *Jet Provost*, 23 T-2 *Buckeye* (12 armed), 25 T-34 *Mentor*.
AAM: R-530.
1 para bn.
(On order: 18 F-16A fighters, 2 G-222 tpts, 6 F-16 B/D trg ac.)

Para-Military Forces: Fuerzas Armadas de Cooperación: 20,000: 28 MICV; 120 60mm mor; 2 *Arava*, 1 *Islander*, 1 *King Air* ac; hel; 43 coastal patrol craft.

[1] Combat casualties, subsequent operational attrition, and reported replacements make this figure suspect.

[2] May no longer be serviceable.

[3] Forces opposed to the regime: full-time, 5,000; part-time, 5,000. 40mm ATK RL, 57mm RCL.

ARMED FORCES OF OTHER LATIN AMERICAN STATES*

Country	Estimated population (000)	Estimated GNP 1980 ($m)	Defence expenditure 1981 ($m)	Total armed forces	Army: Manpower and formations	Army: Equipment	Navy: Manpower and equipment	Air Force: Manpower and equipment	Para-military forces
Guyana	870	559	24.2	7,000†	3 inf bns 1 arty tp	4 *Shorland* armd cars; 130mm guns; 12 81mm, 18 82mm, 18 120mm mor; SA-7 SAM	(150) 3 large, 7 coastal patrol craft (	6 BN-2A, 1 *Super King Air* 200, 1 Cessna U-206, 2 *Skyvan* tpts; 2 Bell 206B, 2 212 hel	5,000
Haiti	6,000	1,555	15.3 (est)	7,500	7,000 Pres Guard (1 inf bn) 1 inf bn Garrison det	5 M-5A1 lt tks; 6 V-150 *Commando* APC; 75mm pack, M-101 105mm how; 81mm mor; 57mm RCL; 37mm, 57mm ATK guns	300 (Coastguard) Coastal patrol craft (	200 8 Cessna 337 COIN; 3 DC-3, 3 DHC-3, 1 *Baron*, 1 Cessna 402 tpts; 3 Cessna 150, 1 172, 1 *Bonanza* trg ac; 1 H-34, 2 S-58 T, 4 Hughes 300/500 hel	14,900 (Police)
Jamaica	2,300	3,200	39.9 (est)	1,700†	1,520 2 inf bns 1 Reserve bn 1 spt bn	*Ferret* armd cars; V-150 *Commando* APC; 6 81mm mor	100 1 large, 3 coastal patrol boats (	80 2 *Islander*, 1 DHC-6-300 ac; 4 Bell 206B, 3 212 hel	8,200
Trinidad and Tobago	1,200	5,185	180 (est 1979)	1,950	1,400 1 inf bn 1 reserve inf bn 1 spt bn	6 81mm mor	500 6 large, 3 coastal patrol craft (On order: 4 FAC)	50 1 Cessna 337 lt ac; 1 *Gazelle* hel, 2 S-76 (SAR) hel (para-mil)	—

Smaller states in the area: Bahamas, Barbados, Grenada, St Vincent have small para-military marine components. Belize and Bermuda have small infantry forces.

* Costa Rica and Panama maintain para-military forces, numbering 7,000 and 9,000 respectively.

† All services form part of the Army.

The East-West Conventional Balance in Europe

Any assessment of the military balance between NATO and the Warsaw Pact involves comparison of the deployed strengths of both men and equipment and of reinforcement potential, consideration of qualitative characteristics, of factors such as geographical advantages, military technology, deployment, training, and logistic support, and of differences in national doctrine and philosophy. It must be set within the context of the strategic nuclear balance, of military forces world-wide, and, in particular, of the relative strengths of the navies and long-range air forces of both sides.

Certain elements in the equation change very little over time. Warsaw Pact equipment, doctrine, and procedures are standardized, whereas those of NATO are not, despite long-standing attempts to improve interoperability and encourage uniformity. The Pact's advantages in flexibility and logistic support will be obvious, as will the geographical advantages which permit it to reinforce any of its fronts on interior lines and, in almost every case, overland. The West has hitherto relied on its superior technology and—although there is evidence that the East has been catching up and, in some instances, has actually overtaken the West—some Western advantage still remains, though this is now much smaller than it was.

The question of balance, as a practical calculation, begins by a comparison of the relative numerical strengths of each side, and this is shown in the table accompanying this essay.

MANPOWER

The total numbers of men in uniform in the armed forces of the countries which comprise NATO and the Warsaw Pact are given in the table, as are the ground force figures. Yet much of this manpower will be employed elsewhere than in Europe—particularly in the case of the United States and the Soviet Union—and so

figures are given for the ground forces in place in Europe. (For convenience, Europe in this case is assumed to exclude the territory of the Soviet Union.) However, in the event of hostilities erupting or threatening to erupt, two kinds of augmentation can take place: first, standing forces not in Europe can be moved there; second, reserve forces can be mobilized either for combat in place or in order to be moved to Europe by external powers. A *total* reserve figure can be assessed but, as with standing manpower, not all these reserves would be allocated to Europe—particularly, again, of non-European powers.

FORMATIONS

Totals for the numbers and types of divisions and division-equivalents in place and manned in time of peace are shown in the table. Estimates of the numbers of divisions existing in peacetime which are not in Europe but are presumed to be earmarked for it as reinforcements *prior* to mobilization, and of the number of divisions or division-equivalents on both sides which could be added to the order of battle on mobilization and earmarked for the European Theatre, are also listed.

Some qualifications and explanations are necessary. First, divisions on the two sides, and within the two sides, are very unequal both in strengths and equipment holdings. Second, the assumption is made that only European Military Districts of the Soviet Union (see p. 69) would in fact provide forces for the European Theatre. Third, territorial defence units have been excluded from the figures in the table. Fourth, rates of mobilization and of forward movement would not be equal. A Norwegian brigade mobilized in place should be ready for defence long before a Soviet division could be mobilized around Leningrad and moved to attack it. On the other hand, an American division based in the continental United States and without equipment prepositioned in Europe will in all likelihood be slower to move into action than a Soviet division from Belorussia. Fifth, Europe is divided into distinct areas of possible confrontation where local balances may look very different to the overall balance and where, particularly on the NATO side, communications between battlefronts will prove very difficult. As a simplification in this analysis, NATO has been divided into North and Central Europe, on the one hand, and Southern Europe (Italy, Greece, and Turkey), on the other. Finally, substantial combat elements are held outside divisional establishments and are not listed.

EQUIPMENT

Equipment holdings can be broken down into categories. The complicating factors are that total holdings of equipment do not necessarily match what is in divisional establishments (there are equipment reserves, non-divisional units, and stockpiles), and not all equipment will be in theatre at the outbreak of hostilities. In the case of Soviet formations moving from the Western USSR, they will be expected to take their full unit inventories. In the case of American reinforcing formations, some plan to equip themselves from stockpiles in Europe. For these reasons, the table includes for each side only the total holdings of equipment known or estimated to be *in Europe*. As a separate category, estimates of the *additional* equipment presumed to come with Soviet reinforcing divisons moved to Europe have also been included; these figures are shown with a + sign below the line for USSR and in Pact total figures. Two ratios for equipment are given: one without reinforcement and one after Soviet divisions have reinforced the Pact in Europe.

NAVAL FORCES

The assessment lists the numbers of vessels presumed to be in the Atlantic, Channel, North Sea, and Mediterranean for NATO and, for the Warsaw Pact, the Soviet Northern, Baltic, and Black Sea Fleets, together with non-Soviet Pact vessels in the Baltic and Black Seas. Soviet naval forces in the Mediterranean are drawn from the Black Sea Fleet or, in the case of submarines, from the Northern Fleet. As with ground force equipment, there are great disparities within categories, both with respect to capability and age. In the case of naval or maritime aircraft, classification by type is necessarily somewhat arbitrary but conforms to the nomenclature used in the country entries. The figures include both land- and sea-based aircraft with a clear maritime role in the above sea areas.

AIR FORCES

Assessment of land attack aircraft and fighters (including armed helicopters) requires similar assumptions to those made in the case of ground forces. The figures for US aircraft are for those based in Europe and do not take account of possible reinforcements from the continental US; the Soviet figures show a possible augmentation of frontal aviation from the Western military districts as a result of reinforcement. These figures are necessarily estimated. In the case of bombers, in particular, the question of allocation to the nuclear role is important. An assessment of nuclear systems is given in the Table on p. 145, and the figures given here are for all medium-range bombers, regardless of whether or not they might be reserved for nuclear delivery. It is necessary to stress the point that the increasing number of multi-role aircraft on both sides tends to make mission distinctions otiose. Aircraft intended primarily for ground attack often have a limited self-defence capability, but national terminology separates the standard air-superiority fighter and the interceptor, and this distinction has been applied.

DEFINING THE COMBAT ZONE

The Northern and Central European sectors are shown as one entity. Yet this is inevitably an incomplete notion. Norwegian defences, for example, are pulled in two directions. The land forces have as their main responsibility the protection of the northern approaches to the country and they have either deployed or plan to deploy virtually all their active field forces to the north because the Soviet formations in the northern Leningrad

Military District pose a substantial potential threat. The Norwegian Navy must assign its larger vessels to support the coastal flank of the forces in Northern Norway; but the Soviet Baltic Fleet poses a threat to Southern Norway, forcing the Navy to attend also to that area. The Air Force has to be prepared to support both sectors. Schleswig-Holstein, although also part of NATO's Northern Command, must anticipate attack from East Germany.

NATO's Southern Flank is even more divided. Italy must contest any Pact threat from Central Europe towards the central Mediterranean basin. Greece and Turkey must between them defend Thrace and the Aegean Sea and its air space, while Turkey must also defend her border in the Caucasus. This means that NATO has to be prepared to fight here on three widely separated fronts, each with its own tactical challenges and each with its own peculiar supply requirements. Yet it is impossible, without making a number of assumptions, to forecast the size and composition of the forces on both sides which would be assigned to those three fronts during hostilities. Pact forces in the south-western sector and threatening Thrace and the Dardanelles would be based on the Southern Group of Forces—Hungary, Bulgaria, and Romania plus the Soviet formations—perhaps supported by formations from the Carpathian and Odessa Military Districts. The south-eastern sector, threatening Eastern Turkey, would be the responsibility of the Trans-Caucasus MD, and reserves for this front would most probably come from the North Caucasus MD. Trans-Caucasus MD is also responsible for the border with Iran.

MOBILIZATION

The rate at which nations *can* mobilize will depend upon the system adopted, staff procedures and competence, distances, and the transport facilities available. The rate at which nations *will* mobilize will depend on the warning received, on the political will to mobilize, on the ability to make decisions and put them into effect, and on how far enemy action obstructs mobilization.

The Warsaw Pact has maintained a reserve based upon large numbers of conscripts who have completed their period of obligatory service. The Soviet Union in particular uses the Military District organization for recalling and placing reservists into skeleton formations for war. The limitations of Soviet internal communications might make it difficult to switch divisions from one part of the USSR to another, but the links between the central USSR and the borders are more than adequate for rapid movement towards potential battlefronts so long as they stay free from attack.

Within Europe many countries can mobilize in place, although very many distinctively different methods are adopted. In the case of Britain, movement to the mainland of Europe is less easy and is liable to interdiction. Those countries which must move reinforcements across the Atlantic clearly face the possibility of serious interruption. Finally, it must be noted that the United States, Britain, and Canada do not have a pool of trained reserve manpower comparable to that available to other nations which have universal conscription.

COMMONALITY AND TECHNOLOGY

The accompanying table shows that the Warsaw Pact enjoys numerical advantage in virtually all categories of weapons shown, the notable exceptions being in crew-served anti-tank missiles, a number of naval vessel types, and some naval aircraft. What is not shown by these figures is a primary advantage enjoyed by the Warsaw Pact, namely that the weapons in service, and the tactical doctrines for their use, are common throughout the Pact. NATO, in marked contrast, suffers from doctrines which are by no means identical and from a wide variety of everything from weapon systems to support vehicles, with consequent duplication of supply systems and some difficulties of interoperability.

The question of technological superiority is impossible to answer without the test of combat. In general, however, Soviet equipment is thought to be rugged, relatively immune to mishandling, and apparently reliable. However, crew comfort and safety standards are significantly lower than those demanded in the West. While these factors may not be detrimental to efficiency over the short term, under the stress of combat the accident rate could rise and efficiency decline rather severely.

LOGISTICS

NATO's logistic system is based almost entirely on national supply lines, and the difficulties are compounded by lack of standardization between nations and by lack of central co-ordination. In these respects it is inferior to that of the Warsaw Pact. Certain NATO countries, too, still lack sufficient spares and ammunition. Some Pact nations may also suffer from shortages, but the fact that their equipment is standardized would enable them to restock more quickly. The Soviet logistic system, which uses a mix of rail, road, and pipeline, has been greatly improved in recent years.

AIR POWER

The Warsaw Pact has long contemplated the use of surface-to-surface missiles to deliver high-explosive, nuclear, and chemical warheads against targets deep in enemy rear areas. However, the Soviet Union is also increasing her inventory of modern fighter-bombers, and these pose an increasingly significant long-range threat. In terms of Pact defence against air attack, a large number of interceptors must be added to an impressive array of surface-to-air missiles and artillery pieces. It is clear that in war NATO air forces would face a formidable task in maintaining air support for the NATO ground forces on the European battlefield.

The Warsaw Pact continues to enjoy the benefits of standardized aircraft servicing and handling facilities. Although its aircraft cannot generally operate from unimproved runways, there are a very large number of modern airfields available with hardened aircraft shelters. NATO, on the other hand, still suffers from too few airfields and too many types of aircraft, although considerable improvements have been made in interoperability and in hardening airfields. NATO probably still enjoys a measure of overall electronic superiority and may enjoy a somewhat greater flexibility in

command and control in combat conditions, but electronic counter-measures are being emphasized by the Pact, and tend to negate NATO's advantage.

SUMMARY

The numerical balance over the last 20 years has slowly but steadily moved in favour of the East. At the same time the West has largely lost the technological edge which allowed NATO to believe that quality could substitute for numbers. One cannot necessarily conclude from this that NATO would suffer defeat in war, but one can conclude that there has been sufficient danger in the trend to require remedies.

Assessing the balance between NATO and the Warsaw Pact based on comparisons of manpower, combat units, or equipment contains a large element of subjectivity. In the first place, the Pact has superiority in some areas and NATO in others, and there is no fully satisfactory way to compare these asymmetrical advantages. Tank superiority can be negated by combinations of many different kinds of anti-tank systems. Secondly, it is not possible to reduce to numbers such qualitative factors as training, morale, leadership, tactical initiative, terrain, and geographical advantage, all of which are vitally significant in warfare. Thirdly, there is no agreement as to the form and scope that any hostilities which might break out would be likely to take. Such an assessment would have a vital bearing on the composition of the forces involved, resupply stocks, reinforcements, and many other considerations. The table which forms part of this presentation attempts to distinguish between forces in being and those which might be made available over the longer term. It can pass no judgements as to the reliability of the forces or the political will and cohesion of the two alliances.

The overall balance continues to be such as to make military aggression a highly risky undertaking. Though tactical redeployments could provide a local advantage in numbers sufficient to allow an attacker to believe that he might achieve tactical success, there would still appear to be insufficient overall strength on either side to guarantee victory. The consequences for an attacker would be unpredictable, and the risks, particularly of nuclear escalation, incalculable.

Comparison of NATO and Warsaw Pact Manpower and Equipment

		NATO (less US)				Ratios				Non-Soviet Pact
		N. Europe[a]	S. Europe	US	Total	NATO Europe: Pact	Total NATO: Pact	Total	USSR	
Manpower (000)										
Total manpower in uniform		1,670	1,211	2,117	4,998	1:1.67	1.04:1	4,821	3,705	1,116
Reserves (all services)		2,050	2,129	900	5,079	1:1.71	1:1.41	7,138	5,200	1,938
Total ground forces		998	931	791	2,720	1:1.36	1.04:1	2,618	1,825	793
Total ground forces in Europe (incl Trans Caucasus)		975	931	219	2,125	1.15:1	1.28:1	1,664	871[b]	793
Divisions[c]										
Divs in Europe and manned in peacetime	Tk	18	4½	2½	24½			29	15	14
	Mech	11	6½	2½	20½			49	26	23
	Other	9½	30	0	39½			1	1	0
Divs manned and available for immediate reinforcement	Tk	1	1	2	4			1	1[d]	0
	Mech	0	0	3	3			1	1[d]	0
	Other	½	6	2½	9			6	6[d]	0
Extra divs available on mobilizing reserves	Tk	0	0	3	3			25½	23[d]	2½
	Mech	½	0	3½	4			59	44[d]	15
	Other	22	8	8	38			4	0	4
Ground Force Equipment										
Main battle tanks		7,531	7,098	3,000	17,629	1:1.87	1:1.55 (1:2.64)	27,300 (+19,200)	13,000 (+19,200[e])	14,300
Arty, MRL		4,100[b]	5,167	562	9,829	1:1.11	1:1.05 (1:2.07)	10,300 (+10,000)	5,000[b] (+10,000[e])	5,300[b]
SAM launchers		163	96	144	403	1:2.39	1:1.54 (1:3.24)	620 (+683)	272 (+685[e])	348
ATK guns		850	146	0	996	1:1.99 (1:3.74)	– –	1,978 (+1,746)	678 (+1,746[e])	1,300[b]
ATGW launchers (crew-served)		3,000[b]	1,000[b]	644	4,644	2.78:1	3.23:1 (2.55:1)	1,437 (+385)	287 (+385[e])	1,150[b]
AA guns		3,500[b]	1,587	120	5,207	1.42:1	1.45:1 (1:1.25)	3,586 (+2,900)	1,086[e] (+2,900[e,b])	2,500[b]
SAM launchers (crew-served)		1,202	280	180	1,662	1:2.13	1:1.90 (1:3.79)	3,151 (+3,142)	1,751[e] (+3,142[e,b])	1,400[b]
Naval Units										
Submarines: cruise missile		0	0	0	0	–	–	54	54	0
attack		100	38	46	184	1.06:1	1.27:1	174	166	8
Carriers		6	1	6	13	1.75:1	3.25:1	4	4	0
Cruisers		1	2	12[b]	15	1:9.00	1:1.80	27	27[b]	0
Destroyers		42	32	35[b]	109	1.36:1	2.06:1	53	52[b]	1
Frigates		111	37	27[b]	175	1.34:1	1.58:1	111	107[b]	4
Corvettes/large patrol craft		56	67	0	123	1.03:1	1.03:1	119	60[b]	59
FAC(M/T/P)		135	74	3	212	1:1.98	1:1.95	414	200[b]	214
MCM[f]		214	83	3	300	1:1.36	1:1.35	405	264[b]	141
Amphibious[g]		180	191	33	404	1.80:1	1.96:1	206	124[b]	82
Naval and Maritime Aircraft										
Bombers		0	0	0	0	–	–	280	280	0
Attack		90	0	204[b]	294	1:1.47	2.23:1	132	90[b]	42
Fighters		31	0	126[b]	157	–	–	0	0	0
ASW		16[b]	20	60[b]	96	1:3.47	1:1.30	125	125[b]	0
MR-RCM		168	22	84[b]	274	2.71:1	3.91:1	70	60[b]	10
ASW hel		147	125	36[b]	308	1.58:1	1.79:1	172	160[b]	12
Land Attack Aircraft and Fighters[h]										
Bombers		88	0	0	88	1:4.83	–	425	425	0
FGA		1,069	758	528	2,355	1.08:1	1.40:1 (1:1.10)	1,685 (+900)	1,100[b] (+900[e])	585
Fighters		42	0	96	138	1:16.7	1:5.07 (1:12.2)	700 (+1,000)	700[b] (+1,000[e])	0
Interceptors		407	207	0	614	1:7.14	–	4,382	2,880[b]	1,502
Reconnaissance[i]		213	96	36	348	1:1.83	1:1.63 (1:2.79)	564 (+400)	400[b] (+400[e])	164
Armed hel		460[b] [+180[b]]	5[b] [+460[b]]	330[b]	795[j]	1:1.63	1.05:1	756 (+650)	700 (+650[e])	56

[a] Includes French forces and Canadian forces in Europe, but not Spanish forces.
[b] Estimated figures.
[c] 'Tk' includes tank and armoured divs; 'Mech' includes mechanized, motorized and motor rifle; 'Other' includes airborne, airportable, mountain, amphibious and light infantry. Structure, readiness have been re-evaluated since the 1981–2 edition.
[d] From western and southern European USSR.
[e] Field forces only; *PVO-Strany* would provide additional AD equipment.
[f] Includes support craft and inshore boats.
[g] All types.
[h] OCU aircraft are not included in these totals.
[i] Includes SW-ES-M aircraft.
[j] Known totals. Figures in square brackets show additional potential armed hel.

Theatre Nuclear Forces in Europe

East and West have traditionally maintained nuclear delivery systems to cover targets in Europe. These include both weapon systems of intercontinental range (which could be delivered over shorter distances) and shorter-range systems. Any comparison of nuclear systems of greater than simply battlefield range (over 160 km) intended for the destruction of targets in Europe is, therefore, inevitably artificial.

Moreover, this assessment does not necessarily imply that a nuclear war confined to Europe is feasible. On the contrary, even a modest exchange of nuclear warheads in Europe would, in all probability, escalate rapidly to the strategic nuclear level.

Nevertheless, despite both technical and conceptual difficulties in defining a neat regional relationship for nuclear forces, it is important to identify and assess those weapon systems on both sides whose primary mission is, *prima facie*, to cover targets in Eastern Europe, the Western USSR, and Western Europe. There are two related reasons for making the attempt. First, the threat that they pose and the means of response must be taken into account by military

planners. Second, the major investment that the Soviet Union has made in recent years in modern medium-range nuclear systems suggests that there are, in the Soviet perspective, tangible military and political advantages to be derived from nuclear preponderance in the European region.

Assumptions made at the outset determine the result, and these can be controversial. Many weapon systems are technically flexible, and there are bound to be uncertainties over mission priorities. Moreover, the weapon systems in East and West are not identical and some judgement as to qualitative factors must be included.

In the following assessment the Institute applies the method of evaluation evolved for *The Military Balance 1980–81* and *1981–82*. Numbers have in some cases changed (due to retirements, to reevaluation, and to the introduction of new systems) resulting in changes in sub-totals and totals.

ASSUMPTIONS

• This evaluation is based on the assumption that the relevant delivery systems are those of beyond battlefield range which can be available after a period of warning sufficient to permit dispersal but not long enough for reinforcement or redeployment. The analysis is thus confined to the consideration of forces which can be expected to survive a pre-emptive attack *after* dispersal has taken place, the total number of warheads that each side might be expected to have available for launching against the other, and the number that might be expected to survive to penetrate the other side's defences.

To go further would require an extremely complex analysis dependent on assumptions about raid size, accuracy, vulnerability, meteorological conditions, timing, and many other factors. At best this could only result in a series of scenarios which would do little to clarify the prerelease relationship of forces, which is all that this analysis attempts.

Even the method of comparing systems likely to survive a pre-emptive attack contains artificiality, since any retaliatory strike in reaction to the pre-emptive attack would find fewer nuclear targets, because silos, launchers, and airfields would be empty; nor would that retaliation necessarily be a *theatre* nuclear retaliation.

The presentation given here cannot, therefore, be taken as a scenario of a European nuclear war; rather it seeks to assess the question of theatre nuclear forces from the perspectives of the respective military planners who need to be able to count on the functioning of a certain number of delivery systems.

• As to the forces counted, Soviet Strategic Rocket Forces (specifically SS-11 and SS-19 missiles), which could be given targets in Europe, have not been included. There is little doubt that some of these missiles have in the past been so targeted, and all modern Soviet ICBM could be quite rapidly re-targeted on Europe should the need arise. Soviet *Yankee*-class SSBN and other maritime systems could also be targeted on Europe. The decision to exclude these systems from the assessments rests on plausibility, not certainty. It is based on the inference that the *primary* missions of these systems (those for which they have been acquired and for which they are primarily deployed) suggest other roles than that of being used against targets on land in Europe, and that, since the number and accuracy of the warheads of the Soviet M/IRBM force has increased substantially with the rapid deployment of the SS-20 missile, Soviet planners are no longer likely to need to divert ICBM, SLBM, or maritime systems to cover targets on land in Western Europe.

• On the Western side, where many similar considerations apply, the Institute's assessment does, however, include 400 US SLBM *Poseidon/Trident* warheads, albeit in a separate category. The reason for this is that they were explicitly allocated to SACEUR's planning authority in the 1960s in order to remedy a shortfall in NATO's nuclear delivery systems. Because SACEUR is presumed to be able to count on these warheads to cover targets in Eastern Europe and the Soviet Union *before* the implementation of the full US SIOP (Single Integrated Operational Plan), it is appropriate to include them in an assessment of those systems whose primary mission is related to the European Theatre. We do include British and French strategic systems in the table, for they fall within our definition of theatre nuclear systems, but would note that they have not been included in the Intermediate Nuclear Forces arms-control negotiations in Geneva. We would also acknowledge that their missions tend to be distinctively different from those of the other systems listed.

• Range estimation for aircraft poses another major definitional problem. It will depend critically upon speed and flight profile, whether external tanks are carried and, most obviously, whether aircraft are refuelled in flight. The figures given are *radii* and are believed to be the *operational* maxima for the aircraft concerned, rather than ferry ranges. This distinction was not always applied in the first assessment made in *The Military Balance 1979–80*. Strike aircraft do not, of course, have to return to their bases but can recover on any friendly territory if this extends their effective range; this is *not* taken into account.

• The designation of aircraft for a theatre nuclear strike role is also inevitably somewhat uncertain. Nuclear *capability* does not necessarily imply a primary nuclear *role*, and, in the case of NATO at least, the nuclear role for aircraft has progressively diminished. A substantial number of Soviet aircraft types which could be adapted for nuclear strike are probably retained in the interceptor role, and this has led to some reduction in numbers of Soviet nuclear-capable aircraft, particularly of MiG-23/-27 *Flogger*, among which only the MiG-27 is likely to be used in the ground-attack role.

• The Table lists the types and numbers of systems presumed to be available, and warheads available are deduced by assessing the number of warheads each system can deliver, the presumed utilization of those systems in the nuclear role in Europe, and their serviceability. A judgement is then made as to the number of warheads which might be expected to arrive on target by assessing survivability, reliability, and penetration and multiplying the warheads available by these factors. Additional criteria are explained in footnotes to the Table.

CONCLUSION

Comparison of the two halves of the table at the end of this essay shows that, if *Poseidon/Trident* is excluded from the calculations, the Warsaw Pact relies more heavily on the missile element of its theatre nuclear systems than NATO. It is also significant that the Warsaw Pact's aircraft appear to be better able to survive and penetrate to their targets than NATO's. This reflects the facts that Soviet aircraft are generally newer than NATO's and that Pact air defences are somewhat denser.

Without *Poseidon/Trident* being included on the NATO side, the Warsaw Pact overall advantage in arriving warheads is about 3.6:1; with *Poseidon/Trident* that advantage falls to about 1.7:1. This emphasizes the critical nature of the assumption as to whether or not to include *Poseidon/Trident* warheads. Nevertheless, even with the inclusion of *Poseidon/Trident* on the Western side and the continued exclusion of Soviet strategic systems, the balance is distinctly unfavourable to NATO and is becoming more so. The Soviet SS-20 programme, intended to replace the older SS-4 and SS-5 missiles, has continued during the year, resulting in an increase in Pact warhead numbers based on more survivable launchers. It is not clear that all SS-4s and SS-5s will be taken out of operation once the SS-20 deployment is complete, although the numbers of the older missiles are still falling steadily. However, nothing has yet been done to reduce substantially the vulnerability of NATO's existing nuclear delivery systems or to increase their ability to penetrate Pact defences. Improvement in both respects must await the implementation of NATO's decision of December 1979 to deploy 464 long-range ground-launched cruise missiles (GLCM) and 108 *Pershing* II MRBM in Europe, a programme unlikely to be completed before the end of the decade.

Long- and Medium-range Nuclear Systems for the European Theatre

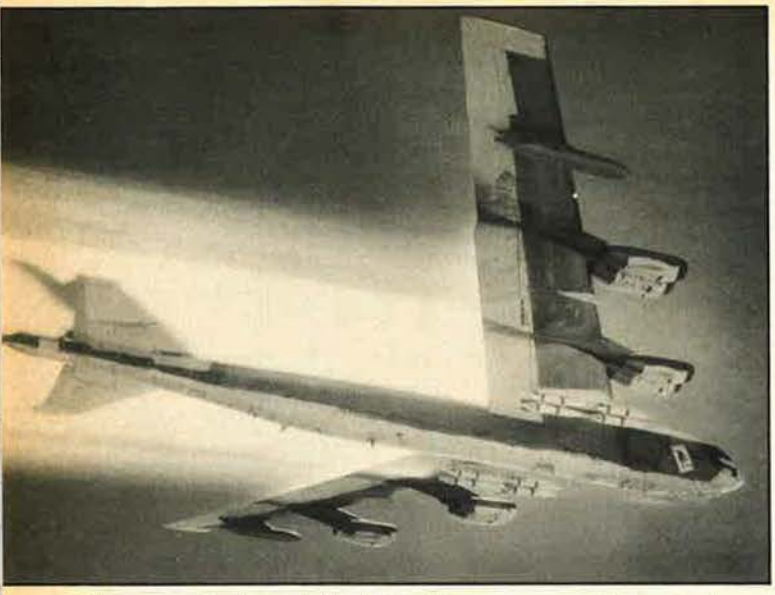
Category and type	Range/ combat radius (km)[a]	First deployment[b]	Inventory	Factors: Warheads per system	Factors: Utilization	Factors: Serviceability	Warheads available (approx.)[c]	Indices: Survivability[d]	Indices: Reliability[e]	Indices: Penetration[f]	Arriving warheads (approx.)[g]	Operating countries and notes
WARSAW PACT												All types listed are in Soviet inventory; USSR holds all warheads
IRBM												
SS-20	5,000	1977	315[i]	3	0.66[j]	0.9	561	0.9	0.8	1.0	404	MIRV (? 1 reload per system)
SS-5 *Skean*	4,100	1961	16[i]	1	1.0	0.75	12	0.6	0.7	1.0	5	
MRBM												
SS-4 *Sandal*	1,900	1959	275[i]	1	1.0	0.7	193	0.5	0.65	1.0	63	
SRBM												
SS-12 *Scaleboard*	900	1969	70	1	1.0	0.8	56	0.7	0.75	1.0	29	
Stud A/B	300	1965	450	1	1.0	0.8	360	0.7	0.75	1.0	189	
Stud B/C	300	1965	143	1	1.0	0.8	114	0.7	0.75	1.0	60	All Pact
SS-22	1,000	1978	(100)[i]	1	1.0	0.8	80	0.8	0.8	1.0	51	
SS-23	350	1980	(10)[i]	1	1.0	0.8	8	0.8	0.8	1.0	5	
SLBM												
SS-N-5 *Serb*	1,400	1964	57[i]	1	1.0[k]	0.45[l]	26	0.8	0.6	1.0	12	On I G-II, & H-II subs
Ballistic missile sub-totals			1,436				1,410				818	
Aircraft												
Tu-22M/-26 *Backfire B*	4,025	1974	100[m]	4[m]	0.4	0.8	128	0.7	0.85	0.7	53	
Tu-16 *Badger*	2,800	1955	310	2[n]	0.4	0.7	174	0.7	0.75	0.5	46	
Tu-22 *Blinder*	3,100	1962	125	2[n]	0.4	0.7	70	0.7	0.8	0.55	22	
Su-24 (Su-19) *Fencer*	1,600	1974	550	2	0.2	0.8	176	0.55	0.8	0.65	50	
MiG-27 *Flogger D*	720	1971	550[m]	1	0.4	0.8	176	0.6	0.8	0.65	55	
Su-17 *Fitter C/D*	600	1974	688	1	0.2	0.8	110	0.55	0.8	0.65	31	Poland
Su-7 *Fitter A*	400	1959	265	1	0.2	0.7	37	0.5	0.7	0.5	6	Czechoslovakia, Poland
MiG-21 *Fishbed J-N*	400	1970	100[m]	1	0.2	0.8	16	0.5	0.8	0.6	4	
Air-delivered weapon sub-totals			2,688				887				267	
Warsaw Pact totals			4,124				2,297				1,085	
NATO												
IRBM												
SSBS S-3	3,000	1971/80	18	1	1.0	0.9	16	0.6	0.8	1.0	8	France
SRBM												
Pershing 1A	720	1962	180	1	1.0	0.9	162	0.7	0.8	1.0	91	US, FRG
SLBM												
Polaris A-3	4,600	1967	64	1[o]	1.0	0.45[m]	29	0.9	0.8	1.0	21	Britain. MIRV, MARV (*Chevaline*) in service shortly
MSBS M-20	3,000	1977	80	1	1.0	0.45[m]	36	0.9	0.8	1.0	26	France
Ballistic missile sub-totals			342				243				146	
Land-based aircraft												
Vulcan B-2	2,800	1960	48	2	1.0	0.7	67	0.6	0.8	0.5	16	Britain. Incl 9 OCU ac
F-111E/F	1,900	1967	156[p]	2	0.5	0.8	125	0.6	0.8	0.75	45	US ac in Europe
Mirage IVA	1,600	1964	34	1	1.0	0.7	24	0.6	0.8	0.5	6	France
Buccaneer	930	1962	50	2	0.5	0.7	35	0.6	0.8	0.5	8	Britain. *Tornado* to replace
F-104	800	1958	290	1	0.3	0.7	61	0.4	0.8	0.3	6	Belgium, FRG, Greece, Italy, Netherlands, Turkey
F-4	750	1962	172	1	0.3	0.6	41	0.4	0.8	0.55	7	FRG, Greece, Turkey
F-4	750	1962	252	1	0.3	0.6	60	0.4	0.8	0.55	11	US Europe-/dual-based ac
F-16	900	1979	48	1	0.3	0.8	12	0.5	0.8	0.75	4	US ac in Europe
F-16	900	1982	20	1	0.3	0.8	5	0.5	0.8	0.75	2	Belgium
Jaguar	720	1974	117[q]	1	0.5	0.8	47	0.4	0.8	0.6	9	Britain, France
Mirage IIIE	600	1964	30	1	0.5	0.8	12	0.4	0.8	0.45	2	France
Carrier-based aircraft												
A-6E	1,000	1963	20[r]	2	0.5	0.8	16	0.5	0.8	0.6	4	US. B43 bombs
A-7E	900	1966	48[r]	2	0.5	0.8	38	0.5	0.8	0.4	6	US. B43 bombs
Super Etendard	560	1980	16[s]	2	0.5	0.8	13	0.5	0.8	0.5	3	France. AN-52 bombs
Air-delivered weapon sub-totals			1,301				536				129	
NATO totals (excluding *Poseidon/Trident*)			1,643				799				275	
US CENTRAL SLBM												
Poseidon C-3 or *Trident* C-4	4,600 or 7,400	1971/ 1980					400[u]	0.9	0.8	1.0	288	
NATO totals (including *Poseidon/Trident*)							1,199				563	

[a] Range for missiles; average combat radius for aircraft, assuming high-level transit, low-level penetration of air defences and average payload, somewhat flexible.
[b] Production runs will continue for up to 10 years from date in service date.
[c] Approx. percentage thought likely to be allocated to nuclear role against Europe. For USSR, assumes about 25% generally deployed in East Europe where north and some 10% of Mox and some 25% of FGA ac retained in nuclear role.
[d] Given by: Inventory × Warheads × Utilization × Serviceability.
[e] Survivability is a function of weapon system characteristics, tactics and location in relation to attacking force.
[f] Estimated likelihood of system functioning as planned after launch.
[g] Dependent on effectiveness of defence against specific system and ECM fit. For NATO, assumes Moscow ABM defences not targeted on after ABM suppression.
[h] Given by: Warheads available × Survivability × Reliability × Penetration.
[i] Total nuclear capable systems available.
[j] Assumes 15% in W. USSR, 15% in "swing zone" in the Central USSR and with range to threaten NATO and Far East.
[k] All assumed in Western Sea Areas (primarily Baltic). H-II SLBMs/SALT counted.
[l] Takes account of approximate submarine refit times and missile serviceability.
[m] Numbers in nuclear strike role requested from 1981-82.
[n] Some authorities give 3 as average warhead loading.
[o] ASW could be carried instead of free-fall bombs, and this would improve the penetration figure substantially.
[p] MRV counts as one regardless of dispersal pattern (warheads not separately targetable).
[q] F-111E/F could be reinforced by F-111D (not SALT counted and might be assumed available for reinforce Europe), but these are not available on day-to-day alert. FB-111A not assumed available for theatre use.
[r] Only 80 nuclear-capable aircraft in Anglo-French inventory of 249. Half of these assumed retained for nuclear role.
[s] Assumes 2 carriers in 1/6 6th Fleet (Mediterranean), temporary redeployment not allowed for. Half strike inventory retained for nuclear role against land targets.
[t] Assumes one out of two French carriers in range.
[u] Figure assumed to be available to SACEUR for NATO targeting. SALT counted systems.

Estimating the Soviet-US Strategic Balance

The strategic nuclear systems deployed by the United States and the Soviet Union can be compared using a wide variety of measures. Perhaps most commonly, such comparisons are expressed in terms of the basic characteristics of the forces in peacetime—such as the number of delivery systems available to each side, or the number of warheads which those systems can deliver. Alternatively, analysts can attempt to assess the military potential inherent in nuclear systems by estimating, for example, missile throw-weight and bomber payload, the total destructive power ('yield') of each side's strategic nuclear weapons, or the effectiveness of strategic nuclear weapons against specific kinds of targets. A number of these measures are described below.

It is, however, important to note at the outset that no single measurement can give a full representation of the strategic nuclear balance. One measure may be useful for some purposes but not for others, and there is considerable debate among analysts as to which measures should be given greatest weight in assessing the overall balance. Moreover, estimates of many of these measures are often either themselves subject to considerable uncertainties (*e.g.*, deliverable warheads,



The venerable but reliable B-52 still serves as a major strategic delivery vehicle for the United States.

aggregate yield), or else very sensitive to predicted performance or to other assumptions which are also highly uncertain (*e.g.*, effectiveness against particular classes of targets). Finally, all these estimates are in any case essentially *static* measures of the balance; they provide alternative indices of the potential of strategic nuclear forces in peacetime, but they cannot portray how these forces might interact in the event of war. Nor can these measures necessarily be applied in the same way to the specific purposes of arms control. (In the US-Soviet SALT II Treaty, for example, verification considerations required 'counting rules' which assumed that *all* missiles of a given type carried the maximum number of warheads with which any missile of that type had been tested.)

DELIVERY SYSTEMS AND DELIVERABLE WEAPONS

The most straightforward means of measuring the strategic nuclear balance is to count the total number of delivery systems—ICBM, SLBM, and long-range bombers—available to the two sides. However, this measure alone is of limited relevance, for it neglects the fact that almost all delivery systems now can carry several (and, in some cases, a varying number of) warheads which can be directed against separate targets. It is more relevant, therefore, to assess the numbers of separately-targetable warheads that each system can carry. However, ICBM and SLBM are frequently deployed with a number of modifications, in order to provide a degree of employment flexibility in terms of yield, accuracy, operational range, and numbers of warheads. To take an extreme case, the Soviet SS-18 is deployed in four (and perhaps shortly five) modifications which carry warheads ranging from 1 × 20 MT to 10 × 50 KT.

Because it is often difficult, if not impossible, to determine precisely which missiles embody which modifications, total numbers of warheads on missiles (and consequently their total yields) cannot be estimated with precision. Similarly, the force loadings of aircraft (*i.e.*, the numbers and yields of gravity bombs, and the numbers and yields of stand-off air-to-surface missiles) cannot be precisely stated, beyond the fact that there is a maximum payload a given aircraft can carry over its operational range. Plans for specific force loadings for specific targets can also be changed. Here we have assessed probable *operational* loadings.

MEASURING DESTRUCTIVE POWER

A second general approach to measuring the balance seeks to assess the military potential inherent in the nuclear systems of the two sides. The crudest method is to assess bomber payload and missile throw-weight to reach a rough measure of the total destructive power available in a strategic force. This takes no account of the sub-division of available payload and throw-weight into separately-targetable weapons, but it does give a measure of the total weight of nuclear ordnance that could be delivered against an opponent. It also takes little account of technological developments. For example, miniaturizing warheads and increasing their accuracy can significantly augment the destructive effects of any given payload. Nor do estimates of payload and throw-weight relate the destructive power of nuclear weapons to potential targets. To do so, it is necessary not only to distinguish between 'area' targets (such as cities and major military concentrations), on the one hand, and 'point' targets (such as hardened missile sites, command-and-control centres, etc.), on the other, but also to account for the effects of yield and accuracy.

A crude measurement of capability against area targets is aggregate warhead yield, expressed in megatons. But destructive power does not grow proportionately with a simple increase in yield; a 10-MT weapon is not ten times as destructive as a 1-MT weapon. Hence, a more accurate indicator is 'equivalent megatonnage' (EMT), which for a given warhead is usually expressed as the two-thirds power of its explosive yield, or $Y^{2/3}$. (Thus the EMT of a 200-KT warhead is $(0.2)^{2/3}$, or 0.34.) However, EMT may overstate the effectiveness of very large weapons, because the area of potential destruction is likely to exceed the area of the target to be destroyed.

In the case of point targets, one must relate the predicted level of destruction (normally blast overpressure, measured in pounds per square inch above atmospheric pressure) to the degree of protection ('hardness') of the target. Here the accuracy of delivery systems and their warheads becomes critical. One widely used measure of weapon capability against point targets is 'counter-military potential' (CMP). Accuracy is taken into account by the use of the formula

$$\text{CMP} = \frac{(\text{Yield})^{2/3}}{(\text{CEP})^2}$$

CEP (circular error probable) being the radius of a circle within which half of the warheads are expected to fall. Because it varies inversely with the square of CEP, CMP is critically dependent not only on predicted system accuracy but also on the precision with which this accuracy can be assessed.

As CEPs become very low, the CMPs of particular

weapons systems tend towards infinity. If the CMPs for such systems are aggregated with those of less accurate systems, the point target kill capability of the whole force may be exaggerated.

Of all the characteristics of strategic nuclear weapons systems, accuracy is one of the hardest to predict. It can at best be only an estimate derived from the observation of a number of test firings. But this estimate is bound to be subject to major uncertainties. The numbers of tests conducted for a specific model are not statistically large; tests are not carried out over the operational trajectories of the delivery systems; when observing tests it can be difficult to determine the precise point of aim, and thus to measure deviation; and meteorological conditions in the impact area can also cause significant deviations. While it is clear that the trend of delivery technologies has been towards greater accuracy, the uncertainty in assessing accuracy may be as high as ±50%. Since accuracies are squared in the equation above, it becomes obvious how tentative any assessment of CMP must be.

However, even if EMT and CMP could be precisely determined and then aggregated for entire strategic forces, they would not be wholly effective instruments for measuring the balance of these forces. Such forces are targeted against a *mix* of area and point targets, and these yardsticks would only be valid if an entire force were to be applied exclusively to either area targets (in the case of EMT) or point targets (in the case of CMP). Thus, both EMT and CMP would be uncertain measures even if warhead numbers, yields, and accuracies were known precisely for both sides (though the uncertainties of EMT are significantly less than those of CMP).

For these reasons, there is no single, fully satisfactory way of comparing the strategic nuclear forces of the US and the USSR. Numbers of warheads and bombs loaded on the delivery systems (particularly, but not only, aircraft) are subject to major uncertainties. The alternative method—relating delivery systems to specific targets—depends critically on factors of performance and accuracy which cannot be measured with precision. It is important to recognize these shortcomings in any evaluation of the strategic nuclear balance between the US and the USSR, and to understand that all such evaluations rely on many assumptions to provide a basis for assessment.

In the following two tables—the first comparing the number of deliverable warheads available to either side, the second the equivalent megatonnage (EMT)—the Institute provides its assessment on the basis of certain assumptions about warhead loadings, numbers, ranges, and yields. These assumptions are made clear in the notes to the accompanying Tables. The sign ~ is used to show approximation. Subject to the qualifications and uncertainties noted above, what these Tables suggest is approximate equality between the strategic forces of the Soviet Union and the United States in deployed ICBM and SLBM warheads, at about 7,000. When bomber-delivered weapons (including SRAM) are added, the US total rises to about 9,300 and the Soviet total (due to the much smaller size of the Soviet strategic bomber force) to about 7,300. Our estimates of total EMT, on the other hand, suggest a Soviet advantage of over 2.65:1 in ICBM and SLBM, and of roughly 1.6:1 when bomber-delivered weapons are included.

Estimated Strategic Nuclear Warheads

United States			
System	Number deployed	Warheads per launcher	Total warheads
ICBM			
Minuteman II	450	1	450
Minuteman III	550	3	1,650
Titan	52	1	52
SLBM			
Poseidon C-3	304	10[d]	3,040
Trident C-4	216	8[d]	1,728
Sub-total (ICBM and SLBM):			*6,920*
Aircraft			
B-52D	75	4[i]	300
B-52G	151	8[i]	1,208
B-52H	90	8[i]	720
FB-111A	60	2[i]	120
TOTAL:			**9,268**

Soviet Union				
System		Number deployed	Warheads per launcher	Total warheads
ICBM				
SS-11		570	1[a]	570
SS-13		60	1	60
SS-17	Mod 1	150	4	~600
	Mod 2	few	1	
SS-18	Mod 1	308	1	~2,500[b]
	Mod 2		8	
	Mod 3		1	
	Mod 4		10	
SS-19	Mod 2	310	1	~1,500[c]
	Mod 3		6	
SLBM				
SS-N-5		57	1	57
SS-N-6	Mod 1	400	1	~400[e]
	Mod 2		1	
	Mod 3		2	
SS-N-8	Mod 1	292	1	~300[f]
	Mod 2		1	
	Mod 3		3	
SS-NX-17		12	1	12
SS-N-18	Mod 2	208	3	~1,040[g]
	Mod 3		7	
Sub-total (ICBM and SLBM):				*~7,000[h]*
Aircraft				
Tu-95		105	2[j]	210
Mya-4		45	2[j]	90
TOTAL:				**~7,300[h]**

[a] There are two Mods, but Mod 1 has a single RV, and the three MRV on Mod 2 are counted as one RV.
[b] Estimate based on the assumption that the bulk of SS-18 are Mod 2. While Mods 1 and 3 may carry a large single warhead, Mod 4 and Mod 5 (not yet deployed) may carry 10 RV.
[c] Assumes about 75% are Mod 3.
[d] May carry up to 14 RV.
[e] Very few Mod 3 believed in service. Discounted.
[f] Very few Mod 3 believed in service.
[g] Assumes half are Mod 2, half Mod 3.
[h] Due to approximation, these are not precise totals of the figures in the column.
[i] Assumes 4 gravity bombs and no SRAM for B-52D, 4 gravity bombs and 4 SRAM for B-52G/H, and 2 gravity bombs for FB-111A; these are operational, not maximum, loadings. SRAM counted as deliverable warhead.
[j] Assumes 2 gravity bombs or ASM per aircraft.

Estimated Equivalent Megatonnage

United States				
System	Total warheads (N)	Yield (in MT) per warhead (Y)	Total EMT ($N \times Y^{2/3}$)
ICBM			
Minuteman II	450	1.2	508
Minuteman III	750[a]	0.17	230
	900[a]	0.34	440
Titan	52	9.0	225
SLBM			
Poseidon C-3	3,040	0.05	413
Trident C-4	1,728	0.10	372
Sub-total (ICBM and SLBM):			*2,188*
Aircraft			
B-52D/G/H	1,114[g]	1.0	1,114
	964[h]	0.2	330
FB-111A	120[g]	1.0	120
TOTAL:			**3,752**

Soviet Union				
System		Total warheads (N)	Yield (in MT) per warhead (Y)	Total EMT ($N \times Y^{2/3}$)
ICBM				
SS-11		570	1.0	570
SS-13		60	0.75	50
SS-17	Mod 1	~600	0.75	~495
	Mod 2			
SS-18	Mod 1	~2,500	20.0	~2,300[b]
	Mod 2		0.9	
	Mod 3		20.0	
	Mod 4		0.5	
SS-19	Mod 2	~1,500	5.0	~1,200[c]
	Mod 3		0.55	
SLBM				
SS-N-5		57	1.0	57
SS-N-6	Mod 1	~400	1.0	~400
	Mod 2		1.0	
	Mod 3		0.003	
SS-N-8	Mod 1	~300	1.0	~250[d]
	Mod 2		0.8	
	Mod 3		0.2	
SS-NX-17		12	1.0	12
SS-N-18	Mod 2	~1,040	0.45	~430[e]
	Mod 3		0.2	
Sub-total (ICBM and SLBM):				*~5,800[f]*
Aircraft				
Tu-95		210	1.0	210
Mya-4		90	1.0	90
TOTAL:				**~6,100[f]**

[a] Assumes 250 msls carry 3 × 0.17-MT MIRV, 300 carry 3 × 0.34-MT MIRV.
[b] Assumes 250 msls carry 8 × 0.9-MT MIRV, 58 carry 20-MT single RV.
[c] Assumes 250 msls carry 6 × 0.55-MT MIRV, 60 carry 5-MT single RV.
[d] Assumes all are Mod 2 msls, carrying 0.8-MT single RV.
[e] Assumes 104 msls carry 3 × 0.45-MT MIRV, 104 carry 7 × 0.2-MT MIRV.
[f] Due to approximation, these are not precise totals of the figures in the column.
[g] Gravity bombs.
[h] SRAM.

Tables of Comparative Strengths

1. Nuclear Delivery Vehicles: Comparative Strengths and Characteristics

(A) United States and Soviet Union

(1) MISSILES AND ARTILLERY

United States

Category and type	Deployed Total 7/82	Deployed First year	Range (km)[a]	Throw-weight (000 lb)[b]	Circular Error Probable (CEP) (m)[c]	Warheads, max. yield[d] and notes
Strategic						
Land-based *(ICBM)*[e]						
Titan II	52	1962	15,000	8.3	1,300	1 × 9 MT, General Electric Mk6. To be phased out.
Minuteman II	450	1966	11,300	1.6	370	1 × 1–2 MT, Avco Type 11B/C. 50 to be upgraded to III.
Minuteman III	250	1970	13,000	2.4	280	3 × 170 KT W-62 warhead, GE Mk 12 penetrating vehicle (MIRV).
	300	n.a.	n.a.	n.a.	220	3 × 335 KT W-78 warhead, Mk 12A MIRV.
Sea-launched *(SLBM)*						
Poseidon C-3	304	1971	4,600	3.3	450	10 × 50 KT (MIRV) or 14 over reduced range.
Trident C-4	216	1980	7,400	2.9	450	8 × 100 KT W-76 warheads (14 RV over 4,600 km), Mk 4 MIRV.
Intermediate						
Land-based *(IRBM)*						
Pershing II	(some 39)	(1983)	1,500	n.a.	30	1 × 250 KT (2 types of warhead).
(GLCM)						
BGM-109A	(some)	(1983)	(some 2,250)	n.a.	n.a.	n.a.
Tactical[f]						
Land-based *(SRBM)*[g]						
Pershing 1A	108	1962	160–720	n.a.	n.a.	Dual-capable, 1 × 60–400 KT.
Lance	36	1972	110	n.a.	50	Dual-capable, 1 × 50 KT W-70 warhead.
Sea-launched *(SLCM)*						
Air-launched						
ALCM						
AGM-86B	some	1982	2,500	2.8	n.a.	W-80, 300 KT.
SRAM						
AGM-69A	1,250	1972	55–160	2.2	370	1 × 200 KT, Carried on B-52G/H (20), FB-111A (6), W-69, possibly W-80 warheads.
Artillery[f]						
M-110 203mm SP how (mod)	200	1962	21	—	170	1 × KT range.
M-109 155mm SP how	252	1964	18	—	n.a.	W-48, W-74, 1 × 2 KT.

Soviet Union

Category and type[a]	Deployed Total 7/82	Deployed First year	Range (km)[d]	Throw-weight (000 lb)[b]	Circular Error Probable (CEP) (m)[c]	Warheads, max. yield[d] and notes
Strategic						
Land-based *(ICBM)*[e]						
SS-11 *Sego* Mod 1	570(–)	1966	10,500	2	1,400	1 MT.
Mod 3	some	1973	8,800	2.5	1,100	3 × 100–300 KT MIRV. Replaced some Mod 1.
SS-13 *Savage* Mod 1	60	1968	10,000	1	2,000	1 × 750 KT.
SS-17 (RS-16) Mod 1	150(–)	1975	10,000	6	450	4 × 750 KT MIRV. In mod SS-11 silos.
Mod 2	few	1977	11,000	3.6	450	1 × 6 MT. In mod SS-11 silos.
SS-18 (RS-20) Mod 1		1975	12,000	16.5	450	1 × 20 MT.
(cold launch) Mod 2	308	1977	11,000	16.7	450	8 × 900 KT MIRV.
Mod 3		1979	10,500	16	350	1 × 20 MT.
Mod 4		1982	9,000	16.7	300	10 × 500 KT MIRV.
(Mod 5)		(1985)	(9,000)	(16)	(250)	(10 × 750) KT MIRV.
SS-19 (RS-18) Mod 1	–	1974	11,000	8	500	6 × 550 KT MIRV (out of service).
(cold launch) Mod 2	few	1979	10,000	7.5	300	1 × 5 MT. In mod SS-11 silos.
Mod 3	310(–)	1982	(10,000)	8	300	6 × 550 KT MIRV. In mod SS-11 silos.
Sea-launched *(SLBM)*						
SS-N-5 *Serb*	57	1964	1,400	n.a.	2,800	1 × 1 MT range. (Includes 39 non-SALT.)
SS-N-6 *Sawfly*						
Mod 1		1968	2,400	1.5	900	1 × 1 MT. Liquid fuel.
Mod 2	400	1973	3,000	n.a.	900	1 × 1 MT. Liquid fuel.
Mod 3		1974	3,000	1.5	1,400	2 × 200 KT MIRV. Liquid fuel.
SS-N-8 Mod 1		1972	7,800	1.5	1,300	1 × 1 MT.
Mod 2	292	n.a.	9,100	8	900	1 × 800 KT.
Mod 3		n.a.	n.a.	n.a.	450	3 × 200 KT MIRV.
SS-NX-17	12	1977	3,900	2.5	1,500	1 × MT; 7 × 200 KT MIRV tested. May be solid-fuel successor to SS-N-6.
SS-N-18 Mod 1			7,400	5	1,400	3 × KT MIRV. Solid-fuel SS-N-8 successor.
Mod 2	208	1978	8,300	n.a.	600	1 × 450 KT.
Mod 3			6,500	n.a.	600	7 × 200 KT MIRV.
SS-NX-20	20	(1981)	8,300	n.a.	n.a.	12 MIRV. Solid fuel (under development).
Intermediate						
Land-based *(IRBM)*[e]						
SS-4 *Sandal*	275	1959	2,000	3	2,300	1 × 1 MT. Being withdrawn.
SS-5 *Skean*	16	1961	4,100	3.5	1,100	1 × 1 MT. Being withdrawn.
SS-20 Mod 1			5,000	n.a.	n.a.	1 × 1.5 MT.
Mod 2	315	1977	5,000	n.a.	400	3 × 150 KT MIRV.
Mod 3			7,400	n.a.	n.a.	1 × 50 KT.
Tactical						
Land-based *(SRBM)*[g]						
SS-1b *Scud* A	450	1957	150	n.a.	n.a.	1 × KT range. Being replaced by SS-23.
SS-1c *Scud* B		1965	160–300	n.a.	n.a.	
FROG-7	482	1965	70	n.a.	400	1 × 200 KT. Being replaced by SS-21.
SS-12 *Scaleboard*	70	1969	490–900	n.a.	900	1 × 200 KT. Being replaced by SS-22.
SS-21	(some 10)	1978	120	n.a.	300	Dual capable.
SS-22	(100)	1979	1,000	n.a.	n.a.	500 KT.
SS-23	(some 10)	1979–80	350	n.a.	n.a.	Dual-capable.
(GLCM)						
SS-C-1b *Sepal*	(100)	1962	450	n.a.	n.a.	1 × KT range. Similar to SS-N-3.
Sea-launched *(SLCM)*						
SS-N-3 *Shaddock*	356	1962	450	2	n.a.	1 × 350 KT or conventional. Numerous versions.
SS-N-7 *Siren*	154	1968	45	1.2	n.a.	1 × 200 KT or conventional.
SS-N-9	136(+)	1968/9	280	n.a.	n.a.	1 × 200 KT or conventional.
SS-N-12 (*Sandbox*)	32	1976	1,000	2.2	n.a.	1 × 350 KT or conventional. SS-N-3 replacement.
		n.a.	550	n.a.	n.a.	
SS-N-14 (*Silex*)	292	1974	55	n.a.	n.a.	KT range, ASW.
SS-N-19	44	1980	460	n.a.	n.a.	Carried in O-class SSGN, *Kirov* cruisers.
Air-launched						
ALCM						
AS-2 *Kipper*	n.a.	1961	200	2.2	n.a.	1 × KT range or conventional.
AS-3 *Kangaroo*	(70)	1961	650	n.a.	n.a.	1 × MT range.
AS-4 *Kitchen*	(180)	1962	300	n.a.	n.a.	1 × KT range.
AS-6 *Kingfish*	(65)	1977	250	n.a.	n.a.	200 KT.
Artillery						
S-23 180mm towed gun	(168)	1950/55	30	0.2	n.a.	Dual-capable. 1 × KT range.

(II) AIRCRAFT[b]

United States						Soviet Union					
Category[c] and type[e]	Deployed Total 7/82	Deployed First year	Range[e] (km)[g]	Max. speed (Mach)	Weapons load (000 lb)	Category[c] and type[e]	Deployed Total 7/82	Deployed First year	Range (km)[g]	Max. speed (Mach)	Weapons load (000 lb)
Bombers						**Bombers**					
Long-range						*Long-range*					
B-52D	75[i]	1956	9,900	0.95	60	Tu-95 *Bear*	105	1956	12,800	0.78	40
B-52G	151[i]	1959	12,000	0.95	70	Mya-4 *Bison*	45[k]	1956	11,200	0.87	20
B-52H	90[i]	1962	16,000	0.95	70						
						Medium Range					
Medium-range						Tu-16 *Badger*	580[k,l]	1955	4,800	0.8	20
FB-111A	60	1969	4,700	2.5	37.5	Tu-22 *Blinder*	165[l]	1962	4,000	1.5	12
						Tu-22M/-26 *Backfire*	180[l]	1974	8,000	2.5	17.5
Strike aircraft[j]											
Land-based						**Strike aircraft**					
F-4C/D/E	198	1962	2,200	2.4	16	*Land-based*					
F-111/E/F	156	1967	4,700	2.2/2.5	28	Su-7 *Fitter* A	150	1959	1,400	1.7	5.5
F-16	48	1979	3,800	2+	20	MiG-21 *Fishbed*	100	1970	1,100	2.2	2
						MiG-27 *Flogger* D	550	1971	1,400	1.7	7.5
Carrier-based						Su-17/-20 *Fitter* C/D	650	1974	1,800	1.6	11
A-6E	(60)	1963	3,200	0.9	18	Su-19/-24 *Fencer*	550	1974	4,000	2.3	8
A-7E	(144)	1966	2,800	0.9	20						

(B) Other NATO and Warsaw Pact Countries

(I) MISSILES AND ARTILLERY

NATO (excluding USA)							Warsaw Pact (excluding USSR)						
Category and type[m]	Deployed Total 7/82	Deployed First year	Range (km)[g]	Warheads and max. yield[d]	Circular Error Probable (CEP) (m)[f]	Countries equipped	Category and type[e]	Deployed Total 7/82	Deployed First year	Range (km)[g]	Warheads and max. yield[d]	Circular Error Probable (CEP) (m)[f]	Countries equipped
Land-based							Land-based						
IRBM[e]							*SRBM (dual capable)*[e]						
SSBS S-3	18	1980	3,500	1 × 1 MT	n.a.	France.	**SS-1c** *Scud* B.						
							KY-3 *Scud C*	143	1965	160–450	1 × KT range.	n.a.	All.[n]
SRBM[e]							*FROG*-3/-7	205	1957-65	40–60	1 × 200 KT.	380	All.[n] (*FROG*-3 obsolescent.)
Honest John	90	1953	40	1 × KT range	n.a.	Greece, Turkey.[o]							
Pershing IA	72	1962	720	1 × KT range	n.a.	FRG (in Air Force).[o,p]							
Pluton	42	1974	120	1 × 10 KT	n.a.	France.							
Lance	61	1976	110	1 × 50 KT	n.a.	Belgium, Britain, FRG, Italy, Netherlands.[o]							
Sea-launched							**Sea-launched**						
SLBM													
Polaris A-3	64	1967	4,600	3 × 200 KT (MRV)	900	Britain, *Chevaline* (?6 warheads) to be fitted from 1983.							
MSBS M-20	80	1977	3,000	1 × 1 MT	n.a.	France, M-4 to replace.							
Artillery (dual-capable)							**Artillery**						
M-110 203mm SP how	231	1962	16	1 × KT range.	170	Belgium, Britain, FRG, Greece, Italy, Netherlands, Turkey.[o]							
M-109 155mm SP how	1,454	1964	18	1 × 2 KT range.	n.a.	Belgium, Britain, Canada, Denmark, FRG, Greece, Italy, Netherlands, Norway, Turkey.[o]							

(II) AIRCRAFT[b]

NATO (excluding USA)							Warsaw Pact (excluding USSR)						
Category[c] and type[e]	Deployed Total (7/82)	Deployed First year	Range (km)[g]	Max Speed (Mach)	Weapons load (000 lb)	Countries equipped	Category and type[e]	Deployed Total 7/82	Deployed First year	Range (km)[g]	Max Speed (Mach)	Weapons load (000 lb)	Countries equipped
Bombers							**Bombers**						
Medium-range													
Vulcan B2	48	1960	6,400	0.95	21	Britain. *Tornado* to replace.							
Strike aircraft							**Strike aircraft**						
Land-based							*Land-based*[p]						
F-104	290	1958	2,400	2.2	4	Belgium, FRG, Greece, Italy, Netherlands, Turkey.	Su-7 *Fitter* A	115	1959	1,400	1.7	5.5	Czechoslovakia, Poland.[p]
F-4	172	1962	2,200	2.4	16	FRG, Greece, Turkey.	Su-20 *Fitter* C	35	1974	1,800	1.6	4.0	Poland.[p]
F-16	20	1982	3,800	2+	20	Belgium.							
Buccaneer	50	1962	3,700	0.95	12	Britain. *Tornado* to replace.							
Mirage IVA	34	1964	3,200	2.2	16	France. 1 × AN-22 60-KT.							
Mirage IIIE	30	1964	2,400	1.8	19	France. (2) × AN-52 15-KT.							
Jaguar	117	1974	1,600	1.4	10	Britain, France.							
Carrier-based													
Super Etendard	36	1980	1,500	1.0	16	France. (2) × AN-52 15-KT.							

Notes to Table I

[a] Ranges given in km; for nautical miles, divide by 1.852. Use of maximum payload may reduce a missile's operational range by up to 25% of figures shown. Figures for aircraft are theoretical maximum unrefuelled range at optimum altitude and speed. Higher speeds, lower altitudes and full weapons loads reduce range, especially with strike ac; for instance an A-6, at operational height and speed and with typical weapons load, has a combat *radius* of some 1,500 km, compared with a maximum ferry *range* of 4,700 km.

[b] Throw-weight is the weight of post-boost vehicle (warheads, guidance systems, penetration aids) deliverable over a given range. Throw-weight will be less than shown maximum ranges.

[c] CEP = the radius of the circle around a target within which there is a 50% probability that a weapon aimed at that target will fall.

[d] Warhead yields vary greatly; figures given are estimated maxima. KT range = under 1 MT; MT range = over 1 MT. Yield figures for dual-capable weapons (which can deliver conventional or nuclear warheads) refer to nuclear warheads only.

[e] ICBM = range of over 6,400 km; IRBM = 2,400–6,400 km; MRBM = 800–2,400 km; SRBM = 800 km or less.

[f] Deployment figures for systems in Europe only, incl European USSR. Carrier-based ac figures assume 6 carriers in European area (Atlantic and Mediterranean fleets).

[g] Names of Soviet missiles and aircraft (e.g. *Scarp*, *Bear*) are of NATO origin. Numerical designations of Soviet missiles (but not aircraft) are of US origin.

[h] All the types listed are dual-capable, but some in the strike categories are not presently configured for the nuclear role.

[i] Long-range = over 9,000 km; medium-range = 5,600–9,000 km; bomber = aircraft primarily designed for bombing missions.

[j] Excluding ac in storage or reserve. B-52D being retired. B-52G/H being modified for cruise missile launch.

[k] Excluding tankers (LRAF: 35 Mya-4, 10 Tu-16; Naval Air: 70 Tu-16).

[l] Including Naval Air Force bombers (some 270 Tu-16, 40 Tu-22, 80 Tu-22M/-26).

[m] Listed as a medium-range bomber on the basis of reported range characteristics.

[n] All NATO missiles of American origin, except SSBS, *Pluton* and MSBS (French). All Warsaw Pact vehicles of Soviet origin.

[o] Nuclear warheads held in American custody. No nuclear warheads held on Danish or Norwegian soil. In few cases is the M-109 likely to have a nuclear role.

[p] Nuclear warheads held in Soviet custody.

[q] *Vulcan* and *Buccaneer* of British origin; F-104 and F-4 American; *Mirage* and *Super Etendard* French; *Jaguar* Anglo-French. All Warsaw Pact aircraft of Soviet origin. It is uncertain how many are nuclear capable.

2. Historical Super-Power Launcher Strengths

	United States					Soviet Union				
	1978	1979	1980	1981	1982	1978	1979	1980	1981	1982
ICBM	1,054	1,054	1,054	1,052	1,052	1,400	1,398	1,398	1,398	1,398
SLBM	656	656	656	576	520	1,028	1,028	1,028	989	989
Long-range bombers (incl trg ac but not reserves)	366	365	338	316	316	135	156	156	150	150

3. Indices of NATO Defense Expenditure in Constant Prices[a]

(in local currency, 1975-100)

Country	1970	1977	1978	1979	1980	1981 (provisional)	% Growth[b] 1960–70	1970–80	1975–80
Belgium	78.8	107.9	115.1	117.6	119.9	119.4	3.3	4.29	3.70
Britain	96.5	102.7	104.0	113.0	121.2	123.3	0	2.31	3.92
Canada	92.3	116.7	116.7	113.6	118.0	123.5	–0.5	2.49	3.36
Denmark	83.4	100.3	102.9	96.9	93.6	111.2	3.4	1.16	–1.31
France	89.4	109.1	115.0	118.4	120.1	123.0	1.6	3.00	3.73
Germany	91.7	101.8	105.0	106.1	106.5	110.2	3.6	1.51	1.267
Greece	71.0	102.1	123.0	n.a.	125.7	124.8	8.5	5.88	4.68
Italy	n.a.	122.8	114.8	118.7	110.6	121.9	4.1	n.a.	2.04
Luxembourg	83.0	114.3	117.8	121.0	133.2	142.0	2.1	4.84	5.90
Netherlands	82.3	100.8	105.6	110.8	114.8	115.3	4.3	3.38	2.80
Norway	91.9	114.1	123.7	134.9	138.8	153.8	5.4	4.21	6.78
Portugal	127.0	85.7	74.5	76.6	71.0	67.5	10.4	–5.65	–6.62
Spain	60.1	72.3	92.2	99.7	123.2	107.7	n.a.	7.44	4.26
Turkey[c]	45.4	110.2	96.1	85.2	58.0	104.0	3.9	2.48	–10.32
United States	118.7	102.5	99.1	99.6	102.0	119.0	2.7	–1.50	0.40

[a] Constant price series defence expenditures are deflated by consumer price indices. These reflect general (not defence sector) rates of inflation.

[b] Average annual compound growth rates.

[c] Based on *national*, not NATO, definitions of defence expenditure.

4. Average Strength of Military Formations (in thousands)

	Division					Brigade				Squadron
	Armoured		Mechanized		Airborne	Armoured		Mechanized		Fighter aircraft
	Men	Tanks	Men	Tanks	Men	Men	Tanks	Men	Tanks	
United States	18,300	324	18,500	216	16,800	4,500	108	4,800	54	18–24
Soviet Union	11,000	335[a]	14,000	266[a]	7,000	1,300[b]	95[b]	2,300[b]	40[b]	12–15
China	9,200	270	12,700[c]	30[c]	9,000	1,200[b]	90[b]	2,000	—	9–10
Britain[d]	8,500	148	—	—	—	—	—	—	—	8–15
Germany	17,000	300	17,500	250	8–9,000	4,500[e]	110	5,000[e]	54	15–21
India	15,000	200	17,500[c]	—	—	6,000	150	4,500	—	12–20
Israel	—	—	—	—	—	3,500	80–100	3,500	36–40	15–20
Egypt	11,000	300	12,000	190	—	3,500	96	3,500	36	10–12

[a] These tank strengths are for Soviet divisions in Eastern Europe; other Soviet divisions have fewer.

[b] Strength of a regiment, which is the equivalent formation in the Soviet and Chinese command structures. (The term 'regiment' may also describe a battalion-size unit, particularly in West European countries. The term 'group', often used in Latin American countries, is imprecise and may apply to a reinforced battalion or understrength brigade with AFV and/or artillery.)

[c] Infantry division.

[d] Britain has reintroduced the brigade organization, but combat formations are battle groups based on an armoured regiment or mechanized battalion. Armoured division strength will rise to 11,500 on mobilization.

[e] Manpower levels currently under review.

5. Comparisons of Defense Expenditure and Military Manpower 1975-82

Country	$ million			$ per capita			% of government spending[a]			% of GNP[b]		Numbers in armed forces (000)			Est. reservists[c] (000)	Para-military (000)
	1975	1980	1981	1975	1980	1981	1975	1980	1981	1975	1981	1975	1981	1982	1982	1982
Warsaw Pact[d]																
Bulgaria	457	1,254	1,346	52	141	150	6.0	6.4	6.0	2.7	4.2	152.0	149.0	148.0	795.0	172.5
Czechoslovakia	1,706	3,601	3,796	116	234	246	7.3	7.5	8.2	3.8	n.a.	200.0	194.0	196.5	325.0	133.5
Germany, East	2,550	4,793	6,953	148	286	415	7.9	8.2	8.6	5.5	7.7	143.0	167.0	166.0	305.0	409.3
Hungary	506	1,067	1,237	48	99	115	3.5	3.8	3.9	2.4	3.0	105.0	101.0	106.0	143.0	75.0
Poland	2,011	5,063	5,408	59	141	151	7.0	5.6	5.1	3.1	4.3	293.0	319.5	317.0	605.0	635.0
Romania	707	1,361	1,351	33	61	60	3.7	3.5	4.0	1.7	2.0	171.0	184.5	181.0	365.0	1.59m
Soviet Union[e]	124,000	n.a.	n.a.	490	n.a.	n.a.	n.a.	n.a.	n.a.	8.4–15.0%		3,575.0	3,673.0	3,705.0	5,000.0[f]	80.56m
NATO[g]																
Belgium	1,971	3,958	3,342	200	399	337	10.0	9.2	9.2	3.0	3.3	87.0	89.5	93.5	141.5	16.2
Britain	11,118	25,921	24,223	198	463	433	11.6	10.7	12.1	4.9	5.4	345.0	343.6	327.6	281.7	9.95
Canada[h]	2,965	4,253	4,914	130	178	203	11.9	n.a.	8.3	2.2	1.7	77.0	79.5	82.86	21.3	1.3
Denmark	939	1,608	1,434	185	314	280	7.3	7.3	7.3	2.2	2.5	34.0	32.6	31.2	153.4	—
France	13,984	26,067[g]	23,545	264	483	437	20.2	19.5	20.7	3.9	4.1	502.0	504.6	492.9	457.0	89.9
Germany[i]	16,142	33,611	29,047	259	548	471	24.4	28.3	28.2	3.7	4.3	495.0	495.0	495.0	750.0	20.0
Greece	1,435	2,275[g]	2,273	159	239	237	25.5	22.5	20.3	6.9	5.7	161.2	193.5	206.5	404.0	29.0
Italy	4,700	9,579	8,769	84	168	153	9.7	5.4	5.6	2.6	2.5	421.0	366.0	370.0	799.0	204.7
Luxembourg	22	52.5	46	65	144	128	3.0	3.2	3.5	1.1	1.2	0.6	0.7	0.7	n.a.	0.5
Netherlands	2,978	5,534	4,717	218	395	333	11.0	9.9	9.7	3.6	3.4	112.5	102.8	104.0	171.0	8.7
Norway	929	1,618[h]	1,646[h]	232	394	401	8.2	10.7	9.0	3.1	3.3	35.0	37.0	42.1	243.0	—
Portugal	1,088[h]	868	840	124	88	88	35.2	11.7	10.2	6.0	3.8	217.0	70.9	66.4	90.0	38.2
Spain[h]	1,701	3,991	3,655	48	106	96	14.5	12.2	11.7	1.8	1.9	302.3	342.0	347.0	1,085.0	105.0
Turkey	2,200	2,306	2,632	55	51	56	26.6	18.5	20.7	9.0	4.5	453.0	569.0	569.0	836.0	120.0
United States[h]	88,983	142,200	176,100	417	644	782	28.8	23.6	25.3	5.8	6.1	2,130.0	2,049.1	2,116.8	899.6	125.3
Other European																
Austria	410	914	768	54	121	102	3.9	3.9	3.6	1.0	1.2	38.0	50.3	49.4	930.0	—
Eire	128	292	278	41	85	80	4.3	3.7	3.5	1.6	1.6	12.1	14.0	16.4	22.2	—
Finland	388	734	712	83	153	148	5.0	6.1	6.0	1.4	1.5	36.3	39.9	36.9	700.0	3.6
Sweden	2,483	3,834	3,431	303	460	412	10.5	7.8	7.8	3.4	3.1	69.8	64.3	64.5	735.5	500.5
Switzerland	1,047	1,957	1,780	160	310	281	19.3	19.0	19.8	1.8	1.8	18.5	20.5	20.0	605.0	—
Yugoslavia	1,705	3,008	2,870	80	135	126	49.9	n.a.	n.a.	5.6	4.6	230.0	252.5	250.5	500.0	3–5m
Middle East																
Algeria	285	704	804	17	36	41	4.7	5.3	5.1	2.2	2.2	63.0	101.0	168.0	100.0	24.0
Egypt	6,103	2,146	2,103	163	53	49	42.0	26.3	20.6	50.4	7.3	322.5	367.0	452.0	335.0	139.0
Iran	8,800	4,461	4,402	268	117	113	24.9	11.2	10.6	17.4	3.6	250.0	195.0	235.0	400.0	(55.0*)
Iraq	1,064	2,980	n.a.	107	227	n.a.	43.7	24.1	n.a.	7.9	n.a.	135.0	252.3	342.0	75.0	704.8
Israel	3,552	4,834	6,056	1,045	1,239	1,514	50.1	33.6	30.6	35.9	28.7	156.0	172.0	174.0	326.0	4.5
Jordan	155	404	425	57	130	134	22.0	24.1	22.0	12.2	11.4	80.2	67.5	72.8	35.0	11.0
Kuwait	n.a.	1,014	1,311	n.a.	769	936	n.a.	5.9	6.9	n.a.	4.3	10.2	12.4	12.4	n.a.	18.0
Libya	203	502	n.a.	83	171	n.a.	13.7	11.8	n.a.	1.7	n.a.	32.0	55.0	65.0	n.a.	5.0*
Morocco	224	1,308	1,106	13	65	52	4.5	17.3	18.8	2.8	7.0	61.0	120.0	141.0	n.a.	30.0
Oman	n.a.	1,158	1,687	n.a.	1,245	1,785	n.a.	41.2	41.2	n.a.	n.a.	14.1	14.5	18.0	n.a.	3.3*
Qatar	n.a.	618	892	n.a.	2,809	3,717	n.a.	20.6	23.8	n.a.	13.6	2.2	9.7	6.0	n.a.	n.a.
Saudi Arabia	6,771	20,766	24,417	1,153	2,525	3,014	20.0	28.1	27.7	18.0	20.5	47.0	51.7	52.2	n.a.	31.5
Sudan	120	287	333	7	16	17	15.1	10.9	10.9	n.a.	2.7	48.6	71.0	58.0	n.a.	3.5
Syria	706	2,240	2,386	96	254	268	25.3	35.4	30.7	15.1	20.0	177.5	222.5	222.5	102.5	9.8
United Arab Emirates	n.a.	1,214	n.a.	n.a.	1,316	n.a.	n.a.	43.3	n.a.	n.a.	n.a.	15.6	42.5	48.5	n.a.	n.a.
Africa																
Ethiopia	84	363	378	3	12	13	19.4	31.7	n.a.	2.9	8.9	44.8	230.0	250.5	20.0	19.0
Nigeria	1,786	1,769	846	28	23	11	11.8	8.2	n.a.	7.1	0.9	208.0	156.0	138.0	n.a.	n.a.
Somalia	25	119	n.a.	n.a.	n.a.	n.a.	n.a.	23.5	n.a.	n.a.	n.a.	23.0	62.6	62.6	n.a.	28.0
South Africa	1,332	2,552	2,760	53	89	94	18.5	17.5	15.5	5.3	3.4	50.5	92.7	81.4	157.0	145.0
Zimbabwe	102	793	555	16	108	74	12.3	36.5	21.9	3.0	n.a.	5.7	34.0	63.0	n.a.	11.5
Asia																
Australia	2,492	4,229	4,778	184	294	317	8.6	10.0	n.a.	3.2	3.0	69.1	72.6	73.2	33.7	—
China	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3,250.0	4,750.0	4,000.0	4,300.0	7.7m
India	2,660	4,816	5,263	4	7	8	21.1	16.6	17.3	3.0	3.3	956.0	1,104.0	1,104.0	240.0	260.0
Indonesia	1,108	2,115	2,692	9	14	17	16.7	12.5	12.3	3.8	3.3	266.0	273.0	269.0	n.a.	82.0
Japan	4,620	12,637	10,453	42	108	89	6.6	5.8	4.8	0.9	0.9	236.0	243.0	245.0	43.6	—
Korea, North	878	1,341	1,681	54	74	92	n.a.	14.6	14.7	n.a.	8.9	467.0	782.0	784.0	300.0	798.0
Korea, South	943	3,471	3,970	28	91	102	29.2	36.0	34.2	5.1	6.3	625.0	601.6	601.6	3,640.0	9.52m
Malaysia	385	1,561	2,055	31	115	140	17.3	16.0	19.7	4.0	8.3	61.0	102.0	99.1	31.0	440.0
New Zealand	243	431	463	79	137	147	4.3	4.7	4.9	1.8	2.2	12.7	12.9	12.9	9.8	—
Pakistan	725	1,422	1,888	10	172	212	12.3	24.4	28.1	7.2	6.9	392.0	450.6	478.6	513.0	109.1
Philippines	407	770	862	10	157	171	19.3	13.3	12.7	2.6	2.2	67.0	112.8	112.8	124.0	110.5
Singapore	344	599	707	152	250	295	18.1	16.6	15.6	5.3	5.7	30.0	42.0	42.0	120.0	37.5
Taiwan	1,007	3,197	3,106	61	178	171	n.a.	59.3	46.2	6.9	6.6	494.0	451.0	464.0	2,970.0	25.0
Thailand	542	1,095	1,306	13	23	27	25.7	20.5	19.3	3.7	3.5	204.0	238.1	233.1	500.0	53.5
Latin America																
Argentina	1,031	3,060	10,084	41	113	360	9.7	15.1	64.2	0.9	8.1	133.5	185.5	180.5	250.0	43.0
Brazil	1,283	2,019	1,344	12	16	11	9.3	8.7	6.6	1.3	0.5	245.5	272.6	272.9	625.0	185.0
Chile	n.a.	1,436	1,474	n.a.	128	132	n.a.	16.6	15.8	n.a.	4.6	73.8	92.0	97.0	160.0	27.0
Cuba	n.a.	1,100	n.a.	n.a.	111	n.a.	n.a.	n.a.	n.a.	n.a.	8.5	117.0	227.0	127.5	130.0	168.5
Mexico	586	1,076	1,403	10	150	203	2.4	2.4	1.3	0.7	0.6	332.5	369.5	119.5	250.0	—
Peru	383	575	398	24	33	22	15.3	15.8	9.1	3.1	2.0	56.0	130.0	135.5	127.5	25.0
Venezuela	494	863	950	41	52	56	5.4	8.6	7.1	1.7	1.4	44.0	40.8	40.8	n.a.	20.0

[a] This series is designed to show national trends only; differences in the scope of the government sector invalidate international comparisons.
[b] Based on local currency. GNP estimated where official figures unavailable.
[c] Reservists with recent training.
[d] The difficulty of calculating suitable exchange rates makes conversion to dollars and international comparisons imprecise. GNP estimates derived from NMP figures.
[e] See p. 67.
[f] Total available reserves could be up to 25,000,000.
[g] Defence expenditures are based on the NATO definition. Figures from 1981 provisional only. GDP figures used.
[h] Expenditure and GNP figures estimated from nationally-defined data.
[i] Incl. aid to W. Berlin.

THE STILL MIGHTY EIGHTH

On a single day in World War II, the fabled Eighth Air Force could launch 3,000 combat aircraft. Today, veterans gathering for a reunion find the numbers down but their old outfit going strong after forty years.

May 1944: Tail gunner Harold Bailey and his crew never had a chance to name their B-17. The big Fort was brand-spanking new, and there hadn't been a chance to adorn the fuselage with a colorful illustration and a nickname like *Blazing Heat, Calamity Jane, Memphis Belle,* or *Virgo.*

They were on their fourth combat mission over Northeast Germany. Their target: a synthetic oil refinery. "Quite a few went down that day. Even some of us no-name bombers," Bailey remembers.

"We were getting flak north of Berlin just after we'd hit our target when a group of Focke-Wulf 190 fighters came at us from right out of the sun."

Bailey didn't see or hear any shots, but briefly watched the German fighters come off their kill on the limping bomber. "I was scared, but my training worked and I got out of the smoking aircraft."

The ten men in his crew survived, with only one sprained ankle among them. Except for Bailey, all were captured the first day. For three days the young American evaded German farmers alerted to watch for him. Finally, needing food and water, he slowly approached a farmhouse. "I thought it was safe, but as I got nearer the house I saw a woman with a posse of fifty German civilians with shotguns, farm tools, and the like behind her."

Bailey tried to hide in a nearby swamp, but eventually was captured. "They had never seen an American before," he said.

Bailey was soon in the hands of German soldiers and headed for Stalag Luft IV, a POW camp, in Grosstychow, in eastern Germany (now Poland). After six months of confinement, he went on a forced march westward across Germany. On the ninety-sixth day of the march, he was liberated by a British patrol.

One footnote: If his crew had named the B-17, they would have called her *Forever Yours.*

Today: The sixty-one-year-old veteran, a retired cabinetmaker, resides near Hartford, Conn.

★ ★ ★

August 1944: Bill Weisner, an eighteen-year-old B-24 waist gunner, was over Holland coming home when it happened.

"A group of fighters, Messerschmitt Me-109s, jumped us—twenty-one of them. The right side tail gunner got shot—then there were flames," Weisner recalled. Six of the crew of ten would die that day.

As he looked around he noticed the right vertical fin of the B-24 Liberator was half gone. "On the fighters' second pass, I caught a 20-mm round in my right side," he continued. "It picked me up and set me down between the ball turret and the right side of the ship."

Dazed, he got up and started shooting again, but soon passed out. "Somehow I got my parachute on, opened the back hatch, and fell out."

He landed in a potato field and lay there for some time before several Dutch farmers found him. "They told me I was done for, but carried me to a hospital anyway."

He was soon turned over to the Germans and was allowed a brief recovery period in a German hospital before being sent to a POW camp near Frankfurt, Germany.

Nine months and three POW camps later he was released to Allied forces.

Today: Fifty-six-year-old Weisner is the Director of the Indiana Business College, Columbus, Ind.

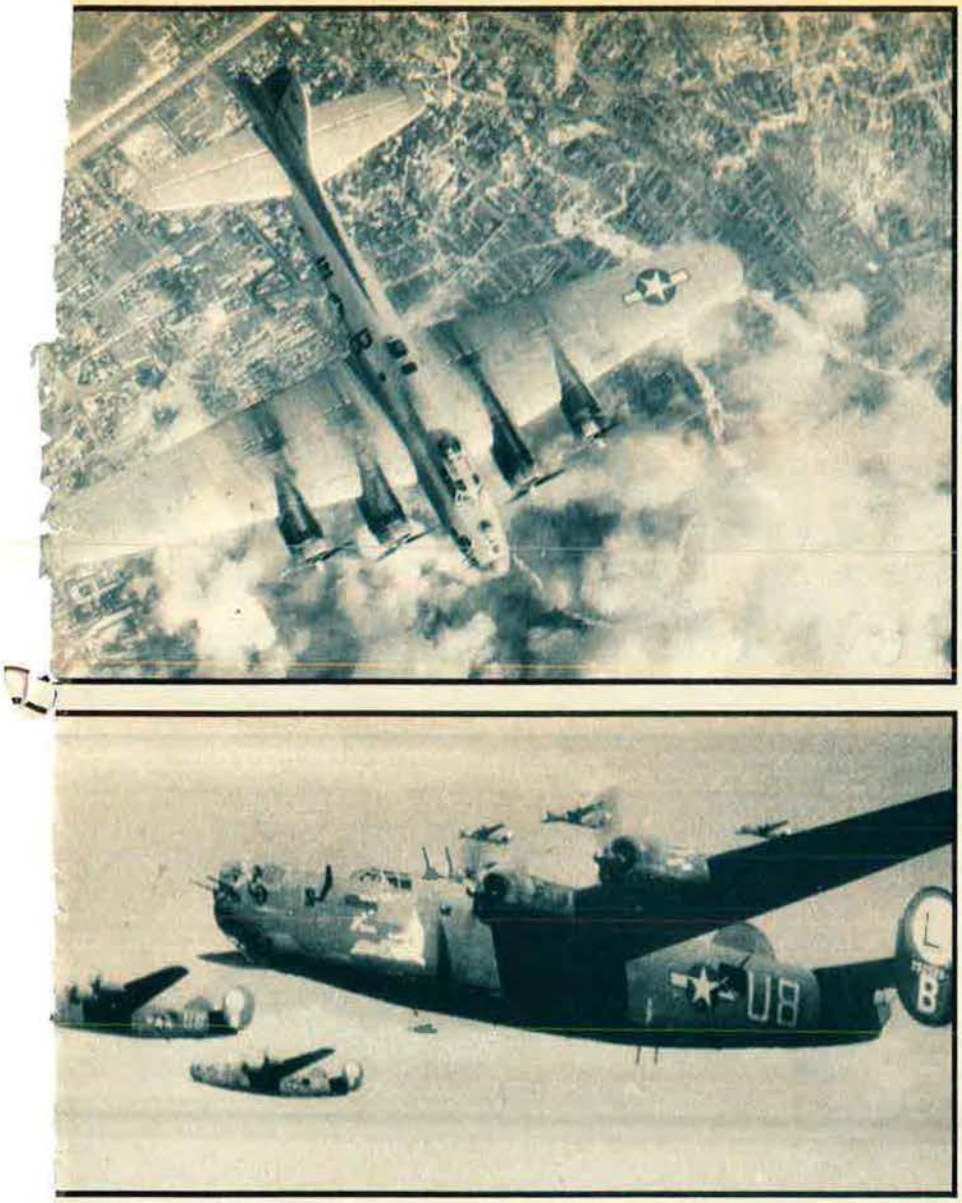
★ ★ ★

December 1944: Charles J. Cesky was a captain assigned to the 352d Fighter Group, based in Bodney, Norfolk, England. Captain Cesky was a fighter ace.

He flew 158 sorties in the P-51 Mustang, escorting bombers and strafing land targets in Germany and France. He downed nine enemy aircraft, three on the same day.

Cesky vividly remembers the day he himself was shot down. "I knew that if it would happen this would be

BY CAPT. MICHAEL B. PERINI, USAF
CONTRIBUTING EDITOR



UPPER PHOTO: An Eighth Air Force B-17 bombs enemy targets during WW II. LOWER: The Eighth flew a variety of bombers during the war, including the B-24.

the day. I wanted to fly so badly that I was willing to go without a parachute," he said.

On December 31, his chute was being repacked when the alert sounded. He was flying out of Asche (Y-29), Belgium, on a radar-controlled mission when Cesky led his flight of four aircraft through an undercast. "When we came out we were directly over a German airfield. Twenty-millimeter shells were popping all around me, and four hit *Diann*." Cesky had named his aircraft after his daughter.

"I was bleeding and tried to climb above the overcast when I lost power." He made a dead-stick crash landing with the Germans still firing from both sides of a frozen field. Shaken but still alive, Cesky was crawling away from the wreckage when he remembered he had left behind the photo of his daughter.

"I had just retrieved it and was turning away from the bent cockpit when I looked up and saw several soldiers pointing their guns at me."

They were British and had just taken the area.

Today: Cesky, a retired USAF lieutenant colonel, lives in Tampa, Fla.

★ ★ ★

Bailey, Weisner, and Cesky. All were members of the Eighth Air Force during World War II. Though it had been four decades since the Eighth played its vital role in the air war in Europe, an observer couldn't discern that fact from their eighth annual reunion, which drew more than 2,500 members of the Mighty Eighth to Cincinnati, Ohio, in October.

Veterans like Bailey, Weisner, and Cesky are all grayer and wiser now, but they tell their war stories with such vigor and excitement that it's as if it all happened yesterday.

The reunion was an opportunity for fellowship, and, as one B-17 aircraft technician said, "It's a chance to go back down memory lane."

Most said they'd join the military again. "I enlisted because I felt there was a job I could do and, yes, I would enlist again," said Mrs. Isabella Novak, a former sergeant and administrative specialist in the Women's Army Corps.

The four-day event was organized by the 8th Air Force Historical Society. Founded in 1975, the Society, which has more than 10,000 members, is "responsible for organizing reunions and tours and creating interest in the preservation of Eighth Air Force memorabilia and history," said Lt. Col. John Woolnough, USAF (Ret.), the Society's operations manager. Reunion activities included a general membership meeting, unit organizational meetings, and a nostalgic "Aero Club" dance. There were World War II movies and a Jimmy Stewart training film from 1941.

Some attendees arrived a day ahead of the reunion to attend an air

war symposium on escape and evasion and prisoner-of-war-related topics. The panels included representatives from several European countries, allied commanders in various POW camps, and Col. Francis S. Gabreski, the highest scoring living USAF ace, who was captured shortly after scoring his twenty-eighth victory, but who went on to score another 6½ victories in Korea to bring his total to 34½.

Dayton Memorial

One of the highlights was the unveiling of the Eighth Air Force Dayton Memorial at the Air Force Museum, Wright-Patterson AFB, Ohio.

The dedication speaker was Lt. Gen. Robert T. Herres, Commander of the Eighth Air Force, who said, "This monument now memorializes the men of Eighth Air Force who gave their lives in the Second World War. Out of their deaths came victory in Europe. Out of their lives came the birth of airpower as we know it today."

The memorial, nearly twenty feet high, is a three-sided pillar constructed of Indiana limestone. A propeller is mounted near the top of the memorial stone. Bronze plaques on each of the three sides depict the history of the Eighth in World War II and provide a map of the Eighth's bases in England during that period.

"We talk today of strategic bombing and air combat maneuvers as if they had been with us always," General Herres said. "They have not. They were discovered the hard way by the men of the Mighty Eighth. The hard way."

More than 2,800 people attended the ceremony, which also included the dedication of living tree memorials on the Museum grounds for the persons lost in various Eighth Air Force units during the war.

A Look Back

The Eighth Air Force was born on January 28, 1942, in Savannah, Ga. In February, Brig. Gen. Ira C. Eaker and six other officers, an advance detachment of the VIII Bomber Command, arrived in England. Their task was to lay the groundwork for American combat flying units soon to be based in England, including Eighth Air Force. The Eighth would test the United States Army Air Forces' new doctrine of high-altitude daylight precision bombing, and, within a short period of time, was spread out on more than 112 English airfields.

According to Roger A. Freeman, noted military historian and author of the book *The Mighty Eighth:* "The hope was that such a campaign could render massive devastation to the war industry of a highly industrialized nation like Germany, so that it would be unable to supply and support its armed forces."

The Eighth flew various models of the B-17, B-24, and B-26 bombers, P-38, P-47, and P-51 fighters, and, for special missions, the British Spitfires and Mosquito light bombers.

By the end of the war the Eighth had achieved these impressive statistics, according to the Eighth Air Force Office of History:

- 600,000 sorties flown.
- 700,000 tons of bombs dropped.
- 5,000 enemy aircraft destroyed by fighters.
- 4,000 enemy aircraft destroyed by strafing.
- 6,000 enemy aircraft destroyed by aircrew gunners.

These figures do not include the undetermined thousands of German aircraft destroyed or damaged on the ground by bombers.

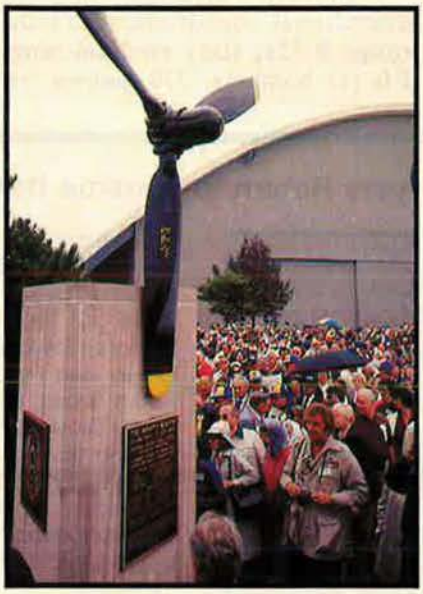
UPPER PHOTO: The first USAF unit to become operational with the air-launched cruise missile (ALCM) is an Eighth Air Force unit—the 416th Bomb Wing, Griffiss AFB, N. Y. LOWER: One of the 170 B-52s operated by the Eighth Air Force today returns from a training mission. (US Air Force photo)

On April 25, 1945, Eighth Air Force attacked its last industrial target of World War II—an armament works in Czechoslovakia. At its peak strength, the Mighty Eighth could launch as many as 2,000 bombers and 1,000 fighters on a single mission.

The Eighth manning roster hit its peak around D-Day, with 250,000 men and women on the rolls. In all, about 350,000 served with the Eighth during the three years of aerial combat over Europe.

The statistics also show:

- 47,000 did not return from combat (estimated killed: 26,000).
- 17 Medals of Honor.
- 220 Distinguished Service Crosses.
- 850 Silver Stars.
- 7,000 Purple Hearts.
- 46,000 Distinguished Flying Crosses.
- 442,300 Air Medals.
- 261 fighter aces, thirty-one of them with more than fifteen kills.



ABOVE: Eighth Air Force veteran Bill Weisner with his WW II logbook. Weisner was shot down over Holland in August 1944. LEFT: More than 2,800 attended the unveiling of the Eighth's Dayton Memorial at the Air Force Museum, Wright-Patterson AFB, Ohio.

Postwar Years

When SAC was organized in 1946, one of the first two major subordinate commands assigned to it was Eighth Air Force, initially headquartered at MacDill AFB, Fla., and then at Fort Worth Army Air Field, Tex. (later designated Carswell AFB).

Throughout this period and well into the 1950s, the Eighth's combat forces were located primarily in the American southwest—Texas, Oklahoma, New Mexico, and Arizona. Eighth units operated the B-29, B-50, B-36, and B-47 bombers, and KB-29 and KC-97 tankers.

In June 1955, the Eighth moved to Westover AFB, Mass., and a year later received its first B-52 heavy bomber with a new tanker aircraft, the KC-135, brought on board the following year.

By the early 1960s, with the phaseout of B-47s and KC-97s having started, the Eighth received a new weapon—the intercontinental ballistic missile (ICBM). Only one ICBM unit was initially under Eighth's control—an Atlas squadron at Plattsburgh AFB, N. Y.—but the Eighth's ICBM arm was strengthened in 1963 when it acquired the Titan I and II units and Atlas units in the Midwest and the Rocky Mountain regions from Fifteenth and Second Air Forces. An embryonic Minuteman missile force was also acquired. The mid-1960s saw the phasing out of several weapon systems, including the Atlas and Titan I missiles and B-47 and KC-97 aircraft.

On April 1, 1970, the Eighth moved personnel and equipment from Westover to Andersen AFB, Guam. There it absorbed the personnel and functions of Hq. Third Air Division, which was inactivated at the time and took over direction of bombing and tanker missions in Southeast Asia.

Besides Andersen, Eighth units also operated from Kadena AB, Okinawa; Clark AB, Philippines; and U-Tapao Air Base, Thailand.

Eighth bombers and personnel were heavily involved in the air campaigns that were aimed at slowing down or preventing the enemy from continuing the war in Southeast Asia. The enemy's supply routes, lines of communication, and suspected storage compounds were bombed.

Linebacker II

By July 1972 the Eighth had more than 200 B-52s flying in Southeast Asia—about sixty in Thailand, and the remainder out of Guam. As Christmas 1972 approached, the peace negotiations were deadlocked with American POWs still in captivity. The strategic bombers of the Eighth were chosen as the main thrust of an operation known as "Linebacker II."

The carefully planned operation was designed to bring the North Vietnamese back to Paris for serious negotiations to halt the war. Targets included North Vietnamese airfields, railroad yards, repair and storage depots, Radio Hanoi, power plants, and surface-to-air missile (SAM) sites. Since the objective was to destroy military targets, not people, pinpoint bombing accuracy was essential.

During the eleven-day campaign (no bombs were dropped on Christmas), Eighth B-52 crews flew 729

sorties and dropped 15,237 tons of bombs on thirty-nine different targets. Fifteen B-52s were lost due to SAMs, and twenty-eight crew members were killed and/or listed as missing. The raids were instrumental in bringing about the cease-fire on January 28, 1973, and the release of American POWs.

On January 1, 1975, Eighth's headquarters moved without personnel and equipment from Andersen to Barksdale AFB, La., where it assumed control over units that had been under the inactivated Second Air Force. Besides B-52s and KC-135s, Eighth now had jurisdiction over FB-111 medium bombers and Titan II and Minuteman II missiles.

On December 1, 1979, three missile warning squadrons in the eastern US, a missile warning group, and an air base group in Greenland transferred from the Air Defense Command to the Strategic Air Command and Eighth Air Force. During 1981, an Eighth Air Force unit, the 32d Air Refueling Squadron, 2d Bombardment Wing, at Barksdale AFB, La., began the USAF's first operational flights with the KC-10 advanced cargo tanker aircraft.

The Eighth Today

Today there are about 50,000 people in the Eighth, which is organized into five air divisions that supervise eleven bombardment wings, two air refueling wings, two air refueling groups, three strategic missile wings, and three missile warning squadrons. Eighth's bases span the eastern half of the US with activities extending eastward to Greenland and Europe.

Eighth Air Force has: forty-one operational squadrons, 170 long-range B-52s, sixty medium-range FB-111 bombers, 370 tankers, reconnaissance and command and control aircraft, and a growing squadron of KC-10s. It also possesses thirty-four Titan II missiles and 150 Minuteman II ICBMs. This month witnesses the first USAF unit to become operational with the Air-Launched Cruise Missile (ALCM)—an Eighth Air Force unit, the 416th Bomb Wing at Griffiss AFB, N. Y.

At the Cincinnati reunion the membership voted to permit all Eighth Air Force members, former and present, to join the Society. "This will help preserve the traditions and activities of Eighth Air Force for future generations," said Colonel Woolnough.

As General Herres told those meeting in Ohio: "As long as there is the slightest chance that airmen will be needed to show an enemy what airpower means, the Eighth will be there." ■

Twentieth Flyers Return to Wartime Bases in China

Five 58th Bomb Wing veterans pose on a taxi strip at Kwanghan Airfield, a wartime B-29 base near Chengtu. From left: Stan Lee, Charles Renegar, and Sam Snider (all from the 462d Bomb Group), Lee Hall (40th BG), and Sherm Wilkins, whose 444th BG flew from this field.

On the night of June 15, 1944, sixty-eight Army Air Forces B-29s left Chinese soil and aimed northeast for the Imperial Iron and Steel Works at Yawata on the northern coast of the Japanese island of Kyushu.

Their crucial war mission: Make the first land-based air attack on Japan of World War II.

The four-engine Superfortresses were flown by Twentieth Air Force aircrews launching from bases deep inside China.

Thirty-eight years later, forty-three former members of the Twentieth traveled to the People's Republic of China to visit the bases from which they had left on their successful mission nearly four decades earlier. Included in the group was Sherman W. Wilkins, a member of the 444th Bomb Group based at Kwanghan during his stay in China. Mr. Wilkins was elected AFA National Secretary at the AFA Convention in September.

The highlight of the tour for the B-29 veterans was the return trip to Chengtu, 900 miles southwest of Peking. Chengtu was the advance site for the 58th Bomb Wing, which was based in India but flew from forward airfields around Chengtu. Kiunglai, the forward Chinese airfield used by the 462d Bomb Group, and Pengshan, wartime forward base for the 468th Bomb Group, are today active Chinese air bases. The 40th Bomb Group was based at Hsinching, where there is now a training facility for the China Civil Air Administration. The group watched An-2s, a 1940s-vintage biplane Russian trainer, practice touch-and-go landings from this historic airfield. The group reportedly became the first Westerners since 1945 to tour the fourth former 58th Bomb Wing airfield near Chengtu—Kwanghan, wartime home of the 444th Bomb Group.

The Far East tour, sponsored by the 20th Air Force Association for the second straight year, included stops in Peking, Shanghai, Canton, and Kunming, as well as Chengtu.

The Association has recently published *The 20th Air Force Album*, which is reviewed on p. 159 of this issue.

—By Richard M. Keenan,
Executive Director, 20th Air Force Association

B-29s of the 58th Bomb Wing line the taxi strip of one of the Chengtu area bomber bases back in May 1944.

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CARA is an advanced technology, all solid state, zero-to-50,000 ft. FM/CW altimeter system, offering inherent low probability of intercept and anti-jam capabilities, as well as both analog and digital outputs for aircraft-peculiar flight control systems.

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AIRMAN'S BOOKSHELF

The Final Objective

Women in the Military: Breaking the Last Barrier, by Maj. Gen. Jeanne Holm, USAF (Ret.). Presidio Press, Novato, Calif., 1982. 399 pages with notes, appendices, and bibliography. $16.95.

So essential have women become to the nation's overall plans for defense that "it would be next to impossible to field a standing peacetime force of 2.1 million volunteers without them." So states the author in the preface to one of the most provocative studies on womanpower to appear in a long time—and she should know.

Jeanne Holm spent thirty-three years in the military, living through most of the landmark changes that affected servicewomen to become the Air Force's first woman to achieve star rank.

As WAF Director in the 1960s and beyond, she was also in a position to view the attitudes, prejudices, and restrictions put on the use of women for defense and, luckily for those who served at the time, was sometimes able to influence decisions on their behalf.

The "last barrier," however, has obviously yet to be overcome, for in this careful and lively history of women in war, from the Revolution to Southeast Asia, one fact becomes sadly clear: The masculine mystique that war is the sole province of men, and that it is a male prerogative to withstand the rigors and demands of combat, relegates women to the "resource of last resort."

Although this is an inevitable conclusion in her work, General Holm has written no strident polemic on women's rights; an important book, hers is a sober assessment that the United States has ignored and often wasted one of its greatest natural strengths.

In October 1917, Gen. John J. Pershing requested 100 women uniformed telephone operators to serve in Europe with the American Expeditionary Forces; he received contract civilians. Later, he would use members of the British Women's Auxiliary Army Corps, since the US War Department remained unconvinced of the desirability of allowing women to leave hearth and home.

When the Surgeon General, accustomed to female nurses, wished to commission female doctors to ease the dire shortage of qualified medical officers, he was told that only persons "physically, mentally, and morally qualified" could be appointed and that women were not physically qualified.

The barriers remained high during the between-the-wars period, although the powerful women's organizations that emerged during the suffrage movement began to make their presence felt.

In 1939, Gen. George C. Marshall saw clearly that should America be drawn into the war, there would be grave manpower shortages in the armed forces. Study followed study on the possible use of women to alleviate these shortages, but nothing happened until November 1941, when General Marshall told his foot-dragging staff, "I want a women's corps right away, and I don't want any excuses."

In 1942, the Women's Auxiliary Army Corps eventually saw the light of day, but from the very beginning, says General Holm, auxiliary status did not work. "The women were neither in nor out, neither fish nor fowl."

Thus, ultimately, the WAC was born in 1943, with conversion to full military status. Before war's end, women had shipped aboard LSTs, slept in the field under shelter halves, eaten field rations, and washed clothes in helmets of cold water. Army nurses at Anzio would be awarded four Silver Stars, the first women so decorated. When they were at their peak strength, 17,000 WACs served overseas in every combat theater.

After the war, the women's programs languished, although the WAF came into being nine months after the Air Force gained its independence from the Army. But women in the armed forces found that they had traded equality for acceptance, and their inferior status was continually underlined.

In Southeast Asia, for the first time since World War II, US military women, other than nurses, were put to the test of enemy fire.

In the watershed years of the 1970s, women would break down the barriers of ROTC, service academies, star and flag ranks, and equal benefits for service in the armed forces. The final barrier, though—the same rights and obligations with men to defend their nation—still stands.

—Reviewed by Poppy Walker, Managing Editor of Army *Magazine.*

An American Legend

Marshall: Hero for Our Times, by Leonard Mosley. Hearst Books, New York, N. Y., 1982. 608 pages with index, notes, and photos. $18.50.

At Gen. George Catlett Marshall's retirement as Army Chief of Staff on November 26, 1945, President Truman promised: "You have done so much for your country, I will never disturb you in your retirement. You have earned your rest."

A few days later, Ambassador to China Patrick J. Hurley publicly criticized the Administration's China policy and made some indiscreet remarks about Truman. As a result, the President fired him. A replacement was needed quickly due to the China crisis that threatened peace in the Pacific.

Only one man could fill the void and take the political heat off the President while bringing new hope for a solution to the problems in China. The President ignored his earlier promise and called Marshall to ask: "Will you go to China for me?"

Amidst unpacked boxes in his new retirement home, Marshall accepted, and thus began his second career as a statesman.

Leonard Mosley's book is the first single-volume anecdotal biography of the late General. The story begins with Marshall's boyhood in Union-

town, Pa., and ends with his death at Walter Reed Hospital in Washington, D. C., on October 16, 1959.

Mosley describes in detail the events surrounding Marshall's years as a soldier, statesman, and counselor to Presidents Roosevelt, Truman, and British Prime Minister Winston Churchill. The author augments his study of Marshall with correspondence and telegrams. These key references are interspersed throughout the book, which is divided into four parts. Part One, "The Road to the Top," consists of seven chapters and depicts how Marshall rose from a boy, academically at the bottom of his prep school class, to Chief of Staff of the US Army.

Part Two details the significant role Marshall played in the Allied victory in World War II. Mosley points out that during the war he had been the sounding board, for the President on down, for decisions and order amid the chaos and confusion of the war.

Following the war, Marshall's presence continued to be deeply felt. Europe was in desperate need of food and other necessities. Marshall recognized the US's responsibility to alleviate the suffering. His ideas for support of Europe's recovery were first presented in a speech he gave at Harvard. He described the devastation and despair plaguing the Continent and urged America's help. Thus, the Marshall Plan was born—unique in history for a victorious nation not only to aid its allies but also the vanquished.

His role as Ambassador to China is described in Part Three, ending with his resignation as Secretary of State. Part Four consists of six chapters and covers Marshall's years as Secretary of Defense, including details of the Gen. Douglas MacArthur showdown and Marshall's final days.

The book is an ambitious and exhaustive effort that not only explores Marshall's professional life but chronicles much of his private life as well. *Marshall: Hero for Our Times* is Mosley's twenty-seventh book. Based on interviews with statesmen who knew and dealt with the General at different periods in his career, this is reportedly the first book to have used the forty hours of tapes Marshall recorded just before his death in 1959 and the full resources of the Marshall papers.

The writing in this book is colorful and upbeat. Mosley's work is a useful course in personal character, inspiring to those who aspire to careers in the military or the DoD civilian sector. The reader can confirm that Marshall was in every sense one of America's greatest men. This biography is a moving study and definitely deserves to be read.

—Reviewed By Capt. Michael B. Perini, USAF, Contributing Editor.

New Books in Brief

F-111 Aardvark, by Bert Kinzey. Part of the "Detail & Scale" series of books, this booklet does not concentrate on the operational history of the F-111; rather, it focuses on the physical features of the aircraft, with particular attention given to the detail differences between the various models of the F-111. The booklet has many close-up photos, technical drawings, and charts and tables, along with color photos of the F-111's different paint schemes. There are also special sections on the EF-111 "Spark Vark" and FB-111, a modeler's section reviewing F-111 model kits that are available, and a pilot report. With reference listing. Aero Publishers, Inc., 329 W. Aviation Rd., Fallbrook, Calif. 92028, 1982. 72 pages. $6.95.

Guadalcanal Remembered, by Herbert Christian Merillat. Author Merillat was a press officer and the in-house historian for the 1st Marine Division on Guadalcanal in 1942. While there, he kept a diary recording his impressions of the first four months of the campaign. Forty years later, he has fleshed out his diary with a historical overview of the battle for Guadalcanal, but it is in his diary entries that the real value of this book lies. The diary excerpts are vivid and arresting, losing none of their immediacy despite the passage of four decades, and provide the reader with an eyewitness account of the organized chaos of a desperate battle. With illustrations, notes, bibliography, and index. Dodd, Mead & Co., New York, N. Y., 1982. 332 pages. $14.95.

Messerschmitt Aces, by Walter A. Musciano. If five confirmed kills make a pilot an ace, then there were twice as many German fighter aces in World War II as there were in the combined total for all the Allies. This book traces the history of the *Jagdwaffe,* the Luftwaffe's "Hunting Arm," from its clandestine beginnings in the 1920s to final defeat in 1945. Though the German aces showed great skill and determination, especially in the face of overwhelming odds near the end of the war, the author maintains that poor decisions and inept leadership by the Luftwaffe High Command fatally diminished their effectiveness. With illustrations, appendix, and index. Arco Publishing Co., New York, N. Y., 1982. 224 pages. $17.95.

Space War, by David Ritchie. Science writer Ritchie provides here a very general outline of the history of the military uses of space, and speculates on the future of "spacewar." Those with a more professional or technical interest in this subject will be disappointed by this book; it is written for a general audience and at times tends toward sensationalism. However, the book is fast-paced and easy to read, and for those new to the topic, *Space War* should suffice as an introduction to this controversial new dimension of warfare. With photos, bibliography, and index. Atheneum Publishers, New York, N.Y., 1982. 224 pages. $14.95.

Strategic Weapons: An Introduction, by Norman Polmar. This is a revised and updated edition of the author's 1975 publication. Written for the layman, this book is a clear outline of the history of strategic weapons development since World War II. The book inventories and discusses the strategic hardware of the two superpowers, examines possible future trends in weapons development, and touches on the nuclear weapons of other nations. Also included is a comparison of the uneasy balance of weapon levels between the United States and the Soviet Union. This book should serve as an excellent reference for those engaged in the debate over nuclear arms. With photos, tables, and appendices. This is a publication of the National Strategy Information Center by Crane, Russak & Co., New York, N. Y., 1982. 126 pages. $8.95.

The 20th Air Force Album, by Richard M. Keenan. The Twentieth Air Force, equipped with the new B-29 Stratofortress, was activated in April 1944 under the command of Gen. H. H. "Hap" Arnold for the express purpose of waging strategic air war against Japan. Author Keenan has collected in this album more than 1,200 photos documenting the operations of the Twentieth, including a fascinating section of 346 photos of B-29 nose art representing every bomb group of the Twentieth. Those who served with the Twentieth will find this large-format album a trove of memorabilia that *shows* how it was in carrying the fight to the Japanese homeland. With an introduction by Gen. Curtis E. LeMay, USAF (Ret.), and appendices and bibliography. Available from 20th Air Force Association, Box 5534, Washington, D. C. 20016, 1982. 248 pages. $30.

—Reviewed by Hugh Winkler, Ass't Managing Editor.

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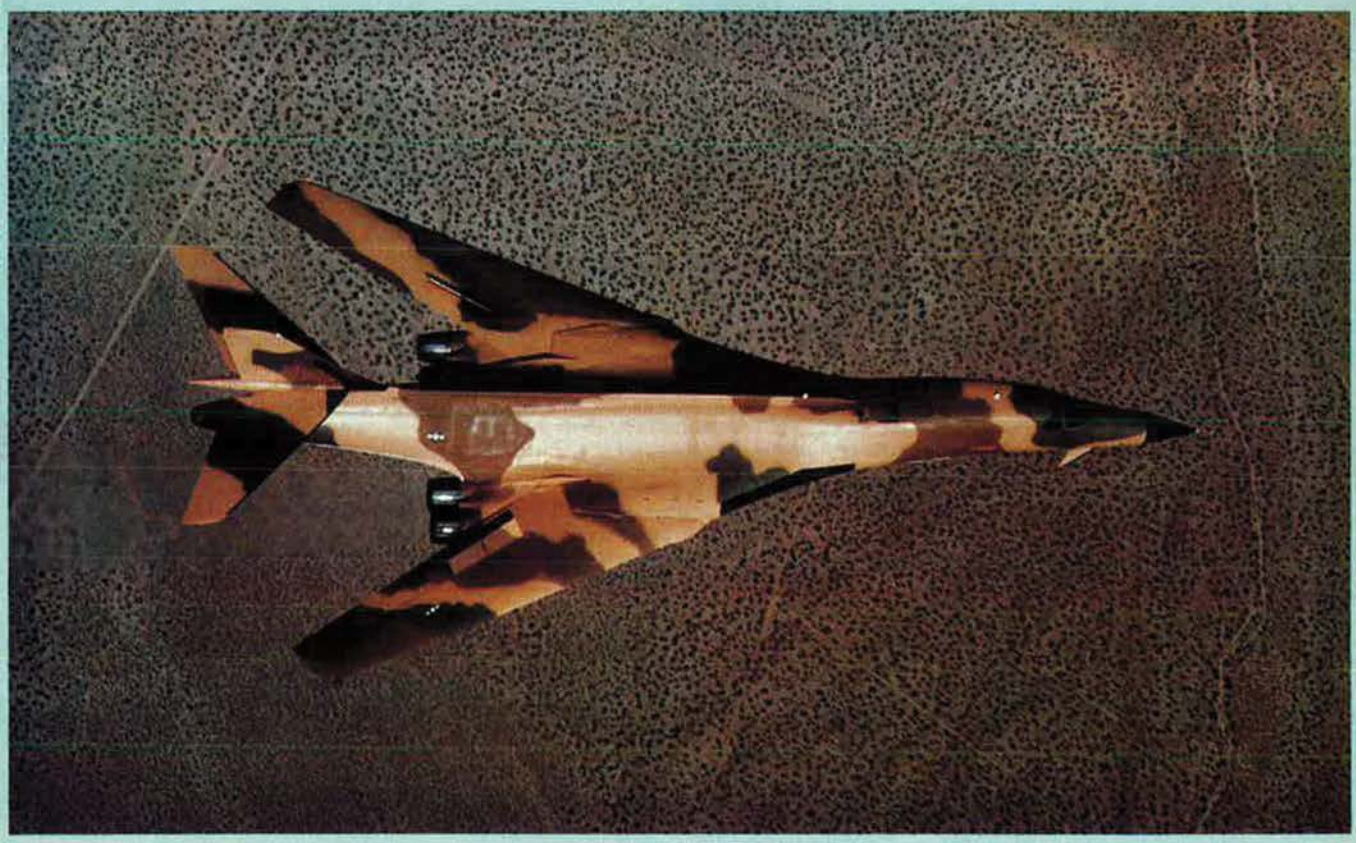


Rockwell International B-1 in flight with wings fully swept

ROCKWELL

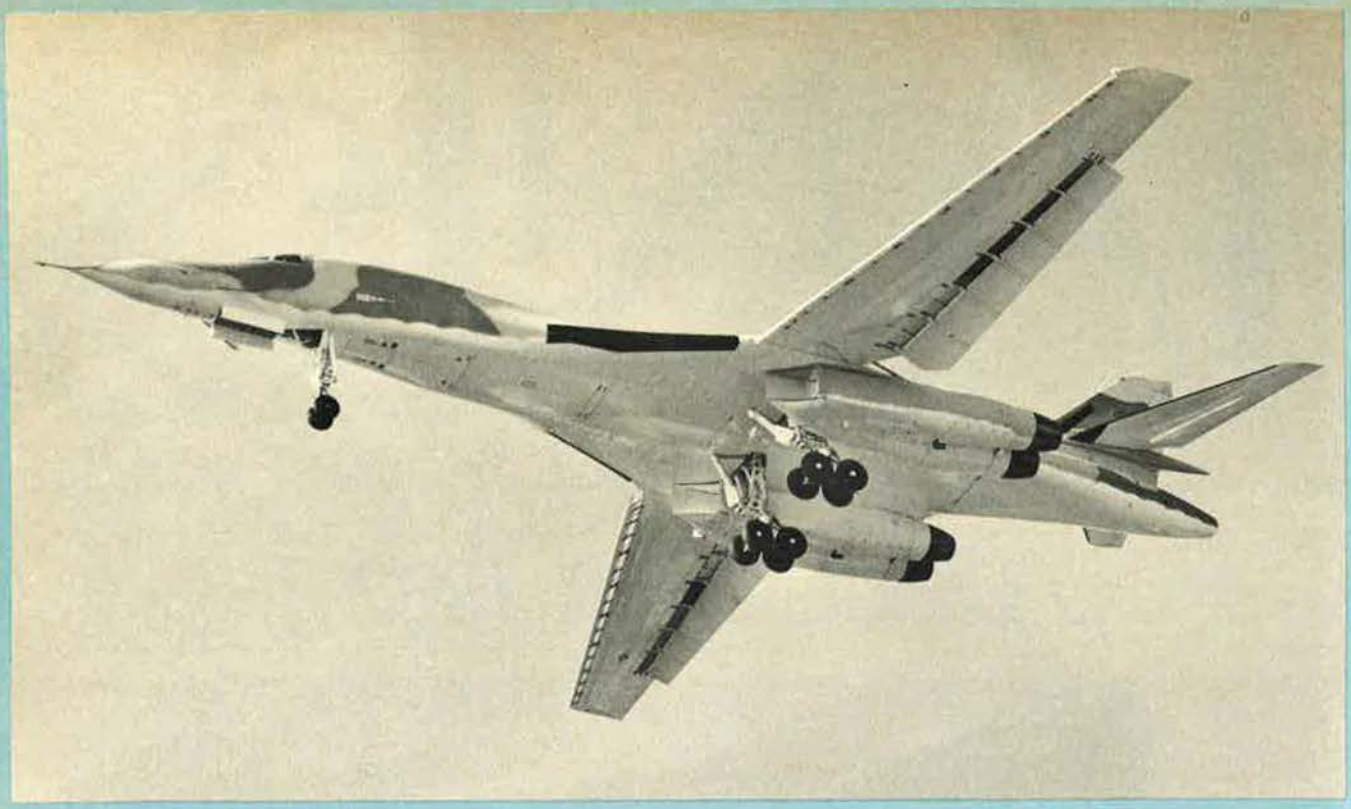
ROCKWELL INTERNATIONAL CORPORATION, NORTH AMERICAN AIRCRAFT OPERATIONS; Executive Offices: 2230 East Imperial Highway, El Segundo, California 90245, USA

ROCKWELL INTERNATIONAL B-1B

The original B-1 was the outcome of a succession of defence studies, begun in 1962 and leading to the AMSA (Advanced Manned Strategic Aircraft) requirement of 1965, for a low-altitude penetration bomber to replace the Boeing B-52s of USAF Strategic Air Command by 1980. It was intended as the third and most flexible component of the US Triad defence system, which comprises also land-based and submarine-launched ballistic missiles.

To meet the B-1 requirement, the Department of Defense (DoD) issued RFPs (Requests For Proposals) to the US aerospace industry on November 3, 1969, and from three airframe and two engine finalists it awarded research, development, test, and evaluation contracts on June 5, 1970, to North American Rockwell's Los Angeles Division (now Rockwell International's North American Aircraft Operations) for the airframe, and to the General Electric Company for the F101 turbofan engine. The original cost-plus-incentive contracts were for five flying prototypes, two structural test airframes, and 40 engines; in January 1971, in which month the essential design of the B-1 was frozen, these quantities were reduced to three flight test aircraft, one ground test aircraft, and 27 engines. However, procurement of a fourth flight test aircraft, as a preproduction prototype, was approved under the FY 1976 budget. The US Air Force planned to order 244 B-1s, including prototypes, to replace in-service B-52s; if this programme had proceeded on schedule, all 244 would have been delivered by 1981.

The B-1 prototypes were assembled in USAF facilities known as Plant 42 at Palmdale, California. Assembly of the first B-1 began on March 15, 1972; this aircraft (USAF serial number 74-158) was rolled out on October 26, 1974, and made its first flight, at Palmdale, on December 23, 1974. This occasion was also the first flight of the YF101 engine. The third B-1 (74-160), used as a testbed for the avionics systems, made its first flight on March



Rockwell International B-1 No. 4 making its impressive arrival for the Farnborough International 1982 Air Show. The four B-1 prototypes still embody features of the original Mach 2 bomber design. Engine intakes of the B-1B will be modified for reduced speed and low observability
(Brian M. Service)

26, 1976, and was followed by the first flight of the second B-1 (74-159) on June 14, 1976. The fourth B-1 (76-174), flown for the first time on February 14, 1979, represented an operational configuration, with both defensive and offensive avionics systems installed.

The first prototype, used to evaluate flying qualities, completed a test programme of 79 flights totalling 405 h 18 min before being placed in storage. The second aircraft, used for structural load testing, completed 60 flights totalling 282 h 30 min before being stored in flyable condition. The third prototype had an advanced ECM system and a Doppler beam-sharpening modification to the forward-looking attack radar. Continued testing of the third and fourth B-1s concentrated on offensive system performance and advanced ECM development. Testing was carried out against simulated enemy threats, defence systems, and against US surrogate threats. By April 30, 1981, when the authorised test programme ended, the third prototype had made 138 flights totalling 829 h 24 min; the fourth B-1 had accumulated 378 h during 70 flights. During this programme, the second B-1 attained the highest speed, Mach 2.22, on October 5, 1978.

Phase I flight testing was completed on schedule by September 30, 1976, and DoD and USAF announced publicly on December 2, 1976, that production contracts had been placed for construction of the first three operational aircraft (c/n 5 to 7) and for the purchase of long-lead items for the second lot of eight operational aircraft. In addition, funds were authorised for the purchase and fabrication of production tooling for the operational aircraft. The production funds were included in the US FY 1978 budget by the outgoing Ford Administration.

However, on June 30, 1977, President Carter announced that production of the B-1 would be cancelled and priority given instead to the cruise missile development programme. This led, in 1978, to B-1 derivative designs being included in DoD studies to evaluate various types of aircraft as cruise missile carriers. In November 1979, as a result of these studies, Rockwell was requested by USAF to submit a proposal for the initial planning and design effort associated with flight demonstration of a prototype B-1 derivative aircraft. Identified then as a strategic ALCM launcher (SAL), it would have been produced by modification of the third B-1 prototype.

In addition to developing this proposal for the Air Force, Rockwell began an in-house examination of various derivative designs of the B-1, with reduced cost and expanded mission roles as priorities. Simultaneously, DoD initiated a study through the Air Force Scientific Advisory Board to determine the direction that future strategic bomber development should take. The conclusion of this last study was that the nation's next strategic bomber should have multi-mission capability, rather than a single dedicated role, and that a B-1 derivative was the best candidate to fulfil the requirement and provide initial operational capability (IOC) in 1987. During the period of these investigations Congress authorised and appropriated funding in the 1981 Defense Bill for a multi-role bomber, directing the Air Force to evaluate all the alternatives and report to Congress. This final study by USAF and DoD led to selection of the derivative B-1B as the next strategic bomber, and in October 1981 President Reagan announced that USAF was to receive 100 of these aircraft.

On January 20, 1982, Rockwell signed two contracts. The first is a $1,317 million full-scale development contract which requires the company to finalise the B-1B design, modify two of the original B-1 prototypes (the second and fourth), and carry out a flight test programme; the second is an $886 million production contract, which covers construction of the first B-1B and procurement of long-lead items for early production lots. Under the planned programme the first aircraft to fly, in early 1983, will be the modified B-1 prototype No. 2, which will be used to evaluate many of the new features, and for stability and control, flutter, and weapons systems tests. Next to fly, in late 1984, will be B-1 prototype No. 4, which will incorporate the remainder of the B-1B improvements and be used for verification testing of the defensive and offensive avionics systems. The first production B-1B, scheduled originally to fly during March 1985, is now expected to be ready ahead of time and to fly in December 1984. Delivery of the first B-1B is scheduled for 1985; IOC with 15 aircraft is planned for August 1986, with deliveries to continue at a rate of approximately four aircraft per month until the 100th has been accepted in June 1988.

Operational B-1Bs will be able to carry, in three weapons bays, varying combinations of nuclear air-to-ground missiles, conventional or nuclear free-fall bombs, and auxiliary fuel. Using electronic jamming equipment, infra-red countermeasures, radar location and warning systems, other advanced avionics, and 'low observable' technology to defeat hostile defensive systems, the B-1B will be able to penetrate present and predicted sophisticated enemy defences well into the 1990s and to operate within less heavily defended areas into the next century. It will also be suitable for deployment in a variety of roles now flown by the Boeing B-52, including anti-submarine patrol or maritime surveillance at long ranges, and aerial minelaying.

Outwardly the B-1B will be generally similar to the B-1 prototype No. 4, but will have structural strengthening for operation at a gross weight that is increased from 179,170 kg (395,000 lb) to 216,365 kg (477,000 lb). Major airframe improvements include a strengthened landing gear; a movable bulkhead in the forward weapons bay to allow for the carriage of a wide range of different-sized weapons, including the ALCM; optional weapons bay fuel tanks to give extended range; and external stores stations beneath the fuselage to accommodate additional fuel or weapons. The variable engine inlets of the B-1 will be replaced by fixed inlets, and new engine nacelles and simplified overwing fairings are to be introduced, these modifications being designed to provide optimum performance for the new high-subsonic low-altitude penetration role. The new bomber will retain the variable-geometry wing of the B-1, its unswept setting allowing rapid take-off from a base threatened by imminent attack, or operation from shorter runways and less sophisticated airfields; the fully-swept position will be used in supersonic flight and for the primary role of high-subsonic low-level penetration. It will retain also the crew ejection seats which, in the B-1 No. 4, replaced the crew escape capsule of the first three B-1 prototypes.

It is, however, the high-technology avionics that make the major difference between the original B-1 and the B-1B. Although externally similar to the B-1, the B-1B will incorporate technological advances that will reduce considerably its radar observability and increase its ability to penetrate hostile airspace. The B-1B has a low radar cross-section, and through the application of 'low observable' technology will have a radar signature only one percent that of a B-52. It will use advanced radar and navigation equipment in the category of that developed for the latest generation of fighter aircraft, such as the General Dynamics F-16, as well as avionics technology from both the B-52's offensive system and that of the original B-1. Thus, offensive avionics of the B-1B will include advanced forward-looking and terrain-following radars, an extremely accurate inertial navigation system, a link to the Air Force Satellite Communications (AFSATCOM) system, and a strategic Doppler radar altimeter. The defensive avionics are built around the AN/ALQ-161 ECM system with extended frequency coverage, and include also the AN/ALQ-153 tail warning system and expendable decoys such as chaff and flares. Much of this defensive and offensive avionics equipment has already been flight tested successfully.

The structure of the B-1B is made principally of aluminium alloys and titanium, and is hardened to withstand nuclear blast and overpressure. More than 60% of the structure and equipment is subcontracted, with some 3,000 subcontractors and suppliers being involved in the programme in addition to AIL/Eaton (defensive avionics), Boeing (offensive avionics), and General Electric (engines).

All available details of the B-1B follow:

TYPE: Long-range multi-role strategic bomber.

WINGS: Cantilever low-wing fail-safe blended wing/body structure, with variable geometry on outer panels. The wing carry-through structure, which is sealed as an integral fuel tank, is mainly of diffusion-bonded 6AL-4V titanium. The wing pivot mechanism is of the same material, with a pin made from a single 6AL-4V forging on each side, in spherical steel bearings, above and below which are integrally stiffened double cover plates of machined titanium. Wing sweep is actuated by screwjacks, driven by four hydraulic motors; it can be powered by any two of the aircraft's four hydraulic systems, asymmetric movement being prevented by a torque shaft between the two screwjacks. Sweep actuators are covered by a leading-edge 'knuckle' fairing which prevents a gap from opening when the outer panels are swept back. Aft of the wing pivot on each side are a hinged panel and two fixed fairings which blend the wing trailing-edges and engine nacelles. Simpler, lighter, and lower-drag overwing fairings being designed for B-1B. Each of the outer wing panels, which have 15° of leading-edge sweep when fully forward and 67° 30' when fully swept, is a conventional two-spar aluminium alloy torsion-box structure, with machined spars, ribs, and one-piece integrally stiffened top and bottom skin panels. Wingtips, wing/body fairings, and some outer wing skin panels, are of GRP. Full-span seven-segment leading-edge slats on each outer panel can be drooped 20° for take-off and landing. Six-segment single-slotted trailing-edge flaps on each outer panel, with maximum downward deflection of 40°. There are no ailerons; instead, lateral control is provided by four-segment airbrakes/spoilers on each outer wing, forward of the outer four flap segments, with a maximum upward deflection of 70°. All control surfaces are operated electro-hydraulically by rods, cables, pulleys, and bellcrank levers, except for the two outboard spoilers on each wing which are controlled by a fly-by-wire system.

FUSELAGE: Conventional area-ruled fail-safe stressed-skin structure of closely-spaced frames and longerons, built mainly of 2024 and 7075 aluminium alloys. Built in five main sections comprising forward, forward intermediate, wing carry-through, aft intermediate, and aft fuselage, the last two of these being manufactured by Vought Corporation. Titanium used for engine bays and firewalls, tail support structure, aft fuselage skins, and other high-load or high-heat areas. Dorsal spine of steel/boron-filled titanium sandwich construction. Nose radome of polyimide quartz; dielectric panels of GRP. Small swept-back movable vane of composite material, with 30° anhedral, on each side of nose, actuated by structural mode control system (SMCS) accelerometers in the fuselage. These sense lateral and vertical motion of the forward fuselage in turbulent conditions and compensate for it by relaying electrical signals to move the vanes, providing both yaw and pitch damping.

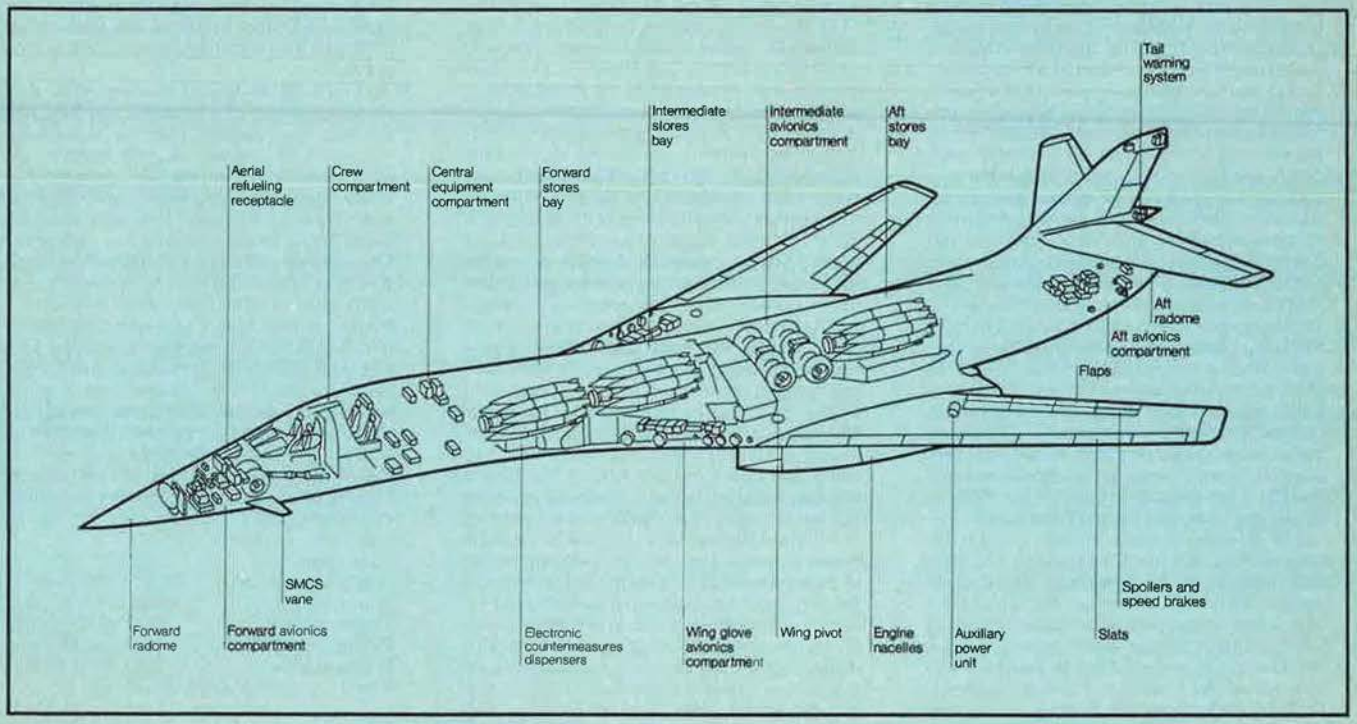
TAIL UNIT: Cantilever fail-safe structure with sweepback on all surfaces. Fin is a conventional titanium and aluminium alloy torsion-box structure, secured to the aft fuselage by a double shear attachment, bolts on the tailplane spindle, a vertical shear pin in the tailplane spindle fitting, and a shear-bolt joint on the front beam of the box. Aluminium alloy rudder is in three sections, all of which have 25° of travel each side. Two-section all-moving tailplane is operated collectively for control in pitch (between 10° up and 25° down) and differentially (±20°) for roll, the two halves moving independently on the steel spindle. Rudder and tailplane actuated hydraulically, with fly-by-wire backup system for use in the event of a mechanical system failure.

LANDING GEAR: Hydraulically-retractable tricycle type. Each main unit, which retracts inward and rearward, has two pairs of wheels in tandem. Steerable nose unit has twin wheels and retracts forward. Oleo-pneumatic shock-absorber in each unit. Goodyear wheels and carbon brakes. Goodrich tyres.

POWER PLANT: Four General Electric F101-GE-102 augmented turbofan engines, each rated in 133.4 kN (30,000 lb st) class, mounted in pairs beneath the fixed centre-section of the wing, close to the CG, to provide optimum stability in low-altitude turbulence conditions. Fixed-geometry inlets. Integral fuel tanks in the fuselage and outer wings; provision for auxiliary fuel tanks in the two forward weapons bays and beneath the fuselage. Fuel capacity increased considerably over that of the original B-1. A Simmonds Precision fuel management system maintains CG trim automatically as fuel is consumed. Receptacle in upper nose section, forward of windscreen, for in-flight refuelling; aircraft is compatible with KC-10 and KC-135 tankers.

ACCOMMODATION: Four-man operational crew comprising pilot, co-pilot, and two systems operators (defensive and offensive) seated on McDonnell Douglas ACES ejection seats in a pressurised crew compartment. Crew access is via a downward-opening door and retractable ladder under the fuselage, aft of the nosewheel unit.

SYSTEMS: All systems and subsystems are either fail-operative or fail-safe, to ensure that no single system failure prevents accomplishment of the primary mission, and that no second failure in the same system prevents a safe return to base. Hamilton Standard air-conditioning and pressurisation systems. Four independent hydraulic systems, each 276 bars (4,000 lb/sq in) pressure, for actuation of wing sweep, control surfaces, land-

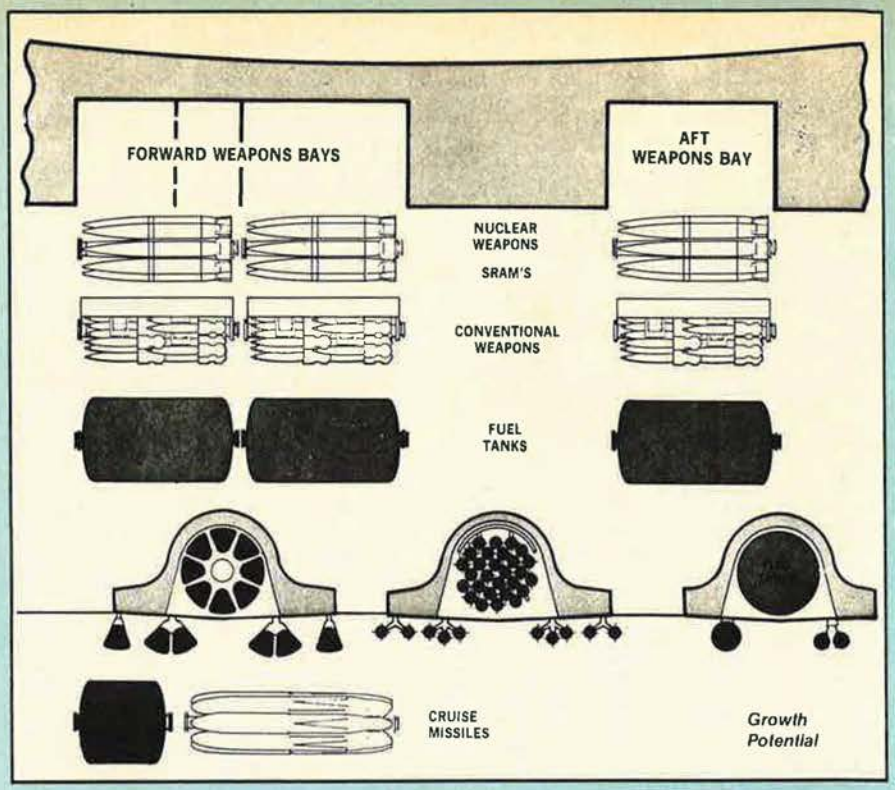


Disposition of crew, equipment, and weapons on the B-1B

ing gear, and weapons bay doors. No pneumatic system. Main electrical system has three 115kVA integrated engine-driven constant-speed generators, supplying 230/400V three-phase AC power at 400Hz through four main buses. A Harris Corporation self-testing electrical multiplex system (EMUX), using mini-computers, will control the B-1B major subsystems: it collects and conditions signals at remote terminals and transmits them from point to point over a common data bus and also supervises all signal data, using a centralised controller/processor. Requiring only two two-wire cables for its operation, EMUX is designed to control such functions as electrical power distribution to subsystems and avionics equipment, engine instruments, environmental control system, fuel system, landing gear, lights, and weapons system operation. Apart from the inherent advantages of such a system, its use results in considerable savings in terms of both volume and weight. Two Garrett APUs provide self-start capability for operation from advance airfields and drive an emergency generator to power the essential bus. Quadruplex automatic flight control system (AFCS) controls flight path, roll attitude, altitude, airspeed, autothrottle, and terrain following. Flight director panel has heading hold, navigation, and automatic approach modes. Central air data computer; gyro stabilisation system; stability control augmentation system; and structural mode control subsystem (SMCS). Engine fire extinguishing system.

AVIONICS: The B-1B will use radar and navigation equipment technology developed for the latest generation of fighter aircraft, such as the F-16, as well as avionics technology from the B-52 bomber's updated offensive avionics system. Standard GFE (government furnished equipment) includes communications, IFF, ILS, intercom, some navigation equipment. Honeywell ASN-131 SPN/GEANS radar altimeter (similar to that in B-52) and altimeter indicator, Westinghouse AN/ALQ-153 pulse-Doppler tail warning system, rescue beacon and transponder. Boeing Military Airplane Company is responsible for the B-1B's offensive avionics system (OAS). This includes a Singer Kearfott high-accuracy inertial navigation system (developed from that used in the F-16); a Teledyne Ryan AN/APN-218 Doppler velocity sensor, comprising a single antenna/receiver/transmitter unit; Westinghouse multi-mode offensive radar system (ORS), derived from the AN/APG-66 in the F-16, which includes a low-observable phased-array-type antenna to provide low altitude terrain following and precise navigational functions; Northrop (Electronics Division) modified NAS-26 astro-inertial navigation accuracy instrumentation system; IBM avionics control units (ACUs), including two for terrain-following based on those used in the B-52 plus a mass storage device (MSD), using AP-101C computers initially (1750As later) to provide programme instructions for navigation, weapons delivery, bomb damage assessment, defensive system computation, and central integrated test; Sperry Flight Systems offensive display sets, similar to those in the B-52, comprising three multi-function displays (two at the offensive systems operator's station and one for the defensive systems operator), an electronics display unit, and a video recorder similar to that used in the B-52; Sanders Associates electronic CRT display units, modified from those developed for the original B-1, to allow the defensive systems operator to analyse threat situations and assign appropriate countermeasures; and Sundstrand data transfer units (similar to those in the B-52) to gather and store mission and flight data.

The defensive avionics system, which is the responsibility of Eaton Corporation's AIL Division, is based on that company's AN/ALQ-161 system. Developed to support the original B-1 over a broad spectrum of missions, including deep solo penetration of hostile airspace, the system has been extensively flight-tested over a two-year period and a number of additions have extended both the frequency coverage and the repertoire of electronic jamming techniques of the original design. The current AN/ALQ-161 will enable the B-1B to penetrate present and predicted enemy defences well into the 1990s. The system is controlled by a network of digital computers which can be reprogrammed easily; in addition, all electronic systems boxes 'plug in' to a dedicated data bus network, enabling the system to be upgraded continuously to adapt to future threats until well into the next century. To protect the B-1B, the system must counter a very dense environment of signals from increasingly sophisticated hostile radar networks. These radars, if not effectively jammed, would vector fighter aircraft to, or guide missiles and anti-aircraft gunfire against, the B-1B. A single AN/ALQ-161 system contains and controls a large number of Northrop (Defense Systems Division) jamming transmitters and Raytheon phased-array antennae. In addition to the jamming hardware, a sophisticated control system, managed by a network of special digital computers, is employed. This network can control the jamming chains so rapidly that each can jam signals from many radars simultaneously. The numerous jamming chains are deployed around the periphery of the B-1B to jam signals in any frequency band coming from any direction. Integrated with the jamming control subsystem is an equally sophisticated network of separate receiving antennae, receivers, and processors which act as the 'ears' of the system. By means of this receiving subsystem new signals can be picked up, identified, and then jammed, with optimised jamming techniques, in a fraction of a second. One of the advantages of having the receiving function completely integrated with the jamming function, which was unique to the AN/ALQ-161 when it was first designed, is that it allows the receiving system to detect new signals and continue to monitor old signals while jamming in the same frequency band. A special subsystem allows this to be accomplished by monitoring the output of the jamming transmitters and adjusting the receivers continuously. All main systems computers on the B-1B, including the AN/ALQ-161's main computer, are identical, and communicate over a time multiplexing military standard data bus designated 1553. Via this bus, the AN/ALQ-161 communicates with a set of controls and displays used by the defensive systems operator. It also uses this bus to send status reports to a central integrated test system (CITS), which records all in-flight failures and battle damage for later diagnosis and repair. Within the AN/ALQ-161 itself there is also a local status monitoring network called SEAT (status evaluation and test), which reports to CITS and allows the system automatically to route electronic signals around failed components and maintain full jamming response against the highest priority threat signals. Exclusive of cabling, displays, and controls, the current AN/ALQ-161 system weighs approximately 2,360 kg (5,200 lb) and consumes about 120kW of power in 'all-out' jamming mode. Other defensive equipment of the B-1B includes expendable decoys, such as chaff and flares.



Typical arrangements of weapons and auxiliary fuel tanks in the B-1B's three internal bays

ARMAMENT: Three internal weapons bays, comprising a 9.53 m (31 ft 3 in) double bay forward of the wing carry-through structure and a single 4.57 m (15 ft) long bay aft, with hydraulically-actuated doors. Forward bay incorporates a movable bulkhead permitting the accommodation of a wide variety of weapons, of various sizes, and mixed loads. Internal capacity in a nuclear role for up to eight AGM-86B air-launched cruise missiles (ALCMs), twenty-four AGM-69 short range attack missiles (SRAMs), twelve B-28 or B-43 free-fall nuclear bombs or twenty-four B-61 or B-83 bombs; or, in a non-nuclear role, for up to eighty-four 500 lb Mk 82 or twenty-four 2,000 lb Mk 84 bombs, all on rotary launchers. Eight external stores stations beneath the fuselage, on which can be carried an additional fourteen ALCMs or SRAMs, eight B-28s, fourteen B-43/B-61/B-83s, fourteen Mk 84s, or forty-four Mk 82s. Provision for carrying auxiliary fuel tank(s) in weapons bays.

DIMENSIONS, EXTERNAL:

Wing span:	
fully spread	41.67 m (136 ft 8½ in)
fully swept	23.84 m (78 ft 2½ in)
Length overall	44.81 m (147 ft 0 in)
Height overall	10.36 m (34 ft 0 in)
Tailplane span	13.67 m (44 ft 10 in)
Wheel track (c/l of shock-absorbers)	4.42 m (14 ft 6 in)
Wheelbase	17.53 m (57 ft 6 in)

AREA:
Wings, gross approx 181.2 m² (1,950 sq ft)
WEIGHTS AND LOADING:
Typical conventional weapon load (128 Mk 82 bombs) 29,030 kg (64,000 lb)
Design max T-O weight 216,365 kg (477,000 lb)
Max wing loading approx 1,194 kg/m² (244.6 lb/sq ft)
PERFORMANCE (design):
Max level speed approx Mach 1.25
Low-level penetration speed at approx 61 m (200 ft) more than 521 knots (965 km/h; 600 mph)
Max unrefuelled range approx 6,475 nm (12,000 km; 7,455 miles)

ICA

INTREPRINDEREA DE CONSTRUCTII AERONAUTICE (Aeronautical Construction Enterprise); Address: PO Box 198, 2200 Brasov, Romania

ICA IAR-825TP TRIUMF

The Romanian aerospace industry exhibit at Farnborough International 1982 included the first public appearance of the IAR-825TP, a new turboprop-powered tandem-seat trainer which has been developed for service with the Romanian Air Force. Although the higher-numbered IAR-826 and IAR-827 agricultural light aircraft first flew in 1973 and 1976, respectively, construction of the IAR-825 prototype (YR-IGB) started as recently as September 22, 1981, and it flew for the first time on June 12, 1982.

The IAR-825 has much in common with the earlier IAR-823 (of which 87 had been delivered to the Romanian Air Force and civilian flying clubs by September 1982), utilising the same landing gear and essentially the same wings, the latter being strengthened for the carriage of practice weapons in the armament training role, but interchangeable with those of the IAR-823. Fuselage and tail unit, although of new design, retain a degree of commonality with the IAR-823.

TYPE: Turboprop-powered military trainer.

WINGS: Cantilever low-wing monoplane. Wing section NACA 23012 (modified). Conventional all-metal structure, with single main spar and rear auxiliary spar; three-point attachment to fuselage. Riveted spars, ribs, and skin of corrosion-proof aluminium alloy. Leading-edges riveted, and sealed to ribs and main spar to form main torsion box and integral fuel tanks. Fabric-covered metal single-slotted flaps and fabric-covered Frise-type slotted metal ailerons. Ground-adjustable tab on each aileron.

FUSELAGE: Conventional semi-monocoque structure. Small bumper under tailcone.

TAIL UNIT: Cantilever metal structure. Two-spar duralumin-covered fin and tailplane; fabric-covered duralumin horn-balanced rudder and elevators. Electrically actuated automatic trim tab in each elevator; controllable tab in rudder.

LANDING GEAR: Retractable tricycle type, with steerable nosewheel. Electrical retraction, main units inward, nose unit rearward. Emergency manual actuation. Oleo-pneumatic shock-absorbers. Dunlop tyres, size 6.00-6 on main wheels, size 355 × 150 mm on nosewheel. Independent hydraulic main-wheel brakes. Shimmy damper on nose unit. No wheel doors.

POWER PLANT: One 507 kW (680 shp) Pratt & Whitney Aircraft of Canada PT6A-15AG turboprop engine in prototype, driving a Hartzell three-blade propeller with spinner; 559 kW (750 shp) PT6A-25C engine specified for production aircraft, driving a Hartzell HC-B3TN-3/T10173-13R three-blade constant-speed reversible-pitch metal propeller. Wings of IAR-823 incorporate four integral fuel tanks with total capacity of 360 litres (79 Imp gallons), and have provision for two 70 litre (15.4 Imp gallon) underwing drop-tanks; IAR-825 may have increased fuel capacity.

ACCOMMODATION: Seats for two persons in tandem, under one-piece framed canopy which opens sideways to starboard. Dual controls standard.

DIMENSIONS, EXTERNAL:

Wing span	10.30 m (33 ft 9½ in)
Wing area, gross	15.00 m² (161.5 sq ft)
Wing aspect ratio	7.07
Length overall	8.90 m (29 ft 2½ in)
Height overall	2.38 m (7 ft 9¾ in)
Wheel track	2.20 m (7 ft 2½ in)

WEIGHTS (A: Aerobatic, U: Utility, N: Normal category):

Weight empty	1,100 kg (2,425 lb)
Max T-O weight:	
A	1,500 kg (3,307 lb)
U	2,000 kg (4,409 lb)
N	2,350 kg (5,181 lb)

PERFORMANCE (provisional):

Never-exceed speed	296 knots (550 km/h; 341 mph)
Max level speed (Aerobatic)	253 knots (470 km/h; 292 mph)
Max cruising speed	237 knots (440 km/h; 273 mph)
Stalling speed, power off:	
flaps up	62.5 knots (115 km/h; 71.5 mph)
flaps down	46–49 knots (85–90 km/h; 53–56 mph)
Max rate of climb at S/L	960 m (3,150 ft)/min
Service ceiling	9,000 m (29,525 ft)
T-O to 15 m (50 ft)	250 m (820 ft)
Landing distance	300 m (985 ft)
Range with max fuel, 30 min reserves	755 nm (1,400 km; 870 miles)
Endurance, conditions as above	3 h
g limits	+6.0/−3.0

The prototype ICA IAR-825TP military trainer from Romania

FAIRCHILD

FAIRCHILD REPUBLIC COMPANY (a Division of Fairchild Industries Inc); Divisional Office and Works: Farmingdale, Long Island, New York 11735, USA

FAIRCHILD REPUBLIC NGT

USAF designation: T-46A

The determined efforts of Fairchild Republic Company to secure a USAF contract for a Cessna T-37 replacement began in 1977, when its design for a Next Generation Trainer (NGT) was initiated. Five years of work was rewarded by an announcement, on July 2, 1982, that the company's submission had won an initial $104 million contract. As well as the design submission for an NGT, Fairchild completed a full-scale mockup which was used for a tour of USAF bases, and acquired a 62% scale NGT to accumulate data for incorporation in the submission. Details of the scale version of the NGT were given in the December 1981 Supplement.

Contenders for this contract had included Cessna teamed with Teledyne CAE, and Rockwell with Garrett Turbine Engine Company; unsolicited submissions from Gulfstream American/Williams International and Ensign Aircraft/Williams were also evaluated. The contract awarded to Fairchild for the NGT, since designated T-46A, covers the design, development, construction, and testing of two prototypes, and the supply of two static test examples. Included in the fixed-price incentive contract is an option for 54 production T-46As, representing an initial batch of a planned procurement of 650 aircraft. Garrett, which had been teamed also with Fairchild, gained an initial contract valued at $121.2 million, covering the supply of 29 TFE76-4A (F109-GA-100) engines, with an option on an additional 119. The first flight of a T-46A prototype is scheduled for April 1985.

TYPE: Two-seat military primary trainer.

WINGS: Cantilever shoulder-wing monoplane, with basic fail-safe light alloy structure. Wing section NASA LS(1). Thickness/chord ratio 15% at root, 12% at tip. Anhedral 2° 30'. Incidence 2° at root, −1° 17' at tip. Sweepback at quarter-chord 3° 30' 22". Conventional two-spar wing box with stiffened skins. Aerodynamically and statically balanced manually-operated ailerons of Kevlar and Nomex honeycomb composite construction. Douglas-type hydraulically-actuated trailing-edge flaps, with single pivot, of similar construction to ailerons. Spring tab in each aileron, trim tab on wing. Two airbrakes, one in outer surface of each engine nacelle, deflect airstream down and away from nacelles.

FUSELAGE: Semi-monocoque fail-safe structure of light alloy.

TAIL UNIT: Cantilever fixed-incidence tailplane with elevators, endplate fins, and rudders of light alloy. Tailplane and fin box of two-spar construction with stiffened skins. Electrically-actuated trim tab in starboard side of manually-operated elevator. The two rudders are controlled by a single hydraulic servo-actuator which is integrated to include the functions of authority limiting, automatic manual reversion, pedal feel, stability augmentation, and trim.

LANDING GEAR: Hydraulically-retractable tricycle type, main units retracting inward and forward, nose unit forward. Oleo-pneumatic shock-absorber in each unit. Main wheels have Type VII tyres size 18 × 4.4; steerable nosewheel has tyre Type VII size 16 × 4.4. Hydraulic brakes.

POWER PLANT: Two 5.9 kN (1,330 lb st) Garrett F109-GA-100 (TFE76-4A) turbofan engines, mounted within nacelles beneath the wing roots. Two bladder cells in fuselage between wing carry-through frames, with combined fuel capacity of 757 litres (200 US gallons). Single-point refuelling on port engine nacelle. Air intake ducts, of superformed light alloy, incorporate hot air deicing of duct lips.

ACCOMMODATION: Two persons side by side on

Full-scale mockup of the Fairchild Republic T-46A Next Generation Trainer for the US Air Force

McDonnell Douglas ACES II ejection seats, in pressurised and air-conditioned cockpit beneath canopy that opens upward and rearward. Dual controls standard. Baggage space in fuselage, behind cockpit; access from port side of fuselage, forward of engine nacelle. Windscreen de-icing.

SYSTEMS: Air-conditioning and pressurisation systems not yet finalised. Single hydraulic system at 207 bars (3,000 lb/sq in) pressure, for actuation of landing gear, nosewheel steering, rudders, trailing-edge flaps, and airbrakes. DC electrical system includes 300A engine-driven generator.

AVIONICS: Accommodated in nose bay and in fuselage aft of baggage compartment. Will include AN/ARN-118 Tacan, AN/ARN-127 VOR/ILS/marker beacon receiver, APX-101(V) IFF, AN/ARC-164 UHF/AM, AN/ARC-186(V) VHF/AM, and AN/AIC-18 intercom.

DIMENSIONS, EXTERNAL:

Wing span	11.27 m (36 ft 11¼ in)
Wing chord (theoretical):	
at c/l	1.74 m (5 ft 8½ in)
at tip	0.91 m (3 ft 0 in)
Wing aspect ratio	8.5
Length overall	8.99 m (29 ft 6 in)
Height overall	2.97 m (9 ft 8¼ in)
Tailplane span	3.86 m (12 ft 8 in)
Wheel track	2.26 m (7 ft 5 in)
Wheelbase	3.20 m (10 ft 6 in)
Baggage door:	
Height	0.71 m (2 ft 4 in)
Width	0.76 m (2 ft 6 in)
Height to sill	0.66 m (2 ft 2 in)

AREAS:

Wings, gross	14.95 m² (160.9 sq ft)
Ailerons (total)	1.18 m² (12.66 sq ft)
Trailing-edge flaps (total)	1.20 m² (12.89 sq ft)
Vertical tail surfaces (total)	2.79 m² (29.99 sq ft)
Horizontal tail surfaces (total, incl tab)	3.43 m² (36.94 sq ft)

WEIGHTS AND LOADINGS (estimated):

Weight empty	2,143 kg (4,725 lb)
Max fuel weight	571.5 kg (1,260 lb)
Max T-O weight	2,980 kg (6,571 lb)
Max zero-fuel weight	2,409 kg (5,311 lb)
Max landing weight	2,948 kg (6,500 lb)
Max wing loading	199.3 kg/m² (40.8 lb/sq ft)
Max power loading	252.5 kg/kN (2.47 lb/lb st)

PERFORMANCE (estimated at max T-O weight):

Max level speed at 10,670 m (35,000 ft)	432 knots (800 km/h; 497 mph)
Max cruising speed at 10,670 m (35,000 ft)	404 knots (748 km/h; 465 mph)
Econ cruising speed at 13,720 m (45,000 ft)	333 knots (616 km/h; 383 mph)
Stalling speed, flaps up, power off	80 knots (148 km/h; 92 mph)
Stalling speed, flaps down, power off	75 knots (138 km/h; 86 mph)
Max rate of climb at S/L	1,362 m (4,470 ft)/min
Rate of climb at S/L, one engine out	375 m (1,230 ft)/min
Service ceiling	14,020 m (46,000 ft)
T-O run	320 m (1,050 ft)
T-O to 15 m (50 ft)	421 m (1,380 ft)
Landing from 15 m (50 ft)	683 m (2,240 ft)
Landing run	399 m (1,310 ft)
Range with max fuel	1,209 nm (2,240 km; 1,392 miles)

HAL

HINDUSTAN AERONAUTICS LIMITED: Address: Indian Express Building, Dr Ambedkar Veedhi, PO Box 5150, Bangalore 560 001, India

HAL HPT-32

Currently under development for the Indian Air Force, the HPT-32 is a fully-aerobatic piston-engined basic trainer, with side-by-side seats for instructor and pupil. A four-seat version is under consideration for the liaison role. The trainer can be used for a wide range of *ab initio* training, including instrument, navigation, night flying, and formation flying; for armed patrol; for observation, liaison, or sport flying; or for weapon training, light strike duties, supply dropping, search and rescue, reconnaissance, or glider or target towing. The airframe, which is of all-metal construction, is designed to FAR Pt 23, and is expected to have a fatigue life of 6,500 h.

The first prototype (X2157) made its first flight on January 6, 1977. The second was flown on March 12, 1979; a third, flown on July 31, 1981, represents an improved version, substantially lighter in weight and with aerodynamic refinements. An Indian Air Force order has been placed for 40 HPT-32s; these will be built by HAL's Kanpur Division, with deliveries scheduled to begin in early 1984.

The following description applies to the third prototype:

TYPE: Two-seat *ab initio*, aerobatic, night flying, instrument flying, and navigation trainer.

WINGS: Cantilever low-wing monoplane of all-metal construction. Dihedral 5° from roots. Incidence 2° 30′ at root. Balance tab in, and ground-adjustable tab on, each aileron.

FUSELAGE: All-metal semi-monocoque structure.

TAIL UNIT: Cantilever all-metal structure, with sweptback vertical surfaces. One-piece elevator. Trim tabs in rudder and starboard half of elevator; balance tabs in rudder and port half of elevator.

LANDING GEAR: Non-retractable tricycle type. Main wheels size 6.00-6.5, nosewheel 5.00-5. Dunlop tyres on all wheels, pressure 2.76-3.10

Third prototype of the HAL HPT-32 multi-role trainer, representative of 40 ordered for the Indian Air Force

bars (40–45 lb/sq in) on main units, 2.07-2.41 bars (30–35 lb/sq in) on nose unit. Hydraulic brakes on main wheels.

POWER PLANT: One 194 kW (260 hp) Avco Lycoming AEIO-540-D4B5 flat-six engine, driving a Hartzell two-blade constant-speed metal propeller with spinner. Total of 211.5 litres (46.5 Imp gallons) of fuel in four flexible tanks (two in each wing), plus an 8.5 litre (1.9 Imp gallon) collector tank in fuselage. Total fuel capacity 220 litres (48.4 Imp gallons).

ACCOMMODATION: Side-by-side seats for two persons in front, with provision for baggage (up to 50 kg; 110 lb, with strapdown facilities) at rear, under rearward-sliding jettisonable framed canopy. Seats adjustable in height by 127 mm (5 in). Full dual controls, and adjustable rudder pedals, for instructor and pupil.

AVIONICS: Include two VHF transceivers, with built-in intercom facility.

DIMENSIONS, EXTERNAL:

Wing span	9.50 m (31 ft 2 in)
Wing chord: at root	2.24 m (7 ft 4¼ in)
at tip	0.92 m (3 ft 0¼ in)
Wing aspect ratio	6.01
Length overall	7.72 m (25 ft 4 in)
Height overall	2.88 m (9 ft 5½ in)
Wheel track	3.45 m (11 ft 4 in)
Wheelbase	2.10 m (6 ft 10¾ in)
Propeller diameter	2.03 m (6 ft 8 in)
Propeller ground clearance (static)	0.24 m (9½ in)

AREAS:

Wings, gross	15.01 m² (161.6 sq ft)
Ailerons (total)	1.04 m² (11.19 sq ft)
Trailing-edge flaps (total)	1.83 m² (19.70 sq ft)
Vertical tail surfaces (above flight reference line)	2.08 m² (22.39 sq ft)
Rudder (aft of hinge line)	0.75 m² (8.07 sq ft)
Tailplane	3.02 m² (32.50 sq ft)
Elevator (aft of hinge line)	1.08 m² (11.625 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	880 kg (1,940 lb)
Max T-O weight	1,210 kg (2,667 lb)
Max wing loading	80.6 kg/m² (16.51 lb/sq ft)
Max power loading	6.24 kg/kW (10.24 lb/hp)

PERFORMANCE (at max T-O weight, ISA + 15°C):

Max level speed at S/L	136 knots (253 km/h; 157 mph)
Stalling speed, flaps up, engine idling	61 knots (112 km/h; 70 mph)
Stalling speed, flaps down, engine idling	56 knots (103 km/h; 64 mph)
Max rate of climb at S/L	335 m (1,100 ft)/min
Service ceiling	4,875 m (16,000 ft)
T-O run	249 m (817 ft)
Range at 3,050 m (10,000 ft) at econ cruise power	426 nm (790 km; 490 miles)
Endurance at 3,050 m (10,000 ft) at min power setting of 2,500 rpm	4 h 15 min
g limits	+6.0/−3.0

WESTLAND

WESTLAND HELICOPTERS LTD: Head Office, Works, and Airfield: Yeovil, Somerset BA20 2YB, England

WESTLAND LYNX-3

Westland Helicopters announced on June 21, 1982, that the company had initiated a programme to develop and produce a new dedicated anti-tank helicopter under the designation Lynx-3. Derived from the current production Lynx and incorporating its proven dynamic systems, it will have an all-up-weight some 27% greater, be engineered to offer increased survivability, and be able to mount greater firepower. Advanced avionics will allow Lynx-3 to operate at optimum performance by day or night, and in adverse weather conditions, with night vision and target acquisition systems available in optional nose, roof, or rotor mast mounts. It will be equipped to carry and launch current and future versions of Euromissile Hot, Hughes TOW, and Rockwell Hellfire air-to-surface missiles; for defence against air attack, it can be armed with General Dynamics Stinger missiles.

Head-on drawing of the Westland Lynx-3 reflects the blending of Lynx and Westland 30 features with new technology

The design of Lynx-3 had not been finalised in the Autumn of 1982. In particular, layout and equipment of the cockpit were still the subject of intensive investigation to provide the helicopter's two-man crew with optimum capability. At that time it was anticipated that the first flight of a prototype might be achieved during 1985–86. All available details follow:

TYPE: Twin-engined anti-armour helicopter.

ROTOR SYSTEM: Advanced four-blade semi-rigid main rotor and four-blade tail rotor. Main rotor blades of Westland composite construction, incorporating BERP (British Experimental Rotor Programme) tips, which are claimed to increase rotor efficiency by up to 40%. Main rotor blades can be folded. The tail rotor, which is generally similar to that of the Westland 30, also has blades of composite construction, but rotates in the opposite direction to that of the standard Lynx and will be considerably quieter.

ROTOR DRIVE: Similar to that of standard Lynx, with drives taken from the front of the engines into the main gearbox, which is mounted above the cabin forward of the engines. In the event of an engine failure, the rotor drive system allows the surviving power unit to operate at its maximum contingency rating.

FUSELAGE AND TAIL UNIT: Conventional semi-monocoque pod and boom structure of light alloy frames and stringers. By comparison with the standard Lynx the fuselage has been lengthened by 30 cm (11.8 in) to provide increased cabin volume. This makes it possible to seat the two-man crew slightly further forward, thus enhancing their view to the rear. It also provides increased storage space for missile reloads and allows for larger cabin doors. The tailcone is a light alloy monocoque structure with integral sweptback vertical fin/tail rotor pylon, as for the Westland 30. Fixed-incidence tailplane of inverted aerofoil section.

LANDING GEAR: Non-retractable tricycle type, with single-wheel main units and twin-wheel nose unit. Crashworthy shock-absorption system designed to survive descent rates as high as 6.10 m (20 ft)/s.

POWER PLANT: Two Rolls-Royce Gem 60 turboshaft engines, each with a max continuous rating for normal twin-engined operation of 832 kW (1,115 shp) and a one-engine-inoperative max contingency rating of 1,004 kW (1,346 shp). Lateral engine air intakes incorporating particle filters. Crash-resistant fuel system. IR suppression optional.

ACCOMMODATION: Crew of two, side by side, in wide-view cockpit designed to meet the requirements of MIL STD-1290. Crew seats have armour protection and are mounted on shock-absorbing struts designed to ensure survival at descent rates tolerable to landing gear. Layout of the advanced cockpit, incorporating new tactical display and flight data management systems to minimise crew workload, is not yet finalised. Considerable space for storage of missile reloads, or to transport mobile anti-tank teams with missiles and launchers. Windscreen anti-icing, demisting, and electrically-operated wipers.

AVIONICS: Lynx-3 avionics are not yet finalised, but the inclusion of a mission avionics databus system, to MIL STD-1553B, will allow integration of the latest systems, reduce wiring looms to a minimum, and simplify the introduction of alternative or new sensor and weapons fits. Navigation is likely to be based on the Sperry GM9 Gyrosyn compass system, Decca tactical air navigation system (TANS), and Decca Doppler. Mission avionics may include Martin Marietta target acquisition and designation system (TADS) and pilot's night vision sensor (PNVS), IFF, radar warning receivers, and IR jamming. Sensors for target acquisition, and enhanced vision systems, will be mounted in optional positions including a mast-mounted sight (MMS) or on the fuselage nose or roof.

ARMAMENT AND EQUIPMENT: Can be equipped with an Oerlikon or similar 20 mm cannon (25 mm cannon under evaluation); a pintle-mounted 7.62 mm GEC Minigun inside the cabin; an 0.5 in machine-gun pod; air-to-surface missiles including Euromissile Hot, Hughes TOW, and Rockwell Hellfire; air-to-air missiles including General Dynamics Stinger or Shorts Blowpipe; and SNEB, SNORA, or SURA rockets. Goodyear chaff dispenser. Cable-cutter mounted on roof, immediately above windscreen.

DIMENSIONS, EXTERNAL:

Main rotor diameter	12.80 m (42 ft 0 in)
Tail rotor diameter	2.44 m (8 ft 0 in)
Length overall, rotors turning	15.47 m (50 ft 9 in)
Length overall, main rotor folded	13.77 m (45 ft 2 in)

Impressive mockup of the Westland Lynx-3 at the Farnborough Air Show displayed mast-mounted sight and Hellfire missiles *(Brian M. Service)*

The new 'cranked-arrow' wing and lengthened fuselage of the F-16XL are evident in this view

The F-16XL offers a doubled weapons load and 45% greater combat radius on internal fuel compared with the standard F-16A

Width overall, main rotor folded
3.02 m (9 ft 11 in)
Height overall, rotors turning
3.33 m (10 ft 11 in)

AREAS:
Main rotor disc
128.71 m² (1,385.5 sq ft)
Tail rotor disc 4.67 m² (50.27 sq ft)

WEIGHTS (estimated):
Max fuel weight 1,000 kg (2,204 lb)
Payload 1,533 kg (3,379 lb)
Normal max T-O weight 5,443 kg (12,000 lb)

PERFORMANCE (estimated):
Cruising speed 140 knots (259 km/h; 161 mph)
Range with max fuel
380 nm (703 km; 437 miles)
Endurance 3 h 30 min

GENERAL DYNAMICS

GENERAL DYNAMICS CORPORATION, FORT WORTH DIVISION; PO Box 748, Fort Worth, Texas 76101, USA

GENERAL DYNAMICS F-16XL

Under the above designation, General Dynamics is undertaking company-funded development of an advanced version of the F-16 that incorporates new aerodynamic and systems technologies. In December 1980, a design team began the preparation of engineering drawings, design analyses, and manufacturing plans leading to the construction of two flight demonstration aircraft, one of single-seat and the other of two-seat configuration. The company is receiving support from the US Air Force, which leased to it two single-seat full-scale development F-16 airframes for conversion to the new configuration, their Pratt & Whitney F100-PW-200 turbofan engines, and one new two-seat cockpit. Flight testing is centred at Edwards AFB, California, under contract to the US Air Force.

As can be seen in the accompanying illustration, the F-16XL has a new highly-swept 'cranked-arrow' wing. This has been developed during some years of close collaboration between the company's Fort Worth Division and NASA. It has an area more than double that of the standard F-16 wing, and incorporates graphite polyimide composite wing skins to provide the strength and rigidity essential for maximum wing performance. The basic F-16 fuselage is lengthened by 1.42 m (4 ft 8 in), the additional volume being used to increase the internal fuel capacity by 82%, and to provide an extra 1.13 m³ (40 cu ft) of space for avionics and sensors.

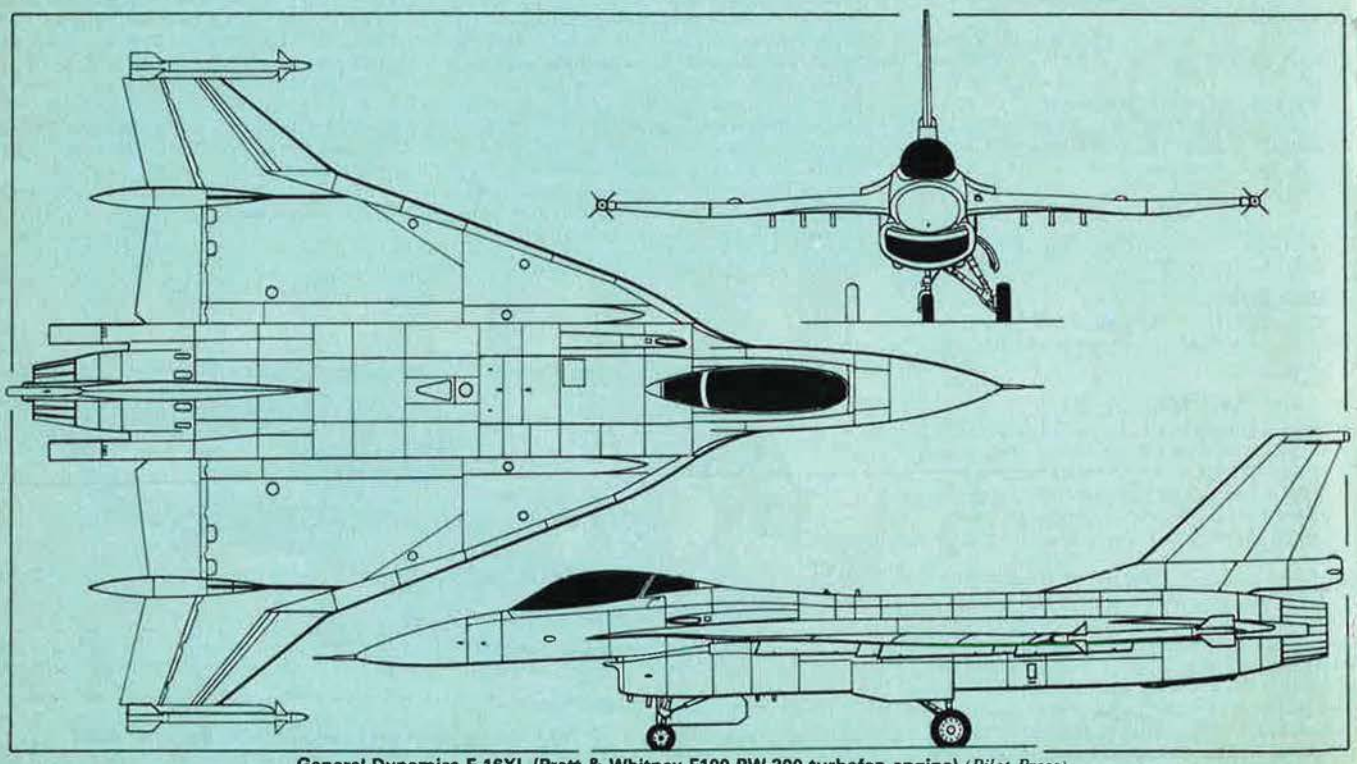
The F-16's modular construction and electronic fly-by-wire control system simplified the modification process. Wind tunnel and computer analyses showed that the 'XL' configuration would extend the F-16's capabilities. By comparison with the current operational version, it will take off and land in only two-thirds of the distance, carry double the weapons load (17 stores stations, with 29 hardpoints, beneath the wings and fuselage), and offer up to 45% greater combat radius with internal fuel only.

The first of the US Air Force's full-scale development aircraft was delivered to Fort Worth at the beginning of March 1981; the second aircraft was received during the Summer. First flight, by the single-seat prototype, was made on July 3, 1982. The second (two-seat) prototype will be powered by a General Electric F101 DFE engine.

DIMENSIONS, EXTERNAL:
Wing span 10.43 m (34 ft 2.8 in)
Wing area, gross 61.59 m² (663 sq ft)
Length overall 16.51 m (54 ft 1.86 in)
Height overall 5.36 m (17 ft 7 in)

WEIGHTS:
Max external stores load 6,803 kg (15,000 lb)
Design mission weight 19,504 kg (43,000 lb)
Max T-O weight 21,772 kg (48,000 lb)

PERFORMANCE:
Max level speed Mach 2
Max range
more than 2,500 nm (4,630 km; 2,875 miles)
Design *g* limit +9



General Dynamics F-16XL (Pratt & Whitney F100-PW-200 turbofan engine) *(Pilot Press)*

FORWARD INTO THE FUTURE OF FLIGHT.

Aeronautical engineering has come a long way since Kitty Hawk. It will go even further with the development of the X-29A.

Sponsored by the Defense Advanced Research Projects Agency, the X-29A program will be administered by the United States Air Force.

The flight test program, conducted by NASA, is scheduled for 1984. This working relationship between government, military and industry could pay big dividends in the advance of knowledge.

The X-29A program will do more than test the advantages of forward-swept-wing design. It will test a broad range of advanced aircraft technologies.

Super-strong but lightweight, non-metallic, graphite epoxy composites for wing construction.

An advanced digital fly-by-wire flight control system with triple channel redundancy for reliability.

A variable camber wing trailing edge that changes shape to match flight conditions. And a forward mounted all-flying canard with less supersonic trim drag than a conventional horizontal tail.

The Wright Flyer was the first plane to employ a canard. Now the X-29A is borrowing from the past to advance aerospace technology and the future of flight.

PEOPLE. PRIDE. PERFORMANCE.

GRUMMAN

THE BULLETIN BOARD

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

VA Administrator Resigns

Robert P. Nimmo, Administrator of Veterans Affairs, has submitted his resignation to President Reagan, citing "compelling personal considerations" that make it "essential" that he "return to California as soon as practicable."

In an exchange of correspondence with the President, Nimmo, who has come under sporadic fire from veterans' groups for alleged insensitivities to veterans and their problems, asked that a date be set for his departure. The President, without setting a date, accepted the resignation on the same day it was tendered, noting that he was "sincerely saddened to hear of your decision to leave the government."

The President also stated that he accepted the resignation "reluctantly" and stressed that "you will be sorely missed by me, by the veterans you have so ably served, and by our close associates in the government."

While speculation immediately surfaced as to a successor, and many congressmen hurried to put forward their favorite-son suggestions, at press time no firm nomination had yet appeared. There is some reason to believe that the newly appointed Deputy Administrator of the Veterans Administration, Everett Alvarez, Jr. *(see September '82 "Bulletin Board")*, is likely to move up to the top job. But given the political sensitivity of this post, which touches more than 29,000,000 veterans in all states, no one in the Administration is yet speaking for the record about a successor.

Recruiting: A Success Story

Winding up its 1982 recruiting year, the Air Force notes that more than 78,000 people donned the blue suit, some ninety-three percent of them high school graduates. All 1982 goals were met, with the exception of some engineer and physician specialties.

Six thousand former military members also came into the Air Force, as well as 3,100 college graduates for officer training and 1,660 health-care professionals. Referring to the prior-service accessions, Maj. Gen. Mele Vojvodich, Jr., Hq. USAF Director of Personnel Programs, noted that the recruitment of these qualified airmen saved training resources valued at more than $40 million. "More importantly," he told Recruiting Service in a laudatory letter, "your recruiting of more than 2,000 airmen, qualified in chronic critical shortage skills, has put years of experience back on the flight line and has helped fill the Air Force's most critical manning shortages." *(For more on this subject, see General Iosue's accompanying "Perspective on People" essay.)*

CHAMPUS Now Mainly Toll Free

All CHAMPUS beneficiaries, except those using OCHAMPUS Europe and Hawaii, can now reach the claims processor for their area toll free. Eligible military members, their families, and retirees should keep in mind, however, that the toll-free lines for each claims processor can only be used from within the states the firm serves *(see box)*.

For example, the CHAMPUS claims processor for Colorado is Mutual of Omaha, while Blue Shield of California serves neighboring New Mexico. A beneficiary who lives in New Mexico, but received care in Colorado, will send the claim to Mutual. However, the beneficiary cannot use the toll-free line to Mutual from the New Mexico home. Options include making a commercial call or traveling back to Colorado to use the toll-free hookup, or using mail.

Listed in the accompanying box are the claims processors for each state and their toll-free numbers. All processors are open during normal business hours.

Agent Orange Study Gets Boost

In a widely applauded move, the VA has decided to allow the Center for Disease Control to take over the Agent Orange health effects study.

The epidemiology study was mandated by Congress almost three years ago, and VA has been accused of foot-dragging ever since, most vocally by Rep. G. V. (Sonny) Montgomery (D-

How to Call CHAMPUS Claims Processors Toll Free

For Alabama, Colorado, Georgia, Mississippi, Nebraska, Ohio, West Virginia, and Canada, Mexico, and Central and South America: **Mutual of Omaha: 1-800-228-7100.**

For Alaska, Idaho, Montana, Oregon, Utah, Washington, and Wyoming: **Blue Cross of Washington-Alaska: 1-800-426-9250.** In Alaska, 1-800-426-1337; and Washington, 1-800-562-1312.

For Arizona, California, Connecticut, Florida, Maine, Massachusetts, Michigan, Nevada, New Hampshire, New Mexico, Puerto Rico, and Vermont: **Blue Shield of California: 1-800-854-2667.** Call 1-800-295-9681 for San Diego only, 1-800-532-3401 for Northern California only, and 1-800-532-3952 for Southern California.

For Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Missouri, North Dakota, Oklahoma, South Dakota, Texas, and Wisconsin: **Wisconsin Physicians Service: 1-800-356-5954.** For Wisconsin only; 1-800-362-7445.

For New Jersey, New York, and Rhode Island: **Blue Cross of Rhode Island.** For Rhode Island only the number is 1-800-662-5260. For New Jersey and New York the number is 1-800-556-7860.

For Tennessee: **Blue Cross/Blue Shield of Tennessee: 1-800-572-7247.**

For Delaware, District of Columbia, Maryland, North Carolina, Pennsylvania, and Virginia: **Blue Cross/Blue Shield of South Carolina: 1-800-845-2572.** For South Carolina only, it's 1-800-922-0144.

Miss.), Chairman of the House Veterans Affairs Committee. Representative Montgomery's committee recently held hearings at which the head of the CDC's Environmental Health Center said that if he were responsible for the study, he would "get a group of experts together, put them in a room, and tell them not to come out until the job was done."

This added impetus to the efforts of Chairman Montgomery, who noted that he was "anxious to see the Center perform at the level and speed suggested by the witness." He wrote to both the VA and to Health and Human Services Secretary Richard S. Schweiker—parent organization of

PERSPECTIVE ON PEOPLE

This is the third in a series of essays by USAF's Deputy Chief of Staff for Manpower and Personnel. This month General Iosue comments on how well the Air Force is doing in attracting and retaining quality personnel.

Brighter Manning Picture Gives Us Quality Options

By Lt. Gen. Andrew P. Iosue, USAF

Today the Air Force is enlisting and retaining the people needed to sustain a first-rate fighting force. A variety of factors contributes to these favorable trends. These factors include the recent pay raises, quality of life improvements, and strong internal retention initiatives. Another key factor, no doubt, is the downturn in the civilian economy. Regardless of the cause, this new environment offers Air Force commanders unique opportunities to build a stronger Air Force.

FY '82: A Banner Year for Recruiting

Fiscal Year 1982 was a banner year for recruiting. More than numbers of recruits, we are getting the best quality enlistees since the All-Volunteer Force (AVF) began. In FY '82, approximately ninety-three percent of the new recruits were high school diploma graduates. That's an increase of five percentage points since FY '81 and a gain of ten percentage points since FY '80. This is very important because graduates have lower attrition and discipline rates than other enlistees.

In addition, the number in the higher mental categories (CAT I and II) is rising. These changes provide additional flexibility in training programs, and Air Training Command has capitalized on this situation to tighten basic military and technical training standards. These tougher standards, combined with recent changes in technical training course lengths, will produce a better trained and more productive first-termer in our operational units.

Retention trends are following a similar pattern, and this is a welcome sight after the traumatic losses the Air Force suffered in the mid-1970s. Retention rates bottomed out in 1980. Since then the Air Force has seen an upswing in officer and first-term retention rates. For example, the continuation rate for officers with four to eleven years of service in FY '79 was thirty-five percent—for FY '82 we attained approximately sixty-three percent. Similarly, the first-term reenlistment rate has risen from a low of thirty-six percent in FY '80 to fifty percent in FY '82. These trends are also evident among second-term and career airmen.

Gratifying Improvements in Retention

At the same time, the voluntary retirement rate has dropped from thirty-six percent in FYs '79 and '80 to twenty-seven percent in FY '82. These improvements in retention are gratifying, but must be sustained to eliminate shortages in critical skills and rated specialties which were created by the reduced retention of the 1970s, and to meet projected growth of approximately 81,000 airmen and officers in end strength between now and FY '87.

To summarize today's situation, we see outstanding manning prospects in most career fields. We have the highest quality in years entering the Air Force, and we are also retaining personnel at very high rates. These trends will enable us to recover from most of the skill shortages that developed in the late '70s and move into a period of force build with an improved manning posture.

The 1980s will see many changes in the Air Force. The growth in Air Force strength in the '80s will be gradual, but the demands on individuals will be substantially increased. Older airplanes like the F-4, A-7, and B-52, as well as Titan missiles, will leave the inventory and will be replaced by such newly designed equipment as the B-1 bomber, the MX missile, GLCM, etc., all of which are at the frontier of Air Force research and development programs.

A New Era for the Air Force

These changes will mark a new era for the Air Force and will intensify the need for individuals with high aptitudes. These changes will also place unusually heavy learning demands on new recruits. Those who are selected to stay in the Air Force must have what it takes to add supervisory skills to their technical skills as they move up and become the supervisors of tomorrow's recruits. We face the giant challenge of sustaining quality enlistees while building experienced middle managers.

The current environment provides the opportunity to stress quality when making promotion, reenlistment, assignment, and disciplinary decisions—and these actions must be taken given the new, sophisticated equipment that we will use in the 1980s. As highly qualified as the force is today, we still have about five percent who have one or more chinks in their armor, *i.e.,* an Unfavorable Information File, a marginal or poor performance report, or are overweight, etc.

In this regard, we recently conducted a major review of existing policies and practices and came up with a number of ways to improve the quality control tools used by supervisors and commanders. We are asking them to use these tools—now honed to a new sharpness—to "fine tune" the force. This will require each Air Force member to "bite the bullet" as the organization is turned a few degrees toward a better quality work force. Such action will help to ensure that the Air Force is not "carrying" people that it simply can't afford.

A Bright Tomorrow

Tomorrow is bright. We are recruiting the finest airmen in several years. Air Training Command is further refining these new accessions with higher training standards and more comprehensive training. The tools have been polished to a cutting edge and, in this environment, it is timely and prudent to reemphasize standards and refine quality.

Supervisors and commanders are the key to this program. They are up to the task and we're counting on them to do it. ■

the CDC—urging immediate action.

Now that it looks as if CDC will be moving ahead, Representative Montgomery has told AIR FORCE Magazine that he's "very appreciative that the VA Administrator was willing to proceed in accordance with my recommendation and that of the ranking minority committee leader, Rep. John P. Hammerschmidt (R-Ark.). I believe that the CDC is well equipped to carry out this study. Like the VA, the CDC has the reputation of providing highly respected results, and VA's action demonstrates its intent to develop a study resolution."

He added that this would have the additional effect of making the results "more acceptable to those veterans who may be affected."

Earlier, Chairman Montgomery went on record that his committee will "fulfill whatever obligations we may have based on the results of the Agent Orange epidemiology study."

If You're Alive, Check In

Air Force retirees or annuitant recipients living in foreign countries no longer have to submit monthly "report of existence" forms. The previous requirement to do so has been changed by the Comptroller General to twice yearly. The Air Force's Accounting and Finance Center will send the forms out along with the end of February and the end of September checks. Forms must be returned by May 15 and November 15, respectively.

Also, the CG decision allows recipients who have their checks automatically deposited in a bank or who use an APO/FPO address to be completely exempt from filing the form. However, Center officials caution that eligibility for using the APO/FPO address depends on the Status of Forces agreement with the foreign country and that retirees should check this closely.

According to AFAFC records, almost 6,500 retirees and annuitants now live in foreign countries. The largest number—about 1,100—are in the United Kingdom, but others live in some ninety-five foreign sites, ranging from Iceland to the British colony of Belize (formerly British Honduras). All had been required to let Uncle Sam know, each month, that they were still alive.

High-Scoring Ways in DoDDS

High school students in Department of Defense Dependents Schools (DoDDS) continued their high scoring ways in the 1981–82 school year on the Scholastic Aptitude Test and the American College Testing Program, topping their Stateside counterparts.

It was the seventh straight year that DoDDS scholars outscored Stateside students on the SAT, averaging 437 on the verbal section, a full eleven points higher than US-based high schoolers. In mathematics alone, the average score of 477 ranked ten points higher than the national mean.

On the ACT, another college entrance exam, which measures English usage, mathematics usage, social studies reading, and natural sciences reading, the average performance of the DoDDS students exceeded that of the national sample in all four achievement areas.

In a related area, seven DoDDS students are among the 15,000 semifinalists in the competition for about 5,000 National Merit Scholarships to be awarded in the spring of 1983.

The DoDDS system now has 271 schools—sixty-three of which are high schools—located in twenty countries around the world. Enrollment is approximately 134,000.

THE BULLETIN BOARD

Home Loan Interest Rate Slides

Within the space of two months, VA's home loan interest rate has dropped from fifteen and one-half percent to twelve and one-half percent, following similar good news in the private sector. The new rate was agreed upon jointly by the VA and the Department of Housing and Urban Development. On the average, for new VA GI loans of just under $60,000, usually for thirty years, the new rate is expected to drop monthly payments almost $100, compared to payments at the fifteen and one-half rate. The change, however, does not affect existing loans, whose interest rate remains the same for the life of the agreement.

GI home loans can be used to purchase, construct, alter, improve, repair, or refinance a home. This includes the purchase of condominiums and mobile homes (at a fifteen and a half percent rate), with or without a lot.

The GI home loan program was established in 1944. Eligibility for veterans and service members is based on certain minimum periods of continuous active duty. Some MIA/POW spouses are also eligible, as are unmarried surviving spouses of veterans who died as a result of service or service-connected injuries. After a loan applicant makes his own loan arrangements through the usual financing channels, VA will guarantee up to sixty percent of the loan to a maximum of $27,500 for homes and up to fifty percent of the loan to a maximum of $20,000 for mobile homes.

Complete details about the GI home loan program are available at the nearest VA Regional Office. Local phone directories list toll-free numbers under "US Government."

DoD Begins New Medical Reserve Program

In a move aimed at bolstering the National Guard and Reserve military medical force—two-thirds of the overall military medical resource is found there—DoD has kicked off the Reserve Physician Liaison Officer Program.

The program, initiated at Georgetown University, Washington D. C., offers physicians flexibility in accomplishing Reserve training requirements while they are completing their residency programs, traditionally a tough time for doctors to meet Reserve training schedules. For example, participants may satisfy Reserve requirements by serving as liaison between civilian and military medical communities, by teaching courses in military medicine, or by providing on-campus contact for students and faculty members who want information about DoD medical programs.

It's hoped that this new program will attract these residents into the Reserve Forces so that future Reserve manning may be strengthened. There currently are serious shortages of Reserve physicians, particularly in orthopedics and other surgical specialties.

Michigan Modeler Captures AFA Award

Clayton S. Mast, Jr., of Royal Oak, Mich., recently flew away with top honors for Best Military Scale Model at the 1982 National Model Airplane Championships. His winning model is a radio-controlled C-130 *(see photo)* powered by four 0.21 cubic inch displacement engines. It boasts a wingspan of 102 inches and weighs fourteen pounds, ten ounces.

For six years, AFA has supported the efforts of military-oriented modelers by awarding an AFA plaque to the Military Scale Model winner of the annual competition, held this year in Lincoln, Neb. Mr. Mast's award will be presented by an AFA leader in his home area.

Clayton S. Mast, Jr., of Royal Oak, Mich., poses with his prize-winning, radio-controlled model of a Lockheed C-130 Hercules. The model has a wingspan of eight and a half feet.

Short Bursts

Retired **Maj. Gen. Abraham J. Dreiseszun,** of San Antonio, Tex., took over the reins of the **USAF Retiree Council** last month. The Council consists of volunteers who provide a link between the Air Force and its retirees. It makes recommendations to the Air Staff in order to resolve retiree issues.

"Dog tags" are back! The Air Force is again issuing the metal identification tags, phased out almost a decade ago. Officials note that the decision to reinstitute the program was based on their utility for readiness moves and mobilization contingencies. New trainees are getting the first ones, and all members are due to have them by 1985.

The **1982 Interservice Slowpitch Softball championship** has been captured by the **Air Force Womens team,** overrunning the Navy team ten to two in the finals.

Effective next month, **unaccompanied tours at Ankara, Izmir, and Yamanlar, Turkey,** will increase from twelve to fifteen months. One year later the tour at **Incirlik** will also be pegged at the longer span. The changes reflect a satisfactory conclusion to long-time Air Force efforts to improve conditions at these sites, including new and upgraded housing and improvements in base support facilities.

The new Chief of the Air Force Nurse Corps is **Col. Diann A. Hale**—one star goes with the job—currently Command Nurse, Air Training Command. The Gridley, Calif., native has been an Air Force nurse since 1956.

Base Exchanges worldwide are now offering **American Express money orders** to their customers, the result of a competitive solicitation required by regulations. The same fee schedule will be used as for the previous brand sold.

Celebrating your eightieth to ninetieth birthday or fiftieth and up wedding anniversary? The White House wants you to know that **congratulatory Presidential greeting cards** are available for those reaching such milestones. Send requests—at least six weeks ahead of time—to: Greeting Office, The White House, Room 39, Washington, D. C. 20500.

The **blazer-style** service coat and slacks will become **mandatory** clothing items for enlisted women next month. The current semibox style coat may still be worn pending a future phaseout. New recruits have been issued the new togs—others will have to purchase them with their clothing allowance. ■

SENIOR STAFF CHANGES

PROMOTIONS: To be **Lieutenant General:** William J. **Campbell;** Robert D. **Russ.**

To be **Major General:** William A. **Gorton.**

To be **Brigadier General:** Wilfred L. **Goodson;** Donald W. **Henderson.**

RETIREMENTS: L/G James H. **Ahmann;** B/G A. Paul **Bruno;** B/G Richard H. **Dunwoody;** M/G James C. **Enney;** M/G Irwin P. **Graham;** B/G Joseph R. **Lowry;** B/G Rano E. **Lueker;** B/G Donald B. **Wagner.**

CHANGES: M/G Leon W. Babcock, Jr., from Ass't C/S for Ops., Hq. AFCENT, Brunssum, Netherlands, to Dep. Cmdr., 6th ATAF, AAFSE, Izmir, Turkey, replacing M/G Earl G. Peck . . . **M/G (L/G selectee) William J. Campbell,** from Dir. of Prgms. & Eval., DCS/P&R, Hq. USAF, Washington, D. C., to Cmdr., 8th AF, SAC, Barksdale AFB, La., replacing L/G Robert T. Herres . . . **B/G Frederic F. Doppelt,** from Command Surgeon, Hq. AFSC, Andrews AFB, Md., to Command Surgeon, Hq. TAC, Langley AFB, Va., replacing B/G Richard D. Hansen . . . **B/G William L. Doyle, Jr.,** from Dep. Dir., Nat'l Strategic Target List, JSTPS, Offutt AFB, Neb., to DCS/Intel., Hq. SAC, Offutt AFB, Neb., replacing retired M/G James C. Enney.

B/G David W. Forgan, from Dep. Cmdr., Joint Special Ops. Command, OJCS, Washington, D. C., to Ass't C/S for Ops., Hq. AFCENT, Brunssum, Netherlands, replacing M/G Leon W. Babcock, Jr. . . . **B/G Gordon E. Fornell,** from Dep. Dir. of Development & Prod., DCS/RD&A, Hq. USAF, Washington, D. C., to Spec. Ass't for MX Matters, DCS/RD&A, Hq. USAF, Washington, D. C., replacing B/G James P. McCarthy . . . **M/G Sloan R. Gill,** from Cmdr., 4th AF (AFRES), McClellan AFB, Calif., to Chief, AFRES, Hq. USAF, Washington, D. C., replacing retired M/G Richard Bodycombe.

Col. (B/G selectee) Wilfred L. Goodson, from Cmdr., 50th TFW, USAFE, Hahn AB, Germany, to DCS/Plans, Hq. USAFE, Ramstein AB, Germany, replacing M/G David L. Nichols . . . **B/G (M/G selectee) William A. Gorton,** from DCS/Plans, Hq. TAC, Langley AFB, Va., to Dir., Op. Requirements, DCS/RD&A, Hq. USAF, Washington, D. C., replacing M/G (L/G selectee) Robert D. Russ . . . **Col. (B/G selectee) Donald W. Henderson,** from Dep. for Space Defense Sys., Space Div., AFSC, Los Angeles, Calif., to Cmdr., SAMTO, AFSC, & Dep. DoD Mgr. for Space Shuttle Support Ops., Vandenberg AFB, Calif., replacing B/G William T. Twinting.

L/G Robert T. Herres, from Cmdr., 8th AF, SAC, Barksdale AFB, La., to Dir., C^3 Sys., OJCS, Washington, D. C. . . . **B/G Merrill A. McPeak,** from C/S, Hq. USAFE, Ramstein AB, Germany, to DCS/Plans, Hq. TAC, Langley AFB, Va., replacing B/G (M/G selectee) William A. Gorton . . . **M/G David L. Nichols,** from DCS/Plans, Hq. USAFE, Ramstein AB, Germany, to C/S, Hq. USAFE, Ramstein AB, Germany, replacing B/G Merrill A. McPeak . . . **M/G Earl G. Peck,** from Dep. Cmdr., 6th ATAF, AAFSE, Izmir, Turkey, to Dir. for Intel. & Space Policy, OSD, Washington, D. C.

M/G M. Roger Peterson, from Ass't Dir. for Plans, Policies & Prgms., Hq. Defense Logistics Agency, Cameron Station, Va., to Dep. Dir., Defense Logistics Agency, Cameron Station, Va. . . . **L/G John L. Piotrowski,** from Vice Cmdr., Hq. TAC, Langley AFB, Va., to Cmdr., 9th AF, TAC, Shaw AFB, S. C., replacing L/G Larry D. Welch . . . **B/G Allen K. Rachel,** from Dep. Dir., Defense Mapping Agency, Washington, D. C., to Dep. Dir., Nat'l Strategic Target List, JSTPS, Offutt AFB, Neb., replacing B/G William L. Doyle, Jr. . . . **M/G (L/G selectee) Robert D. Russ,** from Dir., Op. Requirements, DCS/RD&A, Hq. USAF, Washington, D. C., to Vice Cmdr., Hq. TAC, Langley AFB, Va., replacing L/G John L. Piotrowski.

B/G William T. Twinting, from Cmdr., SAMTO, AFSC, & Dep. DoD Manager for Space Shuttle Support Ops., Vandenberg AFB, Calif., to DCS/T&E, Hq. AFSC, Andrews AFB, Md., replacing M/G Peter W. Odgers . . . **B/G William B. Webb,** from Defense and Air Attaché, DIA, Peking, China, to Dep. Dir., Defense Mapping Agency, Washington, D. C., replacing B/G Allen K. Rachel . . . **L/G Larry D. Welch,** from Cmdr., 9th AF, TAC, Shaw AFB, S. C., to DCS/P&R, Hq. USAF, Washington, D. C., replacing retired L/G Charles C. Blanton. ■

AFA Intercom

Season's Greetings

from the Staffs of the Air Force Association and the Aerospace Education Foundation

We want to wish every member, patron, and supporter of the Air Force Association and their families a joyous and cheerful Holiday Season and a prosperous and healthy New Year.

We are taking this opportunity to send a personal Holiday greeting from us to each of you; and to assure you that we of the staff are dedicated to AFA's professional concern for and support of the people and the technology that provide our nation's aerospace power—power that serves to keep our nation strong, the world at peace, and our fellow Americans free.

Joreen Aharonian, Andy Anderson, Dottie Barnes, Pam Beatty, Bill Belanger, Jancy Bell, Clif Berry, Pamela Braithwaite, Jim Bridgeforth, Jim Brown, Jeanne Buffalino, Gilbert Burgess, Ben Catlin, Sara Ciccoli, Donna Coffey, John Correll, Charles Cruze, Esther Curtis, Ann Di Fiore, Russ Dougherty, Pearlie Draughn, Bill Farrell, Dottie Flanagan, Bill Ford, Margaret Glover, John Gray, Rolla Gray, Joanne Greene, Nancy Hallock, Frank Henry, Janet Hensler, Joan Herzberg, Barbara Jerry, Alan Johnson, Bud Keeler, Max Keeney, Debbie Kinback, Jana Knoska, Doreatha Kornegay, Jean Kund, Grace Lizzio, Linda Mathieson, Kathleen McAuliffe, Ed McBride, Jim McDonnell, Barbara McGolrick, Katie McIntyre, Laura McKiveen, Karen McReynolds, Paul Montalbano, Pat Muncy, Fred Musi, Millie Neider, By Nicholas, Mike Nisos, Dave Noerr, Gill Norton, Carol Nuetzel, Rosemary Pacenta, Clarine Penewell, Teri Pepper, Mike Perini, Corinna Petrella, Bill Schlitz, Bob Shaughness, Dick Skinner, Carol Smith, John Smith, Pat Teevan, Charlie Tippett, Alice Turner, Edgar Ulsamer, Barbara Vest, Ed Walker, Don Whetstone, Pat Whipp, Kathleen White, Robin Whittle, Hugh Winkler, Maria Winter, Ann Wood-Gray.

AEF Plans National Laboratory on Scientific, Technological Literacy

At the Aerospace Education Foundation's Board of Trustees meeting, held last September 14 during AFA's National Convention, the Trustees unanimously approved the Board's Executive Committee recommendation to conduct a third "National Laboratory for the Advancement of Education" during AFA's 1983 National Convention. The theme of the event will be "Scientific and Technological Literacy."

The Laboratory will be the initial effort in the Foundation's drive to focus attention on this nation's lackluster performance in educating its young people in vital technical and scientific disciplines. Because of the Foundation's experience and resources, AEF hopes that it can contribute to an essential reemphasis on scientific and technological training in this country.

The problem is clear. High school students are shunning mathematics and physics courses. A recent National Academy of Sciences report described American high school students as "scientifically and technologically illiterate." The military services, as well as business and industry, are chronically short of engineers and technicians. Foreign technological advances by such nations as the Soviet Union, Japan, and Germany threaten to undermine the security and technological primacy of the United States. And the list goes on.

The Laboratory will bring together experts and educators in an attempt to come up with solutions to the problem. The morning symposium of the Laboratory will study what should be done in high schools and colleges to improve technical and scientific teaching. There will also be a luncheon, featuring a keynote speaker, and an afternoon session devoted to examining initiatives that have been taken to address the problem. Of course, attendees will have the opportunity to visit the Aerospace Development Briefings and Displays and attend other events at the AFA Convention.

The Aerospace Education Foundation has previously sponsored two successful National Laboratories— "Individualized Learning for the Inner City" in 1968, and "Educating for the World of Work" in 1970.

AFA National Director and former National Treasurer Jack Gross, right, recently presented cartoonist Milton Caniff an "Early Birdman" in recognition of the thirty-fifth anniversary of the birth of Caniff's Steve Canyon *as a comic strip figure. At left is Air Force Secretary Verne Orr.*

Airpower Chapter Hosts Twenty-eighth Salute To Space Division

AFA's Greater Los Angeles Airpower Chapter recently held its twenty-eighth annual "Salute to Space Division" luncheon in Los Angeles, Calif. The Salute included presentation of awards to Space Division people for their contributions to the mission over the past year.

The special guest speaker at the luncheon was Air Force Under Secretary Edward C. Aldridge. In his remarks, Secretary Aldridge stressed that "the overriding imperative driving the Air Force is the clear requirement to maintain a military space program that effectively supports national security requirements."

Space Division is the Air Force organization responsible for the nation's military space program, including Space Shuttle activities. Space Division will work closely with the newly formed Air Force Space Command.

Secretary Aldridge went on to ex-

Gen. Bernard A. Schriever, USAF (Ret.), right, recently presented an award named in his honor to Maj. Gen. John E. Kulpa, USAF, Space Division Deputy Commander for Space Operations, for his support of Air Force space and missile programs. The presentation took place during AFA's Greater Los Angeles Airpower Chapter's twenty-eighth annual "Salute to Space Division." See adjacent item. (USAF photo)

plain that "Space Command will provide a useful consolidation of operational space-related activities, as well as provide an effective interface between research and development on the one hand and military requirements and operations on the other."

Following the Secretary's remarks, many Space Division people were recognized for their contributions to the mission over the past year. Among them was Maj. Gen. John E. Kulpa, who received the General Bernard A. Schriever Award for his exceptional support of Air Force missile and space programs *(see photo, p. 175)*. General Kulpa is Director of Special Projects in the Office of the Secretary of the Air Force, and Space Division Deputy Commander for Space Operations.

Fresno Chapter Sponsors Its Eleventh Annual "Gathering Of Warbirds"

AFA's Fresno Chapter 1982 "Gathering of Warbirds," held last August at Madera Municipal Airport in California, saw more than 100 warbirds—spanning fifty-three years of military aviation history—in attendance. The event commemorated the fortieth anniversary of the air and sea battles in the Pacific during World War II.

The salute to naval aviation drew a 1929 NT-1 biplane trainer, as well as a FM-2, F6F, F7F, F4U, SNJs, and many other Navy types. Also on hand were twenty-five P-51 Mustangs, the Confederate Air Force's B-17G *Sentimental Journey*, and three B-25s. The highlight of the show was the Sunday afternoon launch of thirty various fighter aircraft.

The Chapter uses the funds produced from the show to support the Civil Air Patrol, Air Force ROTC, and to sponsor aerospace scholarships. In addition, Chapter members take the opportunity to recruit new AFA members, garnering more than 100 new AFAers over the last two shows.

Fresno Chapter President Arnie Schweer and the show's General Chairman James H. Estep considered the Gathering a resounding success, except for one problem—they're running out of space. "What do you do if people call you next year, and say they want to bring in a B-29, or a B-24, a P-47, or another B-17, or another dozen P-51s?" they ask.

The Gathering attracts so many warbirds that they overflow the Madera Airport, and the sponsors are having to restrict the number of aircraft that can participate.

ABOVE: The Madera Municipal Airport's ramps were packed on Saturday afternoon of the Fresno Chapter's "Gathering of Warbirds," with more than eighty-five warbirds scrambling for a patch of concrete. (Photo by S. Samuel Boghosian) BELOW: During the get-together, then-AFA National Director Arthur L. Littman (third from left) took the occasion of the Gathering to present Chapter President Arnie Schweer, center, with the California State AFA Meritorious Service Award. Those looking on included (from left) airshow directors Chris DeGuitaut and S. Samuel Boghosian, Littman, Schweer, General Chairman James H. Estep, and Melvin Kilner. Chapter Secretary Sharon Schweer waits for a ride in Peter Regina's P-51B Shangri-La. *(Photo by Peter G. Jongbloed)*

Mike Chatter—Reader Feedback Over the Intercom

The ol' mailbag has got a little bit heavier since the initiation of the "Intercom" section. The following are a few examples of feedback from readers.

Spit-and-Polish Update

In the September 1982 "Intercom," we printed an anecdote *(p. 213)* from Gen. T. R. Milton, USAF (Ret.), concerning the antics of Les Johnsen during a visit by dignitaries to Naha AB on Okinawa. We subsequently received a letter from a pilot who participated in the skit, Maj. Frank E. Barry, USAF (Ret.), who had a few clarifying remarks concerning that occasion:

"The anecdote, 'A Spit-and-Polish Fighter Outfit,' although most nostalgic and amusing, does in fact have a few inaccuracies.

"On the day General Burns came to Naha AB, he was not with Air Force Secretary James Douglas, though Secretary Douglas did visit on another occasion as an honored guest and was greeted in the same manner by the pseudo WW I pilot. General Kuter was also welcomed at another time, by himself.

"The F-86Ds mentioned in the anecdote were 'dogs' in every sense of the word. Having just left the 'Geiger Tigers,' where we flew new Dash-60 Model Ds, I can testify that the ones on Okinawa were far from 'gleaming'—they were just beat.

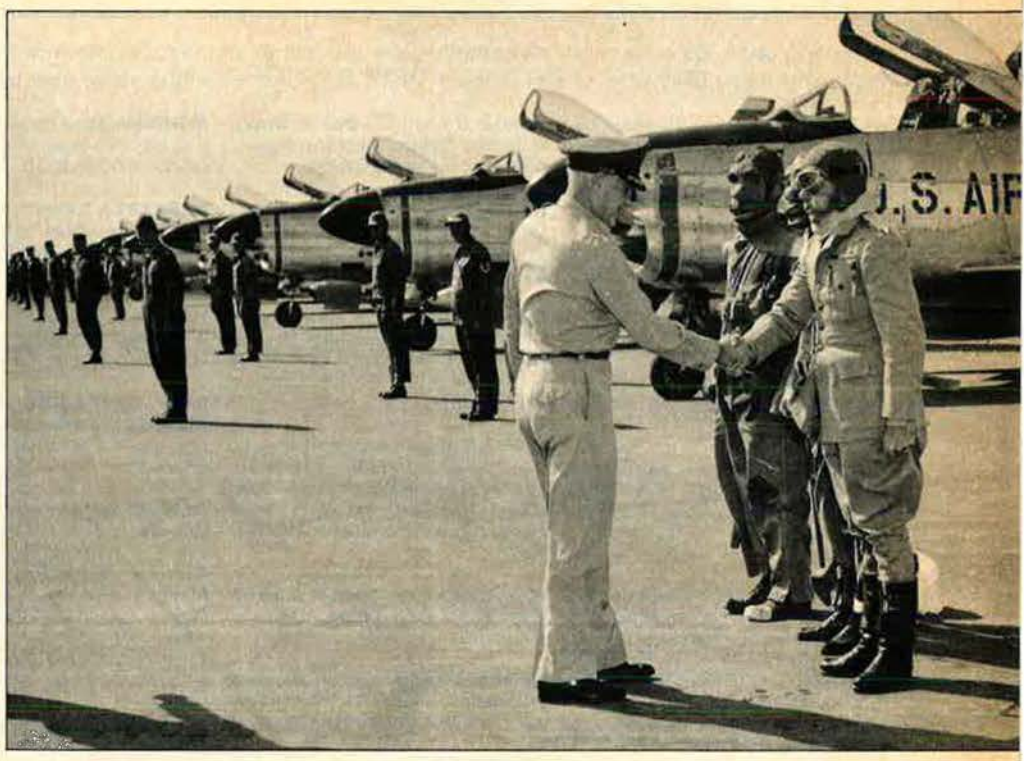
"The crew chiefs were not covered with grease at all. The pilot (myself), who started the whole skit sequence, always tried to get into the cockpit, but never made it. The skit would start, for example, with myself leaning against the 'radome.' When the VIP was within earshot, I would shout, 'Holy mackerel, here comes General Burns! Shape up, you guys!'

"At that point, we would go 'bananas,' and scurry about in fast, jerky movements like old-time movies. I would do pratfalls and try to make it up the ladder to the cockpit, naturally stepping through the rungs. . . .

"Lastly, the impertinent reporter was, in fact, a Navy pilot stationed at Naha. Later, at the dining-in, we had a hard time convincing General Burns that the Navy pilot was not a wire service reporter. . . .

"Les Johnsen was indeed the impresario of the event. It was Les Johnsen's humanistic approach, in both festive and serious matters, that made him a fine leader. Les Johnsen was, and still is, a hell of a guy.

"(This is not meant to be 'sour grapes'—I truly enjoyed reading General Milton's anecdote.)"



ABOVE: Lt. Gen. Robert Burns, Fifth Air Force Commander, greets a well-dressed pilot of the 313th Air Division on Okinawa in 1958. LEFT: With such dedicated airmen as these at the ready to defend America, the nation could rest easy in the late 1950s. See item. Photos courtesy Maj. Frank E. Barry, USAF (Ret.).

Keeping 'Em In

We recently received a copy of a letter that a former Harvard AFROTC graduate, Richard M. Williams, had sent to his AFROTC alumni committee in response to a request for information that was published in the August 1982 "Airmail" section. He suggested that we might want to reprint the last couple of paragraphs of that letter. We agree, and pass it along as food for thought. (Mr. Williams is now a major in AFRES.)

". . . I am enclosing a check for $15 to be used to purchase a membership in the Air Force Association for a newly commissioned second lieutenant going on extended active duty in a non-rated AFSC. The Air Force's in-house publications are aimed at a fairly unsophisticated denominator. AIR FORCE Magazine does a much better job of getting across the 'big picture' than any

AFA STATE CONTACTS

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Don Krekelberg,** 904 Delcris Drive, Birmingham, Ala. 35226 (phone 205-942-0784).

ALASKA (Anchorage, Fairbanks): **William M. Mack,** 610 McKay Bldg., 338 Denali St., Anchorage, Alaska 99501 (phone 907-266-1253).

ARIZONA (Phoenix, Sun City, Tucson): **Thomas W. Henderson,** 4820 N. Camino Real, Tucson, Ariz. 85718 (phone 602-299-6467).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Little Rock): **Charles E. Hoffman,** 1041 Rockwood Trail, Fayetteville, Ark. 72701 (phone 501-521-7614).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hermosa Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Vandenberg AFB, Yuba City): **B. J. Scott Norwood,** 19561 Moray Court, Saratoga, Calif. 95070 (phone 408-867-9466).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Karen M. Kyritz,** 17105 East Bethany Circle, Aurora, Colo. 80013 (phone 303-690-2920).

CONNECTICUT (East Hartford, North Haven, Storrs, Stratford, Westport, Windsor Locks): **Raymond E. Choquette,** 16 Tonica Springs Trail, Manchester, Conn. 06040 (phone 203-646-4818).

DELAWARE (Dover, Wilmington): **Joseph H. Allen, Jr.,** 537 Roberta Ave., Dover, Del. 19901 (phone 302-674-3472).

DISTRICT OF COLUMBIA (Washington, D. C.): **W. Jack Reed,** 1750 Pa. Ave., N. W., Suite 400, Washington, D. C. 20006 (phone 202-637-3346).

FLORIDA (Broward, Cape Coral, Fort Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach, Winter Haven): **Morgan S. Tyler, Jr.,** 1776 6th St., N. W., Apt. 606, Winter Haven, Fla. 33880 (phone 813-299-2773).

GEORGIA (Athens, Atlanta, Columbus, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Edward I. Wexler,** 8 E. Back St., Savannah, Ga. 31406 (phone 912-964-1941, Ext. 253).

GUAM (Agana): **Joe Gyulavics,** P. O. Box 21543, Guam 96921 (phone 671-477-9711).

HAWAII (Honolulu): **Don J. Daley,** P. O. Box 3200, Honolulu, Hawaii 96847 (phone 808-525-6296).

IDAHO (Boise, Mountain Home, Twin Falls): **John W. Logan,** 3131 Malad St., Boise, Idaho 83705 (phone 208-385-5475).

ILLINOIS (Belleville, Champaign, Chicago, Decatur, Elmhurst, Peoria): **Richard H. Becker,** 7 Devonshire Drive, Oak Brook, Ill. 60521 (phone 312-654-3938).

INDIANA (Bloomfield, Fort Wayne, Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **John Kagel,** 1029 Riverside Drive, South Bend, Ind. 46616 (phone 219-234-8855).

IOWA (Des Moines): **Carl B. Zimmerman,** 608 Waterloo Bldg., Waterloo, Iowa 50701 (phone 319-232-2650).

KANSAS (Topeka, Wichita): **Cletus J. Pottebaum,** 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-683-3963).

KENTUCKY (Louisville): **Elmo C. Burgess,** 116 S. 5th St., Louisville, Ky. 40202 (phone 502-585-5169).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **James S. Kendall,** 4428 Parkridge Drive, Benton, La. 71006 (phone 318-965-9164).

MAINE (Limestone, N. Berwick): **Arley McQueen, Jr.,** 153 Jelliegh Drive, Wells, Me. 04090 (phone 207-646-2718).

MARYLAND (Andrews AFB, Baltimore): **William L. Ryon, Jr.,** 8711 Liberty Lane, Potomac, Md. 20854 (phone 301-299-8787).

MASSACHUSETTS (Bedford, Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Zaven Kaprielian,** 428 Mt. Auburn St., Watertown, Mass. 02172 (phone 617-924-5010).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Jeryl L. Marlatt,** 740 S. Cranbrook Rd., Birmingham, Mich. 48009 (phone 313-494-8232).

MINNESOTA (Duluth): **Edward A. Orman,** 368 Pike Lake, Duluth, Minn. 55811 (phone 218-727-8381).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Clarence Ball, Jr.,** 5813 David Davis Pl., Ocean Springs, Miss. 39564 (phone 601-875-5883).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **James R. Hopkins,** 316 Hillcrest Drive, Warrensburg, Mo. 64093 (phone 816-747-6087).

MONTANA (Great Falls): **Dick Barnes,** P. O. Box 685, Great Falls, Mont. 59403 (phone 406-727-3807).

NEBRASKA (Lincoln, Omaha): **Edward A. Crouchley,** 1314 Douglas On the Mall, Omaha, Neb. 68102 (phone 402-633-2125).

NEVADA (Las Vegas, Reno): **William J. Becker,** 1709 Valmora, Las Vegas, Nev. 89109 (phone 702-873-5945).

NEW HAMPSHIRE (Manchester, Pease AFB): **Charles J. Sattan,** 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Middlesex County, Newark, Trenton, Wallington, West Orange): **Frank Kula,** 264 Edgewood Drive, Toms River, N. J. 08753 (phone 201-244-2491).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Louie T. Evers,** P. O. Box 1946, Clovis, N. M. 88101 (phone 505-762-1798).

NEW YORK (Albany, Brooklyn, Buffalo, Chautauqua, Garden City, Hempstead, Hudson Valley, New York City, Niagara Falls, Plattsburgh, Queens, Rochester, Rome/Utica, Southern Tier, Staten Island, Suffolk County, Syosset, Syracuse, Westchester): **Robert E. Holland,** 750-75A Lido Blvd., Lido Beach, N. Y. 11561 (phone 212-347-2413).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **Hal Davis,** 1034 Manchester Drive, Cary, N. C. 27511 (phone 919-467-6522).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **Maurice M. Rothkopf,** 3210 Cherry St., Grand Forks, N. D. 58201 (phone 701-746-5493).

OHIO (Cincinnati, Cleveland, Columbus, Dayton, Newark, Youngstown): **Charles B. Spencer,** 333 West 1st St., Suite 252, Dayton, Ohio 45402 (phone 513-228-1175).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Aaron C. Burleson,** P. O. Box 757, Altus, Okla. 73522 (phone 405-482-0005).

OREGON (Eugene, Portland): **William Gleaves,** 2353 Oakway Terrace, Eugene, Ore. 97401 (phone 503-687-2269).

PENNSYLVANIA (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Lewistown, Philadelphia, Pittsburgh, Scranton, State College, Washington, Willow Grove, York): **Tillie Metzger,** 2285 Valera Ave., Pittsburgh, Pa. 15210 (phone 412-881-1991)

PUERTO RICO (San Juan): **Fred Brown,** 1991 Jose F. Diaz, Rio Piedras, P. R. 00928 (phone 809-790-5288).

RHODE ISLAND (Warwick): **King Odell,** 413 Atlantic Ave., Warwick, R. I. 02888 (phone 401-941-5472).

SOUTH CAROLINA (Charleston, Columbia, Myrtle Beach, Sumter): **William B. Gemmill,** 11 Victoria Ave., Myrtle Beach, S. C. 29577 (phone 803-626-9628).

SOUTH DAKOTA (Rapid City, Sioux Falls): **Duane L. Corning,** Box 901 RR 4, Rapid City, S. D. 57701.

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Arthur MacFadden,** 4501 Amnaicola Highway, Chattanooga, Tenn. 37406 (phone 615-622-6262).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **John Sparks,** P. O. Box 360, San Antonio, Tex. 78292 (phone 817-723-2741).

UTAH (Brigham City, Cedar City, Clearfield, Ogden, Provo, Salt Lake City): **Nuel Sanders,** 875 S. 1650 East #A, Clearfield, Utah 84015.

VERMONT (Burlington): **John D. Navin,** 350 Spear St., Unit 64, South Burlington, Vt. 05401 (phone 802-863-1510).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Ivan R. Frey,** 73 James Landing Rd., Newport News, Va. 23606 (phone 804-595-5617).

WASHINGTON (Seattle, Spokane, Tacoma): **E. A. Kees, Jr.,** 7710 Ruby Drive, S. W., Tacoma, Wash. 98498.

WEST VIRGINIA (Huntington): **David Bush,** 2317 S. Walnut Drive, St. Albans, W. Va. 25177 (phone 304-722-3583).

WISCONSIN (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 414-871-3766).

WYOMING (Cheyenne): **R. S. Rowland,** P. O. Box 811, Cheyenne, Wyo. 82001 (phone 307-638-3335).

AFA Intercom

During the recent Louisiana State AFA Convention held at Barksdale AFB, La., Lt. Gen. Robert T. Herres, Eighth Air Force Commander, was the guest speaker at the Convention banquet. With General Herres at the banquet are (from left): Frank M. Lugo, AFA National Vice President for the South Central Region; Dave C. Noerr, AFA Assistant Executive Director/Field Organizations; Jim Kendall, Louisiana State AFA President-elect; General Herres; and Tom Keal, Louisiana State AFA President. The banquet culminated a Convention that included many business meetings, a golf tournament, and a trip to the Louisiana Downs Racetrack to attend a Louisiana State AFA-sponsored race.

of the in-house publications, or anything else I know.

"I have often reflected that if anyone had steered me toward AFA while I was on active duty, I might well have stayed in."

Mystery B-17

T. A. Geer of North Hollywood, Calif., sent us a clipping from the Kingman, Ariz., *Daily Miner* concerning a chunk of a B-17 fuselage that was found by the Kingman Elks Club when doing some housecleaning. Apparently, the four-by-four panel of fuselage, bearing artwork featuring Joe Carioca and Donald Duck, was cut from the fuselage with a torch. Unfortunately, there is no serial number to be found anywhere, so they are having a difficult time tracing the aircraft. The Kingman Elks are turning over the panel to the Mohave Museum of History and Arts, and both they and the Museum are wondering about the history of this aircraft.

The clipping goes on to ask anyone having any information regarding this mystery B-17 to contact the *Daily Miner* at (602) 757-5545.

Additional Membership Awards and Other Such Items of Interest

• In the November 1982 "Intercom," we published the names of the AFA Regions, States, and Chapters that had met their new member objective for the year, as of July 31. These units were recognized at the AFA National Convention in September.

However, all units reaching their new member objective could not be included in the November listing because of time constraints.

The accompanying box *(p. 180)* lists those additional units that reached their new member objective before September 30, the close of the chapter year.

AFA Intercom

• And here's a switch: Air Force ROTC and the Arnold Air Society at the University of Pittsburgh hosted an Air Force Association Appreciation Night in October. Greater Pittsburgh Chapter officials were involved in the activities. Guest speaker at the event was AFA staffer James A. McDonnell, Jr., Assistant Executive Director for Association Programs and Events.

• Some interesting figures: A readership research report reveals that AIR FORCE Magazine reaches 100 percent of Air Force general officers, and eighty-nine percent of Air Force colonels. However, only forty-two percent of USAF lieutenants receive the magazine.

• Better late than never department: In September 1945, a young Army Air Forces lieutenant named James Ivan Potts, Jr., made a twenty-seven and one-half hour flight from Japan to Washington, D. C., in a B-29. He received a special citation from Gen. H. H. "Hap" Arnold for the feat. He also received the Army Commendation Medal—this last June, thirty-seven years after the fact. Because of lost records, the Army did not know Mr. Potts's address, and only recently tracked him down to award him the commendation. Mr. Potts received the medal during ceremonies in June from Lee Gossick, President of AFA's Arnold Chapter *(see photo).* ■

Additional Membership Achievement Awards

Region	Vice President
Central East	H. B. Henderson
Great Lakes	Howard C. Strand
State	**President**
Alaska	Frank X. Chapados
Chapter	**President**
Erie (Pennsylvania)	Robert P. LaFollette
Fresno (California)	Arnie Schweer
Gold Coast (Florida)	Albert M. Wagner
Greater Amarillo Area (Texas)	John K. York
Illini (Illinois)	Frank W. Elliott
Leigh Wade (Virginia)	George Aguirre
Madison (Wisconsin)	Al Seidel
Northeast Texas (Texas)	Jim Haptonstall
Roanoke (Virginia)	Marvin L. Hale
South Bend (Indiana)	John R. Kagel

AFA Arnold Chapter President Lee Gossick, left, congratulates James Ivan Potts, Jr., on receiving a belated (thirty-seven years) Army Commendation Medal for his 1945 twenty-seven-hour-plus B-29 flight from Japan to Washington, D. C. See item. (USAF photo)

SPECIAL OFFER!

AVIATION ART

Acquire quality limited-edition aviation art and support AFA's awards programs at the same time.

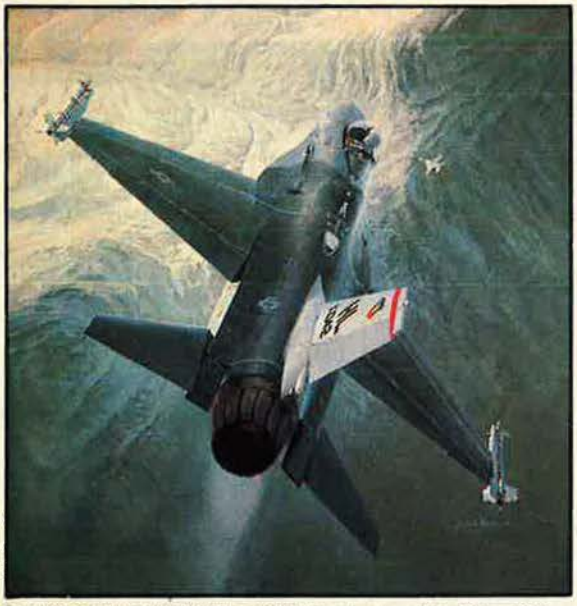
The Air Force Association is proud to offer signed and numbered fine quality prints of the aviation art of Keith Ferris and Bill Phillips.

Your purchase of these prints supports the expanded awards programs of the Air Force Association. Through exclusive agreement with The Greenwich Workshop, $35 of the purchase price of each print will be applied to the new AFA awards named for Generals LeMay, Tunner, Chennault, and Power—awards that recognize outstanding crews in strategic bombers, airlift, fighter/attack, and missilery.

Greenwich Workshop is producing only 1,000 prints of each painting, of which 300 are reserved for AFA and are being offered to AFA members first.

Order now—be among the first AFAers to own these quality prints!

ADVANTAGE EAGLE by Bill Phillips—Bill says, "The term 'Advantage Eagle' will be heard as long as the F-15 'Eagle' is flying. This F-15 is an 'A' version assigned to the 'Triple Nickel' 555th TFS at Luke AFB. A Navy F-4, ahead in the distance, is engaged in low-level dissimilar air combat maneuvering to evade the F-15. But the Eagle has the advantage." 27½" x 22½" Price: $135.



SUNRISE ENCOUNTER by Keith Ferris was a hit of the 1982 Air Force Art Collection show. Keith says, "This F-16 is assigned to the 34th Tactical Fighter Squadron of the 388th TFW, Hill AFB in Utah. The action takes place over the Nellis Range north of Las Vegas. This afterburner view of the plane emphasizes the fantastic 25,000-pound thrust engine. . . . It also shows off the unit markings, armament, and the 360-degree view the pilot has from his bubble canopy." 23" x 23½" Price: $145.

Order both prints now, before the limited edition is gone!

The Greenwich Workshop Gallery
2600 Post Road
Southport, Connecticut 06490

Please send:

_____ copies of "Advantage Eagle" at $135 each
_____ copies of "Sunrise Encounter" at $145 each

(Please add $10.00 for shipping. No additional charge for two or more prints shipped to the same address)

Name _____

Address _____

_____

Telephone _____

Indicate method of payment:
☐ Payment enclosed ☐ VISA ☐ MasterCard ☐ American Express
(Connecticut residents add 7½% sales tax)

Account Number _____

Expiration Date _____

Signature _____

FA CHAMPLUS ... New, Strong Protec

When a Single Accident or Illness Could Cost *You* Thousands of Dollars, You Need AFA CHAMPLUS . . . for *Strong* Protection against Costs CHAMPUS Doesn't Cover!

For military retirees and their dependents . . . and dependents of active duty personnel . . . more and more medical care is being provided through the government CHAMPUS program.

And, of course CHAMPUS pays 75% of allowable charges.

But today's soaring hospital costs—*up to $500 a day* in some major metropolitan medical centers—can run up a $20,000 bill for even a moderately serious accident or illness.

Your 25% of $20,000 is no joke!

AFA CHAMPLUS protects you against that kind of financial catastrophe *and* covers most of your share of routine medical expenses as well.

HOW AFA CHAMPLUS WORKS FOR YOU!

WHO IS ELIGIBLE?

1) All AFA members under 65 years of age who are currently receiving military retired pay and are eligible for benefits under Public Law 89-614 (CHAMPUS), their spouses under age 65 and their unmarried dependent children under age 21 (or age 23 if in college).
2) All eligible dependents of AFA members on active duty. Eligible dependents are spouses under age 65 and unmarried dependent children under age 21 (or age 23 if in college).

EXCEPTIONAL BENEFIT PLAN

(See chart at right)

FOUR YEAR BASIC BENEFIT. Benefits for most injuries or illnesses may be paid for up to a four-year period.

PLUS THESE SPECIAL BENEFITS . . .

1) Up to 45 consecutive days of in-hospital care for mental, nervous, or emotional disorders. Outpatient care may include up to 20 visits of a physician or $500 per insured person each year.
2) Up to 30 days care per insured per year in a Skilled Nursing Facility.
3) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Residential Treatment Center.
4) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Special Treatment Facility.
5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

YOUR INSURANCE IS NON-CANCELLABLE

As long as you are a member of the Force Association, pay your premium time, and the master contract remain force, your insurance cannot be can ed.

ADMINISTERED BY YOUR ASSOCIATION . . . UNDERWRITTEN BY MUTUAL OF OMAHA

AFA CHAMPLUS insurance is adm tered by trained insurance professio on your Association staff. You get pro reliable, courteous service from pe who know your needs and know e detail of your coverage. Your insuranc underwritten by Mutual of Omaha, largest individual and family health ir ance company in the world.

AFA OFFERS YOU HOSPITAL BENEFITS AFTER AGE 65

Once you reach Age 65 and are cov under Medicare, AFA offers you pr tion against hospital expenses covered by Medicare through the S *Age Benefit Plan* of AFA Hospital In nity Insurance. Members enrolled in CHAMPLUS will automatically receive information about AFA's Medicare plement program upon attainment of 65 so there will be no lapse in covera

AFA CHAMPLUS BENEFIT SCHEDULE

Care	*CHAMPUS Pays*	*AFA CHAMPLUS Pays*
	For Military Retirees Under Age 65 and Their Dependents	
Inpatient civilian hospital care	CHAMPUS pays 75% of allowable charges	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS COVERS 75% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.
	For Dependents of Active Duty Military Personnel	
Inpatient civilian hospital care	CHAMPUS pays all covered services and supplies furnished by a hospital less $25 or $5.00 per day, whichever is greater.	CHAMPLUS pays the greater of $5 per day or $25 of the reasonable hospital charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS covers 80% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied.	CHAMPLUS pays the 20% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.

NOTE: Outpatient benefits cover emergency room treatment, doctor bills, pharmaceuticals, and other professional services.

There are some reasonable limitations and exclusions for both inpatient and outpatient coverage. Please note these elsewhere in the plan description.

Against Costs CHAMPUS Doesn't Cover

APPLY TODAY!
JST FOLLOW THESE STEPS

hoose either AFA CHAMPLUS In-patient verage or combined In-patient and Out-tient coverage for yourself. Determine e coverage you want for dependent embers of your family. Complete the closed application form in full. Total the emium for the coverage you select from e premium tables on this page. Mail the plication with your check or money der for your initial premium payment, yable to AFA.

Get AFA's new

CHAMPLUS

MITATIONS

overage will not be provided for condi-ns for which treatment has been re-ived during the 12-month period prior to e effective date of insurance until the piration of 12 consecutive months of in-rance coverage without further treat-ent. *After coverage has been in force for consecutive months, pre-existing* con-tions will be covered regardless of prior eatment.

XCLUSIONS

is plan does not cover and no payment all be made for:

routine physical examinations or immu-zations

domiciliary or custodial care

dental care (except as required as a ecessary adjunct to medical or surgical eatment)

routine care of the newborn or well-aby care

injuries or sickness resulting from eclared or undeclared war or any act hereof

injuries or sickness due to acts of inten-ional self-destruction or attempted sui-ide, while sane or insane

treatment for prevention or cure of al-coholism or drug addiction

eye refraction examinations

Prosthetic devices (other than artificial imbs and artificial eyes), hearing aids, orthopedic footwear, eyeglasses and con-tact lenses

expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS)

QUARTERLY PREMIUM SCHEDULE

Plan 1—For military retirees and dependents

In-Patient Benefits

Member's Attained Age	*Member*	*Spouse*	*Each Child*
Under 50	$19.03	$23.30	$11.00
50-54	$23.78	$29.10	$11.00
55-59	$30.13	$36.90	$11.00
60-64	$39.65	$48.55	$11.00
In-Patient and Out-Patient Benefits			
Under 50	$26.80	$31.05	$27.50
50-54	$33.48	$38.80	$27.50
55-59	$42.43	$49.18	$27.50
60-64	$55.83	$64.73	$27.50

Plan 2—For dependents of active duty personnel.

In-Patient Only	None	$ 8.80	$ 4.40
In-Patient and Out-Patient	None	$35.20	$22.00

Note: Plan II premiums are listed on an annual basis. Because of the very low cost, persons requesting this coverage are asked to make annual payments.

APPLICATION FOR
AFA CHAMPUS SUPPLEMENT INSURANCE

Group Policy GMG-FC70
Mutual of Omaha Insurance Company
Home Office: Omaha, Nebraska

Full name of Member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

DATE OF Birth _____ Current Age ____ Height ____ Weight ____ Soc. Sec. No. _____
Month/Day/Year

This insurance coverage may only be issued to AFA members. Please check the appropriate box below:

☐ I am currently an AFA Member.

☐ I enclose $15 for annual AFA membership dues (Includes subscription ($9) to AIR FORCE Magazine).

☐ I am over 65 years of age. Please send information on AFA's Medicare Supplement.

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (Check One)
☐ AFA CHAMPLUS PLAN I (for military retirees & dependents)
☐ AFA CHAMPLUS PLAN II (for dependents of active duty personnel)

Coverage Requested (Check One)
☐ Inpatient Benefits Only
☐ Inpatient and Outpatient Benefits

Person(s) to be Insured (Check One)
☐ Member Only ☐ Member & Children
☐ Spouse Only ☐ Spouse & Children
☐ Member & Spouse ☐ Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Premium payments are normally paid on a quarterly basis (see table for rate table). Upon request, however, they may be made on either a semi-annual or annual basis.

Quarterly premium for member (age ____) $ _____

Quarterly premium for spouse $ _____

Quarterly premium for ____ children @ $ ____ $ _____

Requests for active duty dependent coverage under Plan 2 should include annual premiums.

Total premium enclosed $ _____

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Dependents to be Insured	Relationship to Member	Date of Birth (Month/Day/Year)

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 12 months prior to the effective date of this insurance coverage will not be covered until the expiration of 12 consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 24 consecutive months.

Date _____, 19____ _____
Member's Signature

12/82

NOTE: Application must be accompanied by check or money order.
Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Ave., NW, Washington, D.C. 20006.

Form 6173GH App.

Bob Stevens'

"There I was..."

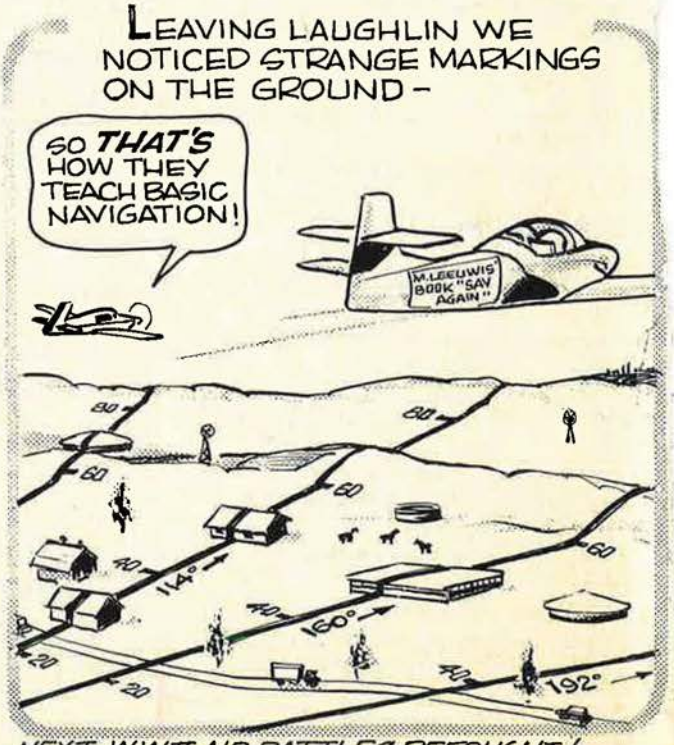
YOUR AUTHOR RECENTLY FLEW HIS LITTLE PRIVATE BIRD TO TEXAS FOR THE BIG CONFEDERATE AIR FORCE SHOW. ENROUTE WE CHANCED TO R.O.N. AT LAUGHLIN AFB, DEL RIO (ATC). COL. 'BUD' FARRINGTON and HIS DO, COL. 'BUNKY' REEVES, MADE US FEEL DOWN-RIGHT WELCOME-

THREE PARALLEL RUNWAYS and THREE AIRSPEEDS-LIGHT YEARS APART-MADE FOR SOME HEAVY BREATHING ON FINAL-

MILITARY AIR TRAFFIC PHRASEOLOGY IS SOMEWHAT DIFFERENT FROM CIVILIAN - THIS EXCHANGE TOOK PLACE ON AN IFR APPROACH-

THE STUDENT OFFICERS WERE IMPRESSED WITH THE VINTAGE OF OUR CRAFT-

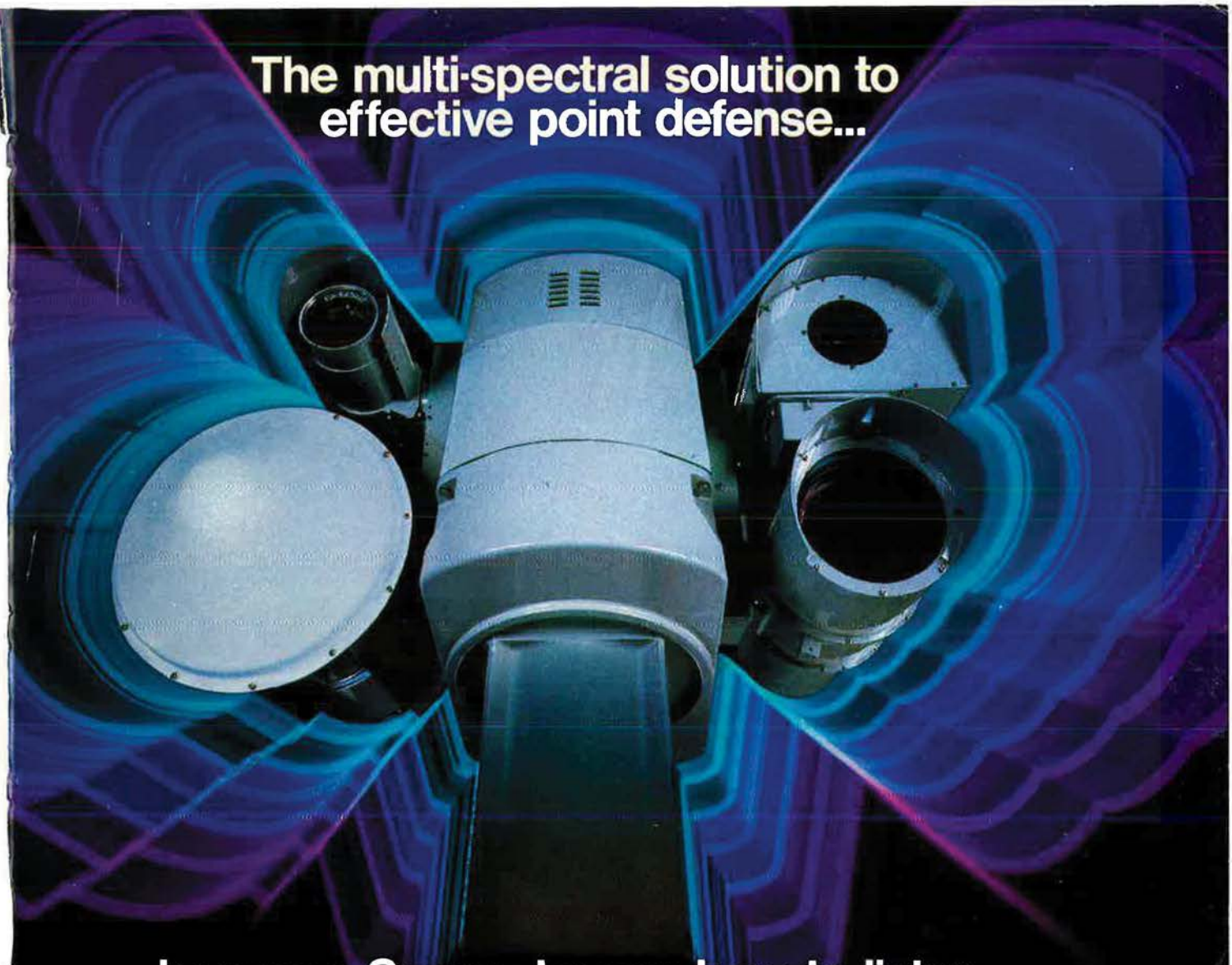
LEAVING LAUGHLIN WE NOTICED STRANGE MARKINGS ON THE GROUND -



Bob Stevens

NEXT: WWII AIR BATTLES REFOUGHT!

The multi-spectral solution to effective point defense...



because Sperry knows how to listen.

hostile air target is detected on a radial course at 20 eters altitude and near sonic velocity. In less than six conds and two kilometers of target penetration, pre se weapon orders are available for defense against is surface-hugging threat.

hat's Sperry's Challenger™ SA-2 in action. It's capable f combining the tracking functions of two bands of nfrared, TV, laser, and millimeter radar in any selected onfiguration. In its class, it is our most advanced fire ontrol system for close-in tactical support.

n all-weather, day/night system, Challenger SA-2 cquires and tracks both air and surface targets... utomatically directing multiple slaved guns up to 6mm in caliber or providing guidance information to ndependent missile weapons.

Whether deployed for either shipborne or land-based applications, Challenger SA-2 requires only one operator and a minimum of training and support.

Challenger SA-2 joins a tradition of Sperry fire control systems including the MK 76, principal area defense of the U.S. Fleet and the MK 92 used for rapid engagement of multi-threat air and surface targets.

To learn more about what we're doing in advanced fire control, talk to us... we listen.

Write to Sperry Division Headquarters, Gyroscope Marketing, Great Neck, N.Y. 11020.

SPERRY

SPERRY IS A DIVISION OF SPERRY CORPORATION

Aggression won't come out of the blue, but out of the dark.

Hostile forces are not likely to come out of the blue, but out of the dark, through a storm, at a moment of least expectation and greatest vulnerability. They can be expected to strike in conditions that hold simple day fighters on the ground like paper airplanes in a downpour.

Tactical Air Command pilots know that aggression won't strike where it's convenient, but where it's vital. Just out of range. At the site of valuable resources. Against undefended allies or unprotected assets. Against remote American soil.

But aggression won't come at all if we are strong enough to deny an aggressor any hope for success. Aggression won't strike areas protected by all-weather aircraft such as the F-15 Eagle, a plane in the USAF Tactical Air Command that can deliver instantaneous, sweeping, punishing force. A plane with the range, radar and weapons to meet them and beat them.

Day or night. Rain or shine. Their place, not ours.

MCDONNELL DOUGLAS