DECEMBER 1978/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

THE MILITARY BALANCE 1978/79

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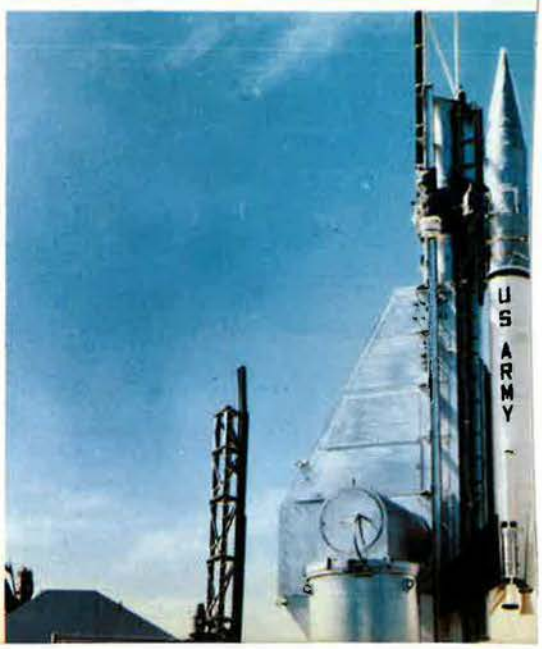

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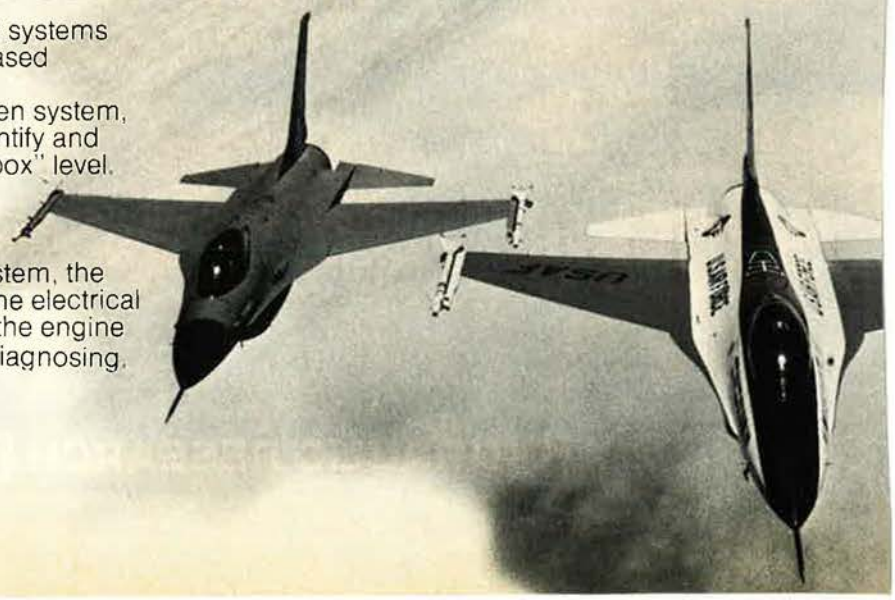

Photo courtesy of General Dynamics

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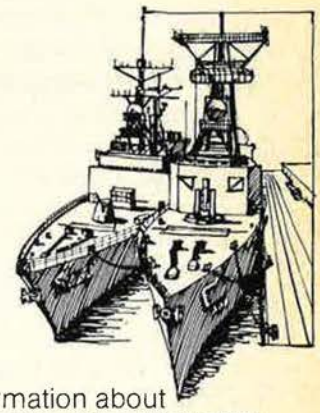

Future combat needs will require quick response with highly sophisticated, fully operational equipment. To achieve these vital goals, maintenance technicians will have to have a better understanding of the equipment they're responsible for.

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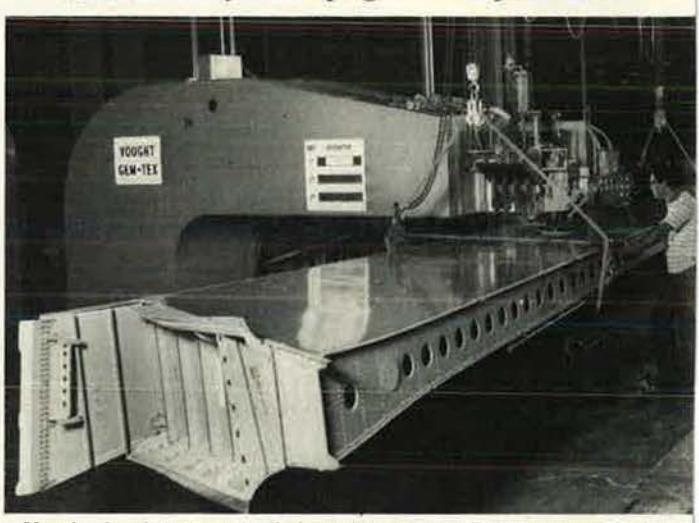
"We're also busy developing new composite and metal laminate materials (some of which are being used to make automobiles lighter). Plus fiber optics, laser and ballistics hardened systems, superplastic and neutron radiography for corrosion flaw detection.



Vought-developed automatic fastening process. Drills, countersinks, injects sealant, inserts and upsets rivets.

"We're involved, too, with energy systems, building parts for nuclear power plants and oil rigs. Meanwhile, we're continuing to improve our manufacturing with techniques like our automatic fastening which enables a single operator to accomplish assembly tasks formerly requiring several men; a cost-effective method which leads the industry by far.

"In sum, Vought is moving forward on a multitude of fronts, managing an expanding base of diverse products to meet complex, highly specialized needs. And while prime production contracts will always have a high priority with us, we can and will do much more."

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

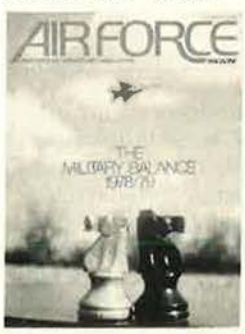
DECEMBER 1978
VOLUME 61, NUMBER 12

This Month

The Military Balance 1978/79

A Publication of The International Institute for Strategic Studies, London

ABOUT THE COVER



For the eighth consecutive year, the Editors of AIR FORCE Magazine are privileged to present "The Military Balance," a detailed compilation of the world's armed strength and resources, as assembled by The International Institute for Strategic Studies, London. See p. 61. The cover photo is by Art Director Bill Ford.

Departments

AIR FORCE Magazine (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 637-3300. Second-class postage paid at Washington, D.C., and additional mailing offices. **Membership rate:** $13 per year (includes $9 for one-year subscription); $30 for three-year membership (includes $21 for subscription). **Life membership:** $200. **Subscription rate:** $13 per year; $5 additional for foreign postage. Single copy $1. Special issues (Soviet Aerospace Almanac, USAF Almanac issue, Anniversary issue, and "Military Balance" issue) $3 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material.

BPA Circulation audited by Business Publication Audit

AN EDITORIAL

The Campaign of '78

BY AND large, the campaigns preceding last month's congressional elections were uninspiring. Most candidates stuck to such popular issues as lower taxes and the virtues of smaller and more efficient government. It often was impossible to tell a candidate's political persuasion by his rhetoric. Packaging, not content, was the currency of the day, often debased by *ad hominem* sallies into gutter, if not gut, issues.

The mid-term maneuvering brought no joy to believers in the democratic process. As the ritual drew to a close, columnist George Will noted that "the candidates show no inclination to perform the primary duty of democratic leadership, which is to create informed public opinion." Nowhere was that more true than in national defense. So far as we are aware, defense wasn't an issue in any congressional contest.

It is understandable, if not laudable, that office seekers concentrated on conditions that daily pinch and frustrate the citizenry, to the exclusion of the shaky condition of national defense—an issue that is complex and seemingly remote, or even nonexistent. After all, the President and his spokesmen have told us—though with few specifics—that our defenses are in good shape and that this country will never be allowed to sink to a position of military inferiority.

Well, throughout the year we have printed facts and judgments that challenge such assertions. Now, in this December issue and for the eighth consecutive year, we end another publishing cycle with our exclusive presentation of "The Military Balance," compiled by the International Institute for Strategic Studies in London. The Institute's solid reputation has not been built on scare tactics, but on adherence to cold facts and, where judgments are made, to cautious conservatism.

We call particular attention to a few Institute findings that help put the balance between the US and the USSR and between NATO and the Warsaw Pact in sharp perspective. There is plenty here to support our contention that the survival issue of national defense should have been a subject of vigorous debate in the campaign of '78.

If you total up US and Soviet arms listed in "The Balance," which starts on page 64, it is obvious that the USSR now leads the US in numbers of major weapon systems with the two exceptions of aircraft carriers and long-range bombers. And the Soviets are running hard to close the qualitative gap that has partially offset this spread in numbers. Soviet emphasis is on weapons used primarily for attack.

A few examples: In the past year, the Soviets have added about 7,000 tanks to their forces, bringing their total to some 50,000. The new Russian T-72 tank is rolling off factory lines at a rate of more than 2,000 a year. In contrast, the US Army and US Marine Corps together have slightly more than 12,000 tanks. (Planned US tank production for FY '79 was 618 of the older M-60s and 110 new XM-1s.)

Since the last *Balance* was published, the USSR has added 200 MiG-23/-27 and seventy Su-19 long-range strike fighters to Frontal Aviation (the counterpart of our Tactical Air Command) while "on the NATO side there has been little change in this category of weapons. . . ." (A recent CIA study shows that Soviet Air Forces have enjoyed the most rapid growth of any Russian military service, with the largest increase in Frontal Aviation.) With the new tactical fighters entering their inventory in increasing numbers, the Soviet Union now has more than twice as many fighters capable of ground-attack missions as in the 1960s. Most of them are nuclear-capable. Much of the battlefield air defense mission has been taken over by mobile surface-to-air missiles and by extremely capable antiaircraft guns.

In the US, improved strategic weapon systems "are now reaching development stage," while the USSR has already deployed at least 370 new and more capable ICBMs. Soviet M/IRBMs (a type of missile the US doesn't have) now are armed with "perhaps 900 deliverable warheads."

The Soviet SLBM force has increased to 1,015 missiles in ninety submarines, compared to the US Navy's 656 SLBMs in forty-one boats. While the US still has considerably more sophisticated missiles, the Soviets now are replacing their SS-N-8 SLBM with the SS-N-18, which has a range of more than 5,000 miles and gives the USSR, for the first time, submarine-launched missiles with multiple independently targetable nuclear warheads.

Finally, NATO is no longer, the Institute believes, in a position to control sea areas important to the Alliance at the start of a war, because of the explosive growth of Soviet sea-denial forces.

We believe the evidence documents an across-the-board Soviet drive for comprehensive military superiority. That does not necessarily signal Soviet intention to attack the US, Western Europe, or any other region, though the potential for doing so is compounded as the balance continues to shift in favor of the Soviet Union. But these developments do represent a startling increase in the Kremlin's political leverage, and in its ability to project Soviet power into areas of strategic importance, many of them now in political turmoil.

The claptrap and pettifoggery of the elections are now behind us. When the victors take their seats in Congress next month, we expect wiser and more responsible performance than was the rule on the campaign trail. Nevertheless, this biennial opportunity for creating informed public opinion through debate of the whole range of national issues—particularly defense—has been squandered. We all are the losers for it. —JOHN L. FRISBEE, EDITOR

"During my career at General Dynamics, I've worked on a variety of important programs, from the Atlas/Centaur to the reusable space shuttle. I've enjoyed them all. But the Tomahawk Cruise Missile is the big winner. It's shaping up as the most versatile performer for America's defense."
(Bernie Kuchta, Director Air Launch Program)

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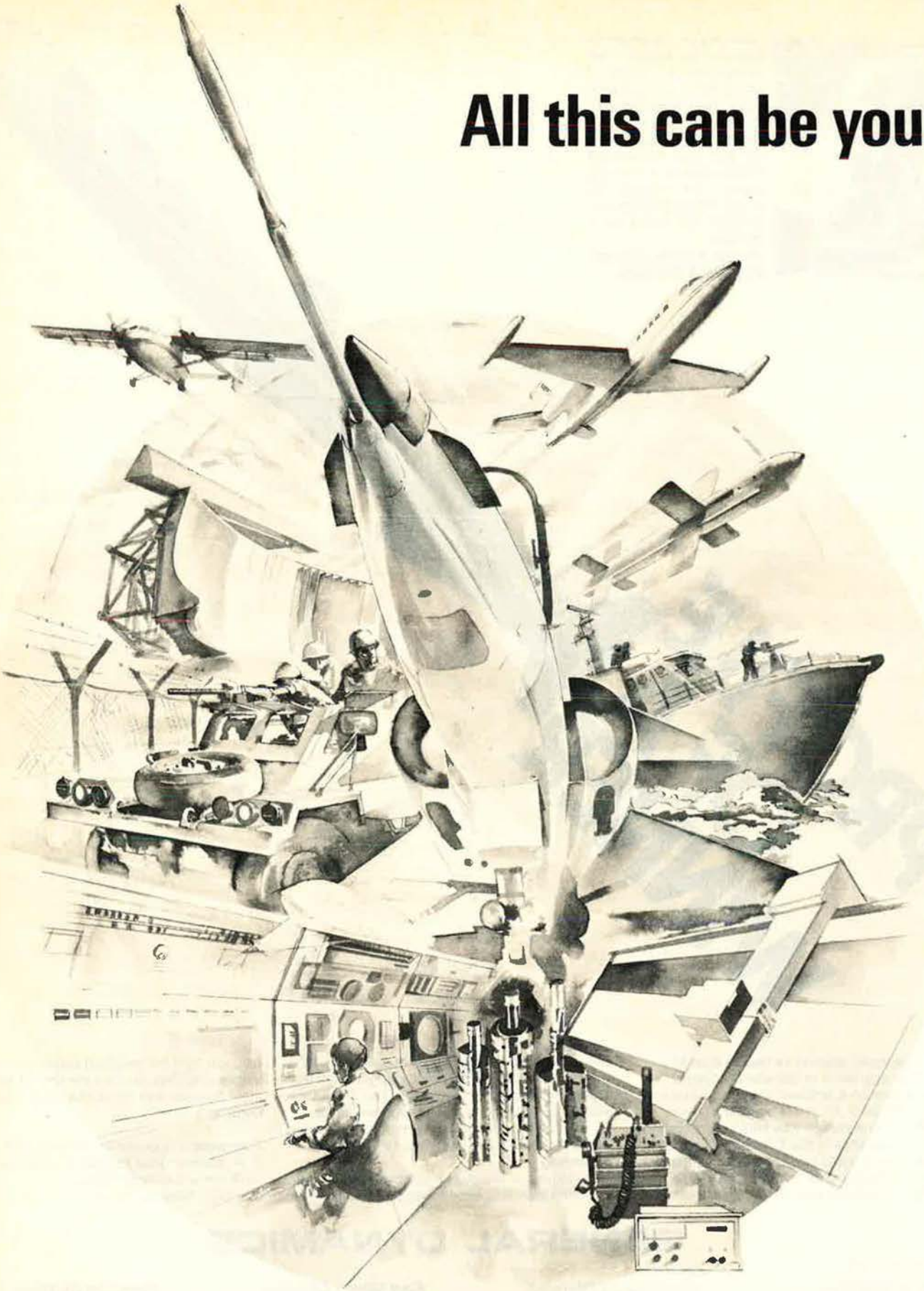

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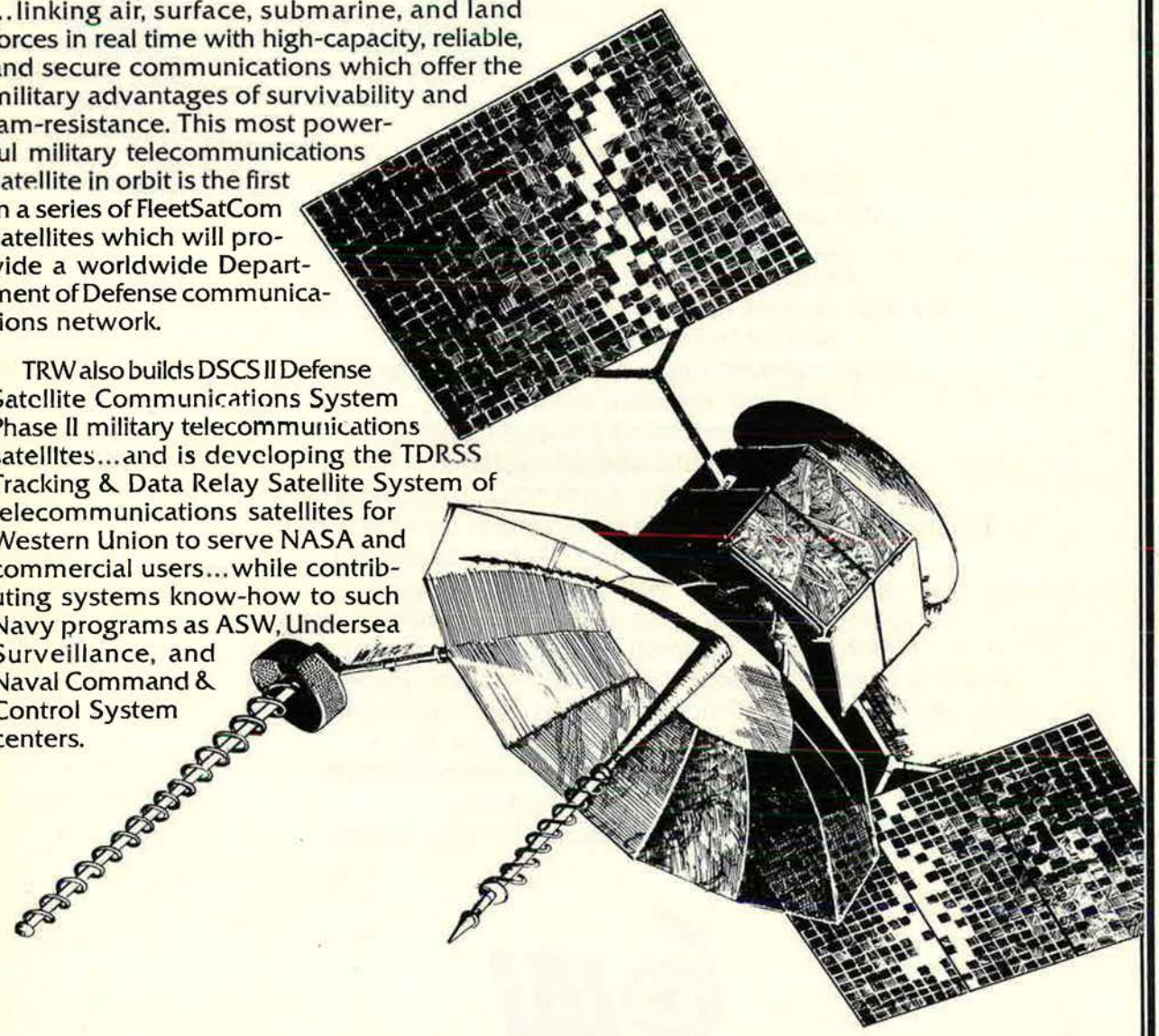

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Airmail

A Democrat Is a Democrat

A letter appearing in the October issue of AIR FORCE Magazine from Maj. Ned Heilig, USAF (Ret.), criticizes you for using the word Democrat instead of Democratic in discussing a Congressman. I've been faced with this argument all my life, and the term Democrat is a proper one. You can use Democratic, but I have *never* heard any real Democrat object to the use of the word prior to a man's name who is in office, or even prior to a man's name to describe his political affiliation.

I think I know a little something about this. My uncle founded the Democrat Party in Arizona way back in the 1870s, and I never heard him refer to any officeholder in any other term than Democrat.

Barry Goldwater
United States Senate
Washington, D. C.

Middle East Problem

I have always found your magazine to be informative, professional, and reasonably free from the rhetoric and political diatribe that fill many other journals. Unfortunately, the letter by Maj. H. H. Rosenheim (October '78) fails to meet the high standards of your publication.

There is nothing to take issue with in his first four paragraphs, but the last two appear to have been written at the headquarters of the "rejectionist front" of Arab states. . . .

Is there any doubt now, in view of the Camp David agreements, that Syria is the intransigent party and *not* Israel?

Prime Minister Begin received a solid vote of confidence in the Knessett. May I remind Major Rosenheim that in a democracy there is always an opposition party and monolithic behavior is a characteristic of a one-party state. Regarding his supposed antagonizing of our own country, I suggest Major Rosenheim reread President Carter's post-Camp David announcements.

The question of legality of the West Bank settlements is one that has yet to be determined and there are varying opinions on this. Only two countries, Pakistan and England, recognized Jordanian sovereignty in this area.

Mr. Begin has agreed to discuss the status of the West Bank after five years and has offered immediate autonomy on internal affairs. This is more than Jordan did in the nineteen years in which she was the occupier of the West Bank.

No—it is not the "October War." That is what the Arab states wish to call it. It might be well to study past wars and learn that opposing sides often give different names to the same conflict. A study of our own "Civil War" might be the best example.

Benjamin Duhov
Stamford, Conn.

Keep Them in the Cockpit

A thought occurred to me as I read Gen. T. R. Milton's column on "Why Pilots Get Out" in the September issue. Why do we have junior officers flying *transports?* . . .

I've known a fair number of good guys who got transports "at the convenience of the government" and spent a good many years thereafter fighting their way *out* (some went to the organized Reserve simply because that was the only way they could get into a fighter unit!).

And I've known a few who wound up in many-motors consequent to some bona fide physical injury or disease process (*e.g.,* they couldn't pull Gs anymore). And I've known some who answer the description of "cull" with discouraging accuracy. But I don't believe the majority of MAC PCs fit the description.

By way of answer, let me start with this truism: A guy who isn't good enough to be a fighter pilot doesn't belong in the Air Force.

Next truism: Fighter piloting is a young man's game (despite occasional larger-than-life exceptions like Robin Olds).

Third truism (communicated to me by a preflight classmate who now flies as a captain for an airline): the DoD turns experienced and currently competent pilots out to grass at the point in their professional careers where they are just beginning to be valuable to an airline employer. . . .

Instead of turning forty-to-fifty-year-old guys out who *want* to fly and who *can* fly, why not put them in charge of the many-motors/helicopters/ABCCC, etc.? I certainly won't dispute the outstanding safety record of the predominantly junior troops who drive the MAC birds. But consider that FAA lets the left-seater driving the comparable airliner keep on working until *age sixty.*

And not so long ago a sixty-year-old gentleman saved a plane-load of people during an aborted takeoff (a rocky road down which I have traveled). So any argument that elderly pilots couldn't hack the transport mission is so much hogwash. Every one of these senior pilots we could keep in the cockpit would save the treasury not only a retirement check but also the cost of recruiting and retaining his junior replacement, who, if he is good enough to be recruited and/or retained, belongs in a fighter anyway.

As somebody must by now have guessed, there's considerable personal motivation tied up in this suggestion. Matter of fact, proximate cause of my "letter of intent" was refusal of personnel detail section to keep me in DIFOT (Duty Involving Flight Operations and Training).

It would have been much more satisfactory for all concerned though, *and* more economical, to pay me to fly a transport for my remaining fifteen or so productive professional years than to pay me for doing nothing.

Col. J. M. Verdi, USMCR (Ret.)
Santa Ana, Calif.

SALT and the Soviets

I am pleased that Jeffrey R. Thomson has chosen to continue, in your September issue, the dialogue on crisis stability and the question of whether a SALT agreement which is in our interest can simultaneously be in the interest of the Soviet Union.

First, he says " . . . the USSR has no concept of 'arms control'—in fact, the term does not even exist in the Russian language." In fact, the term (*kontrol' nadvoorvzheniyami*) does exist, and they use it about as frequently as we do. . . . As for having no concept of arms control, of course they have one, albeit different from ours—that is what their negotiators are presenting at SALT, CTB, MBFR, etc. If the best achievable compromise between their concept and our concept serves our interest,

Airmail

we should ratify it—if not, reject it.

Second, Mr. Thomson rejects the idea that the two sides have a common arms control goal of saving money, arguing that the Soviets will spend liberally on weapons anyway and have no interest in limiting their expenditures. Here he is in direct conflict with SAC Commander in Chief Gen. Richard Ellis who, in behalf of the penetrating bomber, argues in the same issue of your magazine that "Every ruble they spend on defense won't be spent on offensive weapons."

I suggest that defense spending is neither infinitely expandable as Mr. Thomson would have us believe, nor rigidly fixed as General Ellis would have us believe, but is somewhere in between—as in the US defense budget. I also suggest that we would all do well to avoid sweeping overstatements, and to treat the Russians as part of objective reality rather than as fictional creatures to which we can ascribe any attribute which supports whatever debating point we are currently seeking to make.

Third, Mr. Thomson makes a number of arguments against deterrence by threat of countervalue retaliation, which I offered as the principal avenue by which SALT can contribute to the security of both sides.

He discusses Soviet population shift in some detail, which is beside the point since effective countervalue retaliation is directed not against population but against the enemy's economic base and political control base, including theater forces. While it is possible to cite Soviet propaganda to the contrary, the vulnerability of Soviet industrial targets is high and shows no substantial trend in either direction. Soviet industrial dispersion has remained essentially unchanged over the past decade.

He suggests that ". . . Trident, with 240 . . . MIRVs per aim point . . . will pose formidable cross-range and down-range spacing restrictions. . . ." I should say it would! But why would we ever target 240 RVs against a single aim point? [*We believe Mr. Thomson's reference was to the number of MIRVs per Trident, the submarine being an aim point for Soviet missiles.* The Editors]

More to the point, he says, "The Soviet Union does not believe it has to be deterred by anyone, the US included."

It is a fact that the Soviet Union has neither attacked the US nor engaged in a direct military conflict with our forces since we invaded them a half century ago. There are only two possible explanations for this. First, it may be due to their saintly and nonviolent natures. Second, it may be because they don't like what they see as the probable outcome of such a conflict. If you believe the first explanation, you also believe in the Easter Bunny. If you reject it, you have no choice but to accept the second and that, gentlemen, is deterrence.

True, Communist theory is incompatible with deterrence. But any good Communist is accustomed to living under a theory that diverges from reality—for example, the theory says the state will in time wither away, but that time just never seems to arrive. Similarly, just because the Soviets may seek first-strike counterforce capability sufficient for them to no longer feel deterred is no reason for us to assume they are going to succeed. The purpose of both sound weapons policy and sound arms-control policy is to see that they do not succeed and to ensure that deterrence, like the state, remains a part of Soviet reality regardless of theory.

Will SALT II contribute to this effort? Mr. Thomson suggests it will not, because it will permit the Soviets 5,000 ICBM MIRV warheads with [one-tenth of a nautical mile] inaccuracy. Doubtless, we would be more secure if SALT I had prohibited the testing and deployment of MIRV and/or improved accuracy. . . . We can, however, prevent things from getting a good deal worse, which they will do if there is no SALT.

Listen carefully, all you Air Force hardware freaks out there: *If you want MX and/or MAP, you had better see that SALT II is ratified.* With SALT II launcher and fractionation limits, a MAP system capable of surviving 5,000 Soviet RVs is manageable, if expensive. If the counting problem can be solved, the nation may well decide it's a good investment. But with no SALT cap on Soviet RVs, we would have no assurance that they would not build an additional RV or two for every MAP shelter we build. Faced with an open-ended RV-vs.-shelter race leading nowhere, the probability that MAP will go the way of the B-1 is as high as the probability of MX without MAP is low.

Finally, I must disagree with General Ellis's statement that (1) Soviet cruise missile progress could cause our initiative to "boomerang," and (2) the three-year meaningless 2,500-km SALT cruise missile range limitation is liable to become permanent, and therefore significant, because "Historically, it's always been extremely difficult, if not impossible, to turn around such commitments."

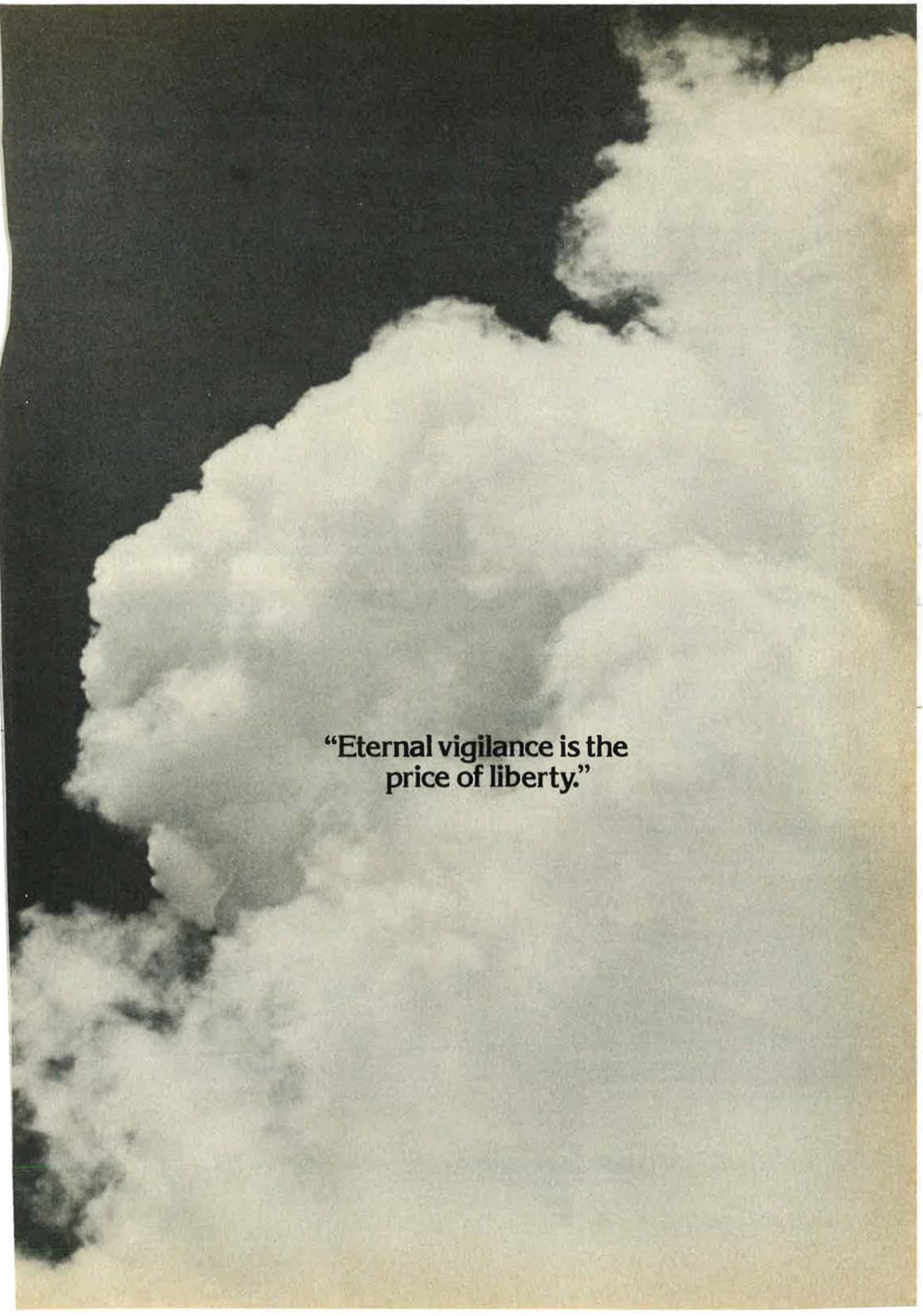
On the first point, the fact that we "lead" the Soviets in cruise missiles is not particularly important. What is important is that we are gaining a deterrent weapon highly effective against both hard and soft targets, but which is too slow to be used in a war-initiating first strike. If the Soviets acquire the same capability, fine; the probability of war is less likely if both sides have it than if they don't. Similar arguments can be made in behalf of the neutron bomb and MAP-with-SALT—assuming the verification, cost, and deployment problems of MAP can be solved.

On the second point, the relevant historical precedents lie right in front of us, and I'm surprised General Ellis is unaware of them. SALT I and Vladivostok granted the Soviets larger numbers of ICBMs and SLBMs than it granted us. SALT II has now turned this around, and provides equal numerical limitations. The same will happen with cruise missile range; if it did not, the next SALT stage would be clearly unratifiable. But we will not be at that decision point for three years. I see no relevance in objecting to a treaty because of a long-term limit it doesn't contain and which the follow-on treaties probably won't either.

Thomas J. Downey
Member of Congress
Washington, D. C.

"VA. May I Help You?"

Everyone has a right to their own opinion, but J. J. McGrath's retort in the October "Airmail" regarding Ed Gates's August article on the Veterans Administration was just too much. Mr. McGrath's allegation that the majority of VA people with whom he has dealt, ". . . act as though the veteran is a charity case and the bureaucrat personally is doing him a great favor," is a blatant castigation of a great many federal employees that is unfair and uncalled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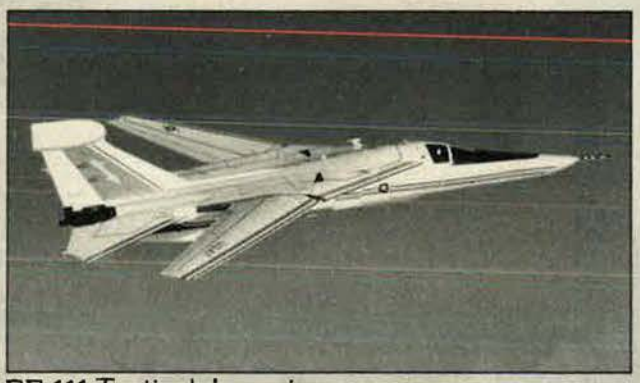
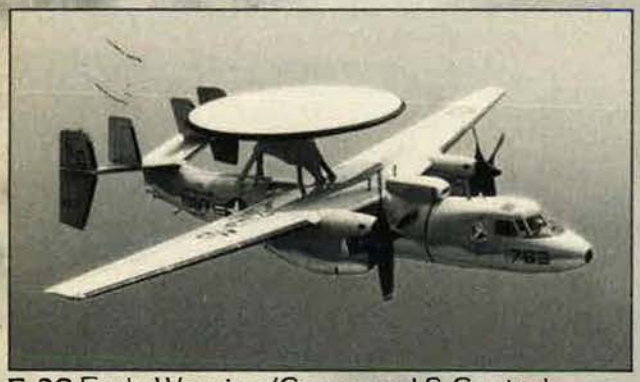


EF-111 Tactical Jamming



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Airmail

for. His insinuation that at least half the VA consists of incompetent employees causes me to take umbrage.

It's true that Max Cleland has made a difference in VA operations since taking over in 1976. But not for the reason cited as the method Mr. McGrath hoped he would adopt, *i.e.*, "I hope he has cleaned house there." Max Cleland has made a difference in VA operations through his leadership. His "VA. May I help you?" campaign has taken hold as a theme and philosophy for doing business with patients and public alike. And Max Cleland, the man, is an inspiration to us all. His grit and determination are constant reminders to us to give our best efforts in all that we do. Yet, Max Cleland needs no public apologist to carry his banner or any public relations flack to tell the VA's story.

The story is told by the example of the countless veterans who daily are helped to lead normal, productive lives through the efforts of VA Medical Center employees. The story is told by the thousands of veterans who have used VA benefits to help further their educations. The story is told by the medical research conducted by the VA—research of such significance that this year two VA employees were awarded Nobel prizes for their efforts. The story is one of heroic proportions.

Mr. McGrath has stated that on only two occasions has he known any *person* at the VA to write a letter; the rest of the time the computer writes letters. Well, let me assure you that I am not a computer, that I wrote this letter, and that I am proud to work for a federal agency as fine as the Veterans Administration.

Rollin J. Wintrode
Program Specialist
Veterans Administration
Woodbridge, Va.

Fair and Equitable?

An article in "The Bulletin Board" in the August issue, headed "Brown Promises Pay Equity," quotes Defense Secretary Harold Brown as having told a military audience at Ramstein AB, Germany: "The President and I will not exploit your patriotism or your dedication" and "your legitimate expectations will be honored and protected."

Such noble utterances emanating from that level of our bureaucratic hierarchy, when read by pre-1958 armed services retirees, have a very hollow and meaningless sound.

Those patriotic and dedicated citizens who were induced into accepting an armed services career in our volunteer forces from WW I through WW II had every reason to assume and expect that their legitimate expectations would be honored since the law of the land then existing during their period of service provided therefor. They served at the meagerest rates of pay and allowances, long before "comparability," Social Security for the military, SBP, and large increases in active-duty pay.

However, years after many had entered, served, and retired in accordance with then-existing laws, they found themselves to be forgotten men as a result of enactment of Pub-

Airmail

lic Laws 85–422 in 1958 followed by 88–132 in 1963, with no grandfather clause to protect their interests and lawful rights, but with ex post facto, retroactive application.

Such abrogation by government of its moral and legitimate obligations to patriotic citizens constitutes open betrayal of the faith, confidence, and trust these citizens had placed in their government. Successive administrations and Congresses have conceded the inequities but consistently ignore the remedies—despite the solemn pledge and agreement entered into under oath between the citizen and his government to sacrifice one's life if necessary in the performance of duty to the country, and the fact that the Supreme Court has said, with reference to a service contract, ". . . it is quite a different matter . . . for Congress to deprive a member of pay due for services already performed but still owing. In that case, the congressional action would appear in a different constitutional light."

What is it going to require in order to obtain simple justice?

Col. Julius A. Kolb, USAF (Ret.)
Sacramento, Calif.

• *Colonel Kolb eloquently states the case for recomputation. His plight, along with that of the other pre-1958 retirees, is one reason AFA's National Convention delegates, at the September Convention, not only reaffirmed AFA support for recomputation but insisted, in our Defense Manpower Issues Policy Paper, that "any new retirement system must guarantee no reduction in benefits for military and federal employees serving, or under contract, at the time of enactment." The time to correct past inequities is long overdue; the time to stop future recomputation problems is before they start.*—THE EDITORS

Physician Recruitment

As a recent Air Force Hospital Commander, I would like to comment on Ed Gates's two articles, "Why They're Leaving the Air Force," and "Military Medicine: Can the Shortage of Physicians be Remedied?", in the October issue. The two subjects are related, and I offer this solution:

1. Ask Congress to immediately rewrite the CHAMPUS Program to extend ninety-five percent coverage for all outpatient costs and one hundred percent coverage for all in-hospital costs for all dependents and all retirees and their families.

2. Permit all dependents and retiree families care by civilian physicians, for all illnesses.

3. Close those Air Force hospitals not serving isolated bases, but retain clinics to care for the active-duty personnel.

This course of action would: (1) assure all active and retired families of quality medical care without large personal expenditures, and (2) solve the problem of recruiting large numbers of physicians who can't be retained.

Without universal national service, military or otherwise, a physician/dentist draft system will not work in peacetime. Any change in the pay system that further increases the disparity in salary between physician and line officer will be poorly received. Pay can never be increased enough to match what the physician can earn in private civilian practice.

Col. Edward R. Jenkins, M. C., USAFR
Garden City, Kan.

352d FG P-51 Troops

I am an assistant air traffic controller with the Royal Air Force here at Eastern Radar, RAF Watton.

I am researching the Mustang operations of the 352d Fighter Group —The Blue Nosed Bastards of Bodney—for the most part stationed at Bodney, a few miles up the road from here. . . . I hope to be able to gather enough material to write a book on the subject.

I would be delighted to hear from anyone who, in any way, was connected with the 352d and its component fighter squadrons, whilst they flew P-51s.

Cpl. Paul A. Coggan
55 Akrotiri Square
RAF Watton
Thetford, Norfolk
England

Get-Together Tour for the 13th

After thirty-five years, a former Thirteenth Air Force P-38 pilot is attempting a reunion of South Pacific World War II Air Force veterans on a tour of many of their old sites, including Hawaii, New Zealand, Australia, the Philippines, and Hong Kong. The twenty-four-day tour leaves February 3, 1979, from Los Angeles, and returns February 26. Lt. Col. Jack Laurie, USAF (Ret.), has joined with American Express and Pan Am in planning the tour.

Colonel Laurie, journalist and photographer, was a former member of the 44th Fighter Squadron, 18th Fighter Group, Thirteenth Air Force, but encourages members and wives of both the Thirteenth and Fifth Air Forces to join the nostalgic trip. For a free brochure contact

Lt. Col. Jack Laurie, USAF (Ret.)
Oak Trail Ranch
Santa Ynez, Calif. 93460
Phone: (805) 688-6508
or
American Express Travel Division
3763 State St.
Santa Barbara, Calif. 93105
Phone: (805) 687-1306

341st Bomb Sqdn.

Would like to contact members of the 341st Bomb Squadron, 97th Bomb Group (H), serving in North Africa in 1943, to make plans for a reunion.

Harry C. Alsaker
1308 Jackson St.
Missoula, Mont. 59801

UNIT REUNIONS

20th Air Force Association: Two special tours for the 20th Air Force Association will be held in 1979. All veterans and families are eligible, at greatly reduced air and land fares. March 29 departures from Los Angeles, Houston, and New York for a 4-week around-the-world tour. Visits Rome, Istanbul, Tehran, New Delhi, the Taj Mahal, the Ganges at Varanasi, Katmandu, Nepal, with a flight to the Himalayas and Mt. Everest, Bangkok, Hong Kong, Tokyo, and Honolulu. Tour limited to first 45 applications accepted.

In early August, for the 10th consecutive year, vets will depart from the West Coast for a 3-week tour to the Mariana Islands (Guam, Saipan, and Tinian), Hong Kong, other stops in Asia, return via Tahiti. Details from: 20th Air Force Association, Box 5534, Washington, D. C. 20016.

F-104 Starfighters: A reunion will be held in Phoenix, Ariz., February 15–18, 1979, to commemorate the 25th anniversary of the F-104's first flight. Anyone who has flown the Starfighter or has been closely associated with its development is invited. Contact Starfighter 25 Ltd., P. O. Box PP, Litchfield Park, Ariz. 85340.

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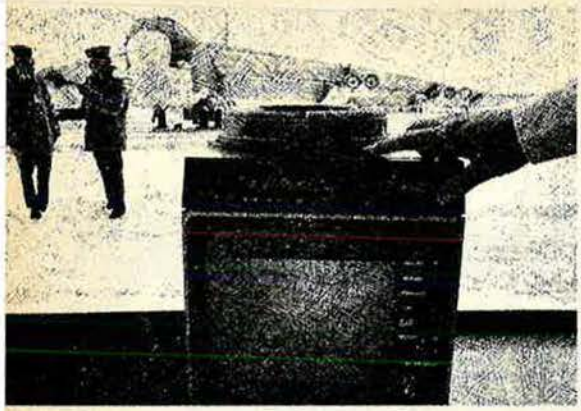

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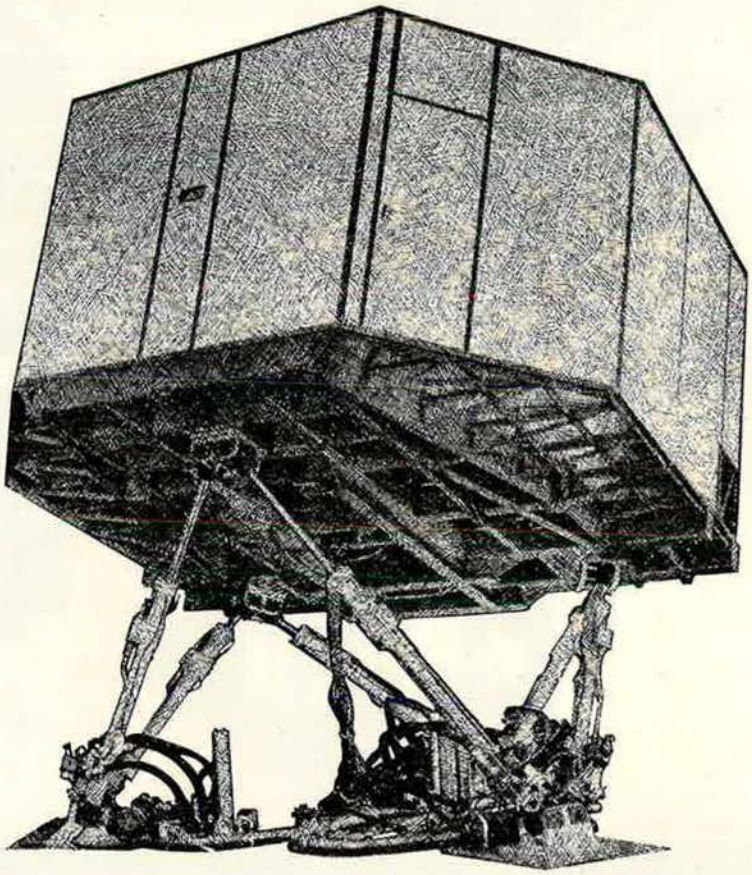

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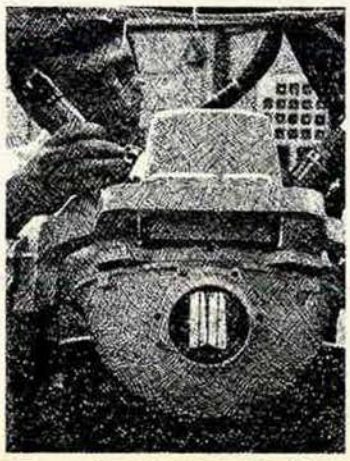

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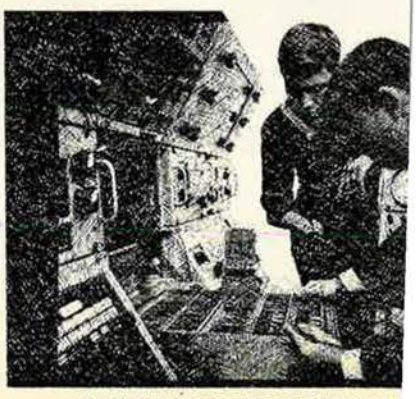

NAVAL WEAPON CONTROL SYSTEMS

In Focus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., Nov. 3

The MX Enigma

Administration plans and policies concerning the future of the strategic triad—especially of its land-based component—seem to be fluid, obscured by zigzagging guidance, and excessively politicized. Recent White House instructions to the Joint Chiefs of Staff (JCS) and the Defense Department's civilian hierarchy to "show cause" why the triad and—especially—ICBMs would be needed in the future reportedly have caused considerable gloom in the Pentagon.

Whether or not the White House *really* intends to modernize USAF's ICBMs—beyond political posing to snare the pro-defense vote in Congress for passage of SALT II—may well be the toughest enigma that the next Congress will have to penetrate. At the root of the puzzle is the Administration's on-again, off-again approach to survivable basing modes for a modern ICBM system. President Carter is said to be strongly opposed to the multiple aim point (MAP) basing of ICBMs recommended by influential elements of OSD, the Joint Chiefs, the Air Force, and key members of the Defense Science Board.

Arrayed against this phalanx of defense experts is a group of academicians headed by Dr. Frank Press, the President's Science and Technology Advisor. The group's study of the ICBM issue, known as the Press Report, concluded that MAP is not workable because of predictable local opposition in areas where the weapons would be deployed. The report further claims that the US would not be able to conceal from the Soviets which shelters house ICBMs and which do not. President Carter seems to have accepted the findings of the Press group.

It is ironic that the same group of academicians assembled by Dr. Press certified last year that in the foreseeable future the US ICBM force would not become broadly vulnerable to a Soviet first strike, even though at the time respected defense and intelligence experts had amassed evidence proving precisely the opposite. The Press group, with remarkable mental agility, has now reversed its position. The Press Report not only accepts forecasts of categoric ICBM vulnerability by the early 1980s but also questions the feasibility of survivable land-basing schemes. Neither argument against MAP reportedly is supported by documentation of any kind in the report.

Building as many as 5,000 vertical MAP shelters—basically fortified covered holes in the ground—probably would not be welcomed by most voters in the affected areas, even though only public land is likely to be used. But the situation is politically more palatable than when Minuteman silos were dug in the 1960s on farm land bought up under threat of condemnation.

The Press Report's unproven contention that the Soviet Union's ground-based and space-based reconnaissance apparatus could identify shelters occupied by an ICBM—as presently envisioned, there will be about twenty-five "holes" among which each weapon is rotated in shell-game fashion—is contrary to the conclusions of the Pentagon and the intelligence community. The Defense Science Board's panel studying survivably based ICBMs remains convinced—as does the Air Force—that even the most advanced spy satellites imaginable can be duped through various countermeasures. The subtle magnetic, gravitational, and thermal "signatures" emitted by a shelter-based ICBM can be simulated with fidelities in excess of the differentiation capability of even the most sophisticated sensors, in the view of ranking defense scientists.

Numerous schemes for keeping hostile agents and spy satellites from tracing the missiles while they are being moved between shelters have been tested and appear capable of frustrating detection during the transport phase. (The JCS and the Air Force now favor a MAP configuration involving vertical shelters interconnected by surface roads rather than by covered trenches, as originally proposed. Hence the need for deceptive techniques involving the transporters.)

Because of SALT considerations, MAP systems probably could not use decoys that look like the real thing to space-based optical sensors. SALT vertification measures are likely to require opening all the holes in a given MAP complex in a random way so the other side's satellite could determine that only one missile is deployed in the twenty-five or so vertical shelters.

The Press Report—in roundly rejecting MAP—recommended that the White House direct the Defense Department to concentrate on mobile ICBM designs. (Early in November, the White House reportedly instructed the Defense Department to prepare proposals for survivably based ICBMs employing airmobile techniques.)

Defense Secretary Harold Brown, meanwhile, informed Congress by letter (bearing a "secret" classification) that the Defense Department plans to proceed with work on a new ICBM, but will delay a decision on how to base the system for the time being, but not beyond the end of FY '79. Secretary Brown hinted that the Administration would seek supplemental funding for this purpose and that by the time he reports on the issue to the Congress again, on December 3, 1978, the program probably will have been cleared for initial engineering development (DSARC IIA). It is probable that Congress, in marking up such a supplemental funding request, will insist that some of the money authorized be used specifically for developing a survivable basing mode.

The Defense Secretary reported further that the new strategic missile design would allow for both USAF and US Navy ballistic missile requirements with common components usable by both services. The proposed system probably will consist of three Air Force stages, two of which are narrowed in diameter in order to fit into the launch tubes of Trident submarines.

By reducing the diameter of the common stages from the ninety-two inches proposed by USAF for its original MX design to eighty-three inches, the new ICBM loses about 700 pounds in throw-weight and 300 miles in range. In practical terms, the eighty-three-inch MX would carry ten warheads rather than the

eleven envisioned for the ninety-two-inch version.

The "front-end" of the latest MX version will be a scaled-up Minuteman III post-boost vehicle (also known as the "bus" that sends the individual reentry vehicles, or RVs, to their separate targets) using liquid propellants. RVs under consideration for the new ICBM are the MK 12A with a yield of about 300 kilotons that is now being retrofitted to Minuteman III, and the so-called ABRV, or advanced ballistic RV, envisioned to yield about 500 kilotons. The eighty-three-inch MX design will use a sophisticated, new Air Force-developed guidance system, the Advanced Inertial Reference Sphere (AIRS).

The Navy version of the new ballistic missile would use a completely different solid-propellant "bus" and its own guidance system. It also would be less accurate than the USAF ICBM since submarines generally are less precise launch platforms than any presurveyed land-based site. The principal reason is that a submerged submarine is always in motion relative to the ground. This velocity cannot be measured with total accuracy, and contributes significantly to the SLBM's navigational error.

Possibly the most significant fact brought out by Dr. Brown's letter to Congress is that in the continuing search for a survivable basing mode, the airmobile approach is to be included. At this writing, the term "airmobile" is not clearly defined. It could mean air-transportable or air-launchable systems. The Press Report seemingly favored study and exploration of both concepts. The result would be a long and costly process that could be stretched ad infinitum. Also, as pointed out in this space last month, both concepts were studied thoroughly by the Air Force years ago and discarded for a variety of reasons. The fundamental drawback is that both air-transportable and air-launched ICBMs share the particular vulnerabilities of the strategic bomber force. Thus, the unique, fortuitous trait of the triad, that each of its components is sufficiently diverse to force the attacker to deal with it individually and with specialized forces and weapons, would be diluted. Further, the basic survivability of either concept demonstrably is low for all missile-carrying aircraft while on the ground.

In the case of the air-transportable system, aircraft of the 747/C-5A type optimized for STOL performance would shuttle between a relatively large number of widely dispersed, specialized short runways. In case of nuclear war, each surviving aircraft would unload a single ICBM equipped with a launch mechanism, to be fired from a presurveyed point on the runway. Air-launched systems can be designed in a number of ways, ranging from systems that launch the ICBM from an aircraft operating over the US to others that delay the launch until the carrier reaches the perimeter of Soviet air defenses. Previous Air Force studies have identified severe command and control as well as cost problems associated with both concepts.

Among the several other basing modes exhumed for restudy in competition with airmobile ballistic missile designs is the "shallow submersible," a relatively small and inexpensive submarine designed to operate along the Continental Shelf. These subs would carry two ICBMs each and could be linked to a central command and control system through prepositioned, movable underseas cables. Since these boats would be extremely slow and operate in shallow waters, some defense scientists view them as sitting ducks for Soviet ASW (antisubmarine warfare) weapons. As in the case of the airmobile system, the shallow submarine would diminish the diversification of the triad.

The Administration's latest deferral of a decision on ICBM basing is guaranteed to raise a flood of questions in Congress. Central here is whether the next Congress will consider itself bound by instructions issued to the Defense Department by its predecessor. These were to not request funds for a new ICBM until the Pentagon could vouch for its survivability by demonstrating an improved basing mode. If the next Congress considers these instructions still valid—and denies funds for building the missile until survivability is assured—the onus of "killing MX" would fall on that body. There are cynics both in Congress and the Pentagon who suggest that Administration adherents of an all-sea-based deterrent would like nothing better than for Congress to act as the fall guy.

In all the uncertainty about the future of the ICBM force two certainties exist: If the US, for whatever reason, reneges on its only strategic force capable of rapid damage limitation and termination of conflict below the level of all-out nuclear war, the prospects of political stability and peace clearly will be diminished. More ominous, if this country caves in on a vital element of its nuclear deterrent because of direct Soviet military pressure, Moscow will be impelled to try again—and again.

NATO's Brighter Future

Next April, the alliance of fifteen dissimilar—and in the past often incompatible—nations known as NATO will reach a mature thirty years of age. Longevity of this sort—by itself—is evidence of success. So is the fact that NATO, backstopped by US strategic deterrent forces, has managed to keep Western Europe free and out of war.

The soldier-statesman in charge of NATO's military affairs. Gen. Alexander M. Haig, Jr., Supreme Allied Commander, Europe (SACEUR), is "cautiously optimistic" about the continuing cohesion of the alliance and its ability to keep the numerically superior, steadily growing and improving forces of the Warsaw Pact at bay.

NATO's current "rejuvenation," General Haig told this writer recently, to a degree is the product of the relentless buildup of Soviet and other Warsaw Pact forces as well as of intensifying Soviet interventionism in third-world countries.

This cause-and-effect sequence starts with what General Haig terms the maturation, after fifteen years of force feeding, of the Soviet Union's military-industrial complex. The Soviet industrial colossus now is capable of pouring out vast volumes of high-quality—third-, fourth-, or even fifth-generation—weapon systems across the spectrum of military requirements, from central strategic to theater nuclear and conventional sea, land, and air weapons.

Emboldened by its swelling arsenal of new, more-capable weapons, the Soviet Union shows a growing inclination toward global interventionism that is becoming an issue of grave concern to the alliance, even though so far it has affected only areas on the periphery of NATO.

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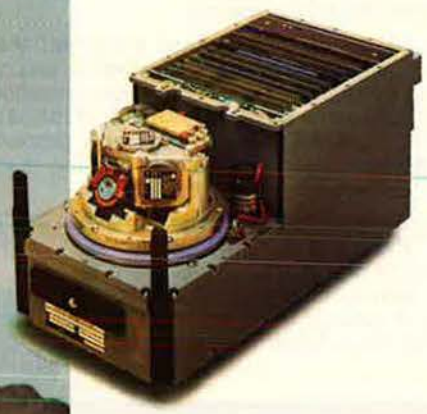

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Rockwell International

InFocus...

But, General Haig points out, Soviet forays into the southern tier of the Arabian peninsula, Africa, the Indian Ocean, and Afghanistan make it obligatory that the Western world "concert together to restrain illegal Soviet interventionism. These areas technically are outside of NATO's defined boundaries, but just as the US learned that there can't be any American security without Western European security, there can be no security for the West if we continue to ignore imperialistic Soviet interventionism through the provision of armaments and the deployment of proxy forces on a global scale."

One of the most persistent problems of the alliance, General Haig believes, is caused by general misinterpretation of its fundamental strategy, known as the forward defense posture. This concept, in a political sense, is an article of faith while from the military vantage point it is a matter of geography.

"Forward defense is not a Maginot Line concept where we plow all our resources into a brittle, inflexible line of defense. But we must assure that the initial defense is as far forward as the terrain and other geographic circumstances permit. Our objective is to employ in-depth, active, mobile tactics at every echelon," he told this column. Collective defense would cease to be viable and workable "if one of the key nations underwriting that effort [West Germany] were asked *a priori* to give up its territory and its population.

"Secondly, Western European geography lacks strategic depth which automatically dictates defenses as far forward as possible to give us the space necessary for the conduct of battle. Admittedly, forward defense is a high-risk strategy in that we maintain less active defense capability than is necessary in the face of the Warsaw Pact threat. We therefore become increasingly reliant on our ability to mobilize and reinforce rapidly in times of crisis," according to the SACEUR.

NATO's current paramount concern centers on remedial programs that enhance the alliance's ability to reinforce its forward defenses through a combination of expanded sea and airlift, prepositioned stockage for selected units, means for rapidly channeling Western Europe's vast civil resources into wartime tasks, and procedures that bolster the mobilization potential of NATO's front-line members. The forward defense strategy is critically dependent on the full realization of *all* these improvements, General Haig asserts with visible conviction. There are grounds for optimism concerning the alliance's determination to continue the current improvement campaign.

One of NATO's recent success stories was doubling the number of US brigades available for rapid reinforcement during the first crucial thirty days—achieved mainly through improved planning—and tripling the alliance's tactical air capability during the initial period of conflict. Next on the agenda is another doubling of the ground force reinforcement potential, the SACEUR told this column.

What else is crucial to maintaining the alliance's momentum? General Haig leaves no room for doubt: "The willingness of the member nations—the US very much included—to meet and see through the increased spending obligations [a three percent per year real growth in defense spending by all members] that we agreed on and which I have described as being on the bottom edge of prudence."

Washington Observations

• The Washington national security community is mesmerized by a highly classified CIA study of the predominant role played by the Soviet military in setting Moscow's SALT and other arms-control terms. Authored by David S. Sullivan, until recently a CIA strategic analyst and now Sen. Lloyd Bentsen's (D-Tex.) Legislative Assistant for Military Affairs and SALT, the study provides convincing proof that the Soviet military exercises control over the arms-control terms, even when these have been approved by President Brezhnev. The study reportedly cites specific, documented instances when the late Marshal A. A. Grechko, until his death in 1976 the Soviet Defense Minister, issued dictates to Brezhnev concerning what was and was not acceptable to the Soviet military in the Politburo's SALT posture.

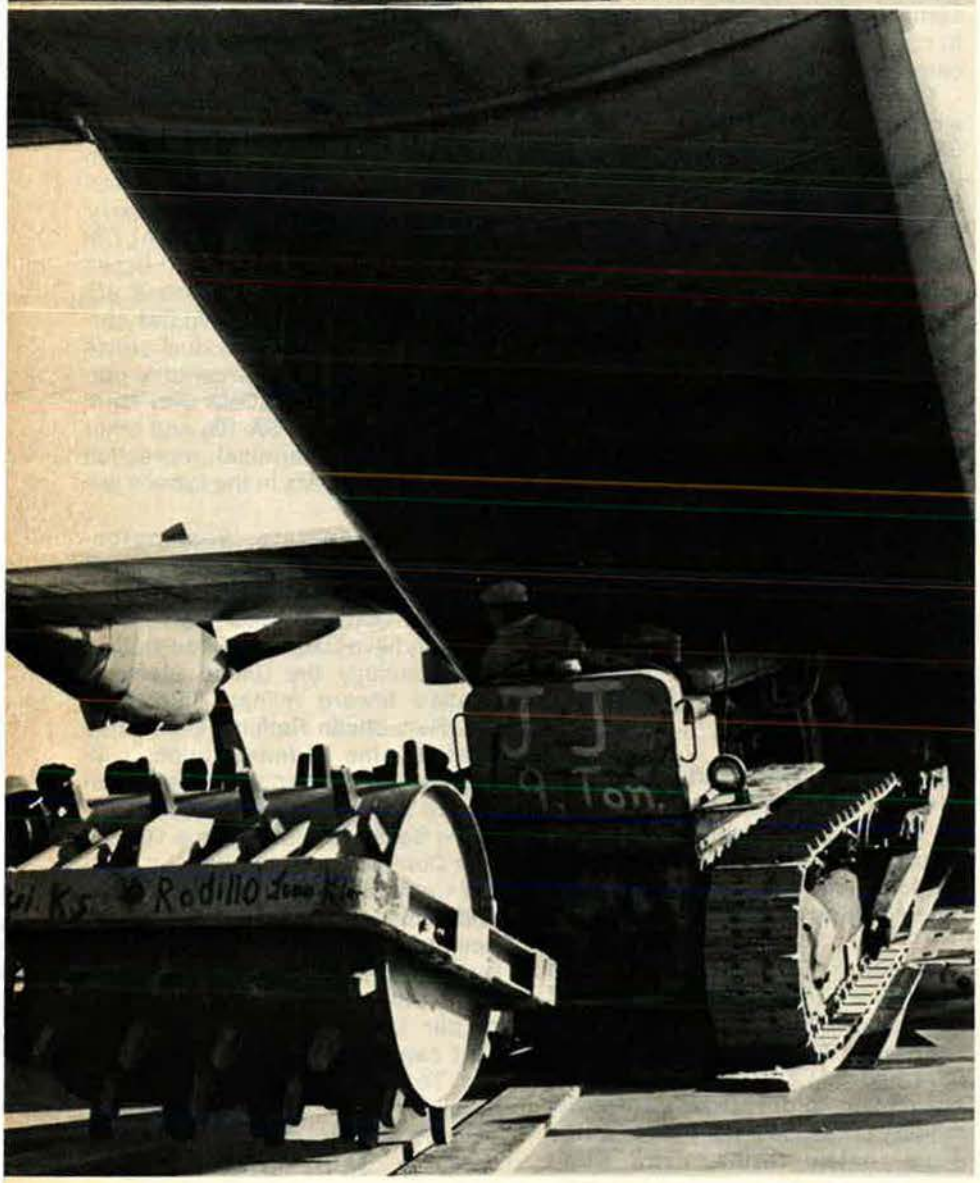
• Soviet Foreign Minister Gromyko's surprising recent concession to free US air-launched cruise missiles (ALCM) from all SALT II range limitations was preceded by alarming Russian progress in neutralizing these weapons. Prior to the Soviet about-face, Russian combat aircraft equipped with look-down, shoot-down systems "successfully demonstrated kill capability against cruise missiles flying at an altitude of 200 feet," this column learned. At the same time, the Soviets started to deploy SS-10 surface-to-air missiles—recognized as *the* optimized ALCM killer—on naval destroyers. The newly installed shipboard launch units contain four SAMs each. The missiles take off vertically, but transition rapidly to horizontal flight to pursue their quarry. The emerging Soviet anti-ALCM strategy is clear: Shipboard-based systems deployed far offshore are targeted against the US ALCM carriers, as well as the individual cruise missiles; manned interceptors pursue the surviving ALCMs over land; and ground-based SA-10s and other SAMs provide terminal protection against US ALCMs in the latter's target areas.

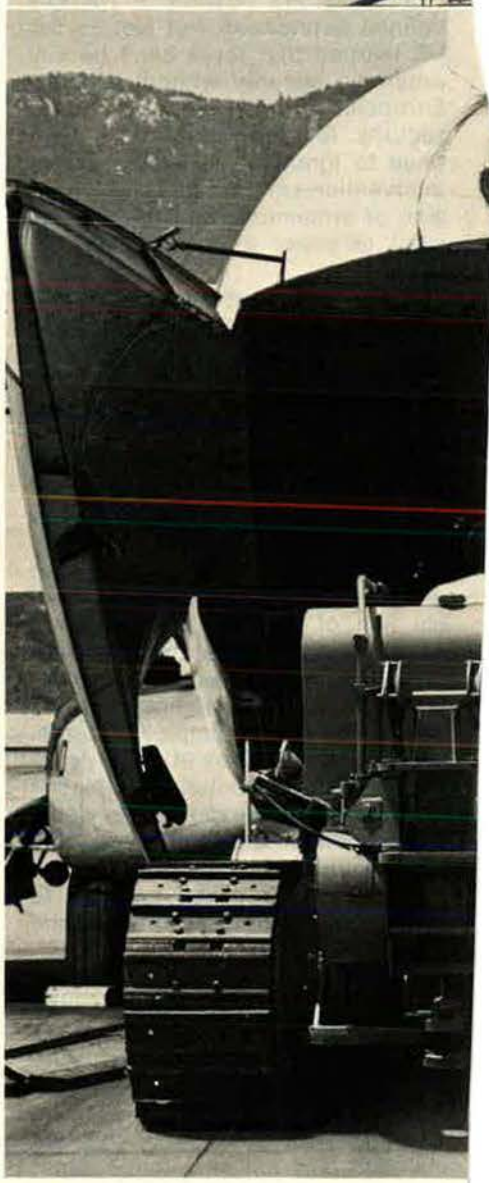
• Two disparate Washington-based organizations, the Republican National Committee and the nonpartisan Committee on the Present Danger, have issued detailed studies that conclude the United States is headed toward military inferiority. The Republican National Committee charged the Administration with "unilateral arms reduction" and conceding "manifest military supremacy to the Soviets effective in the 1980s." The Committee on the Present Danger warns that "the nation's security and survival are in jeopardy" and points out that "only prompt and prudent strategic initiatives can restore the adequacy and credibility of our fading second-strike deterrent capability."

• Testing the Soviet MIRVed, mobile SS-20 intermediate range ballistic missile—which is not covered by SALT—continues under deliberately concealed conditions, including occasional encrypting of telemetry data. Since this missile is a close kin of the world's only mobile ICBM, the SS-16, systematic Soviet attempts to hinder US observation of flight testing take on ominous overtones. There is some evidence that a few SS-16s are now deployed on transporters. ■

The Lockheed

C-130 Hercules





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The C-141 StarLifter, with twice the capacity of Hercules, has ocean-spanning range and can carry up to 72,000 pounds of outsize cargo,

Drive-ins.

C-141 StarLifter

C-5 Galaxy

including vehicles as large as five-ton trucks.

The heavyweight is the C-5. In its 145-foot-long, 19-foot-wide cargo hold, it can pack 220,000 pounds of freight. And this drive-in can carry astonishing loads. Two 59-ton main battle tanks, for instance. That's airlifting.

The Lockheed trio isn't just military, either. After last winter's crippling New England blizzards, these mighty aircraft flew 127 missions into the stricken region. They carried personnel, supplies, and 2,500 tons of much-needed snow-clearing vehicles. The snowplows and bulldozers, of course, drove right off the planes and went instantly to work.

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Command, control, communications...

With IBM helping define the architecture, the military's worldwide command systems work to a common purpose.

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What was needed was a concept to integrate the many DoD systems—and thus help assure the smooth and rapid flow of information for real-time response among all services and operational commands around the globe.

To this end, the Department of Defense selected IBM to help define the system architecture required for a Worldwide Military Command and Control System (WWMCCS). The fully implemented WWMCCS will include a network of specialized Command and Control Systems capable of communicating with each other for coordinated decision-making.

For WWMCCS, IBM applied 25 years of experience in developing both hardware and software for complex real-time command, control and communications systems for the military, NASA and other government agencies.

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With this background, IBM is helping make a complex systems concept like WWMCCS work to a common purpose for both the strategic and tactical requirements of DoD. A challenge that reflects IBM's experience in related programs of design-to-cost systems, command and control, communications, navigation, electronic counter-measures, ASW helicopters, shipboard and submarine sonar, ground tracking and launch control.

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Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

—Wide World Photos

Soviet Cosmonauts Vladimir Kovalenok, left, and Alexander Ivanchenkov chat with well-wishers after their return to earth early in November aboard Soyuz-31 space capsule. The two had shattered the space endurance record by remaining aboard the orbiting space station Salyut-6 almost 140 days. Following their return, the cosmonauts were subjected to extensive physical and psychological tests to determine the effects of long-duration weightlessness.

Washington, D. C., Nov. 6

★ The Anglo-French Jaguar edged out Sweden's Viggen and France's Mirage F1 as India's choice to modernize its Air Force. *(India is already the preponderant military power on the subcontinent. For a rundown on her armed forces, see p. 101.)*

India plans to acquire 200 of the deep-penetration strike aircraft over the next ten years to replace the aging Canberras and Hunters that have been in service since the 1950s.

The twin-engine Jaguar was selected, according to officials, because of its better survival characteristics, more favorable delivery schedule, and important economic considerations.

One feature of the $1.6 billion program calls for setting up production facilities in India for the manufacture of three-quarters of the aircraft's requirements. Under the agreement, India is to buy forty Jaguars on credits extended by the British government. Details for this direct purchase and the license manufacturing pact are currently being worked out.

★ Currently scheduled for viewing on NBC network television on the evening of Sunday, December 17—the seventy-fifth anniversary of the Wright brothers' first powered flight—is "The Winds of Kitty Hawk."

"Winds" is an original, two-hour teleplay that dramatizes the bulldog determination of the two gentlemen from Dayton. It features full-scale flying replicas of the original aircraft. The flight scenes were filmed, curiously enough, not at Kitty Hawk but on the beaches of San Luis Obispo in California. We are assured, however, that intensive research was undertaken at the Smithsonian Institution and the Library of Congress and at Kitty Hawk and Dayton to ensure historical accuracy.

Veteran actors Michael Moriarty (Wilbur) and David Huffman (Orville) play the leads in the ITT-sponsored special.

"Winds" takes the brothers from their early experiments through the first flight and to the subsequent ten-mile, thirty-three-minute, thirty-three-second flight over the Hudson River and the Statue of Liberty. The screenplay was written by Jeb Rosebrook and William Kelley and directed by E. W. Swackhammer.

Check local listings for time.

★ With the award of a $287 million-plus contract, US Navy gave the nod for the construction of the first guided-missile-equipped DDG-47-class destroyer.

A key feature of the DDG-47 will be its high-firepower, computer-controlled Aegis antiaircraft system, the Navy's answer to the Soviet air threat of the '80s and beyond.

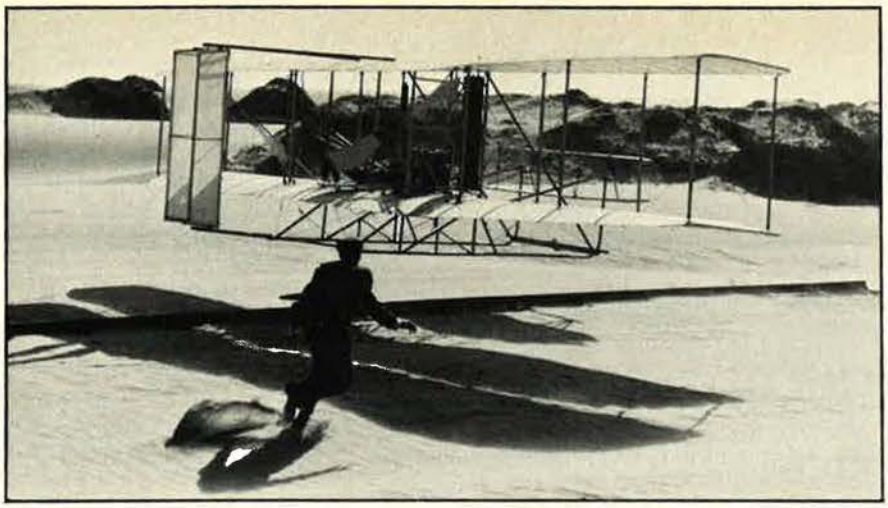
The ship will be 563 feet (172 m) long with a beam of fifty-five feet (seventeen m). Conventionally powered, she'll be capable of sustained speeds of thirty knots.

"The most broadly capable, heavily armed, and survivable destroyer the Navy has ever built," according to a Navy spokesman, the DDG-47 will be equipped with the most advanced electronic warfare and communications gear. Rounding out her armaments will be surface-to-air Standard and surface-to-surface Harpoon missiles, the most up-to-date antisubmarine warfare suit including antisub rockets (ASROC) and torpedoes, two five-inch guns, and the Phalanx close-in defense system. The ship will carry the LAMPS multipurpose helicopter.

With construction—by Litton Industries' Ingalls Shipbuilding Division, Pascagoula, Miss.—getting under way in mid-1979, delivery is expected by early 1983.

★ NASA and the US Army Aviation Research and Development Command have accepted delivery of the first of two Rotor Systems Research Aircraft, a plane especially designed to investigate and verify "a wide variety of existing and advanced rotor systems."

RSRA is unique in that it can be configured as a helicopter, a com-



That historic moment on the dunes when the Wrights first flew in a powered aircraft has been recreated in the teleplay, "The Winds of Kitty Hawk," which will be aired over network TV on December 17—the seventy-fifth anniversary of the flight. See item on p. 30 for details.

pound aircraft (helicopter with fixed wings), or as a fixed-wing aircraft. RSRA will help curb costly modification or development of helicopters to test rotor concepts; it will also provide precise measurements of rotor performance under repeatable test conditions.

Other features of RSRA include the first helicopter crew emergency escape system and sophisticated vibration-measurement gear.

The craft—in the helicopter configuration—is to begin tests at NASA's Wallops Flight Center, Wallops Island, Va. A second RSRA is undergoing flight testing in the compound configuration before delivery.

★ The US Army has narrowed down to three possibilities the future site of its proposed military National Training Center (NTC): Twenty-nine Palms Marine Corps Base, Calif.; Yuma Proving Ground, Ariz.; and Fort Irwin, Calif., the preferred location.

NTC, a concept that requires Secretary of Defense approval before implementation, would provide a simulated battlefield environment similar to USAF's complex at Nellis AFB, Nev., where Red Flag combat flying training is conducted *(see August '78 issue, p. 40).*

Features of the visualized NTC are maneuver areas compatible with modern requirements and warfare techniques, where future weaponry developments would lead to increased combat readiness during peacetime.

Once operational, some forty-two battalions—about 80,000 people—would rotate through the NTC in two-week training sessions each year.

★ NASA's track record for successful space missions was blemished in October by the failure of Seasat, apparently the result of a massive short-circuit within the satellite's electrical system.

The $75 million spacecraft, orbited last June 26 and equipped to measure such ocean phenomenon as tides, waves, surface temperatures, ice fields, and currents, is not likely to be resurrected, NASA officials said, although attempts are being made.

A panel has been organized to investigate the failure.

Although not yet funded, a follow-on Seasat had been under NASA consideration.

—Wide World Photos

Capt. (major selectee) Rich Engle and Capt. Connie Engle relax for a moment at Williams AFB, Ariz. Both flight instructors at the base, the young married couple is assigned to the 97th Flying Training Squadron.

★ During ceremonies in October at the Kennedy Space Center, President Carter awarded the nation's first Congressional Space Medals of Honor to six astronauts. The recipients:

- **Neil A. Armstrong**—for overcoming problems to land his spacecraft safely during the Gemini-8 mission in March 1966 and for the Apollo-11 mission in July 1969, when he became the first person to walk on the moon.
- **Frank Borman**—Commander of the Gemini-7 mission in December 1965 and the Apollo-8 mission in December 1968, when the first manned spacecraft escaped earth's gravity.
- **Charles Conrad, Jr.**—who, from August 1965 to June 1973 participated in four spaceflights, and who, as Commander of the May/June 1973 Skylab mission, saw to the repair of the launch-damaged orbital workshop and saved the program.
- **John H. Glenn, Jr.**—the first American to orbit the earth, during project Mercury in February 1962.
- **Virgil I. Grissom** (posthumous)—the second American in space, who, from July 1961 to January 1967, participated in Mercury and Gemini spaceflights and lost his life in January 1967 in a capsule fire while preparing for the first Apollo flight.
- **Alan B. Shepard, Jr.**—the first American in space, aboard the Mercury spacecraft in May 1961 and Commander of Apollo-14, the third lunar landing mission in February 1971.

★ Giant Voice '78, a three-month competition among SAC, TAC, ANG, AFRES, and RAF bombers and tankers, concluded in late October. Leading the pack with the best combined bombing and navigation team

Aerospace World

score for the fourth consecutive year was the 380th Bomb Wing, Plattsburgh, N. Y., which captured the top honor—**the Fairchild Trophy.**

Other awards in the competition:

• **The Saunders Trophy** for the best tanker unit went to the 28th Bomb Wing, Ellsworth AFB, S. D.

• **The Mathis Trophy** for most points in bombing was taken by the 509th BMW, Pease AFB, N. H.

• **The John C. Meyer Trophy** for best score on the final low-level bombing mission also went to Plattsburgh's 380th.

• **The Navigation Trophy** for the tanker unit compiling the best score in final missions using celestial navigation was garnered by the 93d BMW's 924th Air Refueling Squadron, Castle AFB, Calif.

• **The Maj. James F. Baarsch Memorial Trophy** awarded for the first time this year to the B-52 unit with the most points in electronic countermeasure activity went to the 92d Bomb Wing, Fairchild AFB, Wash.

• **The Russell E. Dougherty Trophy** for highest marks in simulated SRAM launches was presented to the 319th BMW, Grand Forks AFB, N. D.

• **The Lt. Gen. James H. Doolittle Trophy** for SAC's Numbered Air Force whose B-52 unit scored best in low-level bombing went to the Eighth Air Force.

• **The Best Bombing Trophy** was awarded the 509th BMW, Pease AFB, N. H.

• **The William J. Crumm Linebacker Memorial Trophy** for the B-52 or RAF Vulcan unit best in high-altitude bombing was taken by Ellsworth's 28th BMW.

• **Outstanding Bomber and Tanker Test Crew Awards** went to Crew S-02, 379th BMW, Wurtsmith AFB, Mich. (B-52); Crew R-113, 924th ARS, Castle AFB, Calif. (KC-135); Crew S-52, 380th BMW (FB-111); and RAF Crew Number 01 (Vulcan).

★ Trophies have been awarded to ADCOM, USAFE, and ANG category winners in the recent 1978 William Tell worldwide fighter interceptor weapons meet conducted at Tyndall AFB, Fla.

The Mighty Eighth's Fourth Reunion

Washington, D. C., was the scene of the Eighth Air Force's fourth reunion in late October. More than 1,000 attended, representing sixteen of the Eighth's major units.

They're all grayer and wiser now. But no small number of hours was spent by the Eighth's veterans in "hangar-flying"—war stories about the decisive part they played in the event-laden years more than three decades ago.

The US's initial contribution to the air war in Europe was inauspicious at best—a handful of inexperienced crews flying bombers in quick jabs against cross-Channel targets. But the American plan—viewed with grave misgivings by our British allies—was to mount a precision daylight strategic bombing campaign that would carry the war to the source of the enemy's war materiel—his factories and other means of production. And as B-17s and B-24s crossed the Atlantic to England in increasing numbers, the Eighth grew into a gigantic force of nearly 2,000 four-engine bombers able to penetrate deep into Germany. Under the leadership of men like Spaatz, Eaker, and Doolittle, and supported by the long-range fighters flown by Eighth Fighter Command, the Mighty Eighth, together with RAF Bomber Command, laid waste Germany. By war's end, the skies belonged to the Allies and few strategic targets remained. And more than half of the AAF's leading fighter aces were Eighth Air Force men.

In a touching candle-lighting ceremony one evening during the reunion, the Eighth's veterans remembered the years of war, and paid tribute to their living comrades and those now dead.

There were less somber moments. Many vets, accompanied by spouses, toured their capital city in the crisp autumn sunlight. At the National Air and Space Museum, in the World War II gallery, they were greeted by aviation artist Keith Ferris. His famous mural, depicting an Eighth Air Force B-17 formation returning from the August 15, 1944, attack on the fighter base at Wiesbaden, covers an entire wall of the gallery.

In a letter to Eighth Air Force Historical Society president C. Joseph Warth, AFA National President Gerald V. Hasler toasted the Eighth and pointed out that "many of you are members also of the Air Force Association, as might be expected, and I want you to know that AFA shares your devotion to the Mighty Eighth."

Master of ceremonies at the reunion banquet was Medal of Honor winner John C. Morgan, while the main speaker was Lt. Gen. Ira C. Eaker, USAF (Ret.), wartime leader known as "Father of the Eighth."

Many of the Eighth Air Force veterans attending the reunion in Washington, D. C., in October, took time out to visit the National Air and Space Museum. On hand to greet them in the World War II gallery was aviation artist Keith Ferris, fourth from left. His mural, background, depicting an Eighth Air Force formation of B-17s (accompanied appropriately enough by flak and prowling German fighters) returning from an attack on the fighter base at Wiesbaden on August 15, 1944, adorns an entire wall of the gallery. From left, Charles Mainwaring, Visalia, Calif., pilot of the B-17 "Marie" in the mural; Jeff Ethell, who conducted extensive research into Eighth missions to uncover an historically accurate basis for the mural; Elmer Fessler, Opa-Locka, Fla., who was 359th Squadron Inspector; Keith Ferris; and Gene Girman, Highland, Ind., who was radio operator aboard the "Thunder Bird."

The newest system for close air support: the Fairchild A-10.

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Developed for the U.S. Air Force's Electronic Systems Division, GPN-22 is designed to handle multiple aircraft landings simultaneously. With pinpoint accuracy, the system will guide the aircraft in azimuth and elevation through the final approach zone to touchdown. The phased array system will be installed at Air Force bases with high air traffic density and adverse weather conditions.

And, for less severe weather and low density air traffic requirements, Raytheon is producing the solid-state AN/FPN-62 Normal PAR system for the Air Force.

In fact, Raytheon's military air traffic control capabilities are in demand around the world. We're producing eleven GPN-22 systems for the Royal Netherlands Air Force and Navy. In addition, the Dutch, German and Australian governments recently chose Raytheon's AN/TPN-24 air surveillance radar (ASR) to control and vector terminal traffic.

For further information on Raytheon's PAR landing systems and air traffic control capabilities, write Raytheon Company, Government Marketing, 141 Spring Street, Lexington, Massachusetts 02173.

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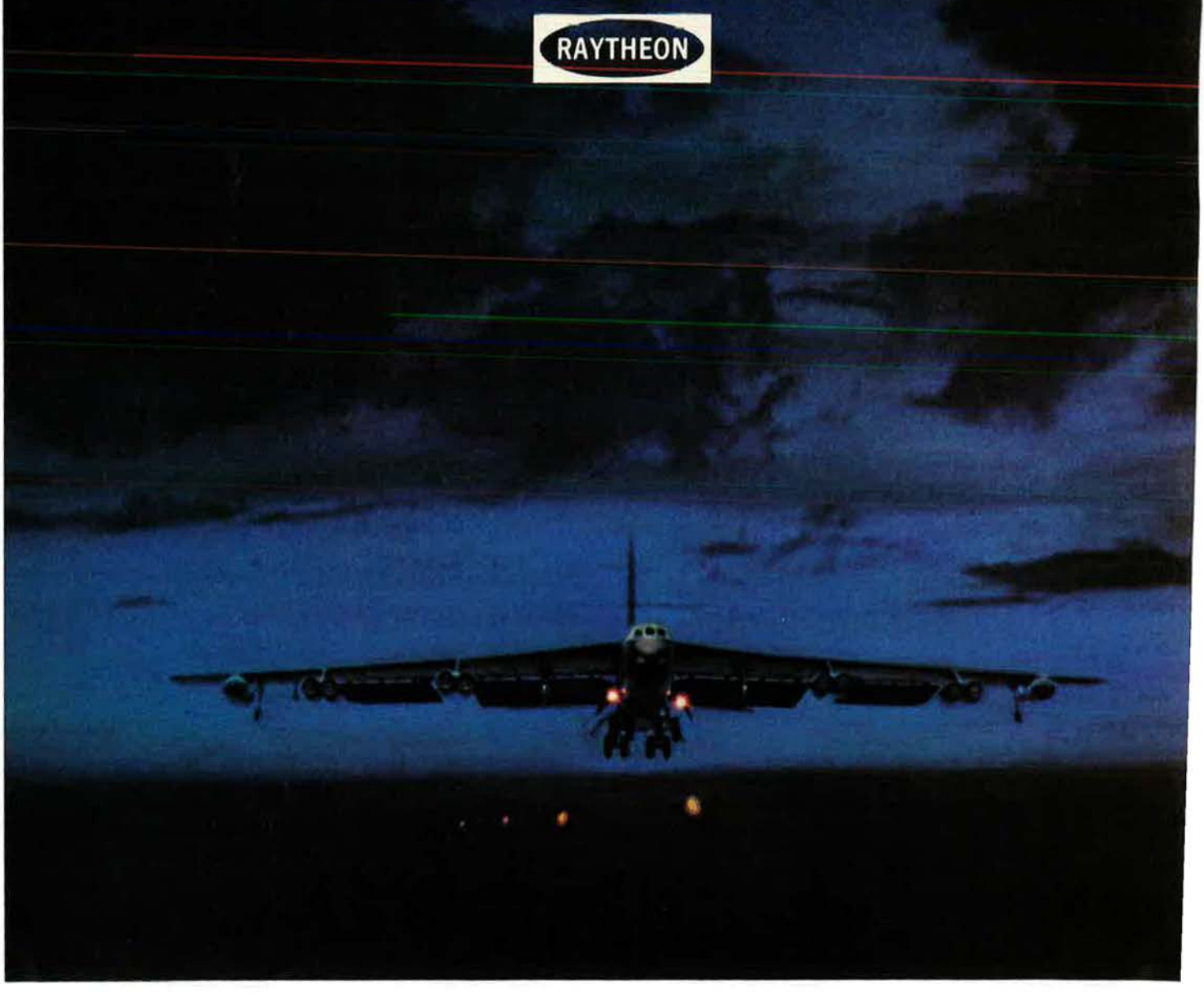

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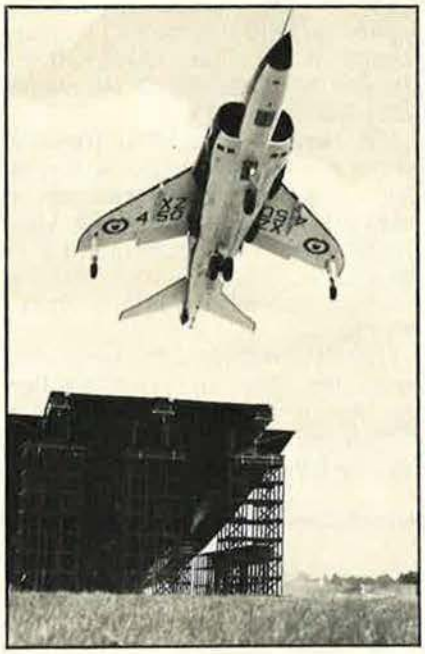


A British Sea Harrier heads skyward with an assist from a "ski jump" launching ramp. Such ramps are to be fitted aboard Royal Navy Invincible*-class command cruisers for service in the 1980s.*

In the F-106 competition, ADCOM's 49th Fighter Interceptor Squadron (FIS), Griffiss AFB, N. Y., nosed out the 120th Fighter Interceptor Group (FIG), Montana ANG, to unseat the two-time defending champions and for the first time in six years give an active-duty USAF unit a win over its ANG counterpart.

The 86th Tac Fighter Wing, Ramstein AB, Germany, narrowly won the F-4 category, the first win for USAFE which joined the biennial competition in 1976 when the F-4s were introduced into the meet.

ANG's 147th FIG, Houston, Tex., edged out another Guard unit, the 142d FIG, Portland, Ore., to capture the F-101 trophy. It was the first category win for the Texas Guard.

"Top Gun" award went to Capts. Earl Robertson (pilot) and Bryan Salmon (WSO) of the Canadian Forces Air Defense Group.

Ground control intercept "Top Scope" awards:

F-101—Capt. Richard Smith, controller, and MSgt. John Earley, controller technician; Capt. Peter Card, controller, and Sgt. Henry Killian, controller technician. These teams are members of the 678th ADG, Tyndall AFB, and controlled the 147th FIG.

F-4—Capt. Kirk Hunter, controller, and MSgt. Raymon Myers, controller technician; 1st Lt. John Fite, controller, and SSgt. B. J. Jones, controller technician, from the 601st Tactical Control Wing, Ramstein AB, Germany, who controlled the 86th TFW.

F-106—TSgt. Albert Fluss, controller, and MSgt. Donald Linane, controller technician; SSgt. Allan Edwards, controller, and SrA Dale Wise, controller technician, from the 20th AD, Fort Lee, Va., who controlled the 48th FIS.

Recipients of aircrew/maintenance team awards in the three-week meet were:

F-101—Canadian Forces Air Defence Group, Capt. Earl Robertson, pilot; Capt. Bryan Salmon, weapons systems officer; Sgt. Robert Burrows, crew chief; and Master Corporal John Rogers, avionics technician.

F-4—86th TFW, Ramstein AB, Germany, Capt. Edward Land, pilot; Capt. Mike Ingelido, weapons systems officer; TSgt. Edward Bloodworth, crew chief; and Sgt. Bruce Lucas, avionics technician.

F-106—49th FIS, Griffiss AFB, N. Y., Capt. Richard Colliander, pi-

BRINGING WAR TO THE AIR WAR COLLEGE

Students at the Air War College (AWC), USAF's top professional military school, are assuming command of major NATO air units in a five-day simulated European conflict against an attacking Warsaw Pact force. The simulation is called TWX, short for Theater War Exercise.

During TWX, each AWC seminar (all lieutenant colonels or colonel-selectees) takes on the roles of Headquarters, Allied Air Forces Central Europe, and the Second and Fourth Tactical Air Forces, and directs their resources through the two phases of a theater air war: planning and execution. In the planning phase, each seminar develops a concept of air operations and a contingency air operations plan. As diplomacy fails and tensions escalate to a conventional armed exchange, the exercise transitions to phase two—execution—and the students shift their emphasis to managing the day-to-day employment of their forces in the first five days of a war of undetermined length.

Heavy emphasis in TWX is placed on the Central European ground battle, considered the most demanding NATO mission. Conditions similar to those intelligence experts say allied forces can expect at the beginning of a European war are used as the basis of TWX. The RED (Pact) attack against the greatly outnumbered BLUE (NATO) forces comes with little notice. Further, the BLUE forces' long and vulnerable lines of communication require them to use forward-deployed units and locally-available reinforcements to accomplish the mission with on-hand resources.

Employment of US and Allied Air Forces, as planned, directed, and controlled by each seminar, is simulated by two computer models that also simulate the interaction of NATO land forces and Warsaw Pact land and air forces. The models determine results of each seminar's operations on a daily basis. The computer models are a modified Rand Corp. land battle named TOTEM, and an in-house model developed jointly by Air War College faculty and student study groups, and the Air University Directorate of Data Automation.

Aircraft losses and damage expectancy are quantified in terms of assigned values based on the significance and possibility of occurrence. All programmed values in TWX are constant, so the same decision will always bring the same results. Certain events in the exercise are based on random numbers and are unpredictable, as they would be in combat.

TWX uses computer simulation purely as an information processing tool. The capacity of a computer to manipulate large amounts of data and instructions from the AWC seminars and to determine the outcome of simulated conflict is necessary in an exercise of the complexity of TWX. Through this simulation, students can see the effects that changes in strategies and employment decisions can have on the outcome of the battle. These are lessons theater air commanders need to learn *before* the war begins.

TWX has been so successful that AWC is using it as the basis for the Combined Air Warfare Course, also taught at Maxwell AFB (*see May '78 issue, p. 29*). Exercise managers at AWC are interested in the possibility of linking TWX to the Army and Navy War Colleges in order to conduct a simulated joint service theater war exercise.

—C. G. T.

Aerospace World

lot; TSgt. James Caracciola, crew chief; and TSgt. Michael Bondy, avionics technician.

★ To receive 1978 Kitty Hawk "Sands of Time" Awards at the Los Angeles Area Chamber of Commerce-sponsored sixteenth Annual Wright Brothers Banquet on December 8 are:

- **Lt. Gen. Thomas P. Stafford,** former astronaut and currently USAF DCS/R&D (the military award).
- **Robert F. Six,** chief executive officer of Continental Airlines (civilian).
- **Edward H. Heinemann,** military aircraft designer for more than forty years (special).
- **Janet Lynn Helton,** who on her sixteenth birthday this year soloed thirty-six different aircraft (youth).

★ **NEWS NOTES**—The Radio and Television News Directors Association's **Distinguished Service Award** has been presented to **Col. Barney Oldfield, USAF (Ret.),** long-time AFAer and Air Force and aerospace industry information officer.

Recently **retired Gen. William J. Evans,** whose final Air Force post was Commander, USAFE, and Allied Air Forces Central Europe, has been named **vice president of United Technologies Corp.,** Hartford, Conn. And **Gen. Robert J. Dixon,** TAC Commander from 1973 until his retirement earlier this year, has been named **president of Fairchild Republic Co.**

USAF's **Lt. Col. Wayne M. Kendall** has been awarded the **1978 Jabara Award for Airmanship.** Colonel Kendall, currently head of aerospace medicine at RAF Lakenheath, England, and an astronaut candidate, conducted research into the biodynamic effects of F-15 and F-16 canopy loss. He himself was the human subject during a flight test that proved crew members could withstand canopy loss at high speeds. The award is named for Col. James Jabara, the first jet ace, who was killed in an auto accident in 1966.

Air University, Maxwell AFB, Ala., will host its **third annual Airpower Symposium** February 26–28. Theme: "Strategic Deterrence: A Forward Look." Those wishing to present papers should contact Lt. Col. Joseph R. Sanchez, AWC/EDRP, Maxwell AFB, Ala. 36112, telephone (205) 293-2414/2419.

Col. James Taylor, USAF (Ret.), a former AIR FORCE Magazine Senior Editor, has been named **president of International Public Relations Ltd.,** the Honolulu member of Public Relations Group of Companies, Inc., a PR chain specializing in opinion research.

The Dayton-Cincinnati Section of the American Institute of Aeronautics and Astronautics is sponsoring a conference to commemorate the seventy-fifth anniversary of powered

Index to Advertisers

Sperry Update

6

A timely report of Sperry Flight Systems activities in the airline, defense, space and general aviation markets.

U.S. Army orders improved ASN-43.

Sperry Flight Systems will supply an improved version of its ASN-43 slaved gyromagnetic compass system for U.S. Army aircraft under a $1.02 million preproduction contract from the Army Materiel Development and Readiness Command.

Improvements to the ASN-43 system, widely used for a number of years in Army aircraft, include addition of a microprocessor to the directional gyro control electronics and a magnetic-only heading mode.

Use of the microprocessor along with a pre-indexed magnetic flux valve contributes to greater long-term heading accuracy and dynamic compensation capability. The improved ASN-43 is specifically designed for use with the ASN-128 Doppler navigation system.

The new "emergency" magnetic mode provides steady magnetic heading information from the remotely-mounted flux valve in the event of gyro failure, reducing dependence on the standby "whiskey" compass.

Beech selects Sperry system for Navy CTX transports.

Beech Aircraft Corp. has selected the Avionics Division of Sperry Flight Systems to supply integrated automatic flight control systems for the first 22 Navy CTX utility transport aircraft.

The CTX, Navy version of the Beech Super King Air 200 and Air Force/Army C-12 turboprop, will be equipped with the Sperry SPZ-200 autopilot and SPI-54 flight director system.

In addition to the dual flight director instruments, the Sperry CTX package will include dual VG-14A remote vertical gyros, C-14-43 slaved gyrocompass system, and AA-215 radio altimeter.

Deliveries of CTX avionics by Sperry to Beech will begin early in 1979.

B-52 control display system to be produced by Sperry.

A controls and displays subsystem (CDS) for the updated B-52 bomber offensive avionics system (OAS) will be supplied by Sperry under a $2.74 million contract with Boeing Wichita Company.

The contract for preproduction units includes production options for retrofit of up to 269 aircraft.

The Sperry CDS will be the major control center for the entire OAS, interfacing with other avionics to generate and display a variety of mission-essential data. The system consists of two 10 in. cathode ray tube multi-function displays, a display electronics unit (DEU), digital radar scan converter, video recorder and two integrated control keyboards.

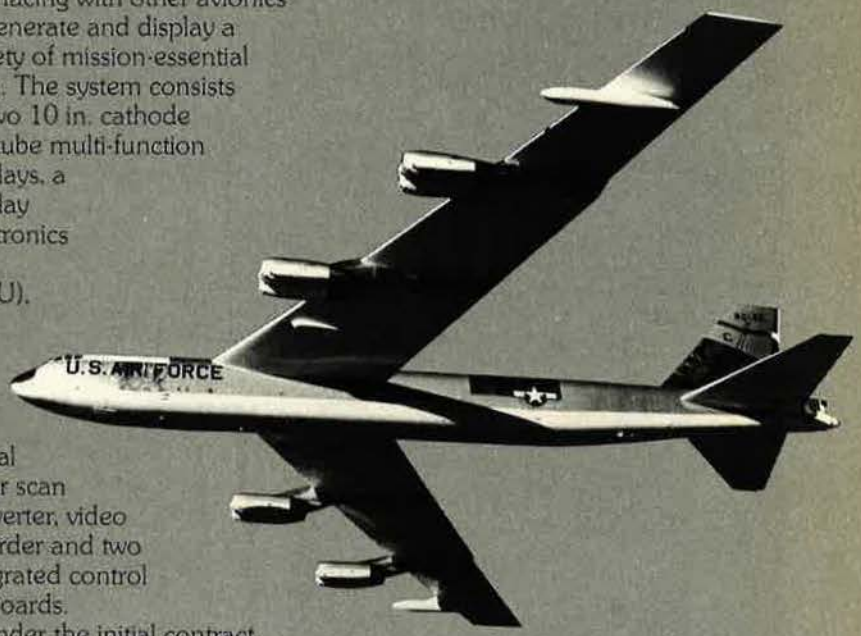
Under the initial contract, deliveries are to begin in May 1979. Boeing-Wichita is the prime contractor, sponsored by USAF/AFSC Aeronautical Systems Division, Directorate of Aircraft Modernization, Wright-Patterson AFB, Ohio. The OAS preproduction work will update the offensive avionics in the B-52G and H model strategic bomber fleet.

In the Sperry CDS, the DEU is the focal point for control and supervision of weapon delivery and navigation display processing and presentation.

Two integrated keyboards located at the radar navigator and navigator stations will control the CDS in conjunction with the navigator's management and presentation panels.

Operators will call up information from various sensor modes, including digitally processed continuous viewing radar returns (with or without alphanumerics), external viewing system imagery with superimposed symbology, and alphanumeric data alone.

A digital data bus interfaces the CDS with other OAS components, including the general purpose digital computers of the computational subsystem.



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Aerospace World

Midshipman Richard A. Magners of the Gen. Carl A. Spaatz CAP Squadron in Boyertown, Pa., receives CAP's Spaatz Award during recent ceremony at the Naval Academy. Presenting the award is Mrs. Spaatz, widow of the General, who was a native of Boyertown. Looking on are, left, Lt. Gen. Ira C. Eaker, USAF (Ret.), a long-time friend of General Spaatz, and Rear Adm. William P. Lawrence, Superintendent of the Academy. (The Midshipman also was named Outstanding CAP cadet in the Pennsylvania Wing by AFA's State organization last year.)

flight. Theme of the event, to be conducted at the Air Force Museum, Wright-Patterson AFB, Ohio, December 14–15, 1978, is **"Diamond Jubilee of Powered Flight—The Evolution of Aircraft Design."** Key aerospace world and industry figures will make presentations; advanced registration is not required.

It has been confirmed that a **Soviet Tu-144 SST crashed** early this past summer, killing two crewmen and critically injuring three others. Aeroflot stopped its SST flights to Alma Ata in June. (A Soviet SST also crashed at the June 1973 Paris Air Show.)

It also has been confirmed that **Cuba has become the recipient** of about twenty **MiG-23s,** the advanced high-speed jet fighter that the USSR has exported to **Egypt, Iraq, Libya,** and **Syria.**

Iran, plagued by civil unrest, **has canceled plans to purchase an additional seventy Grumman F-14 Tomcat fighters** and other sophisticated weaponry, including 140 F-16s, a new fighter developed by General Dynamics that is currently entering USAF's inventory and being sold abroad. *(Iran already has three operational F-14 squadrons; for a report on Iran's military strength, see p. 89.)*

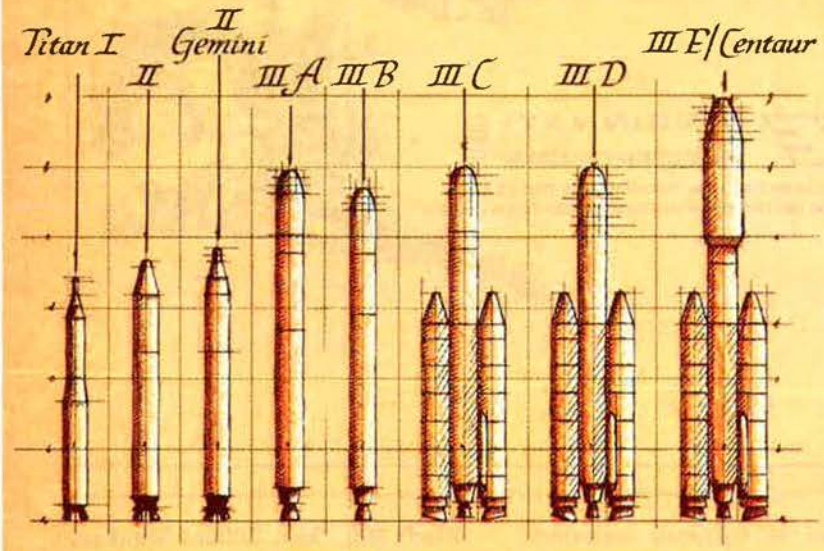
According to NASA, the **Space Shuttle Orbiters** are to be officially named **SS-1, SS-2,** etc., in order of flight. Presumably, pilots will also be permitted to name their aircraft, as was *Enterprise.*

Died: Maj. Gen. Willard Millikan, USAF (Ret.), World War II ace officially credited with thirteen kills and AFA Charter Member who in later service was prominent in ANG affairs, of a heart attack in October in Washington, D. C. He was fifty-nine.

Died: Col. John G. Salsman, USAF (Ret.), AFA Charter Member and early aircraft and dirigible pilot, of heart trouble in Washington, D. C., in September. He was seventy-nine. ■

What is the value of experience in developing big systems?

It reduces the risk.



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A prime requisite in developing a major weapon system is the ability to put innovative ideas to work reducing risk. Through three decades, during which we developed 26 major missile systems and performed 700 on-site missile assemblies and launch-support operations, we've gained that ability.

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We delivered the silo-launched Titan I and II ICBMs, and the Sprint missile interceptor, gaining the technology required for hardened launch sites and severe flight regimes, technology shared by few in the world.

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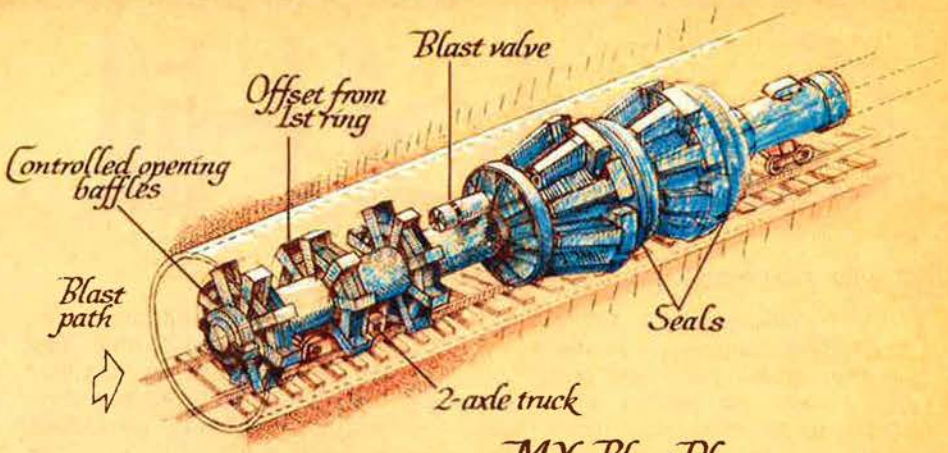
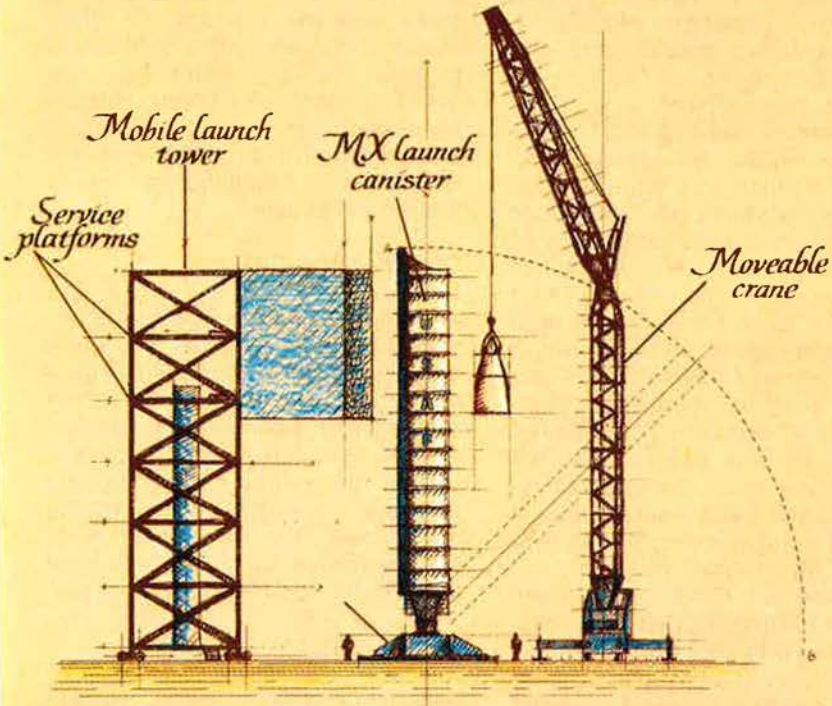
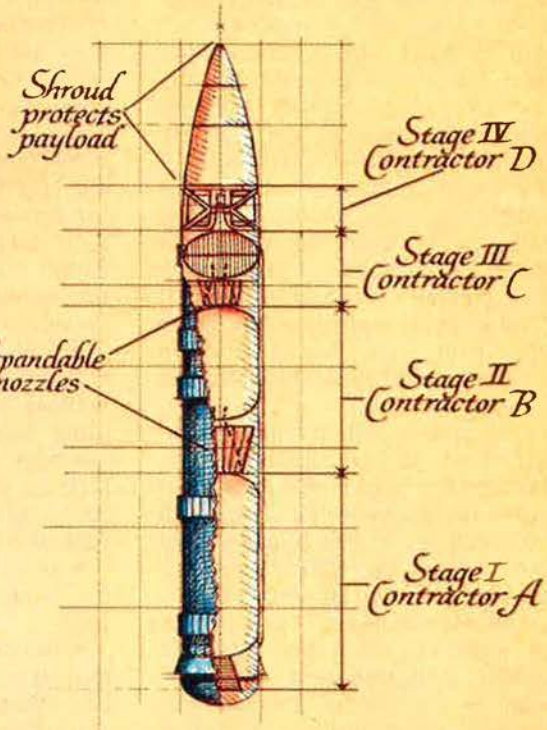


MX Blast Plug



Assembly & Flight Test



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Martin Marietta has participated in fielding more types of missiles that meet broader and more stringent operational, environmental and management requirements than any other company.

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Capitol Hill

By the Air Force Association Staff

Washington, D. C., Oct. 31

The 95th Congress is no more.

After grueling all-night sessions, the House and Senate adjourned October 15, one day later than scheduled. In a final rally, Congress completed action on numerous matters, including several defense-related bills.

Money Bills

Defense funding, in limbo after President Carter's veto of the Defense Procurement Authorization Bill, was enacted just in time to assure millions of military people and DoD civilian employees of their mid-October pay.

Congress dropped the $2 billion nuclear carrier that had prompted the President's veto and passed a bill otherwise similar to the vetoed bill, but including $209 million for Navy shipbuilding claims. The legislators then adopted a $117.3 billion Defense Appropriations Bill, also without the nuclear carrier. President Carter signed both measures.

The amount appropriated is roughly $2 billion less than the Administration had requested. The Air Force's share is $34.1 billion, about $800 million less than requested.

Congress resoundingly rejected several proposals to cut defense funding across-the-board.

Earlier, Administration witnesses testified that the Executive Branch will submit a supplemental budget request. Submission of such a request, coming on top of the normal FY '80 budget request, could cause major problems. An alternative would be to add those funds to the FY '80 budget.

In the area of Research, Development, Test, and Evaluation, Congress cut the $105.5 million budget request for continued B-1 research to $55 million. It also allowed only $20.6 million for RDT&E on the cruise missile carrier aircraft, half the amount requested. Some funds also were cut from the Strategic Bomber Enhancement program (meant to provide for the development and demonstration of critical technologies for present and future strategic aircraft), and from Test and Evaluation support. A $4 million request for Remotely Piloted Vehicle development was eliminated. Funds were added for advanced B-52 avionics, the Advanced Medium STOL Transport (AMST), a theater ballistic missile, and the GBU-15 glide bomb.

In the procurement area, Congress funded eight C-130H transports and twelve two-place TA-7D aircraft. Neither was requested by the Administration. On the other hand, Congress reduced the buy of A-10 aircraft from 162 to 144, cut $10 million from the $161.3 million request for EF-111 modification, and drastically reduced funding for modification of the Civil Reserve Air Fleet (CRAF) from the requested $68.5 million to $7.5 million. The number of air-launched cruise missiles (ALCMs) was cut a third, to twenty-four, and the $40.1 million request for the ground-launched cruise missile (GLCM) was nearly halved.

All three Air Force components were cut slightly in Operation and Maintenance funds.

In authorizing and appropriating funds, Congress also made some important decisions involving personnel. The lawmakers:

- Approved USAF personnel levels slightly higher than requested for active forces, somewhat lower than requested for the Air National Guard, and nearly the same as requested for the Air Force Reserve.
- Authorized dependents of junior enlisted people to accompany the military member overseas. This program was only partially funded, however, and Congress placed a limit on the total number of dependents allowed overseas. (*See also "Bulletin Board," p. 146.*)
- Again rejected attempts to phase out commissary subsidies over three years.
- Increased CHAMPUS benefits to the 80th percentile from the 75th, but attempts to restore reimbursement to the 90th percentile failed.
- Placed restrictions on abortions performed by military doctors, although the limitations were not as severe as the House had wanted.
- Rejected a proposal to stop commissioning physician assistants.
- Turned away an attempt to suspend involuntary release of Reserve officers passed over twice for promotion.

Intelligence Surveillance

A new law significantly changes the rules the government must follow in electronic intelligence-gathering. The controversial measure requires that a special court must approve wiretaps or other electronic surveillance techniques to obtain foreign intelligence in the US. It protects American citizens from electronic surveillance unless a court is convinced that the person is collecting intelligence for a foreign government.

Civil Service Reform

The Civil Service Reform Bill passed by Congress has two provisions of special interest to military people: For the first time, retired field grade and general officers will not be eligible for veterans' preference in federal hiring and retention. In addition, retired military people who are employed by the federal government will have their total income limited to the amount paid those in the top Civil Service grade.

Reserve SBP

A new law allows Reservists to participate in a Survivors' Benefit Plan. By so doing, they will protect their earned retirement income should they die between the time they become eligible for retirement through years of service and the time they reach age sixty, when they can begin collecting retired pay. The bill also improves the Retired Serviceman's Family Protection Plan.

Veterans

VA home loan guarantees have been boosted from $17,500 to $25,000 under a new law that also reduces from 181 to ninety the number of continuous days' service a Vietnam-era veteran must have to qualify. The bill improves home loan guarantees for disabled vets and mobile home purchasers, as well. Other veterans legislation boosts compensation payments and other allowances to disabled vets. ■

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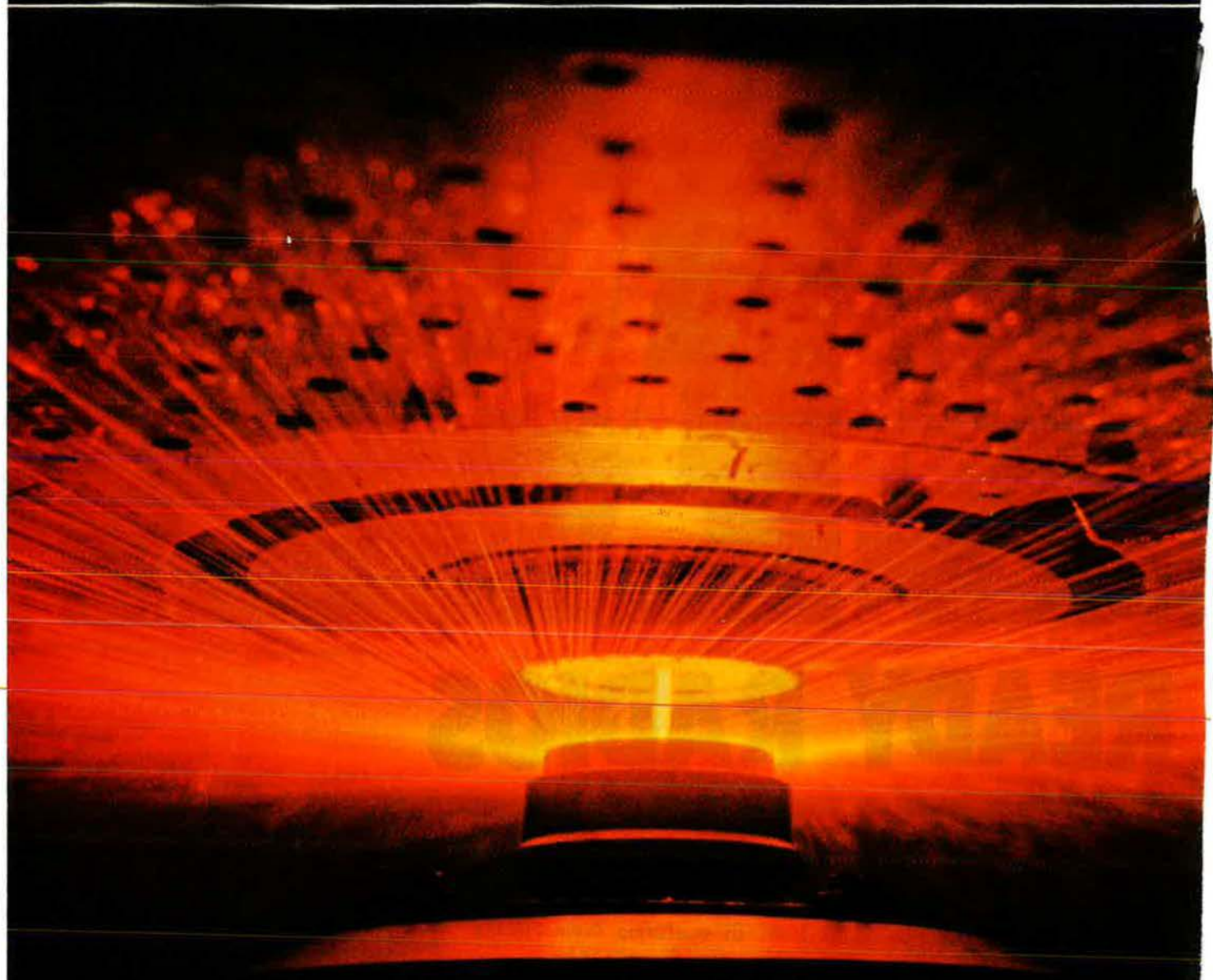

Shown above, a stream of molten alloy, created under vacuum, falls onto a rapidly spinning disk. This disintegrates the stream into fine particles and hurls them into helium quench gas, causing freezing to take place at rates near 1,000,000 degrees per second.

This produces new alloys with much higher percentages of very light elements, substantial increases in strength, higher melting points—in effect, a whole new class of materials.

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The next generation of military aircraft, now only a gleam in some designer's eye, is going to need engines with higher performance and greater durability than even our F100, the the best operational aircraft engine available anywhere today. So there's work to be done.

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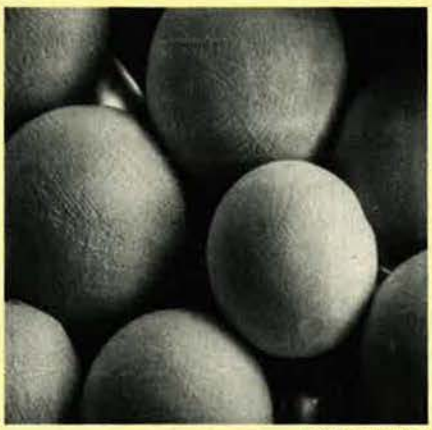

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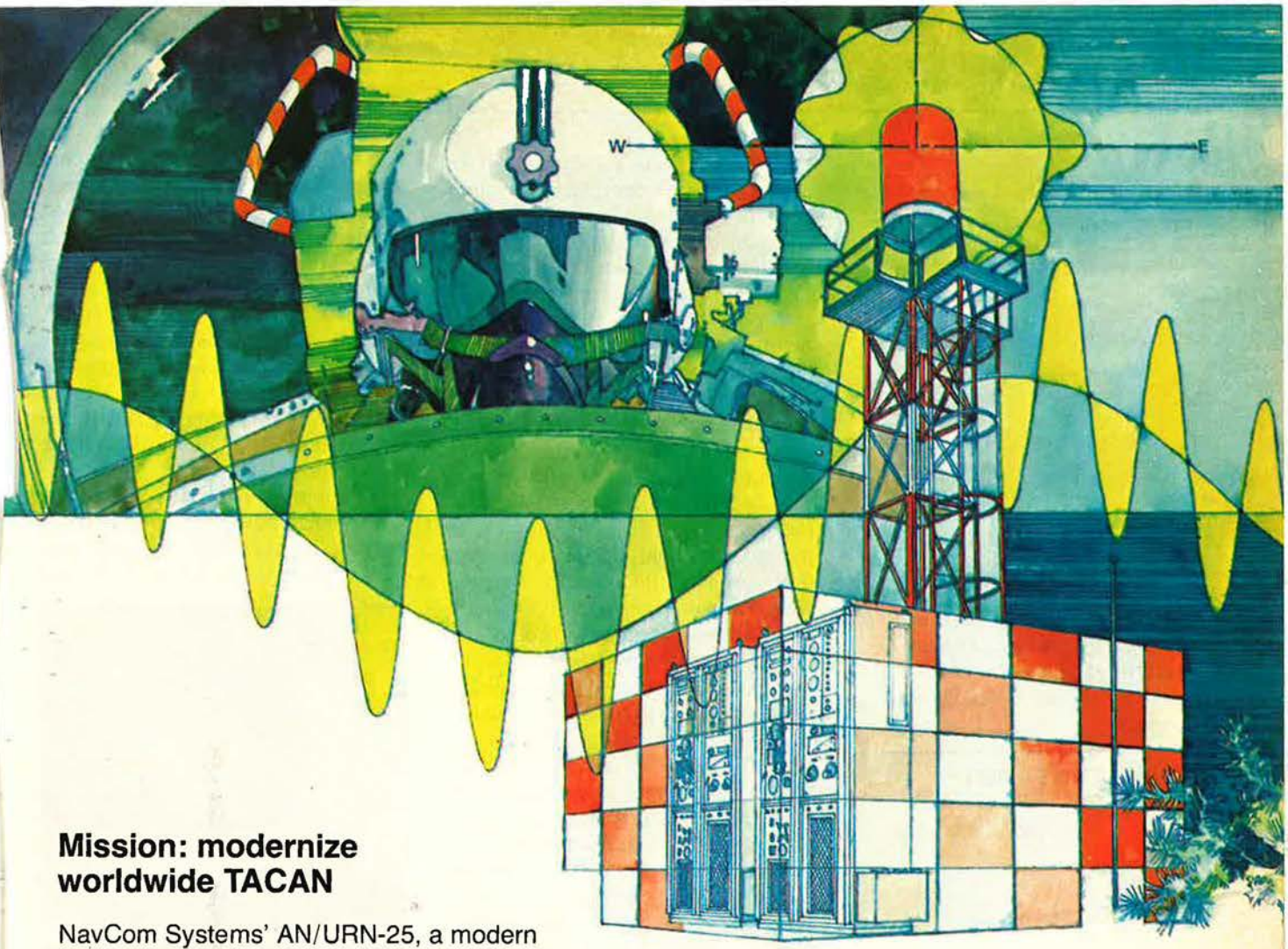

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USAF's R&D, Lean and Healthy

Although USAF's research and development programs are carried out under severe financial constraints, no technologies considered likely to lead to major advances or breakthroughs are being shortchanged by the Air Force Systems Command.

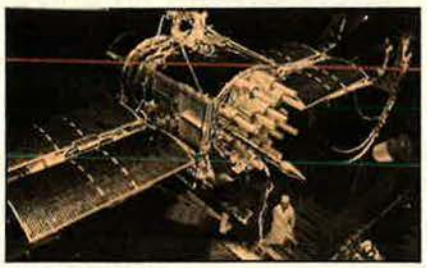
BY EDGAR ULSAMER
SENIOR EDITOR

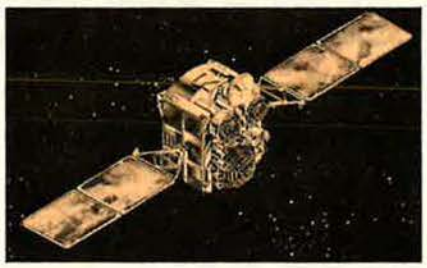
THE Air Force's commitment to space as an operational medium is being strengthened by subtle changes in national policy suggested by the recently issued Presidential Decision Memorandum (PDM) 37 (*see p. 49*) and the pending advent of the Space Shuttle. Gen. Alton D. Slay, Commander of the Air Force Systems Command, told this writer that the Shuttle could become "an open sesame to real-life military space missions." But he also warned that "we have tried, abortively, over the past twenty years to gain a firm military foothold in space, beyond such support functions as warning and command and control. Obviously this decision is largely outside of the Air Force's purview. There has to be national cognizance of the military space mission—over and above what we have now—before we can go much further. The recent Presidential Decision [*see also August '78 issue, p. 12*] helped clear things up, and we plan to build on that."

Even though premised on uncertain logic, public policy has treated space as a sanctuary from military combat. General Slay, for one, doubts that in the foreseeable future space-based strategic deterrence could become politically palatable, even if ballistic-missile-launching submarines were to become vulnerable and thus unable to perform the assured destruction mission. The AFSC Commander suggested further that "thirty years or so from now" even space-based strategic weapons at operationally useful orbital altitudes—geosynchronous or lower—could become vulnerable to attack. It is logical to assume that one goes after "nukes with nukes. With the accuracies possible today it is difficult to think of how we could protect a future space-based deterrent from nuclear weapons going off nearby." Short of presently unforeseeable self-protective systems, future space-based weapons not meant to be used preemptively or on warning might not offer any advantage over earth-based systems, General Slay suggested.

General Slay, whose command manages almost all US military space research and development programs, pointed out also that there are no technologies on the horizon that make it possible to engage in "typical war-fighting from space. It's difficult to envision a tank-busting spacecraft or weapon systems that could stop a Warsaw Pact thrust through the Fulda Gap [in Germany]." While "way-out" schemes about space-based weapons could be postulated for the more distant future, the AFSC Commander believes that prudence militates against extending "our horizon more than a dozen years out."

This type of realism is behind the Air Force's advocacy of its mosaic sensor program (MSP), meant to provide a "general upgrading" of the na-





Top: AFSC Commander Gen. Alton D. Slay on inspection tour. Middle: a Navstar GPS spacecraft undergoing test. Bottom: Artist's view of DSCS III satellite.

tion's early warning satellites by using low-risk, evolutionary technologies. The principal virtue of MSP, according to the Pentagon, is that its sensors "stare" rather than scan. The system would be able to take a panoramic look rather than using the less-sophisticated technique of sweeping like a searchlight, which allows observation of only what falls within the focus of the sweeping beam. As a result, MSP appears not only capable of providing *assured warning* of ballistic missile attack but also of yielding better real-time information, including attack assessment, during all phases of a nuclear war.

But MSP lost out, at least temporarily, to a high-risk, long-term approach sponsored by the Defense Advanced Research Projects Agency (DARPA), the mini-HALO and HALO (High Altitude, Large Optics) programs. Congress, in its just-concluded session, allocated all pertinent funding to the DARPA program. The reason for the setback, according to General Slay, was a misunderstanding by Congress to which "we in the Air Force undoubtedly contributed" about the timing and risk factors of the DARPA program. Since these misunderstandings have been cleared up recently, there are grounds for hoping that Congress will resurrect the MSP program. The Air Force, General Slay said, continues to support the development of both technologies since HALO, many years from now, might become a suitable follow-on system for MSP.

Vulnerability of Spacecraft

Both the United States and the Soviet Union are capable of developing the means for either disabling or interfering with each other's spaceborne command control communications and intelligence (C^3I) systems. Sole reliance on space-based systems for these crucial missions, General Slay argued, would represent "gross national stupidity. We never have relied, and never will rely, on a single mode of communications for SIOP [Single Integrated Operational Plan] control. We have a triad of SIOP communications for the same reason that we have a triad of strategic weapons, that is for fallback." While it is obviously possible to take out the other side's satellites, especially if the attacker resorts to nuclear weapons, the benefits that accrue to him may be problematical, General Slay pointed out.

The situation is no different from an attack on the huge billboard radars of BMEWS (Ballistic Missile Early Warning System) at Thule, Greenland, or Clear, Alaska, or for that matter from strikes against the Air Force Satellite Control Facility at Sunnyvale, Calif., or against DSCS (Defense Satellite Communications System) terminals. From the attacker's point of view, the AFSC Commander suggested, the question is, "Will the US go to war" if he drops a five-inch shell from a submarine on the Thule radar or shoots down a US satellite? "The answer probably is we won't, but we surely will flush our bombers and have everything else greased and ready to go when the other shoe drops. Such an act may not be an unequivocal signal of impending nuclear war, but it would be hard to come up with a better way for the Soviets to manifest intent than by shooting down one of our warning satellites."

Space Defense System

PDM 37, signed by President Carter on May 11, 1978, asserts that in the absence of agreements barring or limiting antisatellite weapons, the US "will vigorously pursue development of its own [space defense] capabilities." The policy document defines the program as including "an integrated attack warning, notification, verification, and contingency reaction capability which can effectively detect and react to threats to US space systems."

The Air Force, meanwhile, has set up a Space Defense System SPO (System Program Office) at AFSC's Space and Missile Systems Organization (SAMSO) with full cognizance over all relevant R&D carried out by the Air Force. Key element of the program is design and development of a US ASAT (antisatellite system) and, if and when authorized, deployment of such a weapon. Preliminary work leading to prototype development has started. There are, however, natural and economic limits to space defense, according to General Slay: "There are, in my personal view, cutoffs that limit space defense to thresholds well below the nuclear level. If somebody attacks a satellite with nuclear weapons I would have to say, forget it, it's gone. If one drops down in threat level, active defense or maneuvering spacecraft might work. Theoretically, if one applies truly long-term standards, beyond twelve years ahead, it might become possible to think even of defense systems on satellites that might kill nuclear warheads."

There is, of course, a means other than direct attack for denying an opponent access to his space-based systems: jamming. But the issue here, General Slay pointed out, is "relative power. Let's take the case of a communications satellite that might be fielded in the late 1980s. Not only would such a satellite have advanced crypto gear that is tough to cope with, but it would also use highly effective antijam features, such as 'spotlighting,' meaning that you illuminate only a certain portion of the earth. Anybody outside of the satellite's communications footprint—which might be one great big electronic dish on the ground that is locked on the beam—would require vast amounts of power and encounter enormous difficulties in his attempt to block the system. Even if an adversary were to succeed in getting in on the beam, we still could thwart him by directing the communications satellite to send its data to a protected satellite on the other side of the world that would then relay the information to the ground."

Major space systems that have advanced survivability and antijam features are the Defense Satellite Communications System, especially in its Phase III configuration, and the Strategic Satellite System. The latter is to provide reliable and survivable command and control of the nation's nuclear-capable forces during the 1980s and beyond through advanced antijam techniques. An important advance in spacecraft survivability could be realized from SAMSO's Fault Tolerant Spaceborne Computer (FTSC) program. The lifespan of present-generation spacecraft com-

puters—even if several are used for redundancy—rarely exceeds three years, with the result that most data processing has to take place on the ground. FTSC will be long-lived—between five and seven years—and capable of correcting internal failures by electronically replacing computer modules that become defective. Fault-tolerant computers will allow future satellites to perform autonomous navigation and maneuvering, as well as on-board data processing, and thus boost satellite survivability.

Navstar GPS

The satellite system under development by AFSC with probably the broadest potential for both military and civilian users is the Navstar Global Positioning System (GPS). When fully operational in 1986, this twenty-four-satellite radio navigational network will permit missiles, aircraft, ships, and ground units to determine their position within approximately ten meters in a three-dimensional sense. GPS is being provided with advanced antijam capabilities. The program, General Slay said, so far has not only met all of USAF's expectations but exceeded them in several areas. Potential users range from all US services to allied forces, NASA's Space Shuttle, and civil aviation. The Defense Department announced that GPS will be used also for the Navy's Improved Accuracy Program to evaluate guidance and control errors for broad ocean area testing of the new Trident Fleet Ballistic Missiles.

With its superb accuracy, Navstar obviously could provide midcourse guidance for missiles and other expendable weapons. But, as General Slay pointed out, the question is, "Do we really want to go this route or is it better to go after accuracy improvements through integral, internal guidance systems—as the Air Force has done in the past—in order to avoid dependence on external, reasonably vulnerable systems?"

Full-scale development of Navstar, currently consisting of three satellites on orbit, is expected to get under way in the spring of 1979 following review by the Defense System Acquisition Review Council (DSARC II).

Laser Weapons

One of the advanced technologies often linked to future space defense systems is the high-energy laser whose lethal energy can be brought to bear on distant targets with the speed of light. But laser weapons are not likely to reach operational status before the end of the next decade. While all military services, along with DARPA, are participating in closely coordinated technology programs with the goal of developing various types of laser weapons, the Air Force carries out the largest share of the effort.

Progress of the laser weapons program, which in rudimentary form got under way more than fifteen years ago, has been slow but not disappointing, according to General Slay: "The laser is coming along about as we expected four years ago. It is having problems and successes as we expected." The Air Force, he pointed out, is refining its "planning of how to take advantage of the latest results of the technology program. We are looking at ways to get more out of the program and at what the next step should be. But we are not making a major reorientation of the program."

The rate of progress of the technology program is "pretty well proportional to the amount of funds we have available. Our present funding level is about right. I am not sure that we would be able to guarantee a significant cost-benefit from a funding increase."

The basic challenge in coming up with efficient operational laser weapons, General Slay said, is a combination of factors that include a highly compact power supply, "the ability to focus that power in an optimized fashion, and tracking the target with enough accuracy to get the job done. Thin-skinned structures such as aircraft are relatively vulnerable to lasers. On the other hand, they are difficult to track long enough and accurately enough for the available power to be effective. The length of time a laser weapon has to track a target is a function of its power output and of the target's hardness. Whether or not laser weapons will ever be able to punch holes through a tank turret is questionable; it could be done, if we can keep the laser on the tank long enough or raise the power levels high enough."

Over the long term, the AFSC Commander suggested, it should be possible to make laser weapons small and powerful enough to substitute for some guns, bombs, and missiles. In addition to its speed-of-light quality, a laser offers weapon designers another unique advantage: The problem of target tracking is virtually eliminated if the laser can disable the target within split seconds. The drawbacks of laser weapons, at least at the prevailing level of technology, are their weight and the size and complexity of the support equipment needed to generate power and to perform the tracking function, according to General Slay.

Particle beam weapon technology lags behind lasers, General Slay said, but might offer the advantage of greater lethality. The laser emission, like ordinary light, has no mass and simply piles vast quantities of photons—infinitesimally small units of energy explained by quantum physics but never actually measured—on a target. Particle beam weapons are the next logical step after laser weapons technology since they use the mass of subatomic particles, such as protons, electrons, and neutrons, to magnify the transfer of energy and thus increase effectiveness. Because particle beam technology is still in an embryonic state, General Slay declined to speculate on when it might reach operational status.

An AMST Comeback?

The Air Force is examining the potential in revamping the presently dormant AMST (Advanced Medium Short Takeoff and Landing Transport) program for which no funding was provided in FY '79. Originally, AMST was meant to accommodate army tanks and other outsize cargo as a follow-on to the C-130 intratheater transport. Boeing and McDonnell Douglas each built two prototype aircraft. The Air Force, along with the two industrial contractors, is looking for means to turn AMST into "more of a strategic airlift augmentation vehicle, a hybrid that could perform both intercontinental and intratheater missions," General Slay

said. A larger wing area and stretched fuselage are being studied to make possible operating from US bases to points in Europe close to the front—in case of a NATO/Warsaw Pact war—where AMST then would function in an intratheater role.

An AMST with increased range also shows promise as a cruise missile carrier aircraft (CMCA), according to General Slay. AMST competes against large, wide-body transports of the C-5 and 747 type for this mission. The smaller AMST, he said, "has the advantage of greater survivability because it can be dispersed widely and operated from semiprepared strips. On the other hand, if you assume that either carrier would survive, a large CMCA would be more cost-effective."

USAF's currently dormant AMST program may be modified and resurrected. At top: YC-15; above: YC-14.

Mockup of AMRAAM is being tested on an F-16. USAF is developing this air-to-air missile for joint service use.

So far as the air-launched cruise missile itself is concerned, AFSC is exploring a number of approaches to boost its survivability and penetration capability, General Slay said. The "obvious first step" involves such add-ons as electronic countermeasures and adaptive systems that would sense and react to the presence of tracking emitters. Modifications to lower the vehicle's infrared and radar cross section also would be beneficial. Raising the cruise missile's penetration speed to a supersonic level would contribute in a major way to the weapon's effectiveness, according to General Slay.

USAF's ASALM, an advanced strategic air-launched cruise missile using hybrid rocket/ramjet propulsion technology, could become a candidate, along with extended range SRAM (Short-Range Attack Missile) designs, for eventually augmenting or replacing current cruise missile types. For the moment, ASALM's principal role is seen as an air-to-air weapon against SU-AWACS, a Soviet command and control aircraft similar to USAF's E-3A. These aircraft are considered the linchpin of the USSR's air defenses against US cruise missiles.

The Enhanced Tactical Fighter Program

One of AFSC's most intriguing and challenging prospective development programs is the "Enhanced Tactical Fighter" (ETF) project. What makes ETF so interesting is lack of definition. It is not certain "whether we are talking about an air-to-ground machine or an enhanced air-superiority fighter," according to General Slay. All the concepts under consideration, each with a strong constituency of its own within the Air Force, "are technologically doable," he added. The Air Force is trying to sort out various options and requirements in order to crystallize several loosely defined concepts into a firm road map that can lead to specific hardware designs.

The presently preferred approach to the Enhanced Tactical Fighter is confined to major modifications of existing aircraft. But not even that is nailed down securely since one school of thought favors a more radical departure, the expeditious development of a new from-the-ground-up advanced tactical fighter incorporating all pertinent technology advances of the past few years. The other options under review, according to General Slay, include various modifications of the F-15, F-16, F-18L, and A-10. "All of these systems can be improved. But if we delay too long, new needs are bound to arise and conflict with ETF. We must decide soon whether we want to treat ETF as an interim, incremental step to an advanced tactical fighter or whether we see it as a natural follow-on buy after we have acquired 650 F-16s, to which we are committed in the present configuration. From that point forward, to a programmed total of 1,388, the question is open. We also know that we are going to buy 733 A-10s and that in case we select these aircraft for the ETF role, we would have to retrofit them. If we were to modify the F-15 to turn it into what we know it is potentially capable of, namely *the* air-to-ground machine *par excellence,* we probably should buy additional aircraft for this purpose."

Another ETF option involving the F-15, he said, centers on grafting elements of the AFTI (Advanced Fighter Technology Integration) program on the airplane in order to make it "a still better air-superiority system later on." Other questions, especially if the decision is made in favor of a radical departure, involve the desirability of providing the aircraft with V/STOL capability and/or giving it significantly greater speed. Still another difficult question hinges on how far "we should go in all-weather/night attack capability. We could start out with night attack features and leave all-weather—which is more difficult and costly—for later, or we might want to mesh both capabilities from the outset," the AFSC Commander explained.

The current process of sorting out various approaches is likely to culminate in one or more specific designs before the 1981 POM (Program Objectives Memorandum setting forth the Defense Department's weapons requirements and budget request) is

formulated by about mid-1979, General Slay suggested.

One fundamental combat aircraft trait that USAF and AFSC view with reservation for ETF—as well as for any other new design—"is to dilute an air-superiority fighter by configuring it also as an air-to-ground weapon and vice versa." After tailoring and using certain aircraft types for specialized functions in World War II, and to a lesser degree in Korea, the Air Force, beginning in the mid-1950s, shifted to multirole all-around aircraft. But the era of omnibus fighters was shortlived. The A-7—a specialized air-to-ground weapon system—was not embraced enthusiastically by the Air Force at first, but it still "turned out to be a first-class machine. With the A-10 we continued the trend toward dedicated ground-support aircraft. In the case of the F-15, we started out as a two-way machine—and even developed specialized pylons for the air-to-ground mission—but during its development made the decision to confine the aircraft to the air-superiority mission. The reason was that we needed the best air-superiority machine we were capable of building. It is that, and also the only fighter that can operate under all-weather conditions as well as dogfight," General Slay, a veteran fighter and test pilot, pointed out.

Strengthening the Air Force belief that the day of the multimission aircraft is drawing to a close is the recognition that aircrews no longer can be made equally proficient in both air-to-air and air-to-ground operations. "The complexity and proliferation of air-to-ground weapons, the range of tactics associated with this mission, and the need to train crews at very low altitudes—with virtually no time for anything else—militate against the multirole approach. Conversely, air-to-air combat is no longer just a matter of eyeballing and blazing away at the enemy, but has evolved into a highly stylized gladiator type of combat requiring lots of specialized training," according to General Slay.

In recognition of the widening gap between air superiority and air-to-ground combat skills, the Air Force, in the last few years, has tended to separate these functions. This emphasis on specialization is likely to extend even to the F-16, a "swing fighter" envisioned originally as equally suitable for both air-to-air and air-to-ground combat, according to General Slay. Most F-16 units probably will be trained primarily for one mission, but will have a secondary capability in the other, he predicted. "This is not to say that we might not reach a point where we will have to strap iron on everything that can fly, including all F-4s, to stop the Warsaw Pact tanks," General Slay said.

The Engager/Assault Breaker Concept

One of the Air Force's top-priority, proposed developments—recent setbacks in Congress, and procedural difficulties notwithstanding—is WAAM, for wide area antiarmor munition, General Slay told AIR FORCE Magazine. WAAM's objective is both ambitious and crucial: Stop the Warsaw Pact's second echelon armor and provide multiple kills per pass under adverse battlefield conditions. Four concepts are under consideration as part of WAAM: the Antiarmor Cluster Munition (ACM) design centers on cluster weapons which integrate self-forging multislug submunitions with dispenser and fuzing systems far more effective than presently available.

Cyclops, a scheme involving clustered antiarmor sensor-fuzed submunitions, is another WAAM design that employs both advanced dispensers and sensor-fuzed armor-defeating submunitions. Each submunition contains a sensor that cues an armor-killing warhead. Once the submunitions leave the dispenser, their sensors begin to scan the ground for telltale signs of targets they have been programmed for. When the sensor detects such a target, the fuzing mechanism directs a single slug against it. The dispenser design assures dispersion of the submunitions over a wide area.

WASP is a minimissile concept that relies on self-contained target acquisition and tracking. A number of approaches are being studied by USAF involving both salvo and individual launch of the missiles. In the case of the former, a standoff dispenser would be used to assure that the minimissiles fan out over a wide area. Under the WASP concept, the minimissile is to be equipped with a shaped-charge warhead and a seeker operating in either the millimeter wave or two-color infrared regimes that automatically detects, locks on, and homes on armored targets.

Finally, the Extended Range Antitank Mine (ERAM) concept is predicated on a sensor/classifier that detects and classifies targets in terms of bearing and range. These air-delivered target-activated munitions can destroy armored targets from remote

Top: Antiarmor Cluster Munition (ACM). Middle: Cyclops antiarmor submunitions. Bottom: WASP self-contained minimissile.

ground positions. When the target passes into ERAM's lethal range, a forged slug or multiple-shaped-charge warhead is released and cued toward the target. ERAM's extended range permits off-road mining and the ability to resist the enemy's mine-sweeping operations. ERAM could be further protected by covering-fire mines (CFM) and antipersonnel mines.

USAF's WAAM program, General Slay pointed out, is coordinated with related Army developments under the umbrella designations of Engager/Assault Breaker. The former is the term used by USAF and the Army while the latter term is preferred by DARPA and the Office, Secretary of Defense (OSD). USAF's concern with this broad-gauged approach is that by intertwining USAF and US Army capabilities the end result would be a system that neither service can operate autonomously. Yet a number of credible contingency war scenarios are predicated on the assumption that only one service would be at the scene initially. Under such conditions, the effectiveness of both services would be compromised. The nature and scope of Engager/Assault Breaker are not yet clearly defined beyond the notion that any technology suitable for neutralizing the Warsaw Pact's second echelon qualifies as a candidate for this weapon systems complex. Other USAF programs—in addition to WAAM—likely to be considered for Engager/Assault Breaker are the TR-1 (a modernized U-2 equipped with side-looking radar), the Precision Location and Strike System (PLSS), and the Lincoln Laboratory/Rome Air Development Center airborne moving ground target indicating radar, according to General Slay.

New Air-to-Air Weapons

The Defense Department has recognized that both the Air Force and the Navy need a new all-weather medium-range air-to-air missile to replace the AIM-7F. Hence, a joint USAF/Navy program, the Advanced Medium Range Air-to-Air Missile (AMRAAM), whose development was started last year. AMRAAM, according to General Slay, will top the performance of the AIM-7F "in all aspects, from high average velocity and greater maintainability and reliability to launch-and-leave and multiple target attack features." The new weapon, which is being developed with a sense of urgency "but not as a crash program," is to be used by the F-15 and F-16, he said.

Initial plans to develop an advanced short-range air-to-air missile have been shelved for the time being because USAF's analyses showed that the existing AIM-9L "is about as good a system as we were considering. We, therefore, decided to go back to the drawing board and look for technologically more advanced approaches for a follow-on to the AIM-9L," according to General Slay.

IRBM vs. GLCM

Congress has shown interest in the development of medium-range and intermediate-range ballistic missiles (MRBMs and IRBMs) as a means of offsetting the Soviet Union's new MIRVed, 3,000-mile-plus weapon, the SS-20. The Air Force, concerned primarily with fitting GLCM, the ground-launched cruise missile, into its inventory and doctrine, has taken a wait-and-see attitude toward IRBMs for several reasons. There is still some uncertainty about SALT II's effect on GLCM's range, although there are clues that the weapon will be limited to a range of 600 kilometers. Such a curtailment would put the operational value of GLCM in question. There is further uncertainty about SALT II's impact on the use of such weapons by other NATO members that are not signatories of the pending bilateral accord and thus not bound by its terms. While SALT II reportedly contains clauses limiting if not prohibiting the transfer of cruise-missile technology by the US to its allies, it would seem likely that such technologically advanced nations as Germany and England could develop and produce such weapons provided they have access to the digital terrain information—considered a US exclusive at present—on which these weapons depend for their precise guidance.

Finally, the US Army's new Pershing II medium-range ballistic missile has a potential for range growth beyond 400 miles. Whether or not this weapon's range could or should be increased so that it can reach deep into European Russia—the Warsaw Pact's second echelon—remains uncertain. From the Air Force's point of view, the crucial question behind a US IRBM, General Slay pointed out, is the political determination of "whether or not we want a weapon that can attack everything west of the Urals, thereby giving us an effective counter to the Soviet Union's IRBMs." Tentative AFSC analysis suggests that GLCM can be made more mobile than an IRBM, mainly because of the difference in guidance systems, and the fact that air-breathing missiles are lighter than rockets of the same range/payload class for the ranges of interest. Also, GLCM probably would cost less to acquire and operate than an IRBM. But an IRBM, once launched, would be far less vulnerable to interception than a cruise missile. No decision on these weapons appears likely until after the conclusion of the SALT II negotiations.

R&D Funding Is Imperative

AFSC's quintessential function is to keep technology moving at a pace adequate to assure that USAF's capabilities years hence will meet foreseeable as well as unforeseeable requirements. General Slay pegged the Air Force's funding needs at ten percent real annual growth in basic research, known as category 6.1, and at five percent in applied research, or category 6.2. There has been real growth since 1975 in both categories, but at a rate lower than stipulated by these guidelines because of congressional funding cuts. "Of course, cuts in a given year lead to a lower baseline in the following year's budget and thus leave further funding reductions in their wake," according to General Slay.

In spite of these cuts, USAF's R&D program is reasonably healthy and adequate to explore all key areas thought to be capable of leading to decisive technological breakthroughs, the AFSC Commander asserts with confidence. ■

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The US is still regarded as the Arsenal of Democracy by much of the world. But new trends are changing that role: sharp controls on American arms sales and competition by the Soviet Union and Western Europe. The result is confusion at home and abroad as foreign countries turn to new suppliers.

Behind the Confusion Over US Arms Sales

BY BONNER DAY, SENIOR EDITOR

US POLICIES on foreign military sales are causing confusion among friends and allies abroad and Americans at home.

Some governments, particularly in Europe and the oil-rich countries of Iran and Saudi Arabia, are being allowed, and even encouraged, to buy all the arms they can afford. Other countries, some with long ties to the US, are being delayed or turned down when they attempt to buy weapons.

A few countries have been cut off from US arms for human rights policies that do not measure up to congressional or Administration standards. Others, with equally questionable policies, are making record purchases.

Adding to the confusion is an arms-sales ceiling set by the President that, because of various exceptions, permits total sales that are above previous levels. Thus, the Carter Administration, while claiming it is holding down arms sales, has reported record sales to Congress. American companies, meanwhile, find some traditional markets being cut off, and some long-term customers turning to other countries.

Says one aerospace executive: "Britain and France are just delighted with the new policy. It has opened up new markets for them."

In some cases, US friends are even turning to the Soviet Union to fill what they feel are legitimate arms needs.

The concern over unilateral arms restraints is not just a question of which arms manufacturing country profits from military exports. Military leaders are increasingly concerned about the effect of the policy on the security of US allies and upon US influence in foreign countries. The present policy also puts US friends in a "catch-up" position, as it forbids the sale of new advanced weapons to any country until other countries in the same geographical area begin to acquire comparable weapons.

In one recent case, the Carter Administration denied the sale of Vought A-7 aircraft to Pakistan in mid-1977. Since then, neighboring India has bought British Jaguar jets. This raises the possibility that Pakistan now may be allowed to buy the A-7s, if it wishes to reapply.

The arms restraint policies are under review by the State Department. The US government has orders for $43.5 billion in weapons to be delivered between 1978 and 1986. But critics insist the restraints already have resulted in a decline in US influence in those countries that have turned to other arms suppliers. Some of these new relationships may be irreversible. Defense officials also note a disturbing trend among former customers to set up domestic arms industries.

Presidential Controls

The turmoil in international arms sales was brought to a head in May last year, when President Carter ordered new controls for arms sales. As a candidate in 1976, Mr. Carter repeatedly criticized America's role as "the world's arms merchant." His complaint: "We cannot be both the world's leading champion of peace and the world's leading supplier of weapons of war."

In the May order, President Carter announced: "I have concluded that the United States will henceforth view arms transfers as an exceptional foreign policy implement, to be used only in instances where it can be clearly demonstrated that the transfer contributes to our national security interests." He emphasized that, "in the future, the burden of persuasion will be on those who favor a particular arms sale, rather than those who oppose it."

Later, the President ordered a reduction of arms sales to foreign customers of eight percent from the FY '77 level. But the ceiling was set in a way that confused many and pleased few.

First, a number of countries were excluded from the ceiling. They are the members of NATO, Japan, Australia, and New Zealand. In the case of Israel, the Administration announced that its security needs would be unaffected by the ceiling, but requests would not be honored automatically. Next, all military sales traditionally counted as military transactions, but which do not involve weapons (*i.e.*, communications systems, support facilities, etc.) would be excluded for accounting purposes. Finally, in calculating the ceiling, the effect of inflation was projected at six percent and discounted.

This made an FY '78 target ceiling of $8.5 billion, which the Administration says it achieved despite a one-year overall increase of $2.2 billion in arms sales, and total military sales of $13.4 billion for arms and support items.

The ceiling has meant that for every country that is permitted to increase its arms sales—and there were a number—one or more countries were not permitted to buy as much as the year before. Some countries were asked to assist the Administration in staying under the

The F-5E Tiger II fighter, operational since April 1973, has become a big seller among US free world allies.

ceiling by delaying the signing of purchase agreements until after the fiscal year ended September 30.

The Administration has estimated that total sales will increase in FY '79 by $100 million, for a total of $13.5 billion. Compared to the potential market, that is a very conservative figure. If the estimate holds, it will mean many potential customers will be turning to British, French, and other foreign producers.

Already British Aerospace, Britain's umbrella organization for the aircraft industry, reports profits before taxes of $118 million between April 1977 and April 1978. This boost of seventeen percent was helped by the sale of up to 200 Jaguar fighters to India. French participation in the production of Jaguars, plus sales of Mirage fighters, similarly have helped the French aerospace industry. "Our military sales are better than our commercial sales," one British company representative remarked.

But US industrialists already are banking that the Carter Administration, pushed by complaints from foreign governments, inroads by the Soviet Union, and strains caused by the growing US international trade deficit, will make an increasing number of exceptions to its arms-restraint policy, even if the policy itself is not publicly abandoned.

If the restraints are loosened, US arms sales could grow at least as much as the $2.2 billion increase recorded over the previous year.

Middle East Arms

The Middle East remains a major market, with the potential for tremendous growth. Ironically, the more the US tries to bring peace to that hotspot of international tension, the more arms it finds itself selling. Soviet arms programs in Syria, Iraq, South Yemen, and Ethiopia, moreover, have created a demand for Western arms in neighboring countries that feel their security threatened.

Israel, which has long had close diplomatic ties to the US, is one of America's biggest arms customers. It has fought four major wars with its Arab neighbors in the past thirty years, making it a wary, if not critical, observer of US arms control efforts. The State Department reported this year that the US has loaned Israel $3.5 billion for foreign military sales, and provided an additional $2.95 billion in loans for which no repayment is required. The US also has furnished another $785 million in Security Support Assistance, a special defense-related form of aid to help reduce balance-of-payments problems generated by that country's military purchases in Europe. Israel is buying forty McDonnell Douglas F-15 and seventy-five General Dynamics F-16 fighters, and other military equipment, and has already expressed an interest in more. In FY '78 alone, US sales orders to Israel totaled $1.7 billion.

Saudi Arabia is a long-time friend of the US and a major supplier of oil to the US and Europe. It plans to modernize its air force, expand its navy, mechanize two army brigades, and build a wide range of military support facilities. Saudi orders are for cash. The country has signed for sixty F-15 fighters, beginning in 1982, among other purchases. In 1977, actual sales agreements totaled $1.8 billion. The Pentagon reports the country has bought $4.1 billion in US military equipment in FY '78, and is expected to buy $5.4 billion worth in FY '79.

Iran, a US ally and leading supplier of oil, bought $2.6 billion in US military equipment during FY '78. State Department officials say these large purchases are justified, because of the massive influx of Soviet arms to Iran's neighbor, Iraq. Major Iranian purchases include 160 F-16 and eighty Grumman F-14 Tomcat jets. The State Department has turned down some military purchase requests, however, and has warned Iranian officials of the difficulties they face in absorbing so many new weapons in such a brief time-span. Iran has indicated it may be cutting back on future arms purchases, diverting some investments instead to the civilian sector.

Egypt is considered a growing market for US military equipment as a result of improved relations with Washington and Israel. Egypt began signing military sales agreements with the US in FY '77, for sales totaling only $40,000. That figure was dramatically increased in Fiscal 1978, to $937 million. The US has agreed to sell fifty Northrop F-5E fighters to Egypt as part of the three-nation Middle East arms package Congress approved this summer.

Sales to the Yemen Arab Republic, financed by Saudi Arabia, are expected to be stepped up in the years ahead. Sales totaled $1.2 million in FY '78, and are expected to rise to $150 million in FY '79. Yemen is threatened by South Yemen, which has been receiving military arms from the Soviet Union.

The Sudan is another beneficiary of Saudi loans for

military purchases. Sudan, which had received Soviet arms until relations between the two countries deteriorated, has turned to the West in the past eighteen months. To meet the threat of guerrillas supported by neighboring Libya, Sudan is buying a squadron of F-5 fighter aircraft during the next year, with Saudi financing. Foreign military sales to Sudan in FY '78 totaled $187 million.

Sales in Europe

Major sales are expected to continue in Western Europe. The US has encouraged NATO members to increase military spending in the face of the massive Warsaw Pact buildup in Eastern Europe. At the same time, US arms manufacturers have a freer hand in competing against European firms in Europe.

The Bonn government bought helicopters, missiles, radars, and other advanced military equipment in FY '78. A German firm, Messerschmitt-Bölkow-Blohm, is working with McDonnell Douglas on a jet-fighter study. West Germany, one of America's major defense customers, negotiated US military equipment agreements totaling $676,654,000 in FY '78.

Improved relations with Greece and Turkey are expected to result in major increases in military sales in those countries.

Greece plans to buy F-4E fighters and RF-4E reconnaissance planes, helicopters, and other military equipment totaling $270 million in FY '79. About half of this is expected to be financed by US loans.

Turkey bought $133 million in US arms in FY '78 and is expected to buy F-4 jets and other military equipment totaling $200 million in FY '79.

Spain, under the terms of the 1976 treaty with the US, was granted credit for up to $600 million in military purchases over a five-year period. Spain's shopping list includes interceptors, tactical fighters, and other military equipment. Sales in FY '78 totaled $190 million.

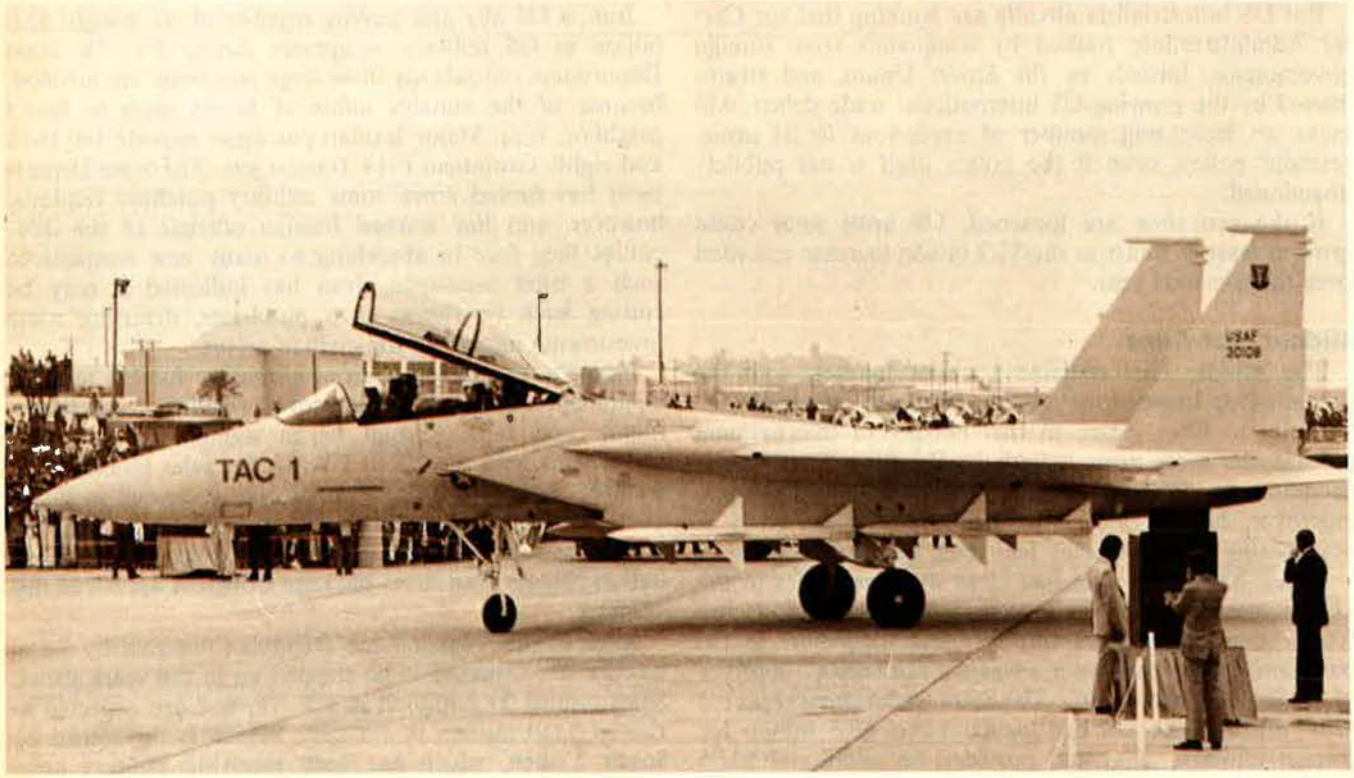
Asian and African Sales

In Asia, traditional customers of US military equipment have run into a wall of indecision in the Carter Administration. On the one hand, policymakers want US allies to be strong militarily in order to deter Communist dictatorships in North Korea and Vietnam. On the other hand, the Administration doesn't want US arms sales to hurt its efforts to improve relations with the Communist-ruled People's Republic of China. As a result, some proposed purchases are continually delayed, others turned down outright.

The Republic of China on Taiwan has been a particular victim of indecision in US arms policies. It has long expressed a need for a modern fighter, and has studied the F-16 and McDonnell Douglas-Northrop F-18. So far, the Administration has turned thumbs down. In an effort to satisfy the Administration's apparent requirements for a plane good enough to satisfy Taiwan but not so good it will upset Peking, Northrop has been asked to develop a new "G" version of the internationally popular F-5. Taiwan already is producing the F-5E under license. Still, Taiwan purchases have remained high so far, totaling $341.7 million in US military sales in FY '78.

South Korea plans to spend $5 billion on military equipment by 1981, to prepare for the eventual withdrawal of US ground troops. US military sales to Korea totaled $400 million in FY '78, and may rise to $1 billion in FY '79.

Japan is buying the F-15 under a licensing arrangement that will let it eventually produce its own. It will receive eight planes built in the US and parts to build another



Rated the world's hottest fighter since the first was rolled off the production line in 1972, the F-15 is sold abroad, but only to the closest allies of the US, including Israel, Saudi Arabia, and Japan. Other friends cannot buy the plane.

Israeli Prime Minister Begin and Egyptian President Sadat embrace (above) during signing of summit agreement, credited in part to US arms package. Meanwhile, Nationalist China President Chiang Ching-kuo (left) has been blocked in his nation's efforts to buy new US jet fighters.

eight while setting up a production line. Another eighty-four will be built solely in Japan. US arms sales to Japan totaled $334 million in FY '78.

The arms sales ceiling, combined with large sales in the Middle East and other arms sales restrictions, have sharply limited sales in Africa, even though twenty-two countries have been ruled eligible by the State Department.

Sales to Zaire, a pro-Western state still shaken by a guerrilla invasion from neighboring Angola, totaled $31 million in FY '78. This is more than double the sales to Zaire the previous year.

Nigeria, an oil-producing state run by a military government, is expected to increase its military purchases from $4 million in FY '77 to more than $50 million over the following two years. Nigeria has indicated one of its major purchases during this period will be Lockheed C-130 cargo aircraft. Nigeria also is a Soviet customer. Its fighter squadrons are equipped with MiG-17s and -21s.

Kenyan military purchases totaled $2.1 million in FY '78. The country has announced plans to beef up its armed forces to defend against neighboring Somalia and Uganda, which have been equipped with Soviet arms, including MiG-21s. Kenya has indicated it wants to buy F-5E fighters.

Latin American Sales

In Latin America, the US has been risking relations with long-time friends in an effort to avoid fueling arms races between feuding neighbors, and to put teeth behind the concern of the Carter Administration over human rights. As a result, sales to Argentina, Brazil, and Chile have stopped, purchases by Peru and Ecuador have been delayed, and overall sales in Latin America have declined.

In reaction to US policy, tiny El Salvador has publicly renounced future US security assistance. El Salvador and neighboring Honduras, both with a history of border conflicts, are buying arms from Europe instead.

Other countries have turned to West Europe and, in the case of Peru, to the Soviet Union for arms, a trend that US firms say may be hard to reverse in future years. One US aerospace company executive comments: "Latin America has given up on the US."

Colombia is the largest purchaser of US military arms. It signed agreements for $7.7 million worth in FY '78. The State Department has estimated sales will increase to $19 million in FY '79.

Refused permission to buy US jets, Ecuador has responded by going to France for sophisticated fighters.

The country with the largest population, Brazil, has stopped buying US military equipment in reaction to Washington's policy of requiring reports on the human rights policies of each country receiving US-produced arms. In FY '77, sales to Brazil totaled $14 million, but dropped to $10 million in FY '78.

West German, French, Belgian, Italian, and British interests are working in Brazil today to establish joint arms manufacturing plants. Brazil is now selling military equipment to Chile, Uruguay, and Sudan, and Brazilian officials predict their arms exports will total $1 billion a year by 1980.

Argentina, also under criticism for its human rights policies, was denied US military arms by Congress this year. Sales to Argentina in FY '78 totaled $5 million. Both Argentina and Brazil had completed sales agreements for F-5 jets before the cutoffs went into effect. But the State Department estimates that $813 million has been lost in sales to Argentina alone as a result of US restrictions.

Chile received $62 million in loans and $154 million in grants for military equipment between 1953 and 1973, but, for the past two years, all military sales have been cut off, in an expression of dissatisfaction with the present anti-Communist military government.

One official says: "Chile has become a symbol of the human-rights question. It is a bad regime, but no worse than a lot of other countries. But like Spain in the 1930s, it is experiencing a clash of left and right ideologies that has become a magnet for political expression in this country."

Not all military governments are so treated. Panama, ruled by a military junta, will receive up to $50 million in military loans over ten years, part of the treaty package with the US that turns the Canal over to Panama.

Peru, under a left-leaning military government, is expected to buy $15 million in military equipment in FY '79, of which an estimated $7 million will be financed by the US government. Sales to Peru in FY '78 totaled $12.4 million, despite Peru's recent policy of buying arms from the Soviet Union. The US has even permitted Soviet fighter

planes bought by Peru to refuel at US airports on the way from the USSR to Peru.

Rationale and Results

One official offered this explanation of the Administration restraints: "The current policy is based on the view that if major arms suppliers all exercise restraints, the overall world arms stockpiles would be lowered and international tensions would be eased. The President felt somebody had to move first, and he elected to exercise unilateral restraints as an example to the other arms-producing countries."

What has been the result? Says one Defense official: "Many foreign governments have expressed concern about their ability to get sufficient weapons for their national defenses. But arms-producing countries have yet to respond" to the Carter restraints.

The US has held three meetings with the Soviet Union on conventional arms transfers, and a fourth meeting is set for Helsinki in December. According to an Administration official: "There is no evidence that the Soviet Union has exercised any restraints, but it has expressed a willingness to discuss the subject."

Industry executives are more critical. An aircraft company official says: "The restraints have been a bonanza for British and French companies. They are opening up markets they never had a chance in before."

Dr. Herbert Y. Schandler, speaking for the American League for International Security Assistance in Washington, D. C., recently reported: "There has been no evidence of multilateral restraint or even much interest in multilateral restraint on the part of other nations which sell arms."

But there is evidence that foreign companies are taking advantage of America's unilateral actions: The Franco-German Transall cargo transport aircraft, which had been out of production for several years, has been reactivated and is being marketed aggressively since the US restricted sales of Lockheed C-130 aircraft.

Libya signed a $358 million contract for the Italian G-222 military transport, substituting British Rolls-Royce engines after the US refused to let the Italian firm export the American-built General Electric engines that equipped the original models.

An Uncertain Future

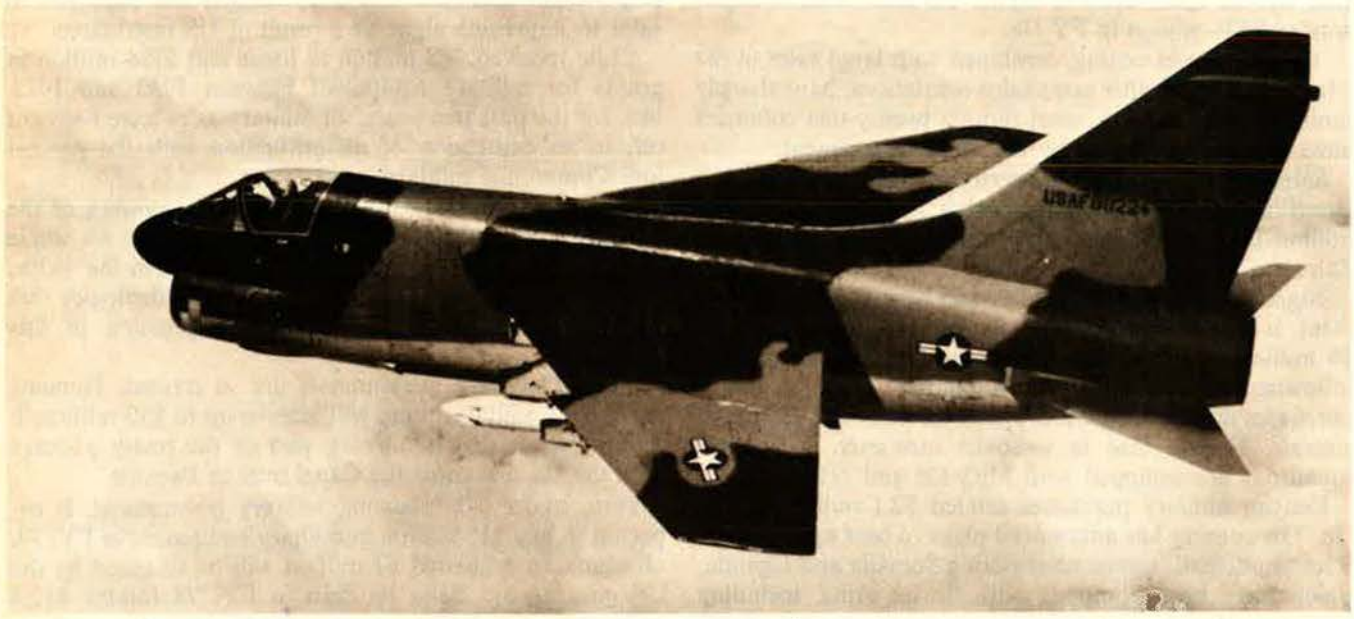
How long will the unilateral experiment in restraining arms sales last? One arms sales administrator said recently that the Administration plans to keep it in effect at least through January 1979, to give other nations adequate opportunity to join in reducing the world's stockpiles of conventional arms.

Others familiar with the difficulties of administering the present policies predict that, as early as April 1979, unilateral restraints will be quietly abandoned.

As for the ceiling on conventional arms sales, Administration officials are hopeful that recent sales have satisfied the major security needs of most US friends abroad, so that few will have to be turned down next year. For this reason, a new and lower ceiling is being studied, about eight percent or more lower than the FY '78 ceiling of $8.5 billion.

Working in favor of the lower ceiling is the limited financial resources of underdeveloped countries. Says one Administration official: "It must be remembered that much of the demand for arms comes from the underdeveloped countries, and if we won't sell, other countries are going to be limited in the credit they can extend."

But the pressure to sell arms to Israel and the oil-producing states is likely to continue. And relations between the US and some non-NATO allies, strained by restrictions on arms sales, are not expected to be alleviated in the year ahead. The confusion over US arms sales thus is far from over. And in the center of the confusion is President Carter, who sealed his Middle East peace initiative with a record $4.8 billion arms package, after repeatedly insisting that the world's largest arms seller could not be the leading champion of peace. ■



The Carter Administration refused to permit the sale of the A-7 aircraft to Pakistan in mid-1977. The subsequent sale of British jets to neighboring India makes the Vought fighter a candidate once again for the strategic Asian nation.

As Compiled by The International Institute for Strategic Studies, London

FOREWORD

Since 1971, the December issue of AIR FORCE Magazine has presented to readers an exclusive feature, "The Military Balance," compiled by The International Institute for Strategic Studies, London, England. The Institute, an independent center for research in defense-related areas, is universally recognized as the leading authority in its field.

"The Military Balance" is an annual quantitative assessment of the military forces and defense expenditures of the major nations. National entries are grouped geographically, but with special reference to the principal regional defense pacts and alignments. A short description of multilateral and bilateral pacts and military agreements introduces each of the regional sections.

The section on the US and USSR includes an assessment of the changing strategic and general-purpose force balances between the two superpowers. A separate section assesses the European theater balance between NATO and the Warsaw Pact and summarizes the statistics of forces and weapons in Europe that are in position or might be used as reinforcements. An analysis of the naval balance is included for the first time.

As in the past, space limitations make it necessary for us to exclude some tabular material, including data on the several kinds of guided missiles and missile-armed patrol vessels, arms agreements that have been negotiated since the last issue of "The Balance," and force structures of smaller countries that maintain only minimal defense establishments.

In preparing "The Military Balance 1978/79" for our use, we have retained the Institute's system of abbreviating military weapons and units as well as British spelling and usage. A list of abbreviations found in the text appears on the following page.

"The Military Balance" examines the facts of military power as they existed in July 1978. No projections of force levels or weapons beyond that date are included except where explicitly stated. The study should not be regarded as a comprehensive guide to the balance of military power, since it does not reflect the facts of geography, vulnerability, or efficiency, except where these are touched on in the sections on balances.

Figures for defense expenditures are the latest available. Those for the USSR and the People's Republic of China are estimates. Notes on the difficulties of estimating Soviet and PRC defense expenditures appear at the end of the sections on forces of those countries. Because estimates of defense expenditures have been amended in the case of certain countries, figures in Table 4 on page 124 will not in all cases be directly comparable with those in previous editions of "The Balance." Where a $ sign appears, it refers to US dollars unless otherwise stated.

GNP figures are usually quoted at current market prices (factor cost for East European countries). Where figures are not currently available from published sources, estimates have been made, and Table 5 uses both published and estimated GNP figures. Wherever possible, the United Nations System of National Accounts has been used, rather than national figures, as a step toward greater comparability. For the Soviet Union, GNP estimates are made in roubles, following R. W. Campbell, "A Shortcut Method for Estimating Soviet GNP" (*Association for Comparative Economic Studies,* Vol. XIV, No. 2, Fall 1972). East European GNPs at factor cost are derived from Net Material Product, using an adjustment parameter from T. P. Alton, "Economic Growth and Resource Allocation in Eastern Europe," *Reorientation and Commercial Relations of the Economies of Eastern Europe,* Joint Economic Committee, 93d Congress, 2d Session (Washington: USGPO, 1974). For the People's Republic of China, two estimates of GNP have been given in a note on page 98.

In order to make comparison easier, national currency figures were converted by the Institute into US dollars at the rate prevailing at the end of the first quarter of the relevant year. An exception is the Soviet Union, where the official exchange rate is unsuitable for converting rouble estimates to GNP. The official rate is given in the country section. Further exceptions are certain East European countries that are not members of the International Monetary Fund and Romania (which is), for which conversion rates used are those described in Alton's study cited above. The conversion rates used in the country entries may not always be applicable to commercial transactions.

ABBREVIATIONS

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)
Armd	Armoured
Arty	Artillery
ASM	Air-to-surface missile(s)
ASW	Anti-submarine warfare
ATGW	Anti-tank guided weapon(s)
ATK	Anti-tank
AWACS	Airborne warning and control system
AWX	All-weather fighter
Bbr	Bomber
Bde	Brigade
Bn	Battalion *or* billion
Bty	Battery
Cav	Cavalry
Cdo	Commando
CEP	Circular error probable
COIN	Counter-insurgency
Comd	Command
Comms	Communications
Coy	Company
Det	Detachment
Div	Division
ECM	Electronic counter-measures
Engr	Engineer
Eqpt	Equipment
EW	Early warning
FB	Fighter-bomber
Fd	Field
FGA	Fighter, ground-attack
Flt	Flight
FPB	Fast patrol boat(s)
FPBG	Fast patrol boat(s), guided-missile
GDP	Gross Domestic Product
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)
Indep	Independent
Inf	Infantry
IRBM	Intermediate-range ballistic missile(s)
KT	Kiloton (1,000 tons TNT equivalent)
LCT	Landing craft, tank
LHA	Amphibious general assault ship(s)
Log	Logistic
LPD	Landing platform, dock
LPH	Landing platform, helicopter
LRCM	Long-range cruise missile(s)
LSD	Landing ship, dock
LSM	Landing ship, medium
LST	Landing ship, tank
Lt	Light
M	Million
MARV	Manoeuvrable re-entry vehicle(s)
MCM	Mine counter-measures
Mech	Mechanized
Med	Medium
MGB	Motor gunboat
MICV	Mechanized infantry combat vehicle(s)
MIRV	Multiple independently-targetable re-entry vehicles(s)
Mor	Mortar(s)
Mot	Motorized
MR	Maritime reconnaissance
MRBM	Medium-range ballistic missile(s)
MRV	Multiple re-entry vehicle(s)
Msl	Missile
MT	Megaton (1 million tons TNT equivalent)
MTB	Motor torpedo boat(s)
n.a.	Not available
OCU	Operational Conversion Unit
Para	Parachute
Pdr	Pounder
PSMM	Patrol ship, multi-mission
RCL	Recoilless rifle(s)
Recce	Reconnaissance
Regt	Regiment
RL	Rocket launcher(s)
RV	Re-entry vehicle(s)
SAM	Surface-to-air missile(s)
SAR	Search and rescue
Sig	Signal
SLBM	Submarine-launched ballistic missile(s)
SLCM	Sea-launched cruise missile(s)
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
Tac	Tactical
Tk	Tank
Tp	Troop
Tpt	Transport
Trg	Training
UNDOF	United Nations Disengagement Observation Force
UNEF	UN Emergency Force
UNFICYP	UN Force in Cyprus
UNIFIL	UN Interim Force in Lebanon
UNTSO	UN Truce Supervisory Organization
Veh	Vehicle(s)
V(/S)TOL	Vertical (/short) take-off and landing

INDEX TO COUNTRIES AND PRINCIPAL PACTS

The manpower figures given are, unless otherwise stated, those of active regular and conscript forces. An indication of the size of militia, reserve, and paramilitary forces is also included in the country entry where appropriate. Paramilitary forces are here taken to be forces whose equipment and training go beyond that required for civil police duties and whose organization and control suggest that they may be usable in support of, or in lieu of, regular forces.

Equipment figures in the country entries cover total holdings, with the exception of combat aircraft, where front-line squadron strengths are normally shown. Except where the contrary is made clear, naval vessels of less than 100 tons of structural displacement have been excluded. The term "combat aircraft" used in the country entries includes only bomber, fighter-bomber, strike, interceptor, reconnaissance, counterinsurgency, and armed trainer aircraft (*i.e.*, aircraft normally equipped and configured to deliver ordnance or to perform military reconnaissance). It does not include helicopters. The symbol (–) indicates that part of a unit's establishment is detached.

Where the term "mile" is used when indicating the range or radius of weapon systems, it means a statute mile.

The Institute assumes full responsibility for the facts and judgments contained in the study. The cooperation of the governments that are covered was sought and, in many cases, received. Not all countries were equally cooperative, and some figures were necessarily estimated.

Photographs and captions have been added by AIR FORCE Magazine, and we assume responsibility for them.

—THE EDITORS

THE UNITED STATES AND THE SOVIET UNION

STRATEGIC FORCES

As negotiations to limit offensive forces continued at the Strategic Arms Limitations Talks (SALT), the two superpowers modernized, and in some areas expanded, their capabilities within the limits imposed by the 1972 five-year Interim Agreement and the guidelines for a second accord reached at Vladivostok in 1974. The Interim Agreement, which set ceilings on numbers of sea- and land-based missile launchers, was scheduled to lapse on 3 October 1977 but has been extended for the duration of the SALT II negotiating process.

The United States concentrated on improvements to the existing triad of ICBM, SLBM, and bombers and continued to fund development programmes for new systems for deployment in the 1980s. The size of the ICBM force—550 *Minuteman* III (each with 3 MIRV), 450 single-warhead *Minuteman* II, and 54 single-warhead *Titan* II—did not change. Plans to improve *Minuteman* III yield and accuracy with procurement of the 370KT Mk 12A MIRV warhead and NS-20 guidance system went ahead. These programmes, together with improvements to *Minuteman* software, would increase accuracy (measured in CEP) from about 0.25 nautical miles (nm) to 700 feet by the end of the decade and significantly enhance the ability to destroy hardened targets. Development of MARV proceeded, and component development has started on an 8–10-MIRV mobile ICBM, the MX, to replace parts of the *Minuteman* force in the 1980s and further enhance hard-target capability, but no decision has yet been taken to proceed to production of either.

At sea, the SLBM force of 496 *Poseidon*, each with 10–14 MIRV, in 31 submarines and 160 *Polaris*, each with 3 MRV, in 10 submarines remained in operation. Construction of the first four 24-tube *Trident* boats continued (initial funding has been approved for others), but delays in building have been reported. Testing began on the 4,000nm C4 *Trident* I missile, which will also be retrofitted in 12 in-service SSBN. When operational in 1979, the C4, armed with 8 × 100KT MIRV, will almost double the effective range of American SLBM and increase their accuracy to a CEP of less than 1,500ft. A second-generation SLBM for the *Trident* class, the 6,000nm D5, with up to 14 × 150KT Mk 500 *Evader* manoeuvrable warheads, was under early development.

In the air, structural and avionics improvements were made to the B-52G/H bomber force and plans were pushed forward to adapt about 120 B-52G/H bombers to carry ALCM. Flight testing continued on three B-1 bomber prototypes, and a fourth is under construction, but plans to procure further aircraft have been cancelled.

Flight testing proceeded of versions of the air-launched cruise missile (ALCM) for deployment aboard the B-52 and possibly other aircraft. The terminally-guided version for possible deployment in the early 1980s would have a maximum range of 1,500nm. Cruise missiles were also tested from other platforms. The *Tomahawk* sea-launched cruise missile (SLCM) has been fired from surface vessels and submarines, and feasibility studies were continued for adapting this 2,000nm-range missile for ground and air launch. Limitations on the ranges of cruise missiles are under discussion in SALT II.

American ICBM, SLBM, and long-range bombers totalled 2,142, more than 168 fewer than in 1967. However, this force had the capability to deliver more than 11,000 warheads, almost twice as many as a decade earlier. Future capabilities obviously depend upon the outcome of SALT II.

The improvement of strategic defensive forces continued at a slower pace. Interceptor aircraft were held at six active and ten reserve (air national guard) squadrons. Development of an advanced bomber and missile attack radar went on, but the *Seafarer* submarine communications system has had to be modified during development as a result of domestic political pressures. Several programmes to enhance satellite survivability have begun, including satellite 'hardening', manoeuvrability, and, possibly, development of an anti-satellite capability.

The Soviet Union proceeded with broad modernization of ICBM, SLBM, and bomber capabilities. Although total ICBM numbers fell to a little more than 1,400 (as older ICBM were replaced by new SLBM), at least 370 new ICBM—SS-17, SS-18, and SS-19—were deployed in MIRV and single-warhead modes. These were said to be notably more accurate than the SS-9 and SS-11, SS-19 accuracy reportedly approaching that of existing US systems. Deployment of the SS-16 in silos is ready to begin, but it has not been deployed in a mobile mode or in silos pending the outcome of SALT II. Deployment of the SS-20 (the first two stages of the SS-16) as a mobile MIRV MRBM has begun in the Western USSR, and possibly in the Eastern USSR also. A new ICBM family for possible late 1980s deployment has been reported in the early development stage.

Soviet SLBM increased to 1,015 in 90 submarines. Thirteen *Delta* II and III submarines are in service, most with 16 4,800nm-range SS-N-8. Two new SLBM have been tested: the SS-NX-17, a solid-propellant replacement for the SS-N-6, and the SS-N-18, a 3-MIRV replacement for the SS-N-8. The first SS-N-18s are reported operational on *Delta* II SSBN. Development of a longer-range replacement for the SS-N-3 SLCM continued.

Deployment of the *Backfire* B bomber continued at a rate of approximately 25 per year, and development proceeded on new ASM.

Compared with 837 in 1967, Soviet ICBM, SLBM, and long-range bombers numbered approximately 2,550. This force can deliver roughly 4,500 warheads against the United States. With the replacement of the remainder of the ICBM force with the new MIRV-equipped missiles, this total would rise to more than 7,500 in the early 1980s, individual warheads having sig-

nificantly higher yields than US ones.

Both air defence interceptors and SAM have been modernized. The 64 ABM launchers around Moscow remained in operation, and tests have been reported of new transportable radars and endo-atmospheric missiles. Civil defence activities and satellite interceptor tests continued.

GENERAL-PURPOSE FORCES

Numbers in the American and Soviet armed forces remained roughly at last year's levels of 2.07 million and 3.64 million respectively, compared with roughly 3 million for each in the mid-1960s. Both steadily improved conventional capabilities. One US infantry division is also being mechanized. Programmes concentrated on new direct- and indirect-fire anti-armour weapons. The procurement of *TOW* and *Dragon* missiles continued. Cannon-launched guided projectiles and scatterable mines were under development, as were new precision-guided munitions for helicopters, and procurement of new surveillance and target-acquisition aids continued. Tank production was increased, but the number of medium tanks (around 10,000) was roughly the same as in 1967. The XM-1 tank has been accepted for service and the first 110 tanks are due to be delivered in FY 1979, to be followed by 569 in FY 1980. Plans to develop a new Mechanized Infantry Combat Vehicle (MICV) have been dropped. A less costly alternative is under consideration; as an interim measure, 1,200 more M-113 APC will be produced in FY 1979 and FY 1980.

The Soviet Union continued to increase holdings of BMP MICV and T-62 and T-72 tanks, and tank numbers rose to some 50,000 compared with some 34,000 in 1967. The deployment of helicopters, SAM, ATGW, and self-propelled artillery also continued.

In the US Navy plans were made to reverse the decline in major surface combatants from more than 300 to 172 in a decade. The building of a new nuclear-powered carrier was undecided, however, and planning concentrated on a new class of smaller, conventionally-engined carrier. [The nuclear-powered carrier was vetoed by President Carter in September and his veto was upheld by the Congress.] Four 688-class attack submarines have been delivered, and three more should be delivered in FY 1979. Development continued of the *Aegis* ship defence system (to be deployed aboard a new strike cruiser), and deployment of the *Harpoon* anti-shipping missile has started, together with a tactical version of the *Tomahawk* SLCM. Research continued on the development of a new generation of naval VTOL aircraft and sea mines.

The Soviet Navy continued its gradual growth in size and quality. The first of three *Kiev*-class aircraft carriers is operational, construction of *Kara*- and *Kresta*-II-class missile cruisers, and development of a class of missile cruiser for the 1980s was also reported. Procurement of nuclear V- and T-class and diesel F-class attack and C-II-class cruise-missile submarines proceeded. New anti-shipping and anti-submarine missiles were under development and being deployed, and the naval air force received more *Forger* VTOL and *Backfire* aircraft.

The United States continued deployment of the Air Force F-15 and the Navy F-14 fighters, began to build the F-16, and continued development of the less costly F-18 in order to enable combat aircraft force levels to be kept above 2,500 as older aircraft are retired. Production of the A-10 close air support aircraft continued and is to be completed by the early 1980s. Procurement of 19 E-3A AWACS aircraft was approved (but no decision to buy it was taken by NATO). Modification of the F-4C and development work on converting the F-111A for electronic warfare roles proceeded.

The deployment of new Soviet fighters with improved range, payload, and avionics continued, including the Su-17 *Fitter* C, MiG-23 *Flogger* B, and Su-19 *Fencer*. With the introduction of more multi-role aircraft, the Soviet Union has more than twice as many fighters suitable for ground-attack missions as in the 1960s, many nuclear capable. There were reports of new air-to-air and air-to-surface missiles under development, and of work on ECM equipment to enhance aircraft penetration.

THE UNITED STATES

Population: 218,630,000.
Military service: voluntary.
Total armed forces: 2,068,800 (115,000 women).
Estimated GNP 1977: $1,890 bn.
Defence expenditure 1978–79: $115.2 bn.
[Budget authority for FY '79 is $117.3 bn.]

Strategic Nuclear Forces:

Offensive:

(a) *Navy:* 656 SLBM in 41 SSBN.
- 31 SSBN (*Lafayette*-class), each with 16 *Poseidon* C3 (12 to be retrofitted with *Trident* C4 msls).
- 10 SSBN (5 *Washington*-, 5 *Allen*-class), each with 16 *Polaris* A3.
- (4 *Ohio*-class SSBN, each with 24 *Trident* C4, building.)

(b) *Strategic Air Command* (SAC): Some 600 combat aircraft.

ICBM: 1,054.
- 450 *Minuteman* II, 550 *Minuteman* III, 54 *Titan* II.

Aircraft:
- Bombers: 432.
- 66 FB-111A in 4 sqns } with
- 241 B-52G/H in 15 sqns } 1,250 SRAM
- 75 B-52D in 5 sqns.
- Training: 50 B-52D/F.
- Storage or reserve: 125, incl B-52D/F.
- Tankers: 487 KC-135 in 30 sqns.
- Strategic Reconnaissance and Command: 10 SR-71A in 2 sqns; 10 U-2C/K; 4 E-4A/B; 19 RC/EC-135.

Defensive:

North American Defense Command (NORAD), HQ at Colorado Springs, is a joint American-Canadian organization. US forces under NORAD are in Aerospace Defense Command (ADCOM).

ABM: Safeguard system (msls deactivated).

Aircraft (excluding Canadian and tac units):
- Interceptors: 331
  - (i) Regular: 6 sqns with 141 F-106A.
  - (ii) Air National Guard (ANG): 3 sqns with 60 F-101B, 2 with 40 F-4D, 5 with 90 F-106A.
- AEW aircraft: 1 reserve sqn with 10 EC-121.

Warning Systems:

(i) *Satellite-based early-warning system:* 3 DSP satellites, 1 over Eastern Hemisphere, 2 over Western; surveillance and warning system to detect launchings from SLBM, ICBM, and Fractional Orbital Bombardment Systems (FOBS).

(ii) *Space Detection and Tracking System* (SPADATS): USAF *Spacetrack* (7 sites), USN *SPASUR*, and civilian agencies. Space Defense Center at NORAD HQ: satellite tracking, identification, and cataloguing control.

(iii) *Ballistic Missile Early Warning System* (BMEWS): 3 stations (Alaska, Greenland, England); detection and tracking radars with ICBM and IRBM capability.

(iv) *Distant Early Warning* (DEW) *Line:* 31 stations roughly along the 70° N parallel.

(v) *Pinetree Line:* 24 stations in Central Canada.

(vi) *474N:* 3 stations on US East, 1 on Gulf, 3 on West coast (to be replaced by *Pave Paws* phased-array radars: 1 on East, 1 on West coast); SLBM detection and warning net.

(vii) *Perimeter Acquisition Radar Attack Characterization System* (PARCS): 1 north-facing phased-array 2,000-mile system at inactive ABM site in North Dakota.

(viii) *Cobra Dane Radar:* phased-array system at Shemya, Aleutians.

(ix) *Back-up Interceptor Control* (BUIC): system for AD command and control (all stations but 1 semi-active).

(x) *Semi-Automatic Ground Environment* (SAGE): 6 locations (2 in Canada); combined with BUIC and Manual Control Centre (MCC) in Alaska (to be replaced by Joint Surveillance System (JSS) with 7 Region Operations Control Centres, 4 in US, 1 in Alaska, 2 in Canada); system for co-ordinating surveillance, and tracking of objects in North American Airspace.

(xi) *Ground radar stations:* some 51 stations manned by Air National Guard, augmented by the Federal Aviation Administration (FAA) stations (to be replaced as surveillance element of JSS).

Army: 774,200 (50,700 women).
- 4 armd divs.
- 5 mech divs.
- 5 inf divs (1 inf div to be mech in 1979). (One National Guard bde is incorporated in 1 mech and 3 inf divs.)
- 1 airmobile div.
- 1 AB div.
- 1 armd bde.
- 1 inf bde.
- 3 armd cav regts.
- 1 bde in Berlin.
- 2 special mission bdes.

Army Aviation: 1 air cav combat bde, indep bns assigned to HQ for tac tpt and medical duties.

1 *Honest John*, 3 *Pershing*, 8 *Lance* SSM bns.

Tanks: some 10,500 med, incl 3,300 M-48, 7,150 M-60 (540 M-60A2 with *Shillelagh* ATGW); 1,600 M-551 *Sheridan* lt tks with *Shil-*

Ielagh.
AFV: some 22,000 M-577, M-114, M-113 APC.
Arty and Msls: about 2,500 105mm, 155mm towed guns/how; 3,000 175mm SP guns and 105mm, 155mm, and 203mm SP how; 3,000 81mm, 3,000 107mm mor; 6,000 90mm and 106mm RCL; *TOW, Dragon* ATGW; *Honest John, Pershing, Lance* SSM.
AA arty and SAM: some 600 20mm, 40mm towed, and SP AA guns; some 20,000 *Chaparral/Vulcan* 20mm AA msl/gun systems, *Redeye, Stinger* SAM; *Nike Hercules* and *Improved HAWK* SAM (to be replaced by *Patriot*). (*Roland* SAM on order.)
Aircraft/Hel: about 500 ac, incl 300 OV-1/-10, 200 U-8/-21, 40 C-12; 9,000 hel, incl 1,000 AH-1G/Q/S, 4,000 UH-1/-19, 15 UH-60A, 700 CH-47/-54, 3,600 OH-6A/-58A, H-13 (148 AH-1S hel on order). Trainers incl 310 T-41/-42 ac; 700 TH-55A hel.

Deployment:
Continental United States
Strategic Reserve: (i) 1 armd, 1 mech, 3 inf, 1 airmobile, 1 AB divs. (ii) To reinforce 7th Army in Europe: 1 armd, 2 mech divs, 1 armd cav regt. (One armd div, 1 mech div, 1 armd cav regt have hy eqpt stockpiled in W. Germany.) (iii) Alaska 1 bde. (iv) Panama 1 bde.
Europe: 198,400.
(i) Germany: 189,000. 7th Army: 2 corps, incl 2 armd, 2 mech divs, 1 armd, 2 mech bdes plus 2 armd cav regts; 3,000 med tks. (Includes those stockpiled for the strategic reserve formations.)
(ii) West Berlin: 4,400 HQ elements and 1 inf bde.
(iii) Greece: 800.
(iv) Italy: 3,000.
(v) Turkey: 1,200.

Pacific
(i) South Korea: 30,000. 1 inf div, 1 AD arty bde (to be reduced by 1 bde in 1978).
(ii) Hawaii: 1 inf div less 1 bde.

Reserves: 556,000.
(i) Army National Guard: 366,000; capable after mobilization of manning 2 armd, 1 mech, 5 inf divs, 22 indep bdes (3 armd, 9 mech, 10 inf), and 4 armd cav regts, plus reinforcements and support units to fill regular formations. (Included in listed ANG units are 4 indep bdes and 11 bns incorporated in active army divs.)
(ii) Army Reserves: 190,000 in 12 trg divs, 3 indep combat bdes; 49,000 a year do short active duty.

Marine Corps: 191,500 (3,700 women).
3 divs.
2 SAM bns with *Improved HAWK.*
575 M-60 med tks; 950 LVTP-7 APC; 175mm SP guns; 105mm, 155mm how; 155mm, 203mm SP how; 230 81mm and 107mm mor; 106mm RCL; *TOW, Dragon* ATGW; *Redeye* SAM.
3 Air Wings: 364 combat aircraft.
12 FGA sqns with 144 F-4N/S with *Sparrow* and *Sidewinder* AAM.
13 FGA sqns: 3 with 80 AV-8A *Harrier,* 5 with 60 A-4F/M, 5 with 60 A-6A/E.
1 recce sqn with 10 RF-4B, 1 ECM sqn with 10 EA-6B.
2 observation sqns with 36 OV-10A.
3 assault tpt/tanker sqns with 36 KC-130F.
3 attack hel sqns with 54 AH-1J.
4 lt hel sqns with 96 UH-1E/N.
9 med hel sqns with 162 CH-46F.
6 hy hel sqns with 126 CH-53D.

Deployment:
(i) *Continental United States:* 2 divs, 2 air wings.
(ii) *Pacific:* 1 div, 1 air wing.

Reserves: 29,700.
1 div and 1 air wing: 2 fighter sqns with 24 F-4N, 5 attack sqns with 60 A-4E/F, 1 observation sqn with 18 OV-10A, 1 tpt/tanker sqn with 12 KC-130, 7 hel sqns (1 attack with 18 AH-1G, 2 hy with 24 CH-53, 3 med with 54 CH-46, 1 lt with 21 UH-1E), 2 tk bns, 1 amph assault bn, 1 SAM bn with *HAWK,* 1 fd arty gp.

Navy: 532,300 (21,600 women); 172 major combat surface ships, 75 attack submarines. A further 38 major surface combat ships and 4 attack submarines are in reserve.
Submarines, attack: 70 nuclear, 5 diesel.
Aircraft carriers: 13; 3 nuclear-powered (2 *Nimitz,* 91,400 tons; 1 *Enterprise,* 89,600 tons).
8 *Forrestal/Kitty Hawk*-class (75/80,000 tons).
2 *Midway*-class (64,000 tons).
These normally carry 1 air wing (85–95 ac, 75 in *Midway* class) of 2 fighter sqns with 24 F-14A or 24 F-4J, 3 attack sqns (1 AWX) 2 with A-7E, 1 with 10 A-6E; 1 recce with 3 RA-5C or 3 RF-8G; 2 ASW sqns (1 with 10 S-3A, 1 with 8 SH-3A/D/G/H hel); 1 ECM sqn with 4 EA-6B; 1 AEW sqn with 4 E-2B/C; 4 KA-6D tankers and other specialist ac.

With the cancellation of B-1 production plans, SAC's venerable B-52Gs and Hs are destined to continue as the mainstay of the Triad's strategic bomber force. Turrets below the nose of this B-52 house low-light-level television sensors.

Other surface ships:
7 nuclear-powered GW cruisers with SAM, *ASROC* (2 *Virginia,* 2 *California,* 1 *Truxtun,* 1 *Long Beach,* 1 *Bainbridge*).
20 GW cruisers with SAM, *ASROC,* 8 with 1 hel, (8 *Belknap,* 9 *Leahy,* 2 *Albany,* 1 *Cleveland*).
37 GW destroyers with SAM, *ASROC* (10 *Coontz,* 4 *F. Sherman,* 23 *C. F. Adams*).
30 gun/ASW destroyers, most with SAM or *ASROC,* (12 *Spruance,* 13 *F. Sherman,* 5 *Gearing*).
7 GW frigates with SAM, *ASROC,* hel (1 *O.H. Perry,* 6 *Brooke*).
58 gun frigates with *ASROC* (52 with 1 hel; 46 *Knox,* 10 *Garcia,* 2 *Bronstein*).
6 *Asheville*-class patrol gunboats, 4 with SSM.
1 patrol msl hydrofoil.
64 amph warfare ships (1 *Raleigh,* 2 *Blue Ridge* comd, 2 *Tarawa* LHA, 7 *Iwo-Jima* LPH, 12 *Austin,* 2 *Raleigh* LPD, 5 *Anchorage,* 8 *Thomaston* LSD, 20 *Newport* LST, 5 *Charleston* amph cargo ships).
3 MCM ships.
38 replenishment and 76 depot and repair ships.
(13 SSN, 1 nuclear-powered carrier, 1 nuclear-powered GW cruiser, 12 destroyers, 7 GW frigates, 3 LHA building.)

Ships in reserve:
4 subs, 7 aircraft carriers, 4 battleships, 7 cruisers, 2 comd ships, 18 amph warfare, 8 MCM ships, 46 log support, and 41 troop, cargo, and tanker ships. (239 cargo ships, 162 tankers could be used for auxiliary sea-lift.)

Aircraft: 12 attack carrier air wings; some 1,100 combat aircraft.
26 fighter sqns: 14 with 168 F-14A, 12 with 144 F-4.
36 attack sqns: 11 with 110 A-6E, 25 with 300 A-7E.
10 recce sqns with 30 RA-5C or RF-8.
24 land-based MR sqns with 280 P-3B/C.
13 ASW sqns each with 10 S-3A.
13 AEW sqns each with 4 E-2B/C.
12 ASW hel sqns each with 8 SH-3A/D/G/H.
17 misc support sqns with 12 C-130F/LC-130, 7 C-118, 12 C-9B, 12 CT-39, 13 C-131, 6 C-117, 20 C-1, 15 C-2, 36 EA-6A/B ac; 30 RH-53D, CH-46, SH-3, SH-2B/C hel.
1 aggressor trg sqn with 13 F-5F/F.
19 trg sqns with T-1A, T-2B/C, T-28/-29B/-34/-38/-44, TA-4J/F, TA-7C, TS-2A, TE-2 ac; TH-1, UH-1D, TH-57A hel.

Deployment (average strengths of major combat ships; some in Mediterranean and Western Pacific based overseas, rest rotated from US):
Second Fleet (Atlantic): 5 carriers, 62 surface combatants.
Third Fleet (Eastern Pacific): 4 carriers, 65 surface combatants.
Sixth Fleet (Mediterranean): 2 carriers, 15 surface combatants, 1 Marine Amphibious Unit (MAU). (Marine Amphibious Units are 5–7 amph ships with a Marine bn embarked. Only 1 in Mediterranean and 1 in Pacific are regularly constituted. 1 Battalion Landing Team (MAU less hel) also deployed in the Pacific; 1 occasionally formed for the Atlantic.)
Seventh Fleet (Western Pacific): 2 carriers, 20 surface combatants, 1 MAU, 1 Marine Bn Landing Team.

Reserves: 94,100. Ships in commission with the Reserve include 28 destroyers, 3 patrol gunboats, 3 amph warfare, 22 MCM ships.
2 carrier wings: 6 A-7A/B attack, 4 F-4N fighter, 2 RF-8G recce, 3 EA-6A and EKA-3 ECM, 2 E-2B AEW sqns.

13 MR sqns with P-3A.
2 tac spt sqns with C-9B, C-118B.
2 composite sqns with TA-4J.
7 hel sqns: 4 ASW with SH-3A/G, 2 lt attack with HH-1K, 1 SAR with HH-3A.

Air Force: 570,800 (39,000 women); about 3,400 combat aircraft. (Excluding ac in SAC and ADCOM; incl ac in Air National Guard and Air Force Reserve.)

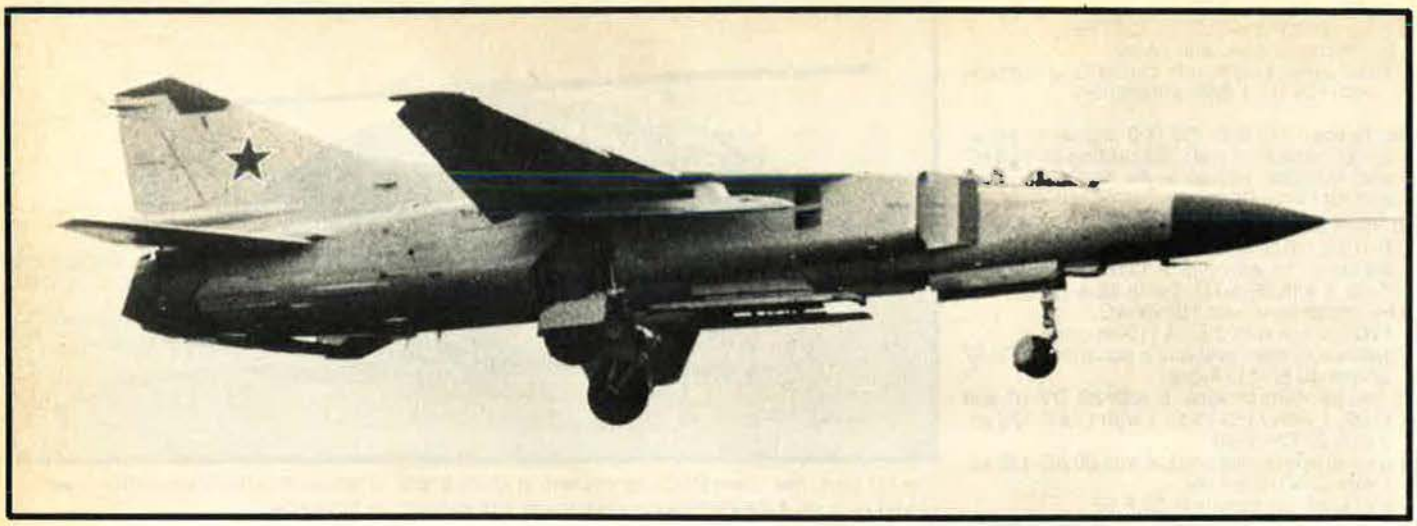
81 FGA sqns: 48 with 1,100 F-4, 2 with 48 F-105G *(Wild Weasel)*, 2 with 48 F-4G *(Wild Weasel)*, 13 with 282 F-111E/F, 9 with 216 F-15, 4 with 96 A-7D, 3 with 48 A-10A.
9 tac recce sqns with 192 RF-4C.
1 AWACS sqn with 3 E-3A (19 on order).
1 defence system evaluation sqn with 21 EB-57 (2 with 40 EF-111A due).
11 tac air control sqns: 6 with 88 OV-10 and O-2E, 1 with 7 EC-130E, 1 with 11 EC-135 ac, 3 with 27 CH-3 hel.
5 special operations sqns: 4 with 20 AC-130 ac, 1 with CH-3, UH-1 hel.
4 aggressor trg sqns with 55 F-5E.
16 OCU: 7 with F-4, 1 with F-5, 2 with F-15, 2 with F-101/-106, 3 with A-10, 1 with RF-4C.
1 tac drone sqn with 7 DC-130A.
15 tac airlift sqns with 234 C-130.
17 hy tpt sqns: 4 with 70 C-5A, 13 with 234 C-141.
5 SAR sqns with 30 HC-130 ac, 76 HH-3/-53, 11 HH-1 hel.
3 medical tpt sqns with 17 C-9.
3 weather recce sqns with 14 WC-130, 29 WC-135.
Hel incl 138 UH-1N, 21 HH-3E, 51 HH/CH-53.
28 trg sqns with 113 T-33, 700 T-37, 900 T-38, 135 T-39, 50 T-41, 20 T-43, C-5A, C-130E, C-141A.

Deployment:
Continental United States (incl Alaska):
(i) Tactical Air Command: 82,000. 9th and 12th Air Forces. 43 fighter sqns, 5 tac recce sqns.
(ii) Military Airlift Command (MAC): 64,500. 21st and 22nd Air Forces.
Europe: US Air Force, Europe (USAFE): 76,000. 3rd Air Force (Britain), 16th Air Force (Spain; units in Italy, Greece, and Turkey), 17th Air Force (Germany and Netherlands). 1 AD sqn in Iceland. 25 fighter sqns (plus 4 in US on call) with 312 F-4C/D/E, 20 F-5E, 72 F-15, 156 F-111E/F; 3 tac recce sqns (plus 3 in US on call) with 60 RF-4C; 2 tac airlift sqns (plus 6 in US on call) with 32 C-130.
Pacific: Pacific Air Forces (PACAF): 31,100. 5th Air Force (Japan, Okinawa, 1 wing in Korea), 13th Air Force (Philippines, Taiwan). 9 fighter sqns, 1 tac recce sqn.

Reserves: 139,900.
(i) Air National Guard: 92,500; about 1,000 combat aircraft.
10 interceptor sqns (under ADCOM, see p. 65); 29 fighter sqns (11 with 283 F-100C/D, 3 with 84 F-105B/D, 2 with 40 F-4C, 11 with 256 A-7, 2 with 49 A-37B); 8 recce sqns (1 with 20 RF-101, 7 with 135 RF-4C); 19 tac tpt sqns (18 with 150 C-130A/B/C, 1 with 16 C-7); 6 tac air spt sqns with 120 O-2A; 13 tanker sqns with 104 KC-135, 1 ECM sqn with 10 C/EC-121; 1 defence system evaluation sqn with 20 EB-57B; 2 SAR sqns with 8 HC-130.
(ii) Air Force Reserve: 47,400; about 190 combat aircraft.
3 fighter sqns with 69 F-105D; 4 attack sqns with 91 A-37B; 17 tac tpt sqns (11 with 121 C-130A/B, 4 with 63 C-123K, 2 with 31 C-7); 1 AEW sqn with 10 EC-121 (ADCOM), 3 tanker sqns with 24 KC-135; 2 special operations sqns with 10 AC-130, 7 CH-3; 4 SAR sqns (2 with 13 HC-130, 2 with 20 HH-3E, HH-1H); 1 weather recce sqn with 4 WC-130. 18 Reserve Associate Military Airlift sqns (personnel only): 4 tpt for C-5A, 13 tpt for C-141A, 1 aero medical for C-9A.
(iii) Civil Reserve Air Fleet: 220 long-range commercial ac (124 cargo/convertible, 96 passenger).

The US Army has some 9,000 helicopters in its inventory. A production decision on this heavily armed Hughes AH-64 attack helicopter was still pending in November.

The US Navy has half as many major surface ships as the USSR, but holds a wide lead in carriers. This is USS Enterprise.



The USSR has several hundred interceptor and attack versions of the Mach 2.3 MiG-23, and now is exporting the aircraft.

THE SOVIET UNION

Population: 261,310,000.
Military service: Army and Air Force 2 years, Navy and Border Guards 2–3 years.
Total armed forces: 3,638,000. (Excludes some 750,000 uniformed civilians.)
Estimated GNP 1977: 516 bn roubles. (See "Foreword," p. 62: official exchange rate 1977, $1 = 0.75 roubles.)
Estimated defence expenditure: see p. 69.

Strategic Nuclear Forces:
(Characteristics of nuclear delivery vehicles and notes on numbers and types under construction and test are given in Table 1 on pp. 122–123.)

Offensive:
(a) *Navy:* 1,015 SLBM in 90 subs.
13 D-II/-III-class SSBN, each with 16 SS-N-8/-18.
15 D-I-class SSBN, each with 12 SS-N-8.
34 Y-class SSBN, 33 with 16 SS-N-6 *Sawfly*, 1 with 12 SS-NX-17.
1 H-III-class SSBN with 6 SS-N-8.
7 H-II-class SSBN, each with 3 SS-N-5 *Serb*.
11 G-II-class diesel, each with 3 SS-N-5. (G-II and G-I launchers are not considered strategic missiles under the terms of the Strategic Arms Limitation [Interim] Agreement.)
9 G-I-class diesel, each with 3 SS-N-4 *Sark*.
(b) *Strategic Rocket Forces* (SRF): 375,000. (The SRF and *PVO-Strany*, separate services, have their own manpower.)
ICBM: about 1,400.
190 SS-9 *Scarp* (converting to SS-18).
780 SS-11 *Sego* (converting to SS-17 and SS-19).
60 SS-13 *Savage*.
60 SS-17.
110 SS-18.
200 SS-19.
IRBM and MRBM: some 690 deployed (most in Western USSR, rest east of Urals).
90 SS-5 *Skean* IRBM.
100 SS-20 IRBM (mobile).
500 SS-4 *Sandal* MRBM.
(c) *Long-Range Air Force* (LRAF): 756 combat aircraft. (About 75 per cent based in the European USSR, most of the remainder in the Far East; there are also staging and dispersal points in the Arctic.)
Long-range bombers: 135.
100 Tu-95 *Bear* A.
35 Mya-4 *Bison*.
Medium-range bombers: 491.
305 Tu-16 *Badger* with ASM.
136 Tu-22 *Blinder* with ASM.
50 Tu- *Backfire* B with ASM.
Tankers: 53.
9 Tu-16 *Badger*.
44 Mya-4 *Bison*.
ECM: 94.
94 Tu-16 *Badger*.
Recce: 36.
4 Tu-95 *Bear*.
22 Tu-16 *Badger*.
10 Tu-22 *Blinder*.

Defensive:
Air Defence Force (PVO-Strany): 550,000; early warning and control systems, with 6,000 early warning and ground control intercept radars; interceptor sqns with SAM units.
Aircraft: about 2,720.
Interceptors: incl some 80 MiG-17 *Fresco*, 170 MiG-19 *Farmer* B/E, 650 Su-9 *Fishpot* B, Su-11 *Fishpot* C, 320 Yak-28P *Firebar*, 150 Tu-28P *Fiddler*, 850 Su-15 *Flagon* A/D/E/F, 200 MiG-23 *Flogger* B, 300 MiG-25 *Foxbat* A.
Airborne Warning and Control Aircraft: 12 modified Tu-126 *Moss*.
Trg ac incl 30 Su-7, 40 Su-11, 120 Su-15, 20 MiG-15, 60 MiG-17, 50 MiG-23, 50 MiG-25, 10 Yak-28.
ABM: 64 ABM-1 *Galosh*, 4 sites around Moscow, with *Try Add* engagement radars. Target acquisition and tracking by phased-array *Dog House* and *Cat House*, early warning by

This Kresta-class guided missile cruiser is part of the Soviet Navy's fleet of nearly 250 surface combat ships. The USSR excels in naval communications.

phased-array *Hen House* radar on Soviet borders. Range of *Galosh* believed more than 200 miles; warheads nuclear, presumably MT range.

SAM:

Fixed-site Systems: some 10,000 launchers, at more than 1,000 sites. SA-1 *Guild*, SA-2 *Guideline*, SA-3 *Goa*, SA-5 *Gammon*.

Army: 1,825,000.

46 tk divs.

115 motor rifle divs.

8 AB divs.

Tanks: 50,000 IS-2/-3, T-10, T-10M hy, T-54/-55/-62/-64/-72 med, and PT-76 lt (most tks fitted for deep wading).

AFV: 55,000 BRDM scout cars; BMP MICV; BTR-40/-50/-60/-152, MT-LB, BMD APC.

Artillery: 20,000 100mm, 122mm, 130mm, 152mm, 180mm, and 203mm fd guns/how, 122mm, 152mm SP guns; 7,200 82mm, 120mm, 160mm, and 240mm mor; 2,700 122mm, 140mm, and 240mm multiple RL; 10,800 ASU-57 and ASU-85 SP, 76mm, 85mm, and 100mm ATK guns; *Swatter*, *Sagger* ATGW.

AA Artillery: 9,000 23mm and 57mm towed, ZSU-23-4 and ZSU-57-2 SP guns.

SAM (mobile system): SA-4 *Ganef*, SA-6 *Gainful*, SA-7 *Grail*, SA-8 *Gecko*, SA-9 *Gaskin*.

SSM (nuclear capable): about 1,300 launchers (units organic to formations), incl *FROG*, SS-21 *Scud B*, SS-12 *Scaleboard*.

Deployment and Strength:

Central and Eastern Europe: 31 divs: 20 (10 tk) in East Germany, 2 tk in Poland, 4 (2 tk) in Hungary, 5 (2 tk) in Czechoslovakia; 10,500 med and hy tks. (Excluding from the area tks in reserve, replaced by new ones but not withdrawn.)

European USSR (Baltic, Byelorussian, Carpathian, Kiev, Leningrad, Moscow, and Odessa Military Districts (MD)): 64 divs (about 22 tk).

Central USSR (Volga, Ural MD): 6 divs (1 tk).

Southern USSR (North Caucasus, Trans-Caucasus, Turkestan MD): 24 divs (1 tk).

Sino-Soviet border (Central Asian, Siberian, Transbaikal, and Far East MD): 44 divs (about 6 tk), incl 3 in Mongolia.

Soviet divs have three degrees of combat readiness: Category 1, between three-quarters and full strength, with complete eqpt; Category 2, between half and three-quarters strength, complete with fighting vehicles; Category 3, about one-quarter strength, possibly complete with fighting vehicles (some obsolescent).

The 31 divs in Eastern Europe are Category 1. About half those in European USSR and the Far East are in Category 1 or 2. Most of the divs in Central and Southern USSR are likely to be Category 3. Tk divs in Eastern Europe have 325 med tks, motor rifle divs up to 266, but elsewhere holdings may be lower.

Navy: 433,000, incl 59,000 Naval Air Force, 12,000 Naval Infantry, and 8,000 Coast Arty and Rocket Troops; 243 major surface combat ships, 243 attack and cruise-missile subs (85 nuclear, 158 diesel). A further 29 major

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 correct figure was discussed in the essay on p. 67 of the December '73 issue of AIR FORCE Magazine and on pp. 49–50 of the December '76 issue.

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

			Defence expenditure			1970–1977	
Source		Price base	1970	1975	1977	% annual growth rate	Burden (% of GNP)
Billions of Roubles							
CIA	(1)	1970	40–45	50–55	53–58	4.5	11–13
Lee	(2)	1970	43–49	72–79	84–93	8–10	14–15
Lee	(2)	Current	43–49	67–76	81–91	—	—
China	(3)	Current	49	72.5	85.5	8.26	15+
USSR	(4)	Current	17.9	17.4	17.2	n.a.	n.a.
Billions of Dollars							
CIA	(5)	1977	105	120	130	4.5	—
CIA	(6)	Current	66–99	105–108	130	—	—
Lee	(7)	1970	80–105	97–133	110–147	5	—

(1) *Estimated Soviet Defense Spending in Roubles*, CIA SR 78-10121, June 1978.

(2) W. T. Lee, 'Soviet Defense Expenditures in the 10th FYP', *Osteuropa Wirtschaft*, No. 4, 1977; W. T. Lee, *The Estimation of Soviet Defense Expenditures, 1955–75: An Unconventional Approach* (New York: Praeger, 1977).

(3) *Peking Review*, November 1975; January 1976. Extrapolation to 1977 using their growth rate.

(4) Official declared budget.

(5) *A Dollar Cost Comparison of Soviet and US Defense Activities 1966–1977*, CIA SR 78-10002, January 1978. 1970 and 1975 figures taken from diagram.

(6) *Ibid.*; 1977 prices converted to current ones using wholesale price index.

(7) W. T. Lee, 'Soviet Defense Expenditures' in W. Schneider and F. P. Hoeber (eds), *Arms, Man & Military Budgets, Issues for Fiscal Year 1977* (New York: Crane Russak, 1976). 1977 figures by extrapolation.

surface combat ships and 117 attack submarines are in reserve.

Submarines:

Attack: 40 nuclear (12 N-, 17 V-I, 5 V-II, 5 E-I, 1 A-class), 134 diesel (60 F-, 10 R-, 10 Z-, 40 W-, 4 B-, 5 T-class, 5 coastal Q-class).

Cruise Missile: 45 nuclear:
- 1 P-class.
- 15 C-class, each with 8 SS-N-7.
- 29 E-II-class, each with 8 SS-N-3 *Shaddock*.

24 diesel:
- 16 J-class, each with 4 SS-N-3.
- 6 W-*Long Bin* class, each with 4 SS-N-3.
- 2 W-*Twin Cylinder* class, each with 2 SS-N-3.

Surface Ships:

1 *Kiev*-class carrier (40,000 tons) with SSM, SAM, 12 VTOL ac, 20 hel (1 on trials, 1 building).

2 *Moskva*-class ASW hel cruisers with SAM, about 20 Ka-25 hel.

6 *Kara*-class ASW cruisers with SAM, 1 hel (more building).

10 *Kresta*-II-class ASW cruisers with SAM, 1 hel.

4 *Kresta*-I-class cruisers with SSM, SAM, 1 hel.

4 *Kynda*-class cruisers with SSM, SAM.

10 *Sverdlov*-class cruisers (3 with SAM, 1 with hel).

1 trg cruiser (*Chapaev*-class).

20 *Krivak*-I/-II-class ASW destroyers with SAM (more building).

8 *Kanin*-class ASW destroyers with SAM.

4 *Kildin*-class destroyers with SSM.

19 *Kashin*-class ASW destroyers with SAM (5 with SSM).

8 modified *Kotlin*-class destroyers with SAM.

38 destroyers (18 *Kotlin*-, 20 *Skory*-class).

107 frigates (20 *Mirka*, 48 *Petya*, 35 *Riga*, 3 *Kola*, 1 *Koni* with SAM).

1 *Sarancha*-class msl patrol ship with SSM, SAM.

15 *Nanuchka*-class msl patrol ships with SSM, SAM (more building).

279 sub-chasers (30 *Turya*, 25 *Pchela* hydrofoils, 30 *Grisha*, 64 *Poti*, 70 *Stenka*, 60 SO-1).

70 *Osa*-I-, 50 *Osa*-II-class FPBG with *Styx* SSM.

70 MTB (50 *Shershen*, 20 P-6).

About 435 minesweepers (160 coastal).

About 84 amph ships, incl 14 *Alligator*, 10 *Ropucha* LST (more building), 60 *Polnocny* LSM.

80 landing craft.

41 hovercraft (5 *Aist*, 11 *Lebed*, 25 *Gus*).

38 tankers, 20 fleet replenishment ships.

45 depot and repair ships.

80 supply ships.

54 intelligence collection vessels (AGI).

Ships in reserve:

2 nuclear-powered attack subs, 10 Z-, 90 W-, 15 Q-class subs, 2 *Sverdlov*-class cruisers, 15 *Skory*-class destroyers, 12 *Riga*-class frigates, 35 T-43 minesweepers.

Naval Air Force: some 770 combat aircraft.

280 Tu-16 *Badger* med bbrs with ASM.

30 Tu-*Backfire* B med bbrs with ASM.

40 Tu-22 *Blinder* med bbrs, MR, ECM ac.

Some 30 Yak-36 *Forger* VTOL FGA, 30 *Fitter* C FGA.

40 Tu-16 *Badger* E/F recce, 30 Tu-16 ECM ac.

210 MR ac: 45 Tu-95 *Bear* D, 25 Tu-95 *Bear* F, 50 Il-38 *May* ac, 90 Be-12 *Mail* amphibians.

80 Tu-16 *Badger* tankers.

220 ASW hel: Mi-4 *Hound*, Mi-14 *Haze*, Ka-25A/B *Hormone*.

280 misc tpts and trainers.

Naval Infantry (Marines):

5 naval inf regts, each of 3 inf, 1 tk bn, one assigned to each of Northern, Baltic, and Black Sea fleets, two to Pacific fleet. T-54/-55 med, PT-76 lt tks, BTR-60P, BMP-76 APC; BM-21 122mm RL; ZSU-23-4 SP AA guns; SA-9 SAM.

Coastal Artillery and Rocket Troops:

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

Deployment (average strengths, excl SSBN and units in reserve):

Northern Fleet: 120 subs, 55 major surface combat ships.

Baltic Fleet: 30 subs, 50 major surface combat ships.

Black Sea Fleet (incl Caspian Flotilla and Mediterranean Squadron): 25 subs, 73 major surface combat ships.

Pacific Fleet: 70 subs, 65 major surface ships.

Air Force: 455,000; about 4,650 combat aircraft. (Excluding *PVO-Strany* and Long-Range Air Force.)

Tactical Air Force: aircraft incl 120 Yak-28 *Brewer*, 40 MiG-17 *Fresco*, 260 Su-7 *Fitter* A, 1,300 MiG-23/-27 *Flogger* B/D, about 1,450 MiG-21 *Fishbed* J/K/L/N, 530 Su-17 *Fitter* C/D, 190 Su-19 *Fencer* A FGA; about 250 *Beagle*, *Brewer*, 150 MiG-25 *Foxbat* B/D, 300 *Fishbed* recce; 60 *Brewer* E, 6 An-12 *Cub* ECM ac; 220 tpts; 3,700 hel, incl 800 Mi-1/-2 *Hare*/*Hoplite*, 420 Mi-4 *Hound*, 500 Mi-6 *Hook*, 1,660 Mi-8 *Hip*, 10 Mi-10 *Harke*, 310 Mi-24 *Hind*; 1,100 tac trg ac.

Air Transport Force: about 1,300 aircraft: 50 An-8, 735 An-12 *Cub*, 20 An-24/-26 *Coke*/*Curl*, 235 Il-14 *Crate*, 15 Il-18 *Coot*, 2 Il-62 *Classic*, 80 Il-76 *Candid*, 100 Li-2 *Cab*, 10 Tu-104 *Camel*, 8 Tu-134 *Crusty* med, 50 An-22 *Cock* hy. 1,300 Civil Aeroflot med- and long-range ac available to supplement military airlift.

Deployment:

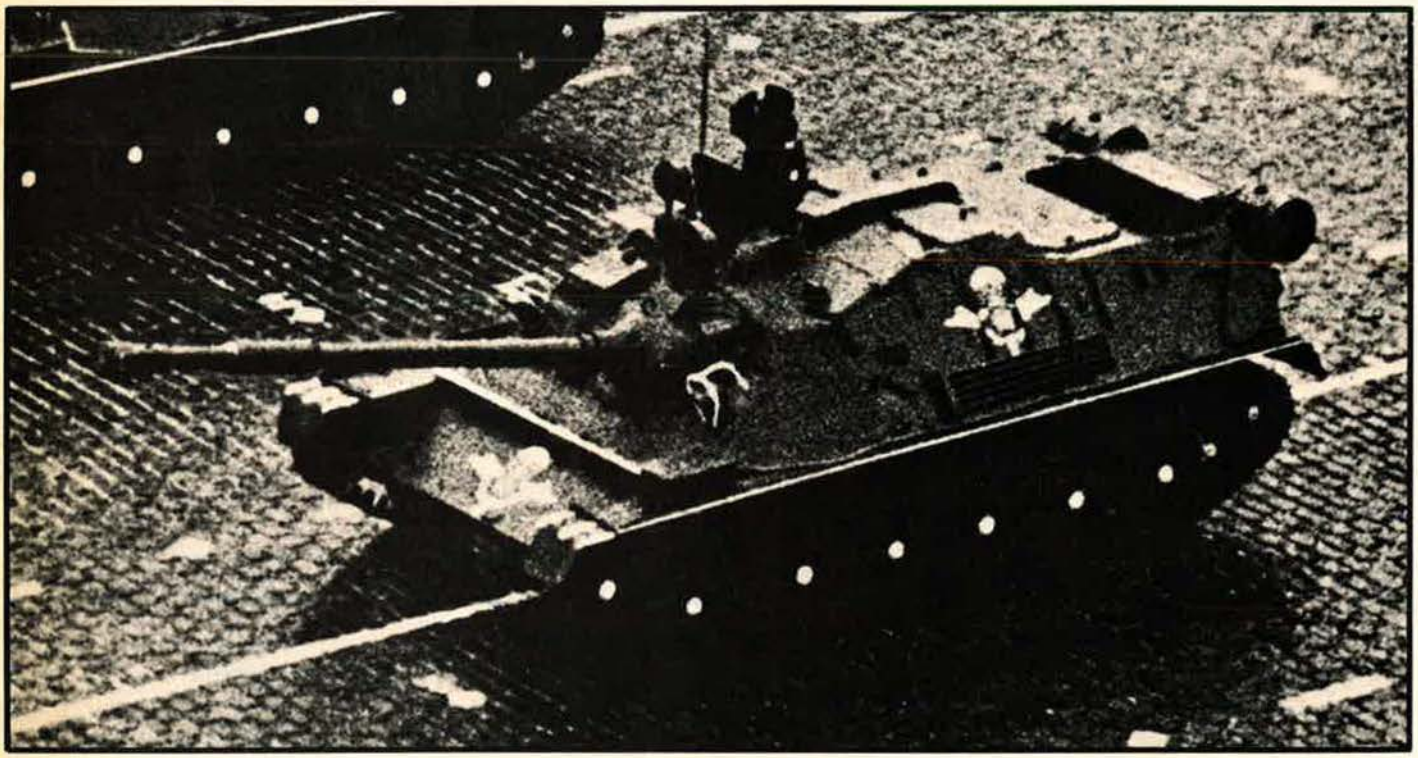
16 Tactical Air Armies 4 (1,700 ac) in Eastern Europe and 1 in each of 12 MD in the USSR.

Reserves (all services):

Soviet conscripts have a Reserve obligation to age 50. Total Reserves could be 25,000,000, of which some 6,800,000 have served in last five years.

Para-Military Forces: 450,000.

200,000 KGB border troops, 250,000 MVD security troops. Border troops equipped with tks, SP guns, AFV, ac, and ships; MVD with tks and AFV. Part-time military training organization (DOSAAF) conducts such activities as athletics, shooting, parachuting, and pre-military training given to those of 15 and over in schools, colleges, and workers' centres. Claimed active membership 80 million, with 5 million instructors and activists; effectives likely to be much fewer.



The ASU-85 assault gun uses a PT-76 light tank chassis. It is air transportable, and has been provided to the Polish Army.

THE WARSAW PACT

TREATIES

The Warsaw Pact is a multilateral military alliance formed by the 'Treaty of Friendship, Mutual Assistance, and Co-operation' which was 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. Members of the Warsaw Pact 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.

ORGANIZATION

The Political Consultative Committee consists, in full session, of the First Secretaries of the Communist Party, Heads of Government, and the Foreign and Defence Ministers of the member countries. The Committee has a Joint Secretariat, headed by a Soviet official and consisting of a representative from each country, and a Permanent Commission, whose task is to make recommendations on general questions of foreign policy for Pact members. Both are located in Moscow.

Since the reorganization of the Pact in 1969 the non-Soviet Ministers of Defence are no longer directly subordinate to the Commander-in-Chief of the Pact but, together with the Soviet Minister, form the Council of Defence Ministers, which is the highest military body in the Pact. The second military body, the Joint High Command, is required by the Treaty 'to strengthen the defensive capability of the Warsaw Pact, to prepare military plans in case of war, and to decide on the deployment of troops'. The Command consists of a Commander-in-Chief and a Military Council. This Council meets under the chairmanship of the C-in-C and includes the Chief-of-Staff and permanent military representatives from each of the allied armed forces. It seems to be the main channel through which the Pact's orders are transmitted to its forces in peacetime and through which the East European forces are able to put their point of view to the C-in-C. The Pact also has a Military Staff, which includes non-Soviet senior officers. The posts of C-in-C and Chief-of-Staff of the Joint High Command have, however, always been held by Soviet officers, and most of the key positions are still in Soviet hands.

In the event of war, the forces of the other Pact members would be operationally subordinate to the Soviet High Command. The command of the air defence system covering the whole Warsaw Pact area is now centralized in Moscow and directed by the C-in-C of the Soviet Air Defence Forces. Among the Soviet military headquarters in the Warsaw Pact area are the Northern Group of Forces at Legnica in Poland; the Southern Group of Forces at Budapest; the Group of Soviet Forces in Germany at Zossen-Wünsdorf, near Berlin; and the Central Group of Forces at Milovice, north of Prague. Soviet tactical air forces are stationed in Poland, East Germany, Hungary, and Czechoslovakia.

The Soviet Union has deployed short-range surface-to-surface missile (SSM) launchers and nuclear-capable aircraft in Eastern Europe. Most East European countries also have short-range SSM launchers, but there is no evidence that nuclear warheads for their missiles have been supplied. Longer-range Soviet SSM and aircraft are based in the Soviet Union.

BULGARIA

Population: 8,850,000.
Military service: Army and Air Force 2 years, Navy 3 years.
Total regular forces: 150,000 (94,000 conscripts).
Estimated GNP 1977: $18.6 bn.
Defence expenditure 1978: 518 m leva ($432 m).
$1=1.2 leva.

Army: 115,000 (75,000 conscripts).
8 mot rifle divs. (Divisions of all East European Warsaw Pact members are of three categories with different manning and hence readiness levels. Category 1 formations are at up to three-quarters of establishment strength; Category 2 at up to half; Category 3 little more than cadres.)
5 tk bdes.
1 AB regt.
3 SSM bdes with *Scud*.
4 arty regts.
3 AA arty regts.
1 mountain bn.
2 recce bns.
125 T-34, 1,800 T-54/-55 med tks; 290 BRDM-1/-2 scout cars; 1,500 BTR-60, 35 OT-62 APC; 200 85mm, 400 122mm, 95 152mm guns/how; 82mm, 350 120mm, 160mm mor; BM-21 122mm RL; 36 *FROG*-7, 20 *Scud* SSM; 76mm ATK guns; 130 82mm RCL; *Sagger, Snapper* ATGW; 57mm, 85mm AA guns; SA-6/-7 SAM.

Reserves: 200,000.

Navy: 10,000 (6,000 conscripts).
4 submarines (ex-Soviet, 2 W- and 2 R-class).
2 *Riga*-class escorts.
3 *Poti*-, 6 SO-1-class coastal escorts.
4 *Osa*-I-class FPBG with *Styx* SSM.
4 *Shershen*-and 4 P-4-class MTB.
6 MCM ships (2 T-43-, 4 *Vanya*-class).
24 PO-2-class small patrol/minesweeping boats.
20 landing craft (10 *Vydra*-, 10 MFP-class).
6 Mi-4 ASW hel.

Reserves: 15,000.

Air Force: 25,000 (13,000 conscripts); 263 combat aircraft.
6 FGA sqns with 72 MiG-17, some MiG-23/-27.
10 interceptor sqns: 4 with 53 MiG-21, 1 with 20 MiG-19, 5 with 64 MiG-17.
3 recce sqns with 10 MiG-21, 24 MiG-15.
1 tpt regt with 6 Il-14, 4 Il-18, 4 An-24, 2 Tu-134.
1 hel regt with 30 Mi-4, 30 Mi-2 and Mi-8.
Operational trainers incl 20 MiG-21U; other trg ac incl 80 L-29, Yak-11/-18, 50 MiG-15/-17/

-21UTI.
AA-2 *Atoll* AAM.
26 SA-2, 8 SA-3 SAM bns.
1 para regt.

Reserves: 20,000.

Para-Military Forces: 15,000 border guards with AFV; 12,000 construction troops; 12,000 security police; 150,000 volunteer People's Militia.

CZECHOSLOVAKIA

Population: 15,070,000.
Military service: 2 years.
Total regular forces: 186,000 (110,000 conscripts).
Estimated GNP 1977: $49.6 bn.
Defence expenditure 1978: 19.45 bn koruny ($1.82 bn).
$1=10.7 koruny.

Army: 140,000 (95,000 conscripts).
5 tk divs.
5 motor rifle divs.
1 AB regt.
3 SSM bdes with *Scud*.
2 ATK regts.
2 arty, 2 AA arty bdes.
3,400 T-54/-55 med tks; 680 OT-65, BRDM scout cars; 200 BMP MICV; 2,000 OT-62/-64/-810 APC; 300 100mm, 600 122mm, 50 130mm, 120 152mm guns/how; 122mm SP guns; 81mm, 120mm mor; 250 RM-70 122mm, M-51 130mm RL; 40 *FROG*, 27 *Scud* SSM; 125 82mm RCL; 125 *Sagger* ATGW; 200 57mm towed, M53/59 30mm SP AA guns; SA-4/-6/-7 SAM.

Reserves: 300,000.

Air Force: 46,000 (15,000 conscripts); 613 combat aircraft.
13 FGA sqns with 80 Su-7, 36 MiG-15, 42 MiG-21, 12 MiG-23.
18 interceptor sqns with 240 MiG-21, 7 MiG-15.
6 recce sqns with 24 MiG-21R, 48 L-29.
Tpts incl 6 An-24, 53 Il-14, 1 Tu-134.
Hel incl 90 Mi-1/-2, 100 Mi-4, 20 Mi-8.
Operational trainers incl 6 Su-7B, 34 MiG-21U, 60 L-29, 24 L-39.
AA-2 *Atoll* AAM.
28 SA-2/-3 SAM bns.

Reserves: 50,000.

Para-Military Forces: 10,000 border guards, some APC, 82mm RCL; about 120,000 part-time People's Militia, 2,500 Civil Defence Troops.

GERMAN DEMOCRATIC REPUBLIC

Population: 16,830,000.
Military service: 18 months.
Total regular forces: 157,000 (92,000 conscripts).
Estimated GNP 1977: $54.6 bn.
Defence expenditure 1977: 11.02 bn Ostmarks ($3.15 bn).
$1=3.5 Ostmarks.

Army: 105,000 (67,000 conscripts).
2 tk divs.
4 motor rifle divs.
2 SSM bdes with *Scud*.
2 arty regts.
2 AA arty regts.
1 AB bn.
2 ATK bns.
About 2,500 T-54/-55 med tks (600 T-34 in storage); about 120 PT-76 lt tks; 880 BRDM-1/-2, FUG-66 scout cars; 1,500 BMP MICV, BTR-50P/-60P/-152 APC; 335 122mm, 100 130mm, 72 152mm guns/how; 250 120mm mor; 108 BM-21 122mm, RM-70 122mm RL; 24 *FROG*-7, 16 *Scud* B SSM; 100mm ATK guns; *Sagger, Snapper* ATGW; 130 57mm, 65 100mm towed, 105 ZSU-23-4 SP AA guns; SA-4/-7 SAM.

Reserves: 250,000.

Navy: 16,000 (10,000 conscripts).
1 *Riga*-class frigate.
4 SO-1-, 14 *Hai*-class submarine chasers.
12 *Osa*-I-, 3 *Osa*-II-class FPBG with *Styx* SSM.
45 MTB (18 *Shershen-*, 27 *Libelle*-class).
24 coastal patrol craft (coastguard).
34 *Kondor*-class coastal minesweepers.
5 *Frosch-*, 3 *Robbe*-class LST, 7 *Labo*-class LCT.
2 *Kondor*-class intelligence collection vessels (AGI).
1 hel sqn with 8 Mi-4, 5 Mi-8.

Reserves: 25,000.

Air Force: 36,000 (15,000 conscripts); 362 combat aircraft.
3 FGA sqns with 35 MiG-17.
18 interceptor sqns with 270 MiG-21.
1 recce sqn with 12 MiG-21, 4 Il-14.
2 tpt sqns with 20 Il-14, 3 Tu-124, 8 Tu-134.
6 hel sqns with 46 Mi-1, 18 Mi-4, 40 Mi-8 hel.
41 MiG-21U, L-39 trainers.
AA-2 *Atoll* AAM.
5 AD regts with 120 57mm and 100mm AA guns.
2 SAM bns with 22 SA-2, 4 SA-3.
2 para bns.

Reserves: 30,000.

Para-Military Forces: 71,500. 46,500 border guards, some tks, AFV, 24 coastal craft; 25,000 security troops, 500,000 Workers' Militia.

HUNGARY

Population: 10,670,000.
Military service: 2 years (incl Border Guard).
Total regular forces: 114,000 (78,000 conscripts).
Estimated GNP 1977: $25.2 bn.
Defence expenditure 1978: 14.41 bn forints ($658 m).
$1=21.9 forints.

Army: 91,000 (70,000 conscripts).
1 tk div.
5 motor rifle divs.
1 SSM bde with *Scud*.
3 arty regts.
2 AA arty regts.
1 SAM regt with SA-6.
1 AB bn.
Danube Flotilla.
About 1,000 T-54/-55 med, 100 PT-76 lt tks; about 600 FUG-65/-66 scout cars; 1,500 PSZH APC; 250 122mm, 36 152mm guns/how; 300 82mm, 100 120mm mor; 75 BM-21 122mm RL; 24 *FROG*, 12 *Scud* SSM; 300 57mm and 85mm ATK guns; 75 *Sagger, Snapper* ATGW; 200 57mm and 100mm towed, 40 ZSU-23-4 and ZSU-57-2 SP AA guns; 20 SA-6, SA-7, 50 SA-9 SAM; 10 100-ton patrol craft, river MCM, 5 small landing craft.

Reserves: 130,000.

Air Force: 23,000 (8,000 conscripts); 180 combat aircraft.
6 interceptor sqns with 116 MiG-21.
About 20 An-2/-24/-26, 10 Il-14, 10 Li-2 tpts.
About 30 Mi-1/-2, 35 Mi-8, Ka-26 hel.
53 MiG-15UTI, 11 MiG-21U, Yak-11/-18, 20 L-29/-39 trainers.
AA-2 *Atoll* AAM.
14 SAM bns with SA-2.

Reserves: 13,000.

Para-Military Forces: 15,000 border guards (11,000 conscripts) with lt inf weapons; 60,000 part-time Workers' Militia.

POLAND

Population: 34,950,000.
Military service: Army, internal security forces, Air Force 2 years; Navy, special services 3 years.
Total regular forces: 306,500 (190,000 conscripts).
Estimated GNP 1977: $86.1 bn.
Defence expenditure 1978: 58.8 bn zloty ($2.55 bn).
$1=23.1 zloty

Army: 222,000 (166,000 conscripts).
5 tk divs.
8 motor rifle divs.
1 AB div.
1 amph assault div.
4 SSM bdes with *Scud*.
3 arty bdes, 1 arty regt.
6 AA arty regts.
3 ATK regts.
3,800 T-34/-54/-55 med. 300 PT-76 lt tks; 2,000 OT-65 and BRDM-1/-2 scout cars; BMP MICV; OT-62/-64 APC; 400 76mm, 85mm, 700 122mm, 150 152mm guns/how; 122mm SP guns; 600 82mm, 120mm mor; 250 BM-21 122mm, 140mm RL; 52 *FROG*-3/-7, 36 *Scud* SSM; 76mm, 85mm towed, ASU-85 SP ATK guns; 73mm, 82mm, 107mm RCL; *Sagger* ATGW; 400 23mm, 57mm, 85mm, 100mm towed, ZSU-23-4, 24 ZSU-57-2 SP AA guns; SA-6/-7/-9 SAM.

Deployment: Egypt (UNEF); 957; *Syria* (UNDOF): 90.

Reserves: 500,000.

Navy: 22,500, incl Marines and 6,000 conscripts.
4 W-class submarines.
1 *Kotlin*-class destroyer with 2 *Goa* SAM.
13 *Osa*-class FPBG with *Styx* SSM.
22 large patrol craft (some coastguard).
21 MTB (15 *Wisla-*, 6 P-6 class).
12 *Krogulec-*, 12 T-43-class ocean minesweepers, 20 K-8-class minesweeping boats.
23 *Polnocny* class LCT and 15 landing craft.
2 trg ships.
1 Naval Aviation Regt (60 combat aircraft):
1 lt bbr/recce sqn with 10 Il-28.
4 fighter sqns with 12 MiG-15, 38 MiG-17.
2 hel sqns with some 25 Mi-1/-2/-4.

Reserves: 45,000.

Air Force: 62,000 (18,000 conscripts); 725 combat aircraft.
1 lt bbr sqn with 6 Il-28.
15 FGA sqns: 14 with 160 MiG-17 and 30 Su-7, 1 with 28 Su-20.
33 interceptor sqns with 80 MiG-17, 340 MiG-21.
6 recce sqns with 72 MiG-15/-21, 5 Il-28, 4 Il-14.
Some 50 tpts, incl 22 An-12/-24/-26, 21 Il-14/-18/-62, 4 Tu-134, 5 Yak-40.
165 Mi-1/-2, 19 Mi-4, 26 Mi-8 hel.
300 trainers, incl *Iskra*, MiG-15/-17/-21UTI, Il-28.
AA-2 *Atoll* AAM.
36 SA-2, 12 SA-3 SAM bns.

Reserves: 60,000.

Para-Military Forces: 95,000: 18,000 Border Troops (Ministry of Interior), 77,000 Internal Security and Internal Defence Troops (incl

The MiG-19 (above), a twenty-year-old fighter, is still used by the USSR and several other air forces. At left, the deadly ZSU-23-4 self-propelled AA system. Below, the Soviet-built Mi-8 helicopter is found in all Pact air forces.

21,000 Construction Troops). Some tks, AFV, ATK guns; 34 small boats operated by coastguard; 350,000 Citizens' Militia.

ROMANIA

Population: 21,670,000.

Military service: Army and Air Force 16 months, Navy 2 years.
Total regular forces: 180,500 (110,000 conscripts).
Estimated GNP 1977: $51.4 bn.
Defence expenditure 1978: 12.0 bn lei ($923 m).
$1 = 13.0 lei.

Army: 140,000 (95,000 conscripts).
2 tk divs.
8 motor rifle divs.
2 mountain bdes.
1 AB regt.
2 SSM bdes with *Scud*.
2 arty bdes.
3 arty regts.
2 ATK regts.
2 AA arty regts.
200 T-34, 1,500 T-54/-55 med tks; 1,000 BRDM scout cars; BTR-50/-60, TAB-70/-72 (BTR-60) APC; 60 76mm, 50 85mm, 600 122mm, 150 152mm guns/how; 130 SU-100 SP guns; 1,000 82mm, 200 120mm mor; 122mm, 150 130mm RL; 30 *FROG*, 20 *Scud* SSM; 57mm ATK guns; 260 76mm and 82mm RCL; 120 *Sagger, Snapper* ATGW; 300 30mm, 37mm, 250 57mm, 85mm, 100mm AA guns; SA-6/-7 SAM.

Reserves: 300,000.

Navy: 10,500 (5,000 conscripts).
6 coastal escorts (3 *Poti*-, 3 *Kronstadt*-class).
5 *Osa*-class FPBG with *Styx* SSM.
13 P-4-class MTB, 12 *Hu Chwan*-class hydrofoils.
18 *Shanghai*-class MGB.
28 patrol craft (19 coastal, 9 river under 100 tons).
30 MCM craft.
4 Mi-4 helicopters.

Reserves: 20,500.

Air Force: 30,000 (10,000 conscripts): 437 combat aircraft.
5 FGA sqns with 75 MiG-15/-17.
12 interceptor sqns with 27 MiG-15/-19, 210 MiG-21.
1 recce sqn with 15 Il-28.
2 tpt sqns with some 4 Il-14, 4 Il-18, 1 Il-62, 10 An-24, 2 An-26, 12 Li-2, 1 Boeing 707.
6 Mi-4, 20 Mi-8, 45 *Alouette* III hel.
Trainers incl 50 L-29, 50 MiG-15UTI, 10 MiG-21U, 60 IAR-823.
AA-2 *Atoll* AAM.
108 SA-2 *Guideline* at about 18 SAM sites.

Reserves: 25,000.

Para-Military Forces: 37,000: 17,000 border, 20,000 security troops with AFV, ATK guns. About 700,000 Patriotic Guard.

THE NORTH ATLANTIC TREATY

TREATIES

The North Atlantic Treaty was signed in 1949 by Belgium, Britain, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, and the United States; Greece and Turkey joined in 1952, and West Germany in 1955. 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 to the Treaty aimed at strengthening the structure of NATO and revised the Brussels Treaty of 1948, which now includes Italy and West Germany in addition to its original members (Benelux countries, Britain, and France). The Brussels Treaty signatories are committed 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'.

Since 1969 members of the Atlantic Alliance can withdraw on one year's notice; the Brussels Treaty was signed for 50 years.

ORGANIZATION

The Organization of the North Atlantic Treaty is known as NATO. The governing body of the Alliance, the North Atlantic Council, which has its headquarters in Brussels, consists of Ministers from the fifteen member countries, who normally meet twice a year, and of ambassadors representing each government, who are in permanent session.

In 1966 France left the integrated military organization, and the 14-nation Defence Planning Committee (DPC) was formed, on which France does not sit. It meets at the same level as the Council and deals with questions related to NATO integrated military planning and other matters in which France does not participate. Greece has announced her intention to leave the integrated military organization; her status is under discussion, but she left the DPC in autumn 1974.

Two permanent bodies for nuclear planning were established in 1966. The first, the Nuclear Defence Affairs Committee (NDAC), is open to all NATO members (France, Iceland, and Luxembourg do not take part); it normally meets at Defence Minister level once a year to associate non-nuclear members in the nuclear affairs of the Alliance. The Secretary-General is Chairman of the NDAC.

The second, the Nuclear Planning Group (NPG), derived from and subordinate to the NDAC, has seven or eight members and is intended to go further into the details of topics raised there. The composition consists, in practice, of Britain, Germany, Italy, and the United States, plus three or four other member countries serving in rotation, each for a term of 18 months. On 1 July 1978 these were: Belgium, Denmark, and Turkey. The Secretary-General also chairs the NPG.

The Eurogroup, which was set up by West European member states of the Alliance (with the exception of France, Portugal, and Iceland) in 1968, is an informal consultative body acting to co-ordinate and improve the West European military contribution to the Alliance. Its activities have included the European Defence Improvement Programme (1970) and agreement on principles of co-operation in the fields of armaments (1972), training (1973), and logistics (1975). Discussion in the Eurogroup of the need to extend European armaments co-operation led to the formation in 1976 of the European Programme Group, open to all European members of the Alliance but independent of it. Its membership now includes France and ten member countries of Eurogroup.

The Council and its Committees are advised on politico-military, financial, economic, and scientific aspects of defence planning by the Secretary-General and an international staff. The Council's military advisers are the Military Committee, which gives policy direction to NATO military commands. The Military Committee consists of the Chiefs-of-Staff of all member countries except France, which maintains a liaison staff, and Iceland, which is not represented; in permanent session the Chiefs-of-Staff are represented by Military Representatives, who are located in Brussels together with the Council. The Military Committee has an independent Chairman and is served by an integrated international military staff. The major NATO commanders are responsible to the Committee, although they also have direct access to the Council and heads of Governments.

The principal military commands of NATO are Allied Command Europe (ACE), Allied Command Atlantic (ACLANT), and Allied Command Channel (ACCHAN).

The NATO European and Atlantic Commands participate in the Joint Strategic Planning System at Omaha, Nebraska, but there is no Alliance command specifically covering strategic nuclear forces. The United States has, however, committed a small number of ballistic-missile submarines (and Britain all hers) to the planning control of SACEUR and a larger number to SACLANT.

The Supreme Allied Commander Europe (SACEUR) and the Supreme Allied Commander Atlantic (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.

(I) ALLIED COMMAND EUROPE (ACE) has its headquarters, known as SHAPE (Supreme Headquarters, Allied Powers in Europe), at Casteau, near Mons, in Belgium. It is responsible for the defence of all NATO territory in Europe except Britain,

France, Iceland, and Portugal, and for that of all Turkey. It also has general responsibility for the air defence of Britain.

The European Command has some 7,000 tactical nuclear warheads in its area. The number of delivery vehicles (aircraft, missiles, and howitzers) is more than 3,000, spread among all countries excluding Luxembourg. The nuclear explosives, however, are maintained in American custody, with the exception of certain British weapons (there are also French nuclear weapons in France). There is a large number of low-yield weapons, but the average yield of bombs is about 100 kilotons, and of missile warheads, 20 kilotons.

About 66 division-equivalents are available to SACEUR in peacetime. The Command has some 3,100 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.

The 2nd French Corps of two divisions (which is not integrated in NATO forces) is stationed in Germany under a status agreement reached between the French and German Governments. Cooperation with NATO forces and commands has been agreed between the commanders concerned.

The following Commands are subordinate to Allied Command Europe:

(a) *Allied Forces Central Europe* (AFCENT) has command of both the land forces and the air forces in the Central European Sector. Its headquarters are at Brunssum in the Netherlands, and its Commander (CINCCENT) is a German general.

The forces of the Central European Command include 26 divisions, assigned by Belgium, Britain, Canada, West Germany, the Netherlands, and the United States, and about 1,400 tactical aircraft.

The Command is sub-divided into Northern Army Group (NORTHAG) and Central Army Group (CENTAG). NORTHAG, responsible for the defence of the sector north of the Göttingen–Liège axis, includes the Belgian, British, and Dutch divisions and four German divisions and is supported by 2nd Allied Tactical Air Force (ATAF), composed of Belgian, British, Dutch, and German units. (One newly-formed American brigade is being stationed in the NORTHAG area.) American forces, seven German divisions, and the Canadian battle group are under CENTAG, supported by the 4th ATAF, which includes American, German, and Canadian units and an American Army Air Defense Command. Allied Air Force, Central Europe (AAFCE) was set up in 1974 to provide centralized control of air forces in the sector.

(b) Allied Forces Northern Europe (AFNORTH) has its headquarters at Kolsaas, Norway, and is responsible for the defence of Denmark, Norway, Schleswig-Holstein, and the Baltic Approaches. The commander (CINCNORTH) has always been a British general. 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 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.

(c) Allied Forces Southern Europe (AFSOUTH) has its headquarters at Naples, and its commander (CINCSOUTH) is an American admiral. Its main responsibilities are to deter aggression, to safeguard the sea lanes of communication in the Mediterranean, and to defend the territorial integrity of Greece, Italy, and Turkey. It is also responsible for the air defence of the Southern Region in peace and war and for naval operations in the Mediterranean and Black Seas. Ground forces include 22 division-equivalents from Turkey, 13 from Greece, and 8 from Italy, as well as the tactical air forces of these countries. Other forces have been earmarked for AFSOUTH, as have the US Navy's Sixth Fleet and naval forces from Italy. Naval forces from Greece and Turkey will act in support of NATO's plans in the Region. The ground-defence system is based upon two separate commands: the Southern, comprising Italy and the approaches to it, under an Italian commander (LANDSOUTH), and South-eastern (LANDSOUTHEAST), comprising Turkey, under a Turkish commander. Command arrangements for Greece await the resolution of Greece's relationship to the integrated military structure of NATO. There is also an overall air command (AIRSOUTH), and there are two naval commands (NAVSOUTH and STRIKEFORSOUTH) responsible to AFSOUTH, with headquarters in Naples.

Maritime patrol aircraft from Southern Region nations and the United States operate in the Mediterranean, co-ordinated by Maritime Air Forces Mediterranean (MARAIRMED), a functional command of NAVSOUTH. French aircraft participate. Submarine Force Mediterranean (SUBMED), another functional command of NAVSOUTH, is responsible for the conduct of submarine operations throughout the Mediterranean. COMARAIRMED and COMSUBMED are American rear admirals.

The Allied Naval On Call Force Mediterranean (NAVOCFORMED) consists of a ship from each of the allied powers concerned with the Southern Region, including the United Kingdom and the United States, and is activated twice each year for a month.

(d) United Kingdom Air Forces (UKAIR) has its headquarters at High Wycombe, England.

(e) ACE Mobile Force (AMF), with headquarters at Seckenheim, Germany, has been formed with particular reference to the northern and south-eastern flanks. Formed by seven countries, it comprises seven infantry battalion groups, an armoured reconnaissance squadron, six artillery batteries, helicopter detachments, and ground-support fighter squadrons, but has no air transport of its own.

(II) ALLIED COMMAND ATLANTIC (ACLANT) has its headquarters at Norfolk, Virginia, and is responsible for the North Atlantic area from the North Pole to the Tropic of Cancer, including Portuguese coastal waters. The commander is an American admiral.

In the event of war, its duties are to participate in the strategic strike and to protect sea communications. There are no forces assigned to the command in peacetime except 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 commands: Western Atlantic, Eastern Atlantic, Iberian Atlantic, Striking Fleet Atlantic, Submarine Command, and STANAVFORLANT. The nucleus of the Striking Fleet Atlantic has been provided by the United States 2nd Fleet with some five attack carriers; carrier-based aircraft share the nuclear strike role with missile-firing submarines.

(III) ALLIED COMMAND CHANNEL (ACCHAN) has its headquarters at Northwood, near London. The commander (CINCCHAN) is a British admiral. The wartime role of Channel Command is to exercise control of 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 cooperation with French naval forces. A Standing Naval Force, Channel (STANAVFORCHAN) was formed in 1973 to consist of mine counter-measures ships from Belgium, Germany, the Netherlands, and Britain; other interested nations might participate on a temporary basis. Its operational command is vested in CINCCHAN.

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BELGIUM

Population: 9,930,000.
Military service: 8 or 10 months. (Conscripts serve 8 months if posted to Germany, 10 months if serving in Belgium.)
Total armed forces: 87,100 (26,600 conscripts).
Estimated GNP 1977: $73.4 bn.
Defence expenditure 1977: 66.47 bn francs ($1.82 bn).
$1 = 36.62 francs (1977).

Army: 63,400, incl Medical Service and 22,600 conscripts.
1 armd bde.
3 mech inf bdes.
3 recce bns.
2 mot inf bns.
1 para-cdo regt.
3 arty bns.
1 SSM bn with 4 *Lance*.
2 SAM bns with 24 *HAWK*.
5 engr bns (3 fd, 1 bridge, 1 eqpt).
4 aviation sqns.
334 *Leopard*, 52 M-47 med, 136 *Scorpion* lt tks; 154 *Scimitar* AFV; 1,229 M-75 and AMX-VCI, 174 *Spartan* APC; 22 105mm, 15 203mm how; 96 M-108 105mm, 25 M-44, 41 M-109 155mm, 11 M-110 203mm SP how; 5 *Lance* SSM; 80 JPK C-90 SP ATK guns; *ENTAC*, *Milan* ATGW; 41 *Striker* AFV with *Swingfire* ATGW; 114 20mm, 40mm, 57mm AA guns; 60 *HAWK* SAM; 6 Piper *Super Cub*, 12 BN *Islander* ac, 74 *Alouette* II hel; 31 *Epervier* RPV. (90 *Spartan* APC, 55 *Gepard* SP AA guns, *Swingfire* ATGW on order.)

Deployment: Germany: 27,000; 1 corps HQ, 2 div HQ, 1 armd bde, 2 mech inf bdes.

Reserves: 50,000: 10,000 train every year, 1 mech, 1 mot inf bde train every three years.

Navy: 4,300 (800 conscripts).
4 frigates with *Exocet* SSM, *Sea Sparrow* SAM.
7 ocean minehunters (ex-US).
6 coastal minesweepers/minehunters.
14 inshore minesweepers.
2 log support and comd ships (for MCM).
6 river patrol boats.
3 *Alouette* III hel.

Reserves: 4,400.

Air Force: 19,400 (3,200 conscripts); 148 combat aircraft.
2 FB sqns with 36 F/TF-104G.
3 FB sqns with 54 *Mirage* VBA/D.
2 AWX sqns with 36 F-104G, 4 TF-104G.
1 recce sqn with 18 *Mirage* VBR.
2 tpt sqns with 12 C-130H, 3 HS-748, 6 *Merlin* IIIA, 2 *Falcon* 20, 2 Boeing 727QC.
1 SAR sqn with 4 HSS-1, 5 *Sea King* Mk 48 hel.
37 *Magister*, 33 SF-260, 12 T-33 trainers.
Sidewinder AAM.
8 SAM sqns with *Nike Hercules*.
(116 F-16A/B fighters, 33 *Alpha Jet* trg ac, *Super Sidewinder*, AIM-7E *Sparrow* AAM, 40 BDX APC on order.)

Para-Military Forces: 16,500 Gendarmerie with 62 FN armd cars, 5 *Alouette* II, 3 *Puma* hel.

BRITAIN

Population: 56,700,000.
Military service: voluntary.
Total armed forces: 313,253 (14,649 women and 8,100 enlisted outside Britain).
Estimated GNP 1977: $263.6 bn.
Defence expenditure 1978–79: $6.92 bn ($13.04 bn).
$1 = $0.531 (1978), $0.582 (1977).

Strategic forces:
SLBM: 4 SSBN, each with 16 *Polaris* A3 missiles.
Ballistic Missile Early Warning System (BMEWS) station at Fylingdales.

Army: 160,837 (5,740 women and 7,400 enlisted outside Britain).
10 armd regts.
9 armd recce regts.
47 inf bns.
3 para bns (1 in para role).
5 Gurkha bns.
1 special air service (SAS) regt.
1 msl regt with *Lance* SSM.
3 AD regts with *Rapier* SAM.
1 hy, 13 field, 1 GW, 1 cdo, 1 ATK, 1 locating arty regts.
10 engr regts.
6 army aviation regts.
900 *Chieftain* med, 271 FV101 *Scorpion* lt tks; 243 *Saladin* armd cars; 290 *Scimitar*, 178 FV438/FV712 AFV; 1,429 *Ferret*, 200 *Fox* scout cars; 2,338 FV432, 600 *Saracen*, 60 *Spartan* APC; 100 105mm pack how and lt guns; 155 *Abbot* 105mm, FH70 155mm, 50 M-109 155mm, 31 M-107 175mm, 16 M-110 203mm SP guns/how; 12 *Lance* SSM; 84mm *Carl Gustav*, 120mm RCL; *Milan*, *Swingfire* ATGW; FV102 *Striker* with ATGW; L/70 40mm AA guns; *Blowpipe*, *Rapier/Blindfire* SAM; 100 *Scout*, 7 *Alouette* II, 20 *Sioux*, 150 *Gazelle*, 20 *Lynx* hel. (FH70 155mm guns, *TOW* ATGW on order.)

Deployment and Organization:
United Kingdom. United Kingdom Land Forces (UKLF): United Kingdom Mobile Force (UKMF)—6th Field Force with 5 (3 regular, 2 TAVR) inf bns and log spt gp; 7th Field Force with 3 regular, 2 TAVR bns; 8th Field Force (3 regular, 2 TAVR bns for Home Defence); 1 bn gp (for ACE Mobile Force (Land)), 1 SAS regt (–), 1 Gurkha inf bn. HQ Northern Ireland: 3 inf bde HQ, 1 armd recce regt, variable number of major units in inf role (some nine drawn from BAOR on short tours), 3 engr, 2 army aviation sqns and elements of SAS.
Germany. British Army of the Rhine (BAOR): 55,000: 1 corps HQ, 4 armd divs, 5th field force, 1 arty div. Berlin: 3,000 (Berlin Field Force).
Brunei: 1 Gurkha bn.
Hong Kong: Gurkha Field Force with 1 British, 3 Gurkha inf bns, 1 hel flt, 1 engr sqn, spt units.
Cyprus: 1 inf bn less 2 coys, 1 armd recce sqn, 1 hel flt, and log support with UNFICYP; 1 inf bn plus 2 inf coys, 1 armd recce sqn, 1 hel flt in garrison at Sovereign Base Areas.
Gibraltar: 1 inf bn, 1 engr tp.
Belize: 1 inf bn, 1 inf bn (–), 1 armd recce tp, 1 arty bty, 1 engr sqn, 1 hel flt.

Reserves: 116,800 Regular reserves. 60,700 Territorial and Army Volunteer Reserve (TAVR): 2 armd recce regts, 38 inf bns, 2 SAS, 2 med, 3 lt AD, 7 engr regts. 7,800 Ulster Defence Regiment: 11 bns.

Navy: 67,770, incl Fleet Air Arm, Royal Marines, 4,003 women, and 400 enlisted outside Britain; 72 major surface combat vessels.
Submarines, attack:
10 nuclear, 17 diesel.
Surface ships:
1 aircraft carrier (30 ac, 9 hel).
2 ASW/cdo carriers (1 with *Seacat* SAM, hels; 1 in reserve).
2 assault ships with *Seacat* SAM (1 trg).
2 hel cruisers each with 4 *Sea King* hel, *Seacat* SAM.
11 GW destroyers (7 County-class with *Seaslug*, *Seacat* SAM, ASW hel, 4 with *Exocet* SSM; 1 Type 82 with *Sea Dart* SAM, *Ikara* ASW; 3 Type 42 with *Sea Dart* SAM, ASW hel).
55 frigates: 49 GP (8 Type 21 with *Exocet* SSM, *Seacat* SAM, 1 *Lynx* hel; 26 *Leander*-class, all with 1 *Wasp* hel, 14 with *Exocet* SSM, 8 with *Ikara* ASW, 25 with *Seacat* SAM, 1 with *Seawolf* SAM; 7 Tribal-, 8 *Rothesay*-class with *Seacat* SAM and 1 *WASP* hel); 2 Type 41 AA; 2 Type 61 aircraft direction with *Seacat* SAM; 2 ASW (1 Type 12 (trg), 1 Type 14).
33 coastal minesweepers/minehunters (3 trg).
5 inshore minesweepers (trg).
5 *Island*-class offshore patrol vessels.
4 *Bird*-class patrol craft, 5 *Ton*-class coastal patrol, 1 FPB.
13 survey, 1 ice patrol, 1 Royal Yacht/hospital, 3 depot/support ships.
3 hovercraft (2 SRN-6, 1 BH-N7).
Included above are 1 nuclear, 6 diesel subs, 1 hel cruiser, 1 ASW/cdo carrier, 1 assault ship, 1 GW destroyer, 12 frigates, 4 minesweepers in reserve or undergoing refit. (2 ASW cruisers, 3 SSN, 7 destroyers, 4 frigates, 2 MCM, 2 offshore patrol building; *Ikara* ASW msls, *Sub-Harpoon* underwater-to-surface GW, *Sea Skua* ASM on order.)

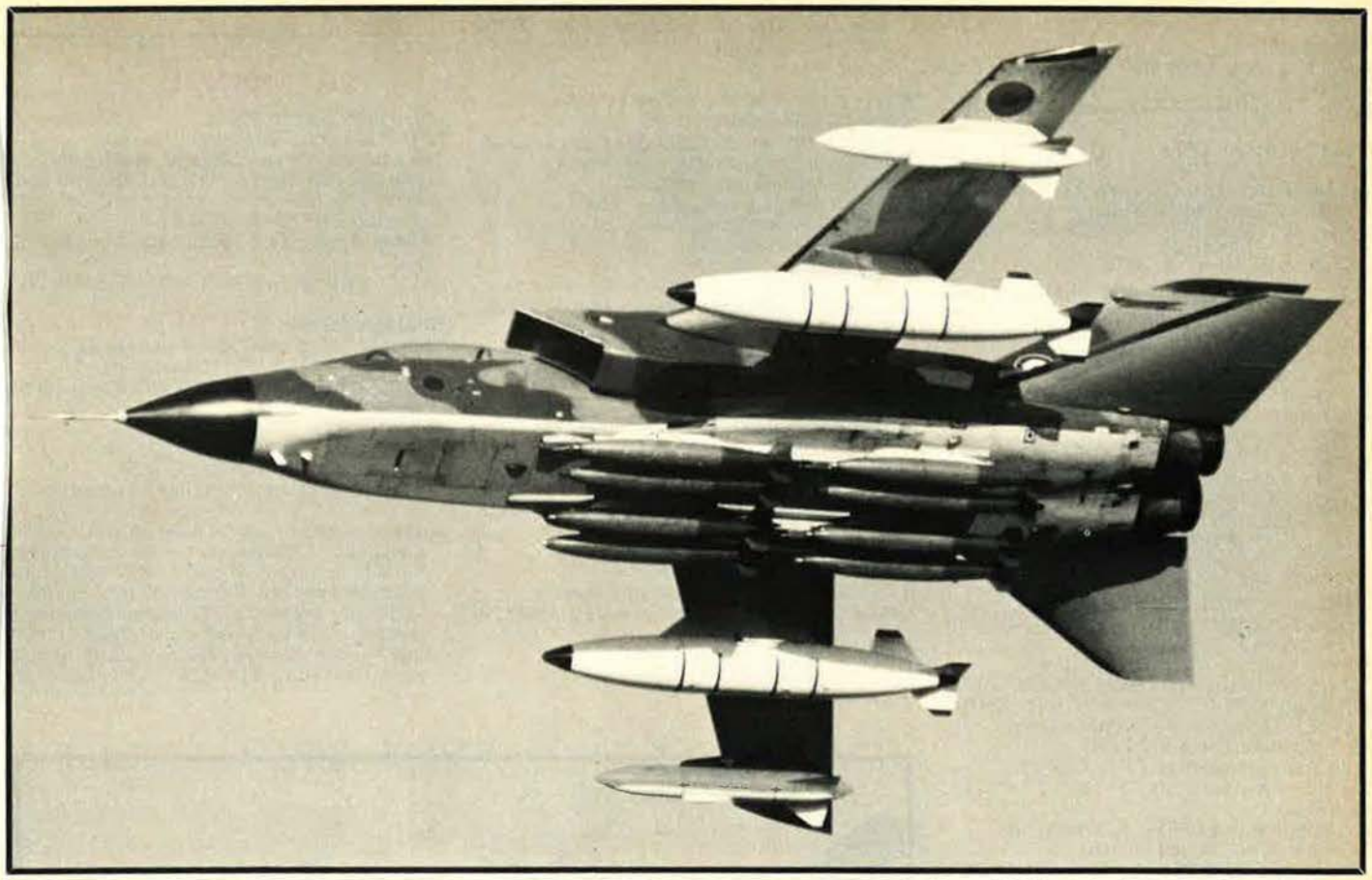
The Fleet Air Arm:
1 strike sqn with 14 *Buccaneer* S2.
1 FGA sqn with 14 *Phantom* FG1.
1 AEW sqn with 7 *Gannet* AEW3, 1 COD4, 3 T5.
7 ASW hel sqns: 5 with 29 *Sea King* (4 sqns embarked), 1 of 39 *Wasp* flts, 1 of 6 *Wessex* 3 flts, 4 *Lynx* flts.
1 cdo assault sqn with 16 *Wessex* 5.
3 SAR flts: 2 with *Wessex* HAS-1, 1 with *Wessex* 5.
1 utility hel sqn with *Wessex* 5.
5 trg sqns with *Sea King*, *Wasp*, *Wessex* 3/5, *Lynx*. (35 *Sea Harrier* VTOL ac, 21 *Sea King*, 60 *Lynx* hel on order.)

The Royal Marines: 7,468.
1 cdo bde with 4 cdo gps, 1 lt hel sqn, spt units.
120mm RCL; SS-11 ATGW; *Blowpipe* SAM; *Milan* ATGW; 12 *Gazelle* hel. (4 *Lynx* hel on order.)

Deployment:
Malta: 1 indep cdo coy gp (to be withdrawn by April 1979).
Falkland Islands: 1 det.

Reserves (naval and Marines): 29,100 regular and 6,500 volunteers.

Air Force: 84,646 (4,906 women and 300 enlisted outside Britain); about 511 combat aircraft.
6 strike sqns with 48 *Vulcan* B2.
4 strike sqns with 50 *Buccaneer* S2.
3 close support sqns with 48 *Harrier* GR3.
6 attack and close support sqns with 72 *Jaguar* GR1.
9 interceptor sqns: 2 with 24 *Lightning* F6, 7 with 72 *Phantom* FG1/FGR2.
5 recce sqns: 1 with 8 *Vulcan* SR2, 2 with 24 *Jaguar* GR1, 2 with 22 *Canberra* PR7/9.
1 AEW sqn with 11 *Shackleton* AEW Mk 2 (to be replaced by *Nimrod*).
4 MR sqns with 28 *Nimrod* MR1.
1 ECM sqn with 3 *Nimrod* R Mk 1, 4 *Canberra* B6.
2 tanker sqns with 16 *Victor* K2.
1 strategic tpt sqn with 11 VC-10.
4 tac tpt sqns with 40 C-130.
3 lt comms sqns with HS-125, *Andover*, *Pembroke*, *Devon* ac, *Whirlwind* hel.
Operational conversion units with some 97 combat aircraft, incl 9 *Vulcan*, 11 *Buccaneer*, 7 *Canberra*, 21 *Phantom*, 24 *Jaguar*, 7 *Lightning*, 15 *Harrier*, 3 *Nimrod*, *Andover*, *Hercules*; trg units with *Hunter*, *Hawk*, *Gnat*, *Bulldog*, *Jet Provost*, C-130, *Victor*, *Dominie* ac; *Wessex*, *Whirlwind*, *Puma*, *Gazelle* hel.
8 hel sqns: 5 tac tpt (2 with 24 *Puma* HC-1, 3 with 40 *Wessex* HC-2), 3 SAR with 17 *Whirlwind* HAR-10, 8 *Wessex*.
Sidewinder, *Sparrow*, *Red Top*, *Firestreak* AAM; *Martel*, AS.12, AS.30 ASM.
2 SAM sqns with *Bloodhound* 2.
(24 *Harrier* FGA, 11 *Nimrod* AEW, 9 VC-10 tankers, 175 *Hawk*, *Bulldog* trg ac, 30 *Chinook* hel; *Bloodhound* SAM; *Super Sidewinder*, *Sky Flash* AAM on order; 385 *Tornado* MRCA (220 FGA, 165 AD) planned.)



Some 800 Mach 2+ Tornados (above) will equip the British, French, and Italian air forces. The subsonic Alpha Jet (left) is to be used by France and Germany.

Royal Air Force Regiment:
7 fd and 5 AD sqns with *Rapier* SAM.
1 flt with *Tigercat* SAM.

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: 8,600). Sqns are deployed overseas as follows:
Germany: 2 *Phantom* FGR2, 2 *Buccaneer*, 5 *Jaguar*, 2 *Harrier*, 1 *Wessex*, 1 *Bloodhound*, 4 *Rapier*, fd sqn RAF Regt.
Gibraltar: Hunter det.
Cyprus: 1 *Whirlwind* (4 ac with UNFICYP); periodic dets of other ac; 1 sqn RAF Regt.
Malta: 1 *Canberra* PR7 (to be withdrawn 1978).
Hong Kong: 1 *Wessex*.
Belize: Harrier (6 ac), *Puma*, 1 sqn RAF Regt.

Reserves: 30,300 regular; about 300 volunteer.

CANADA

Population: 23,700,000.
Military service: voluntary.
Total armed forces: 80,000 (4,500 women).

Estimated GNP 1977: $US 197.9 bn.
Defence expenditure 1978–79: $Can 4.13 bn ($US 3.64 bn).
$US 1 = $Can 1.14 (1978), $Can 1.05 (1977).

Army (Land Forces): 29,300. (The Canadian Armed Forces were unified in 1968; the strengths shown here for army, naval, and air forces are only approximate.)

Mobile Command (about 17,700 land and air. 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, and HQ 4 ATAF in Europe operational control of 1 CAG; Air Defence Group is part of NORAD. There are also a Communications Command and a Canadian Forces Training System.)
2 bde gps each comprising:
- 3 inf bns.
- 1 armd regt.
- 1 lt arty regt of 2 close support, 1 AD btys.
- 1 engr regt.
- support units.

1 special service force comprising:
- 1 armd regt.
- 1 inf bn.
- 1 AB regt.
- 1 arty regt of 2 close support btys.
- support units.
- 1 sigs regt.

32 *Leopard* A2 med tks (leased until tanks on order are delivered); 121 Ferret scout cars, 174 *Lynx* AFV; 827 M-113 APC; 58 105mm pack, 159 105mm how, 50 M-109 155mm SP how; 810 *Carl Gustav* 84mm RCL; 150 *TOW* ATGW; CL-89 drones; 57 40mm AA guns; 103 *Blowpipe* SAM. (114 *Leopard* med tks, 177 Mowag armd cars, 241 Mowag APC, *TOW* ATGW on order.)

Deployment:
Europe: One mech bde gp of 2,800 with 32 *Leopard* med tks, 375 M-113 APC/recce, 24 M-109 155mm SP how.
Cyprus (UNFICYP): 515.
Egypt (UNEF): 855.
Syria (UNDOF): 161.
Lebanon (UNIFIL): 99.
Other UN: 333.

Reserves: about 15,200 Militia; 99 combat arms units plus support units (all in Mobile Command).

Navy (Maritime): 14,200.
Maritime Command (about 9,000).
3 submarines (*Oberon*-class).
4 ASW hel destroyers each with 2 CH-124 (*Sea King*) hel and 2 *Sea Sparrow* SAM.
19 ASW frigates (8 with 1 CH-124 hel, 4 with *ASROC*, 3 in reserve).
3 support ships with 3 CH-124 hel.
6 coastal patrol trg ships.

6 reserve trg vessels.

Deployment:
Atlantic: 3 subs, 13 surface (1 in reserve), 2 spt ships.
Pacific: 10 surface (2 in reserve), 1 spt ship.

Reserves: about 3,200.

Air Force (Air): 36,500; some 214 combat aircraft. *Air Command* (23,000).
2 trg sqns: 1 with 16 CF-5A, 19 CF-5D; 1 with 10 CF-104, 10 CF-104D.
Air Defence Group:
- 4 main, 17 auxiliary sites of Distant Early Warning *(DEW)* Line.
- 24 long-range radar sites (*Pine Tree Line*).
- 3 AWX sqns with 36 CF-101 *Voodoo*.
- 1 ECM sqn with 8 CF-100, 3 CC-117 (*Falcon* 20), 15 T-33.

Air Transport Group:
- 4 tpt sqns: 2 with 24 C-130E/H, 1 with 5 CC-137 (Boeing 707), 1 with 7 *Cosmopolitan*, 4 CC-117.
- 4 tpt/SAR sqns with 14 CC-115 *Buffalo*, 8 CC-138 *Twin Otter* ac, 3 CH-113 *Labrador*, 3 CH-113A *Voyageur*, 3 CH-135 (UH-1N) hel. 1 SAR unit with 3 CH-113 hel.
- (2 DHC-7 tpts on order.)

Maritime Air Group:
- 3 maritime patrol sqns, 1 trg and 1 testing sqn with 26 CP-107 *Argus*.
- 1 MR sqn with 13 CP-121 *(Tracker)*.
- 2 ASW hel sqns with 26 CH-124 (SH-3A).
- 2 sqns with 9 T-33, 3 CP-121 ac, 6 CH-124 hel.
- (18 CP-140 *Aurora* [*Orion*] on order.)

10 Tactical Air Group (10 TAG):
- 2 fighter sqns with 20 CF-5, 4 CF-5D.
- 5 hel sqns with 30 CH-135, 37 CH-136 *(Kiowa)*.
- 1 tpt sqn with 8 CH-147 (*Chinook*) hel.

1 Canadian Air Group (1 CAG):
- 3 fighter sqns with 54 CF-104 and 6 CF-104D. *Sidewinder*, AIM-4D *Falcon AAM*.

Deployment:
Europe: 1 Canadian Air Group (1 CAG), 11 CH-136 (*Kiowa*) hel.

Reserves: 700. Air Reserve Group: 4 wings with DHC-3, DHC-6, and C-47.

DENMARK

Population: 5,080,000.
Military service: 9 months.
Total armed forces: 34,000 (12,270 conscripts).
Estimated GNP 1977: $43.8 bn.
Defence expenditure 1978–79: kr 7.13 bn ($1.28 bn). $1 = 5.57 kroner (1978), 5.85 kroner (1977).

Army: 21,000 (9,000 conscripts).
3 mech inf bdes, each with 1 tk, 2 mech, 1 arty bn, 1 recce sqn, 1 engr coy, spt units.
2 mech inf bdes, each with 1 tk, 2 mech, 1 arty bn, 1 engr coy, spt units.
1 indep recce bn.
Some indep mot inf bns.
120 *Leopard* 1, 200 *Centurion* med, 48 M-41 lt tks; 630 M-113, 68 M-106 mortar-armed APC; 24 155mm guns; 144 105mm, 96 155mm, 12 203mm how (dual-capable; no nuclear warheads on Danish soil.); 12 M-109 155mm SP how; 120mm mor, 252 106mm RCL; *TOW* ATGW; 224 L/60 and L/70 40mm AA guns; *Hamlet (Redeye)* SAM; 9 Saab T-17 lt ac; 12 Hughes OH-6A hel.

Deployment: Cyprus (UNFICYP): 360.

Reserves: 4,500 Augmentation Force, subject to immediate recall; 41,000 Field Army Reserve, comprising 12,000 Covering Force Reserve (to bring units to war strength and add 1 mech bn to each bde), and 29,000 other reserve units to provide combat and log support; 24,000 Regional Defence Force, with 21 inf, 7 arty bns, ATK sqns, support units; 56,100 Army Home Guard.

Navy: 6,100 (1,900 conscripts).
6 coastal submarines.
2 frigates with *Harpoon* SSM, *Sea Sparrow* SAM.
5 fishery-protection frigates, each with 1 hel.
2 coastal escorts (corvettes).
6 FPB, 10 FPBG with *Harpoon* SSM.
6 minelayers (2 coastal).
8 coastal minesweepers.
22 large patrol craft.
8 *Alouette* III hel.
(3 corvettes, 1 coastal minelayer, *Harpoon* SSM, 7 *Lynx* hel on order.)

Reserves: 4,500; Navy Home Guard 4,800.

Air Force: 6,900 (1,370 conscripts); 114 combat aircraft.
1 FB sqn with 20 F-35XD *Draken*.
2 FB sqns with 38 F-100D/F.
2 interceptor sqns with 40 F-104G.
1 recce sqn with 16 RF-35XD *Draken*.
1 tpt sqn with 8 C-47, 3 C-130H.
1 SAR sqn with 8 S-61A hel.
3 TF-35XD *Draken*, 23 Saab T-17 trainers.
8 SAM sqns: 4 with 36 *Nike Hercules*, 4 with 24 *Improved HAWK*.
Sidewinder AAM; *Bullpup* ASM.
(58 F-16A/B fighters on order.)

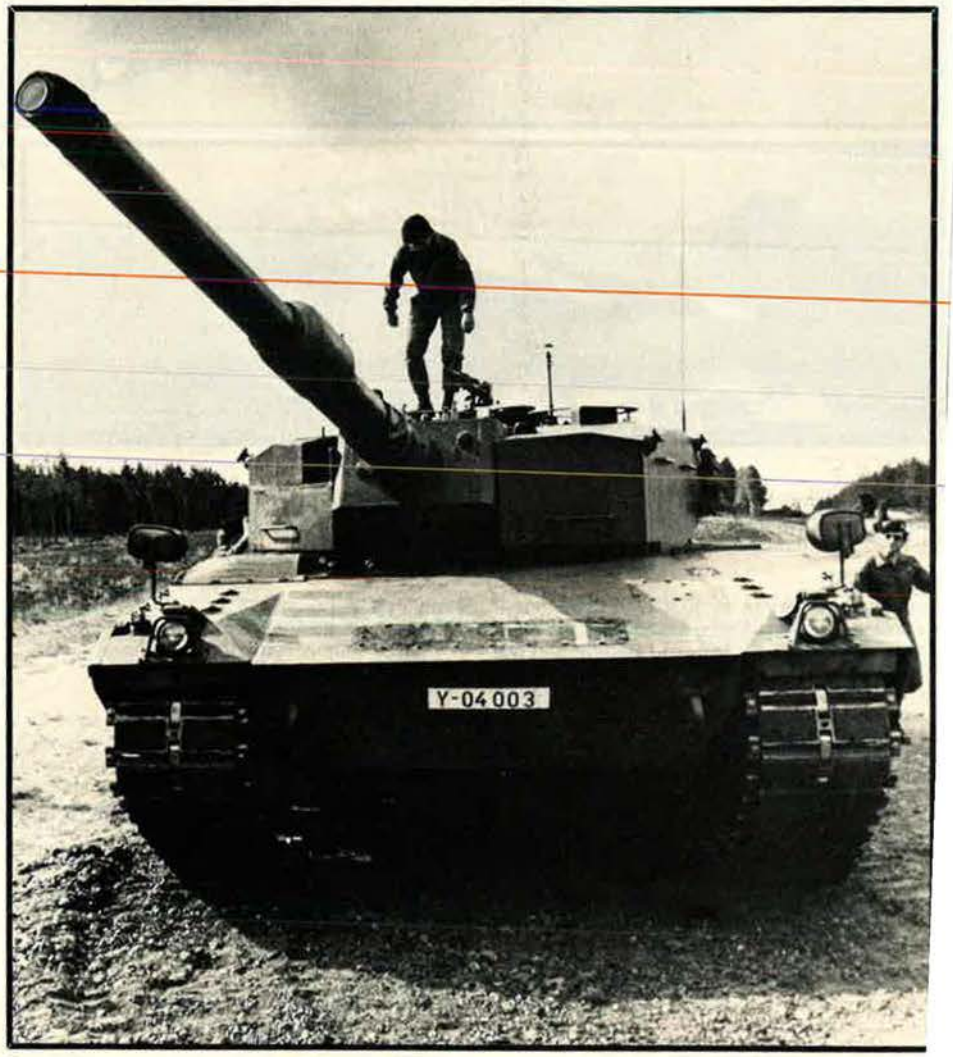
Reserves: 8,000; Air Force Home Guard 12,000.

FRANCE

Population: 53,850,000.
Military service: 12 months.
Total armed forces: 502,800. (Incl 9,400 on inter-service central staff and 266,200 conscripts.)
Estimated GNP 1977: $374.8 bn.
Defence expenditure 1978: fr 80.77 bn ($17.52 bn).
$1 = 4.61 francs (1978), 4.98 francs (1977).

Strategic forces:
SLBM: 64 SLBM in 4 SSBN: 1 with 16 M-2, 3 with 16 M-20 msls. (1 with M-4 building.)
IRBM: 2 sqns, each with 9 SSBS S-2 msls (to be replaced by S-3).
Aircraft:
Bombers: 6 sqns with 33 *Mirage* IVA.
Tankers: 3 sqns with 11 KC-135F.
Reserve: 16 *Mirage* IVA (incl 12 recce).

Army: 324,400, incl Army Aviation and 209,000 conscripts. (The army is being re-structured; the 4 armd and 2 inf divs now have the new establishment of 8,000 men in 2 tk, 2 mech inf, and 2 arty regts and 6,500 men in 3 mot inf, 1 armd car, and 1 arty regt respectively. In 1979 the 3 mech divs will re-organize to form 4 more armd and 2 inf divs. A fifth inf div is to be



Germany plans to build 1,800 of these Leopard 2 main battle tanks. Earlier versions of the Leopard are used by the armies of seven NATO countries.

formed later. An additional 14 inf divs will be formed on mobilization.)
2 corps HQ.
4 armd divs.
3 mech divs.
2 inf divs.
1 alpine div.
1 air-portable mot div (Marines).
1 para div of 2 bdes.
7 armd car regts.
2 mot inf regts.
Berlin sector force (1 lt armd regt, 1 mech inf regt).
5 SSM regts with 30 *Pluton*.
4 SAM regts with 54 *HAWK*.
1,060 AMX-30 med, 1,100 AMX-13 lt tks; some 960 AFV, incl 410 Panhard EBR hy, 450 AML lt armd cars; 500 AMX-10 MICV, AMX-VCI, 1,500 AMX-13 VTT, 100 VAB APC; 195 Model 56 105mm pack, 115 155mm how; 168 AMX 105mm, 185 155mm SP how; *Pluton* SSM; 265 120mm mor; 105/6mm RCL; SS-11/-12, *Milan, HOT, ENTAC* ATGW; 40mm towed, 30mm SP AA guns; *HAWK, Roland* SAM. (30 AMX-30 med tks; 40 AMX-10 armd cars, 40 AMX-10 MICV, 330 VAB APC; *HOT, Milan* ATGW; 120 *Vadar* 20mm SP AA guns; 35 *Roland* I, 70 *Roland* II SAM on order.)

Army Aviation (ALAT): 6,450.
2 groups, 6 hel regts, and 5 regional commands.
30 *Broussard*, 91 L-19 lt ac.
190 *Alouette* II, 70 *Alouette* III, 135 SA-330 *Puma*, 170 SA-341 *Gazelle* hel (20 *Gazelle* on order).

Deployment:
Germany: 34,000; 2 mech divs.
Berlin: 2,000; 1 lt armd regt, 1 mech inf regt.
Djibouti: 4,000; 2 inf regts, 1 arty regt, 2 sqns lt tks.
Senegal: 1,000 (all services).
Ivory Coast: 400.
Gabon: 450.
Lebanon (UNIFIL): 1,244; 1 bn and log units.
Chad: 1,500.
Overseas Commands:
There are four overseas commands (Antilles-Guyana, South Indian Ocean, New Caledonia, Polynesia), and two naval comds (ALINDIEN, ALPACI). Some 19,000 from all services are deployed overseas (numbers can vary according to local circumstances); equipment incl: 130 AFV, 36 hel, 9 frigates, 2 FPB, 1 tender ship, 2 lt tpt ships, 12 combat and 15 tpt ac.

Reserves: about 300,000.

Navy: 68,200, incl Naval Air and 18,400 conscripts; 46 major surface combat vessels.
21 submarines (3 building).
2 lt attack aircraft carriers (each with 40 ac).
1 helicopter carrier (trg ship).
1 cruiser with *Exocet* SSM, *Masurca* SAM.
5 frigates: 2 with *Masurca* SAM and *Malafon* ASW msls, 3 with *Malafon* and ASW hel.
14 destroyers: 8 with *Malafon*, 4 with *Tartar* SAM, 2 GP (1 with *Exocet* SSM and ASW hel, 3 building).
23 escorts (5 building).
16 large patrol craft (12 in reserve).
5 FPBG with SS-12 SSM: 4 *Trident*, 1 *Combattante*-class.
35 ocean and coastal MCM (8 in reserve).
2 LSD, 5 LST, 2 log spt ships, 12 LCT, 29 med landing craft.

Naval Air Force: 13,000; 123 combat aircraft.
2 attack sqns with 24 *Etendard* IVM.
2 interceptor sqns with 20 F-8E(FN) *Crusader*.
2 ASW sqns with 24 *Alizé*.
4 MR sqns with 25 *Atlantic*, 10 SP-2H *Neptune*.
1 recce sqn with 8 *Etendard* IVP.
2 OCU with 12 *Etendard* IVM, 14 *Magister*, 4 Nord 262.
3 ASW hel sqns with 12 *Super Frelon*, 12 SH-34J, 8 *Alouette* III.
1 assault hel sqn with 12 SH-34J.
2 SAR sqns with 20 *Alouette* II/III.
1 hel sqn with 4 *Alouette* II, 7 *Super Frelon*, 18 *Lynx*.
9 comms sqns with DC-6, C-47 ac, *Alouette* II/III, 5 *Super Frelon* hel.
4 trg and liaison sqns with Nord 262, C-47, *Falcon, Paris, Alizé, Rallye* ac, *Alouette* II/III hel.
(29 *Super Etendard* fighters, 8 *Lynx* hel on order.)

Marines: 1 bn.

Reserves: about 50,000.

Air Force: 100,800 (38,800 conscripts); 471 combat aircraft.
Air Defence Command (CAFDA): 6,300.
8 interceptor sqns: 2 with 30 *Mirage* IIIC, 6 with 90 *Mirage* F1C.
4 liaison and comms flts with 15 *Magister*, 13 T-33A, 8 *Broussard*.
10 SAM bns with *Crotale*.
Automatic *STRIDA II* air-defence system.
Tactical Air Force (FATAC): 7,400.
17 FB sqns: 7 with 105 *Mirage* IIIE, 2 with 30 *Mirage* VF, 8 with 105 *Jaguar* A/E.
2 lt bbr sqns with 16 *Vautour* IIB/N (being withdrawn).
3 recce sqns with 45 *Mirage* IIIR/RD.
2 OCU: 1 with 25 *Mirage* IIIB/BE/C, 1 with 25 *Jaguar* E.
8 liaison and comms flts with 25 *Magister*, 30 T-33A, 10 *Broussard*, 5 *Paris*, 3 *Frégate*, 7 *Noratlas*, 2 *Mystère* 20 ac, 13 *Alouette* II/III hel.
Air Transport Command (COTAM): 4,600.
7 tac tpt sqns: 3 with 45 Transall C-160, 4 with 60 *Noratlas*.
4 tpt sqns with 4 DC-8F, 21 *Frégate*, 8 *Mystère* 20, 5 *Caravelle*, 30 *Paris*, 31 *Broussard* ac, 70 *Alouette* II/III, 18 *Puma* hel.
Sidewinder, R.503, R.550 *Magic* AAM; AS.20, AS.30, *Martel* ASM.
Training Command (CEAA): Some 400 aircraft, incl *Magister*, T-33, *Mystère* IV, *Falcon, Flamant, Noratlas, Broussard, Paris*.
(33 *Mirage* F1 fighters, 200 *Alpha Jet* trg ac, 4 Transall tpts on order.)

Para-Military Forces: 76,400 Gendarmerie (4,800 conscripts) with 38 AMX-13 lt tks, 160 AML armd cars, 100 *Alouette* II/III hel. 6,900 Service de Santé (230 conscripts).

GERMANY: FEDERAL REPUBLIC OF

Population: 63,410,000 (incl West Berlin).
Military service: 15 months.
Total armed forces: 489,900 (236,000 conscripts); mobilization strength about 1,250,000. (The military divisions of the Ministry of Defence, Central Military Agencies, and the Central Medical Agencies comprise 11,000 military personnel. The overall strength of the armed forces includes 5,000 reserve duty training positions.)
Estimated GNP 1977: $508.6 bn.
Defence expenditure 1978: DM 35.0 bn ($17.26 bn).
$1=2.03 (1978), DM 2.39 (1977).

Army: 336,200 (187,000 conscripts).
(The army is being reorganized to form 15 armd bdes (each with 3 tk, 1 armd inf, 1 armd arty bns), 17 armd inf bdes (each with 2 tk, 2 armd inf, 1 armd arty bns), and 3 AB bdes.)
Field Army:
16 armd bdes (each with 2 tk, 1 armd inf, 1 armd arty bns).
12 armd inf bdes (each with 1 tk, 2 armd inf, 1 armd arty bns).
3 lt inf bdes.
2 mountain bdes.
3 AB bdes.
(Organized in 3 corps: 12 divs (4 armd, 4 armd inf, 2 *Jäger*, 1 mountain, 1 AB).)
15 SSM bns: 11 with *Honest John*, 4 with Lance.
3 army aviation comds (each with 1 lt, 1 med tpt regt).

Territorial Army:
3 Territorial Commands, 6 Military Districts, 6 Home Defence groups, 28 mot inf bns, 300 inf coys. In support are 4 service support comds, 1 sig bde, 2 sig, 2 engr regts. The Territorial Army provides defensive, comms, police, and service units on mobilization.
1,342 M-48A2, 2,437 *Leopard* 1 med tks; 408 Spä Pz-2 *Luchs*, 1,100 SPz 11-2, 460 SPz 12-3 (HS-30) armd cars; 2,136 *Marder* MICV; 4,020 M-113 APC; 275 105mm, 71 155mm how; 586 M-109 155mm, 149 M-107 175mm, 77 M-110 203mm SP guns/how; 956 120mm mor; 209 *LARS* 110mm multiple RL; 65 *Honest John*, 26 *Lance* SSM; 770 KJPz 4–5 SP ATK guns; 106mm RCL; 316 SS-11, 561 *Milan*, 170 *TOW* ATGW; 316 RJPz-2 SP ATGW; 1,731 20mm, 710 40mm, 70 *Gepard* 35mm SP AA guns; 911 *Redeye* SAM; 190 UH-1D, 225 *Alouette* II/III, 109 CH-53G hel; 5 CL-89 drones. (1,800 *Leopard* 2 tks, 214 FH-70, 114 FJPz-3 SP ATGW, 177 *TOW*, 1,939 *Milan* ATGW, 362 *Gepard* AA guns, 140 *Roland* II SAM, 212 PAH-1, 227 BO-105M hel on order.)

Navy: 36,500, incl Naval Air Arm and 11,000 conscripts.
18 Type 206, 6 Type 205 coastal submarines.
7 GW destroyers: 3 with *Tartar* SSM and *ASROC*, 4 with *Exocet* SSM.
4 destroyers.
6 frigates.
5 corvettes.
11 *Rhein*-class combat spt ships.
59 MCM ships (18 coastal, 22 fast, 19 inshore).
10 Type 143, 20 Type 148 FPBG with *Exocet* SSM.
10 *Zobel*-class FPB.
22 utility landing craft.
(6 Type 122 frigates, 10 Type 143A FPB, 12 minehunters, 150 *Exocet* SSM, 28 *Roland*, 96 *Sea Sparrow* SAM on order.)

Naval Air Arm: 6,000; 134 combat aircraft.
3 FB sqns with 85 F-104G.
1 recce sqn with 30 RF-104G.
2 MR sqns with 19 *Atlantic*.
1 SAR hel sqn with 21 *Sea King* Mk 41.
1 utility sqn with 20 Do-28 ac.
Kormoran ASM.
(110 *Tornado* FGA on order.)

Air Force: 106,200 (38,000 conscripts); 484 combat aircraft.
16 FGA sqns: 4 with 60 F-4F, 8 with 144 F-104G; 4 with 84 G-91R-3 (to be replaced by *Alpha Jet*).
4 AWX sqns with 60 F-4F.
4 recce sqns with 81 RF-4E.
2 OCU with 18 TF-104G, 37 G-91T.
5 tpt sqns with 88 Transall C-160.
4 hel sqns with 114 UH-1D.
Sidewinder AAM; AS.30 ASM.
8 SSM sqns with 72 *Pershing* 1A.
24 SAM btys with 216 *Nike Hercules*.
36 SAM btys with 216 *Improved HAWK*.
4 aircraft control and warning regts.
Other ac: 4 Boeing 707, 3 C-140, 9 HFB-320, 3 VFW-614, 3 *Noratlas*, 120 Do-28D, 16 OV-10Z.
(10 F-4F, 210 *Tornado* FGA, 175 *Alpha Jet* FGA, *Kormoran* ASM, 175 *Roland* SAM on order.)

Para-Military Forces: 20,000 Federal Border Guard with armd cars, APC, mor, ATK weapons, *Alouette* II, UH-1D and CH-53G hel.

GREECE

Population: 9,280,000.

Military service: 24–30 months.
Total armed forces: 190,100 (149,000 conscripts).
Estimated GNP 1977: $26.3 bn.
Defence expenditure 1978: 55.8 bn drachmas ($1.52 bn).
$1=36.6 drachmas (1978), 37.3 drachmas (1977).

Army: 150,000 (123,000 conscripts).
1 armd div.
11 inf divs (some mech).
1 armd bde.
1 para-cdo bde.
1 marine inf bde.
2 SSM bns with 8 *Honest John*.
1 SAM bn with 12 *Improved HAWK*.
12 arty bns.
14 army aviation coys.
300 M-47, 750 M-48, 120 AMX-30 med, 170 M-24 lt tks; 180 M-8 armd cars; 460 M-59, 520 M-113, Mowag APC; AMX-10P MICV; 100 75mm pack, 80 105mm, 240 155mm how; M-52 105mm, M-44 155mm, M-107 175mm, M-110 203mm SP guns/how; 8 *Honest John* SSM; 550 106mm RCL; SS-11, *Cobra*, *TOW*, *Milan* ATGW; 40mm, 75mm, 90mm AA guns; *Improved HAWK*, *Redeye* SAM; 1 *Super King Air*, 2 *Aero Commander*, 20 U-17, 15 L-21 ac; 5 Bell 47G, 20 UH-1D, 42 AB-204/-205 hel. (100 AMX-30 med tks, AMX-10P MICV on order.)

Reserves: about 250,000.

Navy: 17,500 (11,000 conscripts).
7 submarines (2 ex-US *Guppy*, 1 *Balao*, 4 Type 209).
12 destroyers (5 ex-US *Gearing*-, 6 *Fletcher*-, 1 *Sumner*-class).
4 frigates (ex-US *Cannon*-class), 1 depot ship.
10 FPBG (8 *Combattante* II/III with *Exocet* SSM, 2 with SS-12 SSM).
16 fast torpedo boats.
5 coastal patrol craft.
2 coastal minelayers.
13 coastal minesweepers.
16 landing ships (10 LST, 5 med, 1 dock).
6 utility, 13 med landing craft.
1 sqn with 4 *Alouette* III hel.
(4 Type 209 subs, 6 *Combattante* II FPBG with *Penguin* SSM, *Harpoon* SSM on order.)

Reserves: about 20,000.

Air Force: 22,600 (15,000 conscripts); 257 combat aircraft.
6 FGA sqns: 2 with 38 F-4E, 8 RF-4E; 3 with 59 A-7H, 1 with 28 F-104G.
5 interceptor sqns: 3 with 45 F-5A/B, 2 with 39 *Mirage* F1CG.
1 recce sqn with 20 RF-84F.
1 MR sqn with 8 HU-16B *Albatross*.
OCU with 8 F-5B, 4 TF-104G.
2 tpt sqns with 25 C-47, 50 *Noratlas*, 12 C-130H, 1 *Gulfstream*, 8 CL-215.
3 hel sqns with 14 AB-205, 2 AB-206, 10 Bell 47G, 10 H-19D, 35 UH-1D.
Trainers incl 50 T-33A, 20 T-41A, 18 T-37B, 40 T-2E, 3 TF-104G, 8 F-5B.
Sparrow, *Sidewinder*, *Falcon*, R.550 *Magic* AAM.
1 SAM bn with *Nike Hercules*.
(18 F-4E FGA, 6 RF-4E recce, 6 TA-7H trainers, 300 *Super Sidewinder* AAM on order.)

Reserves: about 20,000.

Para-Military Forces: 29,000 Gendarmerie, 100,000 National Guard.

ITALY

Population: 57,070,000.
Military service: Army and Air Force 12 months, Navy 18 months.
Total armed forces: 362,000 (227,000 conscripts).
Estimated GNP 1977: $193.7 bn.
Defence expenditure 1978: 4,313.8 bn lire ($5.06 bn).
$1=852 lire (1978), 888 lire (1977).

Army: 251,000 (180,000 conscripts).
3 corps HQ.
1 armd div (of 1 armd, 2 mech bdes).
3 mech divs (each of 1 armd, 1 mech bde).
1 indep mech bde.
5 indep mot bdes.
5 alpine bdes.
1 AB bde.
2 amph bns.
1 msl bde with 1 *Lance* SSM, 4 *HAWK* SAM bns.
650 M-47, 300 M-60A1, 700 *Leopard* med tks; 4,000 M-106, M-113, M-548, M-577 APC; 1,500 guns/how, incl 334 105mm pack, 155mm, 203mm; 108 M-44, 200 M-109 155mm, 36 M-107 175mm, 150 M-55 203mm SP guns/how; 81mm, 107mm, 120mm mor; *Lance* SSM; 57mm, 106mm RCL; *Mosquito*, *Cobra*, SS-11, *TOW* ATGW; 300 40mm AA guns; *Indigo*, *22 HAWK* SAM. (180 *Leopard* tks, 600 M-113 APC, 160 FH-70, SP-70, M-109 SP how, *TOW* ATGW, CL-89 drones on order.)
Army Aviation: 20 units with 40 O-1E, 39 L-21, 80 SM-1019 lt ac; hel incl 70 AB-47G/J, 36 AB-204B, 98 AB-205A, 140 AB-206A/A-1, 26 CH-47C, 5 A-109 (60 A-129 on order).

Reserves: 550,000.

Navy: 42,000, incl 750 Naval Air Arm, 1,700 Marines, and 24,000 conscripts.
9 submarines (3 more building).
1 hel cruiser with 9 AB-204B ASW hel, 1 *Terrier/ASROC*.
2 cruisers with 4 ASW hel, *Terrier* SAM.
4 GW destroyers (2 with 2 ASW hel, *Tartar* SAM; 2 with 1 ASW hel, *Tartar* SAM).
3 destroyers (1 trg).
2 GW frigates (with *Otomat* SSM, *Sea Sparrow*/*Aspide* SAM, 1 hel).
10 frigates (2 with 2 hel, 4 with 1 hel).
8 coastal escorts.
4 ocean, 30 coastal, 10 inshore minesweepers.
4 FPB, 1 hydrofoil with *Otomat* SSM.
12 MTB.
2 LST, 57 landing craft.
1 Marine inf bn with M-113A1, LVTP-7 APC, 81mm mor, 106mm RCL.
(1 hel carrier, 6 *Maestrale*- 2 *Lupo*-class frigates, 6 SSM hydrofoils, 4 minehunters on order.)

Naval Air Arm:
5 ASW hel sqns with 3 SH-34, 24 SH-3D, 32 AB-204AS, 12 AB-212.
(15 AB-212, 9 SH-3D on order.)

Reserves: 115,800.

Air Force: 69,000 (23,000 conscripts); 319 combat aircraft.
6 FGA sqns: 1 with 18 F-104G, 3 with 54 F-104S/G, 2 with 36 G-91Y.
3 lt attack/recce sqns with 54 G-91R/R1/R1A.
6 AWX sqns with 72 F-104S.
2 recce sqns with 36 F/RF-104G.
3 MR sqns: 2 with 18 *Atlantic*, 1 with 8 S-2F *Tracker*.
1 ECM recce sqn with 6 PD-808, 2 EC-119G, EC-47, RC-45, RT-33.
3 tpt sqns: 1 with 28 C-119, 1 with 14 G-222, 1 with 13 C-130H.
5 comms sqns with 33 P-166M, 32 SIAI-208M, 8 PD-808, 2 DC-9, 2 DC-6 ac; 2 SH-3D hel.
2 SAR sqns with 11 HU-16 ac; 14 AB-204, 7 AB-47J, 3 HH-3F hel.
1 OCU with 15 TF-104G.
9 trg sqns with 75 G-91T, 100 MB-326, 14 P-166M, 20 SF-260M ac; 65 AB-47, 40 AB-204 hel.
AIM-7E *Sparrow*, *Sidewinder* AAM.
8 SAM groups with 96 *Nike Hercules*.
(100 *Tornado* FGA, 30 F-104S fighters, 100 MB-339 trg, 30 G-222 tpts; 17 HH-3F hel; *Aspide* AAM on order.)

Reserves: 28,000.

Para-Military Forces: 83,500 *Carabinieri*, 1 mech bde with 13 bns, 1 AB bn, 2 cav sqns; 140 M-47 tks, 240 M-6, M-8 armd cars, 96 M-113 APC, 30 AB-47, 11 AB-205, 12 AB-206 hel; 70,000 Public Security Guard, with 16 mot bns, 4 rescue bns (30 Fiat 6616 armd cars on order). 13 P-64B ac, 18 AB-47J, 13 AB-206, 2 AB-212 hel. 42,000 Finance Guards, with 47 AB-47J, 49 NH-500M hel.

LUXEMBOURG

Population: 365,000.
Military service: voluntary.
Total armed forces: 660
Estimated GNP 1977: $2.49 bn.
Defence expenditure 1978: 978 m francs ($31.0 m).
$1=31.5 francs (1978), 36.6 francs (1977).

Army: 660.
1 lt inf bn.
1 indep coy.
TOW ATGW.

Para-Military Forces: 430 Gendarmerie.

NETHERLANDS

Population: 13,950,000.
Military service: Army 14 months, Navy and Air Force 14–17 months.
Total armed forces: 109,700 (49,100 conscripts).
Estimated GNP 1977: $104.1 bn.
Defence expenditure 1978: 9.12 bn guilders ($4.21 bn).
$1=2.17 guilders (1978), 2.49 guilders (1977).

Army: 75,000 (43,000 conscripts).
2 armd bdes.
4 mech inf bdes.
2 SSM bns with *Honest John* (to be replaced by *Lance*).
3 army aviation sqns (Air Force crews).
340 *Centurion*, 460 *Leopard* med, AMX-13 lt tks; 2,000 AMX-VCI, YP-408, and M-113 APC; 105mm, 155mm, 203mm how; AMX 105mm, M-109 155mm, M-107 175mm, M-110 203mm SP guns/how; 107mm, 120mm mor; 8 *Honest John* SSM; *Carl Gustav* 84mm, 106mm RCL; *LAW*, *TOW* ATGW; L/70 40mm AA guns; 60 *Alouette* III, 30 BO-105 hel. (880 YPR-765 APC, 90 35mm *Gepard* SP AA guns, 350 *Dragon* ATGW, *Lance* SSM on order.)
Deployment: Germany: 1 armd bde, 1 recce bn.

Reserves: 145,000; 1 armd, 2 inf bdes and corps troops, incl 1 indep inf bde, would be completed by call-up of reservists. A number of inf bdes could be mobilized for territorial defence.

Navy: 17,000 (2,000 conscripts, 2,900 Marines, 1,900 naval air arm).
6 patrol submarines.
2 GW destroyers with *Tartar*/*Sea Sparrow* SAM, *Harpoon* SSM, 1 lt ASW hel.
6 frigates with *Seacat* SAM and 1 lt ASW hel.
9 destroyers.
1 GW ocean escort with *Sea Sparrow* SAM, *Harpoon* SSM, 1 lt ASW hel.
6 coastal escorts.
5 large patrol craft.
37 MCM ships (3 spt, 18 coastal, 16 inshore).
2 fast combat spt ships.
(11 frigates, 15 MCM vessels on order.)

Marines:
2 amph combat gps.
1 mountain/arctic warfare coy.

Naval Air Arm:
2 MR sqns with 8 *Atlantic*, 15 P-2 *Neptune*.
2 ASW hel sqns with 6 *Lynx*, 12 *Wasp*.
(18 *Lynx* ASW hel on order.)

Deployment: Netherlands Antilles: 1 destroyer, 1 amph combat det, 1 MR det (3 ac).

Reserves: about 20,000; 9,000 on immediate recall.

Air Force: 17,700 (4,100 conscripts); 162 combat aircraft.
2 FB sqns with 36 F-104G.
3 FB sqns with 54 NF-5A.
1 FB/trg sqn with 18 NF-5B.
2 interceptor sqns with 36 F-104G.
1 recce sqn with 18 RF-104G.
1 tpt sqn with 12 F-27.
Sidewinder AAM.
4 SAM sqns with *Nike Hercules*.
11 SAM sqns with *Improved HAWK*.
(102 F-16 fighters, *Super Sidewinder* AAM on order.)

Reserves: about 10,000.

Para-Military Forces: 3,800 Gendarmerie; 4,446 Home Guard.

NORWAY

Population: 4,075,000.
Military service: Army 12 months, Navy and Air Force 15 months.
Total armed forces: 39,000 (28,250 conscripts).
Estimated GNP 1977: $36.2 bn.
Defence expenditure 1978: 6.85 bn kroner ($1.30 bn).
$1=5.28 kroner (1978), 5.24 kroner (1977).

Army: 20,000 (17,250 conscripts).
1 bde gp of 3 inf bns in North Norway.
Indep armd sqns, inf bns, and arty regts.
78 *Leopard*, 38 M-48 med, 70 NM-116 lt tks (M-24/90); M-113 APC; 250 105mm, 155mm how, 130 M-109 155mm SP how; 107mm mor; 75mm, *Carl Gustav* 84mm, 106mm RCL; *ENTAC*, *TOW* ATGW; Rh-202 20mm, L/60 and L/70 40mm AA guns; 40 O-1E, L-18 lt ac.

Deployment: Lebanon (UNIFIL): 1 bn and log units (930).

Reserves: 120,000. 11 Regimental Combat Teams (bdes) of about 5,000 men each, supporting units, and territorial forces; 21 days' refresher training each 3rd/4th year. Home Guard (all services) 85,000 (90 days initial service).

Navy: 9,000, incl 1,600 coast artillery, 6,000 conscripts.
15 coastal submarines.
5 frigates with *Sea Sparrow* SAM and *Penguin* SSM.
2 corvettes.
26 FPBG with *Penguin* SSM.
20 FPB.
10 coastal minesweepers.
2 minelayers.
1 spt ship.
7 LST.
6 patrol ships (fishery protection).
36 coastal arty btys.
(14 FPBG on order.)

Reserves: 22,000. Coastguard will be established as part of navy.

Air Force: 10,000 (5,000 conscripts); 115 combat aircraft.
2 FGA sqns with 32 F-5A.
1 FGA sqn with 22 CF-104G/D.
1 AWX sqn with 27 F-104G, 2 TF-104G.
1 recce sqn with 13 RF-5A.
1 MR sqn with 5 P-3B.
1 OCU with 14 F-5B.
2 tpt sqns: 1 with 6 C-130H, 1 with 5 DHC-6, 2 *Falcon* 20 ECM ac.
1 SAR sqn with 10 *Sea King* Mk 43 hel.
2 hel sqns with 32 UH-1B.
17 Saab *Safir* trainers.
Sidewinder AAM; *Bullpup* ASM.
4 lt AA bns with L/70 40mm guns.
1 SAM bn with *Nike Hercules*.
(72 F-16 fighters, 1 *Sea King* hel, 40 *Roland* II SAM on order.)

Reserves: 18,000. 7 lt AA bns for airfield defence with L/60 40mm guns.

PORTUGAL

Population: 9,110,000.
Military service: Army 15–24 months, Navy 36 months.
Total armed forces: 63,500.
Estimated GNP 1977: $16.4 bn.
Defence expenditure 1978: 21.79 bn escudos ($533 m).
$1=40.85 escudos (1978), 38.7 escudos (1977).

Army: 40,000.
6 regional commands.
1 inf bde.
1 tk regt.
2 cav regts.
16 inf regts.
4 indep inf bns.
3 arty regts, 2 arty gps.
1 coast arty regt, 2 indep AA arty bns.
2 engr regts.
1 sigs regt.
90 M-47, 23 M-48 med, 10 M-24 lt tks; 100 Panhard EBR armd cars; 86 M-113, 60 *Chaimite* (*Commando*) APC; 30 5.5-in. guns, 50 105mm guns/how; 107mm mor; 80 120mm RCL; 15 *TOW* ATGW; coast and 40mm AA arty.

Navy: 14,000 (2,500 Marines).
3 submarines (*Daphne*-class).
3 destroyer escorts (*Almirante P. Silva*-class).
10 escorts (4 *J. Belo*-, 6 *J. Coutinho*-class).
10 *Cacine*-class large patrol craft.
4 *Sao Roque*-class coastal minesweepers.
8 coastal patrol craft, 2 LCT.

Air Force: 9,500 (1,300 para); 18 combat aircraft.
1 FGA sqn with 18 G-91R-3/-4.
2 tpt sqns with 2 C-130H, 24 CASA C-212 *Aviocar*.
Trainers incl 5 G-91T, 10 T-33A, 18 T-37C, 6 T-38A, 19 Do-27, 25 *Chipmunk*, 32 Reims-Cessna FTB 337G.
2 hel sqns with 30 *Alouette* III, 10 SA-330 *Puma*.
3 para bns.
(4 C-130H tpts on order.)

Para-Military Forces: 9,500 National Republican Guard, 13,700 Public Security Police, 6,200 Fiscal Guard.

TURKEY

Population: 42,110,000.
Military service: 20 months.
Total armed forces: 485,000 (361,000 conscripts).
Estimated GNP 1977: $46.6 bn.
Defence expenditure 1978–79: 42.5 bn liras ($1.7 bn).
$1=25 liras (1978), 17.5 liras (1977).

Army: 390,000 (300,000 conscripts).
1 armd div.
2 mech inf divs.
14 inf divs.
5 armd bdes.
4 mech inf bdes.
5 inf bdes.
1 para, 1 cdo bde.
} About half are below strength
4 SSM bns with *Honest John*.
2,800 M-47 and M-48 med tks; 1,650 M-113, M-59, and *Commando* APC; 1,500 75mm, 105mm, 155mm, and 203mm how; 265 105mm, 190 155mm, 36 175mm SP guns; 1,750 60mm, 81mm, 4.2-in mor; 18 *Honest John* SSM; 1,200 57mm, 390 75mm, 800 106mm RCL; 85 *Cobra*, SS-11, *TOW* ATGW; 900 40mm AA guns; 2 DHC-2, 18 U-17, 3 Cessna 421, 7 Do-27, 9 Do-28, 20 Beech *Baron* ac; 100 AB-205/-206, 20 Bell 47G, 48 UH-1D hel. (193 *Leopard* tks; *TOW*, *Milan* ATGW; 56 AB-205 hel on order.)

Deployment: Cyprus: 2 inf divs (25,000).

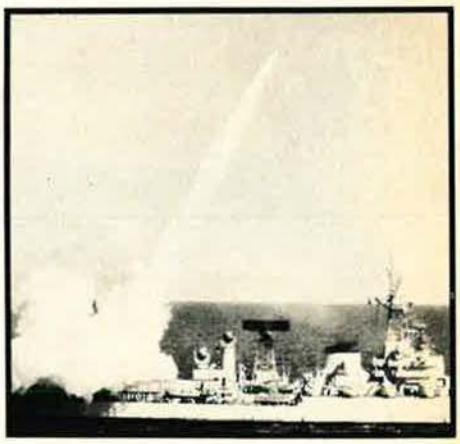
Reserves: 500,000.

Navy: 45,000 (31,000 conscripts).
11 submarines (2 Type 209, 9 ex-US *Guppy*-class, 2 on order).
11 destroyers (5 ex-US *Gearing*-, 5 *Fletcher*-, 1 *Sumner*-class).
2 frigates.
13 FPB (14 on order), 8 FPBG with *Harpoon* SSM.
41 large, 4 coastal patrol craft.
21 coastal, 4 inshore minesweepers.
8 minelayers (7 coastal).
4 LST, 25 LCT, 36 landing craft.
2 ASW sqns with 8 S-2A, 12 S-2E *Tracker*, 2 TS-2A, 3 AB-204B, 6 AB-212 ASW hel.
(10 AB-212 hel, 33 *Harpoon* SSM on order.)

Reserves: 25,000.

Air Force: 50,000 (30,000 conscripts); 339 combat aircraft.
13 FGA sqns: 2 with 49 F-4E, 4 with 100 F-5A and 10 F-5B, 2 with 32 F/TF-104G, 2 with 30 F-104S, 3 with 50 F-100C/D/F.
1 interceptor sqn with 30 F-102A, 3 TF-102A.
2 recce sqns with 31 RF-5A, 4 F-5B.
4 tpt sqns with 7 C-130E, 20 Transall C-160, 30 C-47, 3 C-54, 3 *Viscount* 794, 2 *Islander*, 6 Do-28, 3 Cessna 421 ac; 5 UH-19, 6 HH-1H, 10 UH-1H hel.
Sidewinder, *Sparrow*, *Falcon* AAM; AS.12, *Bullpup*, *Maverick* ASM.
8 SAM sqns with *Nike Hercules*.
Trainers incl 40 T-33A, 30 T-37, 20 T-34, 25 T-41.
(22 F-4E, 8 RF-4E, 56 *Alpha Jet* trainers on order.)

Para-Military Forces: 110,000 Gendarmerie (incl 3 mobile bdes).



The Italian guided missile cruiser Giuseppe Garibaldi *launching a Terrier SAM.*

OTHER EUROPEAN COUNTRIES

ALBANIA

Population: 2,710,000.
Military service: Army 2 years; Air Force, Navy, and special units 3 years.
Total armed forces: 41,000 (22,500 conscripts).
Estimated GNP 1974: $1.1 bn.
Defence expenditure 1978: 824 m leks ($154 m).
$1 = 5.36 leks.

Army: 30,000 (20,000 conscripts).
1 tk bde.
8 inf bdes.
2 tk bns.
1 arty regt.
2 AD rgts.
8 lt coastal arty bns.
70 T-34, 15 T-54, 15 T-59 med tks; BRDM-1 scout cars; 20 BA-64, BTR-40/-50/-152, K-63 APC; 76mm, 85mm, 122mm, 152mm guns/how; SU-76, SU-100 SP guns; 120mm mor; 107mm RCL; 45mm, 57mm, 85mm ATK guns; 37mm, 57mm, 85mm, 100mm AA guns; SA-2 SAM.

Reserves: 60,000.

Navy: 3,000 (1,000 conscripts).
3 submarines (ex-Soviet W-class, 1 trg).
4 coastal escorts (ex-Soviet *Kronstadt*-class).
40 MTB (8 ex-Soviet P-4, 32 *Hu Chwan* hydrofoils).
4 *Shanghai* II-class MGB.
8 MCM ships (2 ex-Soviet T-43, 6 T-301).
10 patrol boats (ex-Soviet PO-2, under 100 tons).

Air Force: 8,000 (1,500 conscripts); 101 combat aircraft.
2 AWX sqns with 10 MiG-17/F-4, 13 MiG-19/F-6, 17/F-4, 32 MiG-19/F-6, 12 MiG-21/F-8 (Chinese).
1 tpt sqn with 4 Il-14, 10 An-2.
2 hel sqns with 30 Mi-4.
Trainers incl 10 MiG-15UTI.

Reserves: 5,000.

Para-Military Forces: 13,000: internal security force 5,000; frontier guard 8,000.

AUSTRIA

Population: 7,900,000.
Military service: 6 months, followed by 60 days reservist training for 12 years.
Total armed forces: 37,000 (20,000 conscripts; total mobilizable strength 150,000).
Estimated GNP 1977: $47.7 bn.
Defence expenditure 1978: 10.47 bn schilling ($718 m).
$1 = 14.58 schilling (1978), 16.95 schilling (1977).

Army: 33,000 (18,000 conscripts).
1 mech div of 3 mech bdes, each with 1 tk, 2 mech inf (1 trg), 1 armd arty, and/or 1 armd ATK bns.
3 inf bdes, each with 3 inf, 1 arty bns.
4 inf regts (to form 4 inf bdes on mobilization).
3 arty bns.
1 cdo bn.
3 engr, 5 sigs bns.
150 M-47, 120 M-60 med tks; 460 Saurer 4K4F APC; 22 SFKM2 155mm guns; 108 M-2 105mm, 24 M-1 155mm how, 38 M-109 155mm SP how; 300 81mm, 100 M-2 107mm, 82 M-30 120mm mor; 18 Steyr 680 M3 130mm multiple RL; 240 M52/M55 85mm towed, 150 *Kuerassier* SP ATK guns; 400 M-40 106mm RCL.

Deployment: Cyprus (UNFICYP): 1 inf bn (332); *Syria* (UNDOF): 1 bn (523); other Middle East (UNTSO): 12.

Reserves: 113,000; 4 reserve bdes (each of 3 inf, 1 arty bns), 16 regts, and 4 bns *Landwehr* distributed among 8 regional military comds. 800,000 have a reserve commitment.

Air Force: 4,000 (2,000 conscripts); 30 combat aircraft. (Austrian air units, an integral part of the Army, are listed separately for purposes of comparison.)
3 FB sqns with 30 Saab 105Ö.
1 tpt sqn with 2 *Skyvan*, 12 *Turbo-Porter*.
6 hel sqns with 23 AB-204B, 13 AB-206A, 24 *Alouette* III, 12 OH-58B, 2 S-65Oe (HH-53).
2 trg sqns with 18 Saab 91D, 7 Saab 105Ö.
Other ac incl 23 Cessna L-19, 3 DHC-2.
4 indep AD bns.
300 20mm Oerlikon, 70 35mm Z/65, Z/75, 60 40mm Bofors AA guns; *Super-Bat* and *Skyguard* AD system.
(12 AB-212 hel on order.)

Reserves: 700.

Para-Military Forces: 11,250 Gendarmerie.

EIRE

Population: 3,240,000.
Military service: voluntary.
Total armed forces: 14,581.
Estimated GNP 1977: $9.2 bn.
Defence budget 1978: £102.2 m ($193 m).
$1 = £0.531 (1978), £0.584 (1977).

Army: 13,227.
2 inf bdes (1 with 3 inf bns, 1 with 2 inf bns, each with 1 recce sqn, 1 fd arty bty, 1 engr coy).
2 inf bn gps (each with 1 recce sqn, 1 fd arty bty, 1 engr coy).
4 indep inf bns.
1 AA arty bty.
8 AML H90, 24 AML H60 armd cars; 30 Panhard VTT/M3, 10 *Unimog* APC; 48 25-pdr gun/how; 204 81mm mor; 447 *Carl Gustav* 84mm, 96 PV-1110 90mm RCL; 26 Bofors 40mm AA guns.
(4 *Scorpion* lt tks, 5 *Timoney* APC on order.)

Deployment: Lebanon (UNIFIL): 1 bn (665); *Cyprus* (UNFICYP): 6.

Navy (Naval Service): 680.
2 patrol vessels (1 on order).
3 coastal minesweepers (ex-British *Ton*-class).
1 training/supply vessel.

Air Force (Air Corps): 674; 16 combat aircraft.
1 COIN sqn with 6 *Super Magister*.
1 COIN/trg sqn with 10 SF-260W.
1 liaison sqn with 8 Cessna FR-172H.
1 hel sqn with 8 *Alouette* III hel.
1 flt with 3 *Dove*, 1 *King Air*.

Although Finland's armed forces are largely Soviet-equipped, the Finns have developed this Leko-70 trainer to replace the currently used Saab-91 Safir.

Reserves (all services): 18,661 (1st line 456, 2nd line 18,205).

FINLAND

Population: 4,770,000.
Military service: 8–11 months (11 months for officers and NCOs).
Total armed forces: 39,900 (32,000 conscripts; total mobilizable strength 700,000 within days).
Estimated GNP 1977: $31.7 bn.
Defence expenditure 1978: 1.9 bn markka ($454 m).
$1 = 4.2 markka (1978), 3.8 markka (1977).

Army: 34,400.
1 armd bde.
6 inf bdes.
8 indep inf bns.
3 fd arty regts.
2 indep fd arty bns.
2 coast arty regts.
3 indep coast arty bns.
1 AA arty regt.
4 indep AA arty bns.
T-54, T-55 med, PT-76 lt tks; BTR-50P/-60 APC; 76mm, 105mm, 122mm, 130mm, 150mm, 152mm, 155mm guns/how; 60mm, 81mm, 120mm mor; 55mm, 95mm RCL; SS-11 ATGW; 23mm, 30mm, 35mm, 40mm, 57mm towed, ZSU-57-2 SP AA guns.

Deployment: Egypt (UNEF): 654; *Cyprus* (UNFICYP): 12.

Navy: 2,500 (incl 600 coastguard).
2 *Riga*-class frigates.
2 corvettes.
14 MGB, 4 *Osa*-II-class FPBG with *Styx* SSM.
5 large, 12 coastguard patrol craft.
1 coastal minelayer.
6 inshore minesweepers.
1 HQ and log ship.
14 small landing craft/tpts.
(5 *Osa*-II-class FPBG, 1 minelayer on order.)

Air Force: 3,000; 47 combat aircraft.
2 fighter sqns with 17 MiG-21F, 12 J-35S, 6 J-35F, 5 J-35B *Draken*.
1 OCU with 1 MiG-15UT1, 3 MiG-21U, 3J-35C.
Tpts incl 8 C-47, 2 Cessna 402.
Trainers incl 60 *Magister*, 25 Saab *Safir*.
Liaison ac: 5 *Cherokee Arrow*.
1 hel flt with 3 Mi-4, 6 Mi-8, 1 Hughes 500, 1 AB-206A.
AA-2 *Atoll*, *Falcon* AAM.
(50 *Hawk*, 30 Leko-70 trg ac on order.)

Reserves (all services): 690,000 (30,000 a year do training).

Para-Military Forces: 4,000 frontier guards.

SPAIN

Population: 36,690,000.
Military service: 15 months.
Total armed forces: 315,500 (191,000 conscripts).
Estimated GNP 1977: $123.6 bn.
Defence expenditure 1978: 188.7 bn pesetas ($2.36 bn).
$1 = 79.84 pesetas (1978), 68.6 pesetas (1977).

Army: 240,000 (150,000 conscripts).
1 armd div
1 mech inf div
1 mot inf div
2 mountain divs
1 armd cav bde
10 indep inf bdes
} about 70 per cent strength
1 mountain bde.
1 airportable bde.

Sweden's per capita defense spending is the highest of any European country. In addition to Saab combat planes, these tracked vehicles are Swedish made.

1 para bde.
2 arty bdes.
10 mixed AA/coast arty regts.
3 Foreign Legion regts.
3 *Regulares* regts (local forces in Ceuta/Melilla).
1 SAM bn with *Nike Hercules* and *HAWK*.
200 AMX-30, 480 M-47/-48 med, 180 M-41 lt tks; 88 AML-60, 100 AML-90 armd cars; 375 M-113 APC; 860 105mm, 200 122mm, 80 155mm, 24 203mm towed, 48 M-108 105mm, 70 M-44, 70 M-109 155mm, 12 M-107 175mm, 4 M-110 203mm SP guns/how; 216mm, 300mm, 381mm multiple RL; 60mm, 800 81mm, 300 120mm mor; 90mm, 106mm RCL; SS-11, *Milan*, *Cobra* ATGW; 54 35mm, 280 40mm, 150 90mm AA guns; 200 88mm, 6-in, 12-in, 15-in coast arty guns; *Nike Hercules*, *Improved HAWK* SAM; 10 CH-47C, 3 *Puma*, 65 UH-1B/H, 5 *Alouette* III, 1 AB-206A, 15 OH-13, 15 OH-58A hel.
(60 M-60 tks; 102 M-113 APC; *Dragon*, *TOW* ATGW; 38 *Skyguard* AD systems; 18 OH-58A, 8 UH-1H hel on order.)

Deployment: Balearics: 6,000. *Canaries:* 16,000. *Ceuta/Melilla:* 18,000.

Reserves: 700,000.

Navy: 40,000 (10,000 Marines, 32,000 conscripts).
10 submarines (4 *Daphne*-class, 4 US, 2 midget).
1 aircraft carrier (capacity 7 AV-8A, 20 hel).
13 destroyers, 7 with 1 hel (10 ex-US *Gearing-*, *Fletcher*-class).
15 frigates/corvettes (5 with *Standard* SAM and *ASROC*, 7 more on order).
12 large patrol craft (10 more on order).
4 ocean, 12 coastal minesweepers.
2 patrol vessels (ex-ocean minesweepers).
2 attack transports, 1 LSD, 3 LST, 8 LCT, 6 med landing craft.
1 FGA sqn with 5 AV-8A *Matador (Harrier)*, 2 TAV-8A.
1 comms sqn with 4 *Commanche*.
5 hel sqns with 10 SH-3D, 11 AB-204/212AS, 12 Bell 47G, 12 Hughes 500HM, 6 AH-1G.
4 Marine lt inf regts and 2 indep gps.
(4 *Agosta* subs, 40 *Harpoon* SSM, 5 AV-8A FGA; 5 AB-212, 6 SH-3D hel on order.)

Reserves: 200,000.

Air Force: 35,500 (9,000 conscripts); 214 combat aircraft.
Air Defence Command:
5 interceptor sqns: 2 with 34 F-4C(S), 2 with 22 *Mirage* IIIE, 6 IIID, 1 with 14 *Mirage* F1C. 1 OCU with 35 T-33A.
Tactical Command:
2 FB sqns with 18 F-5A, 2 F-5B, 25 HA-220 *Super Saeta*.
1 recce sqn with 22 RF-4, RF-5A.
1 MR sqn with 10 HU-16B, 2 P-3A.
5 liaison flts with 12 O-1E, 27 Do-27.
Sparrow, *Sidewinder*, R.550 *Magic* AAM (*Super Sidewinder* on order).
Transport Command:
7 sqns with 9 C-130H, 3 KC-97, 12 CASA-207 *Azor*, 30 CASA-212 *Aviocar*, 12 DHC-4, 5 *Aztec*, 1 *Navajo*.
Training Command:
2 OCU with 24 F-5B, 5 sqns with 35 F-33C *Bonanza*, 45 HA-200A/B *Saeta*, 40 T-33, 25 T-34, 70 T-6, 8 *King Air*, 10 *Baron*, 34 AB-47 and AB-205 hel.
Other ac incl:
3 SAR sqns with 5 HU-16A, 6 Do-27 ac, 17 AB-205/-206, 4 *Alouette* III hel.
1 SAR sqn with 8 CL-215.
(58 *Mirage* F1, 4 F-4C, 4 RF-4C, 3 F-27 MR, 6 CASA-212, 60 CASA C-101, 17 Hughes 300C hel on order.)

Reserves: 100,000.

Para-Military Forces: 65,000 *Guardia Civil*, 38,000 *Policia Armada*.

SWEDEN

Population: 8,290,000.
Military service: Army and Navy 7½–15 months, Air Force 8–12 months.
Total armed forces: 65,680 (46,500 conscripts; total mobilizable strength about 750,000 within 72 hours. There are normally some 120,000 more conscripts (105,000 army, 10,000 navy, 5,000 air force) plus 15,000 officer and NCO reservists doing 18–40 days refresher training at some time in the year.)

Switzerland has the fifth largest air force among Western European nations. It includes some fifty of these Mirage IIIs. Northrop F-5Es are on order.

Estimated GNP 1977: $83.0 bn.
Defence expenditure 1978–79: Kr. 13.54 bn ($2.95 bn).
$1 = 4.60 kronor (1978), 4.21 kronor (1977).

Army: 40,580 (34,700 conscripts).
Peace establishment:
47 non-operational armd, cav, inf, arty, AA, engr, and sig trg regts for basic conscript trg.
War establishment:
5 armd bdes.
20 inf bdes.
4 *Norrland* bdes.
50 indep inf, arty, and AA arty bns.
23 Local Defence Districts with 100 indep bns and 400–500 indep coys.
350 Strv 101, 102 (*Centurion*), 300 103B (S-tank) med, Ikv 91 lt tks; Pbv 302A APC; 105mm, 150mm, 155mm how; Bk 1A (L/50) 155mm SP guns; 81mm, 120mm mor; 90mm ATK guns; *Carl Gustav* 84mm, *Miniman* RCL; *Bantam* ATGW; 20mm, 40mm AA guns; *Redeye*, RBS-70, *HAWK* SAM; 20 Sk-61 (*Bulldog*), 12 *Super Cub* ac; 15 HKP-3 (AB-204B), 19 HKP-6 (*Jet Ranger*) hel. (Ikv 91 lt tanks, FH77 155mm how, *TOW* ATGW, *Improved HAWK* SAM on order.)

Deployment: Cyprus (UNFICYP): 427; *Egypt* (UNEF): 687; *Lebanon* (UNIFIL): 216.

Navy: 11,800 (6,950 conscripts).
17 submarines (3 building).
6 destroyers.
4 frigates.
2 *Hugin*-class FPBG with *Penguin* SSM (14 on order).
23 large torpedo boats (18 *Spica*-, 5 *Plejad*-class).
8 MTB, 16 coastal patrol craft (under 100 tons).
3 2,700-ton, 9 250-ton coastal minelayers.
12 coastal, 10 inshore minesweepers (8 under 100 tons).
70 landing craft (under 100 tons).
25 mobile, 45 static coastal arty btys with 75mm, 105mm, 120mm, 152mm, 210mm guns, Rb08 SSM.
5 HKP-2 (*Alouette* II), 3 HKP-4B (Vertol 107), 7 HKP-4 (KV-107/II), 10 HKP-6 (*Jet Ranger*) hel.
(1 minelayer on order.)

Air Force: 13,300 (4,850 conscripts); 450 combat aircraft. (More ac in store, including 110 A-32A *Lansen*.)
6 FGA sqns: 5 with 72 AJ-37 *Viggen*, 1 with 18 SK-60C (Saab 105).
15 AWX sqns: 13 with 234 J-35F *Draken*, 2 with 72 J-35D.
4 recce sqns: 2 with 36 S-35E *Draken*, 2 with 18 SH-37 *Viggen*.
2 tpt sqns with 3 C-130E/H, 2 *Caravelle*, 6 C-47.
5 comms sqns with 110 SK-60A/B (Saab 105), 57 SK-61 (*Bulldog*).
Trainers incl 150 SK-60, 78 SK-61, 20 SK-35C *Draken*, 40 SK-50 *Safir*, 17 SK-37 *Viggen*.
5 hel gps (3–4 ac each) with 1 HKP-2 (*Alouette* II), 6 HKP-3 (AB-204B), 10 HKP-4B (Vertol 107). *Sidewinder*, Rb27, Rb28 AAM; Rb04E, Rb05A ASM.
A fully computerized, semi-automatic control and air surveillance system, *Stril* 60, co-ordinates all air defence components.
(90 JA-37 interceptors, *Maverick* ASM on order.)

Reserves: voluntary defence organizations (all services) 500,000.

SWITZERLAND

Population: 6,440,000.
Military service: 17 weeks recruit training followed by reservist refresher training of 3 weeks for 8 out of 12 years for *Auszug* (age 20–32), 2 weeks for 3 years for *Landwehr* (33–42), 1 week for 2 years for *Landsturm* (43–50).
Total armed forces: about 3,500 regular and 15,000 recruits (total mobilizable strength 625,000 within 48 hours. There are two recruit intakes per year (Jan/Jun) each of 15,000. A further 300,000 reservists are called up for refresher training at some time during the year).
Estimated GNP 1977: $60.1 bn.
Defence expenditure 1978: fr 2.91 bn ($1.55 bn).
$1 = 1.88 francs (1978), 2.53 francs (1977).

Army: 580,000 on mobilization.
War establishment:
3 fd corps, each of 1 armd, 2 inf divs.
1 mountain corps of 3 mountain inf divs.
Some indep inf and fortress bdes.
320 *Centurion*, 150 Pz-61, 170 Pz-68 med, 200 AMX-13 lt tks; 1,250 M-113 APC; 105mm guns; 105mm, 155mm, 150 M-109U 155mm SP how; 120mm mor; 80mm multiple RL; 75mm, 90mm, 105mm ATK guns; 83mm, 106mm RCL; *Bantam*, *Dragon* ATGW; 10 patrol boats. (150 Pz-68 med tks, *Dragon* ATGW on order.)

Air Force: (The Aviation Brigade, an integral part of the Army, is listed separately for purposes of comparison.) 45,000 on mobilization (maintenance by civilians); 340 combat aircraft.
9 FGA sqns with 142 *Hunter* F58.
9 FGA sqns with 145 *Venom* FB50 (to be replaced by F-5E).
2 interceptor sqns with 35 *Mirage* IIIS.
1 recce sqn with 18 *Mirage* IIIRS.
1 tpt sqn with 3 Ju-52/3m.
7 lt ac sqns with 6 Do-27, 12 *Porter*, 6 *Turbo-Porter*, 3 *Bonanza*.
2 hel sqns with 30 *Alouette* II/III.
Other ac incl 48 Pilatus P-2, 70 P-3, 65 *Vampire* FB6, 35 T55, 3 *Mirage* IIIBS, 23 FFA C-3605; 70 *Alouette* II/III hel.
Sidewinder, AIM-26B *Falcon* AAM; AS.30 ASM.
1 para coy.
3 air-base regts.
1 AD bde with 1 SAM regt of 2 bns, each with 32 *Bloodhound*, and 7 arty regts (22 bns) with 20mm, 35mm, and 40mm AA guns.
(66 F-5E, 6 F-5B FGA, 45 *Skyguard* AA systems on order.)

Reserves: Militia 621,500.

YUGOSLAVIA

Population: 21,950,000.
Military service: Army and Air Force 15 months; Navy 18 months.
Total armed forces: 267,000 (145,000 conscripts).
Estimated GNP 1977: $37.8 bn.
Defence expenditure 1978: 42.68 bn dinars ($2.33 bn).
$1 = 18.30 dinars (1978), 18.28 dinars (1977).

Army: 200,000 (130,000 conscripts).
9 inf divs.
7 indep tk bdes.
11 indep inf bdes.
3 mountain bdes.
1 AB bn.
12 arty regts.
6 ATK regts.
12 AA arty regts.
1,500 T-34/-54/-55, M-47, about 650 M-4 med, some PT-76 lt tks; M-3, M-8, BRDM-2 scout cars; M-980 MICV; BTR-50/-60P/-152, M-60 APC; 76mm, 105mm, 122mm, 130mm, 152mm, 155mm guns/how; SU-76, SU-100, 105mm SP how; 81mm, 120mm mor; 128mm multiple RL; *FROG*-7 SSM; 57mm, 75mm, 100mm towed, M-18 76mm, M-36 90mm, ASU-57 SP ATK guns; 57mm, 75mm, 82mm, 105mm RCL; *Snapper*, *Sagger* ATGW; 20mm, 30mm, 37mm, 40mm, 57mm, 85mm, 88mm, 90mm, 94mm towed, ZSU-57-2 SP AA guns; SA-6 SAM.

Navy: 27,000, incl Marines (8,000 conscripts).
5 submarines (2 building).
1 destroyer.
3 corvettes.
10 *Osa*-class FPBG with *Styx* SSM.
14 *Shershen*-class MTB.
23 patrol craft (13 *Kraljevica*, 10 Type 131).
20 '101'-class FPB (under 100 tons).
4 coastal, 10 inshore, 14 river minesweepers.
27 LCT.
25 coast arty btys.
Mi-8, Ka-25 ASW, *Gazelle* hel.
1 marine bde.
(1 corvette/trg ship, 2 LST, 10 FPBG with *Styx* SSM on order.)

Air Force: 40,000 (7,000 conscripts); 329 combat aircraft.
15 FGA sqns with 9 F-84G, 12 *Kraguj*, 110 *Galeb/Jastreb*.
6 interceptor sqns with 120 MiG-21F/PF/M.
3 recce sqns with 15 RT-33A, 25 *Galeb/Jastreb*.
OCU with 18 MiG-21U, 20 *Jastreb*.
Tpts incl 15 C-47, 10 Il-14, 2 Il-18, 4 Yak-40, 1 *Caravelle*, 2 An-12, 9 An-26, 4 Li-2, 1 Boeing 727.
60 *Galeb/Jastreb*, 30 T-33 trainers.
14 Mi-1, 20 Mi-4, 48 Mi-8, 12 *Gazelle* hel.
AA-2 *Atoll* AAM.
8 SA-2, 4 SA-3 SAM bns.
(102 *Gazelle* hel on order.)

Para-Military Forces and Reserves: 500,000 Reservists, 16,000 Frontier Guards, 1,000,000 Territorial Defence Force.

THE MIDDLE EAST AND THE MEDITERRANEAN

BILATERAL AGREEMENTS WITH EXTERNAL POWERS

The Soviet Union has a fifteen-year treaty of friendship and co-operation with Iraq which was signed in April 1972. A similar but more comprehensive treaty with Egypt, signed in May 1971, was abrogated by Egypt in March 1976. Before May 1975 the Soviet Union was a major arms supplier to Egypt, but no significant quantities of arms or spare parts have been delivered since then. The Soviet Union continues to deliver arms to Iraq, Syria, and Libya, and military assistance has also been provided from time to time to Algeria, Morocco, Sudan, and the People's Democratic Republic of Yemen.

The United States has varying types of security assistance agreements and has been providing military aid on either a grant or credit basis to Greece, Turkey, Spain, Morocco, Tunisia, Lebanon, Jordan, Saudi Arabia, Israel, and Egypt. She provides, in addition, a significant amount of military equipment on a cash-sales basis to many countries, notably Greece, Spain, Israel, Iran, Kuwait, Saudi Arabia, and Jordan.

There are US military facilities in Greece and Turkey, recently the subject of renegotiation and much affected by the outcome of current political negotiations. A treaty with Spain extending the use of military bases in Spain for five years was signed and ratified in 1976. (There is also an agreement with Portugal for the use of the Azores.) The United States maintains communications facilities in Morocco under informal arrangements due to be terminated in September 1978.

Britain has an agreement with the Republic of Malta, signed on 26 March 1972, which permits her to base forces on the island for British and for NATO purposes. This expires in March 1979, and almost all forces have now been withdrawn. Britain concluded treaties of friendship with Bahrain, Qatar, and the United Arab Emirates in August 1971 and is also an arms supplier to Iran, Kuwait, Bahrain, Qatar, the United Arab Emirates, Saudi Arabia, Oman, Jordan, and Egypt. Some British troops have aided government forces in Oman and provided training and technical assistance, although the extent of this aid is diminishing.

Britain—a signatory, with Greece and Turkey, of the 1959 Treaty of Guarantee which guarantees the independence, territorial integrity, and security of the Republic of Cyprus—maintains a garrison in two Sovereign Base Areas in Cyprus. Greece and Turkey are each entitled to maintain a contingent in the island under an associated Treaty of Alliance with the Republic. Turkish forces in Cyprus were increased in July 1974, some reductions have followed, and the future arrangements are under discussion.

The People's Republic of China has supplied arms to Albania, Sudan, and the People's Democratic Republic of Yemen.

France has a military mission in Morocco and supplies arms to a number of countries, including Egypt, Greece, Libya, Morocco, Abu Dhabi, Iraq, Kuwait, and Saudi Arabia.

Israel is the only foreign country now operating F-15s. Saudi Arabia has forty-five F-15s and fifteen TF-15s on order.

MULTILATERAL AGREEMENTS INCLUDING EXTERNAL POWERS

A number of Mediterranean countries are members of NATO (see pp 74–83).

The members of the Central Treaty Organization (CENTO) are Britain, Iran, Pakistan, and Turkey, with the United States as an associate. All sit on the Military, Economic, and Counter-Subversion Committees and on the Permanent Military Deputies Group. The Treaty provides for mutual co-operation for security and defence but has no central command structure for forces allocated to it. For the local powers, the economic organization of Regional Co-operation for Development (RCD), which has evolved independently out of CENTO, is a basis for more concrete co-operation.

There are United Nations forces stationed in Cyprus (UNFICYP), Syria (UNDOF), Egypt (UNEF), and Lebanon (UNIFIL).

ARRANGEMENTS WITHIN THE REGION

Algeria, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, the United Arab Emirates, the Yemen Arab Republic, and the People's Democratic Republic of Yemen are members of the League of Arab States. Among its subsidiary bodies are the Arab Defence Council, set up in 1959, and the Unified Arab Command, organized in 1964.

Defence agreements were concluded by Egypt with Syria in November 1966 and Jordan in May 1967, to which Iraq later

acceded. These arrangements provided for the establishment of a Defence Council and Joint Command. The loosely associated Eastern Front Command, comprising Iraq, Jordan, the Palestine Liberation Army, and Syria, was reorganized in December 1970 into separate Jordanian and Syrian commands. Iraq and Syria concluded defence pacts in May 1968 and July 1969, but friction between the two countries continues to cast some doubt on their application. Jordan and Syria have set up a joint committee to co-ordinate economic and political planning and a Syrian—Jordanian consultative body to co-ordinate military policy. The Federation of Arab Republics, formed by Libya, Syria, and Egypt in April 1971, provided for a common defence policy and a Federal Defence Council, and in January 1973 an Egyptian Commander-in-Chief was appointed to command all Federation forces. The present status of this agreement is unclear. Algeria and Libya signed a defence agreement in December 1975, and Egypt signed one with Sudan in January 1977. Mauretania and Morocco signed a defence agreement in May 1977.

Iran has provided military assistance to Oman.

In 1975 the Arab Military Industrial Organization (AMIO) was set up to encourage indigenous Arab arms production. British, French, German, and American equipment is to be produced under licence. The Arab states involved include Egypt, Saudi Arabia, Qatar, the United Arab Emirates, and Sudan. Production will be in Egypt, at least in the first instance.

ALGERIA

Population: 18,420,000.
Military service: 6 months.
Total armed forces: 78,800.
Estimated GNP 1977: $10.1 bn.
Defence expenditure 1978: 1.84 bn dinars ($456 m).
$1 = 4.04 dinars (1978), 4.13 dinars (1977).

Army: 70,000.
1 armd bde.
4 mot inf bdes.
3 indep tk bns.
50 indep inf bns.
1 para bn.
12 coys desert troops.
10 indep arty bns.
7 AA arty bns.
3 engr bns.
350 T-54/-55/-62 med tks; AML armd cars; 440 BTR-40/-50/-60/-152, *Walid* APC; 600 85mm, 122mm, 152mm guns and how; 85 SU-100, ISU-122/-152 SP guns; 80 120mm, 160mm mor; 20 140mm, 30 240mm RL; *Sagger* ATGW; 57mm, 85mm, 100mm AA guns.

Reserves: up to 100,000.

Navy: 3,800.
6 ex-Soviet SO-1 submarine chasers.
6 *Komar*-, 3 *Osa*-I-, 4 *Osa*-II-class FPBG with *Styx* SSM.
10 ex-Soviet P-6 torpedo boats (6 coastguard).
2 fleet minesweepers (ex-Soviet T-43-class).
1 LCT (*Polnocny*-class).
(3 F-28 tpt ac on order.)

Air Force: 5,000; 204 combat aircraft.
1 lt bbr sqn with 24 Il-28.
3 interceptor sqns with 90 MiG-21.
4 FGA sqns: 2 with 20 Su-7BM, 2 with 30 MiG-17.
1 COIN sqn with 20 *Magister*.
OCU with 20 MiG-15.
2 tpt sqns with 8 An-12, 10 F-27, 4 Il-14, 4 Il-18.
4 hel sqns with 4 Mi-6, 42 Mi-4, 12 Mi-8, 5 *Puma*, 6 Hughes 269A.
Other ac incl 1 *King Air*, 3 *Super King Air*, 3 *Queen Air*, 2 CL-215.
Trainers incl MiG-15/-17/-21U, Su-7U, 19 Yak-11.
AA-2 *Atoll* AAM.
SA-2 SAM.

Para-Military Forces: 10,000 Gendarmerie.

BAHRAIN

Population: 345,000.
Estimated GNP 1977: $1.7 bn.
Total armed forces: 2,300.
Defence expenditure 1978: 16.7 m dinars ($43 m).
$1 = 0.388 dinars (1978), 0.400 dinars (1977).

Army: 2,300.
1 inf bn.
1 armd car sqn.
8 *Saladin* armd cars; 8 *Ferret* scout cars; 6 81mm mor; 6 120mm RCL.

Coastguard:
20 patrol launches.
Police:
2 *Scout* hel.

CYPRUS

Population: 625,000 (508,000 Greek-Cypriot, 117,000 Turkish-Cypriot).
Estimated GNP 1977: $154 m.
$1 = £C 0.38 (1978), £C 0.41 (1977).

1. GREEK-CYPRIOT FORCE
Military service: 26 months.
Total armed forces: 10,050 (reducing to about 8,000).
Defence expenditure 1978: £C 8.6 m ($22.6 m)

Army: 10,000. (Greek-Cypriot National Guard, mainly composed of Cypriot conscripts, but with some seconded Greek Army officers and NCOs.)
1 armd bn.
2 recce/mech inf bns.
20 inf bns (under strength).
15 arty and support units.
25 T-34 med tks and BTR-50 APC; 30 Marmon-Harrington armd cars; 120 100mm, 105mm, and 25-pdr guns, and 75mm how; 40mm, 3.7-in AA guns.

Reserves: 20,000.

Navy: 50.
2 patrol boats.

Para-Military Forces: 3,000 armed police.

2. TURKISH-CYPRIOT SECURITY FORCE
About 5,000 men, organized in a number of inf bns.
Some T-34 med tks.

EGYPT

Population: 39,760,000.
Military service: 3 years.
Total armed forces: 395,000.
Estimated GNP 1977: $13.3 bn.
Defence expenditure 1978–79: £E 1.11 bn ($2.81 bn).
$1 = £E 0.395 (1978), £E 0.394 (1977).

Army: 350,000, incl Air Defence Command.
2 armd divs (each with 1 armd, 2 mech bdes).
3 mech inf divs.
5 inf divs (each with 2 inf bdes).
1 Republican Guard Brigade (div).
3 indep armd bdes.
7 indep inf bdes.
2 airmobile bdes.
2 para bdes, 6 cdo gps.
6 arty, 2 hy mor bdes.
1 ATGW bde.
2 SSM regts (up to 24 *Scud*).
850 T-54/-55, 750 T-62 med, 80 PT-76 lt tks; 300 BRDM-1/-2 scout cars; 200 BMP-76PB MICV; 2,500 OT-62/-64, BTR-40/-50/-60/-152, *Walid* APC; 1,300 76mm, 100mm, 122mm, 130mm, 152mm, and 180mm guns/how; about 200 SU-100 and ISU-152 SP guns; 300 120mm, 160mm, and 240mm mor; 300 122mm, 140mm, and 240mm RL; 30 *FROG*-4/-7, 24 *Scud* B, *Samlet* SSM; 900 57mm, 85mm, and 100mm ATK guns; 900 82mm and 107mm RCL; 1,000 *Sagger, Snapper, Swatter, Milan, Beeswing* ATGW; 350 ZSU-23-4, ZSU-57-2 SP AA guns; SA-7/-9 SAM.
(M-113 APC, *Swingfire* ATGW on order.)

Air Defence Command (75,000): 360 SA-2, 200 SA-3, 75 SA-6 SAM; 2,500 20mm, 23mm, 37mm, 40mm, 57mm, 85mm, and 100mm AA guns; missile radars incl *Fan Song, Low Blow, Flat Face, Straight Flush,* and *Long Track;* gun radars *Fire Can, Fire Wheel,* and *Whiff;* EW radars *Knife Rest* and *Spoon Rest.* (There is a shortage of spares for Soviet equipment.)
(*Crotale* SAM on order.)

Reserves: about 500,000.

Navy: 20,000.
12 submarines (ex-Soviet, 6 W-, 6 R-class).
5 destroyers (4 *Skory*-, 1 ex-British Z-class).
2 escorts (ex-British).
12 SO-1 submarine chasers (ex-Soviet).
16 FPBG (6 *Osa*-I-, 10 *Komar*-class with *Styx* SSM).
26 MTB (6 *Shershen*, 20 P-6).
3 SRN-6 hovercraft.
14 ex-Soviet MCM (6 T-43, 4 *Yurka*, 2 T-301, 2 K-8).
3 LCT (*Polnocny*-class), 13 landing craft utility (9 *Vydra*, 4 SMB-1).
6 *Sea King* ASW hel.
(2 *Lupo*-class frigates, 6 Vosper *Ramadan*-class FPBG, 3 SRN-6 hovercraft, *Otomat* SSM on order.)

Reserves: about 15,000.

Air Force: 25,000; about 612 combat aircraft. (Additional Soviet ac are grounded for lack of spares.)
23 Tu-16D/G med bbrs.
5 Il-28 lt bbrs.
3 FB regts with 80 MiG-21F/PFM, 90 MiG-15/-17.
5 FGA/strike regts with 70 Su-7, 19 Su-20, 21 MiG-23, 46 *Mirage* VDE/DD.
9 interceptor sqns with 108 MiG-21MF.
Tpts incl 3 C-130, 2 EC-130H, 26 Il-14, 19 An-12, 1 *Falcon*, 1 Boeing 707, 1 Boeing 737.
Hels incl 20 Mi-4, 32 Mi-6, 70 Mi-8, 30 *Commando*, 54 *Gazelle*.
Trainers incl 150 MiG-15/-21/-23U, Su-7U, L-29, 45 *Gomhouria*.
AA-2 *Atoll*, R.530 AAM; AS-1 *Kennel*, AS-5 *Kelt* ASM.
(42 F-5E, 8 F-5F, 14 *Mirage* V fighters, 14 C-130H tpts, 50 *Lynx* hel on order.)

Para-Military Forces: about 50,000; National

Guard 6,000, Frontier Corps 6,000, Defence and Security 30,000, Coast Guard 7,000.

IRAN

Population: 36,365,000.
Military service: 2 years.
Total armed forces: 413,000.
Estimated GNP 1977: $72.6 bn.
Defence expenditure 1978–79: 700.4 bn rials ($9.94 bn).
$1 = 70.45 rials (1978), 71.2 rials (1977).

Army: 285,000.
3 armd divs.
3 inf divs.
4 indep bdes (1 armd, 1 inf, 1 AB, 1 special force).
4 SAM bns with *HAWK*.
Army Aviation Command.
760 *Chieftain*, 400 M-47/-48, 460 M-60A1 med tks; 250 *Scorpion* lt tks; *Fox, Ferret* scout cars; about 325 M-113, 500 BTR-40/-50/-60/-152 APC; 710 guns/how, incl 75mm pack, 85mm, 330 105mm, 130mm, 155mm, 203mm towed, 440 M-109 155mm, 38 M-107 175mm, 14 M-110 203mm SP; 72 BM-21 122mm RL; 106mm RCL; *ENTAC*, SS-11, SS-12 *Dragon, TOW* ATGW; 1,800 23mm, 35mm, 40mm, 57mm, 85mm towed, 100 ZSU-23-4, ZSU-57-2 SP AA guns; *HAWK* SAM; ac incl 40 Cessna 185, 6 Cessna 310, 10 Cessna O-2, 2 F-27; 202 AH-1J, 210 Bell 214A, 21 *Huskie*, 88 AB-205A, 70 AB-206, 30 CH-47C hel. (1,297 *Chieftain/Shir Iran* med, 110 *Scorpion* lt tks, BMP MICV, ASU-85 SP ATK, 100 ZSU-23-4 SP AA guns, Rapier, *Improved HAWK*, SA-7/-9 SAM, 163 Bell 214A, 350 Bell 214ST hel on order.)

Deployment: Oman: 2 coys, 1 hel sqn (400). *Syria* (UNDOF): 385. *Lebanon* (UNIFIL): 1 bn (524).

Reserves: 300,000.

Navy: 28,000.
3 destroyers (1 ex-British *Battle*-class with *Seacat* SAM, 2 ex-US *Sumner*-class with 1 hel, all with *Standard* SSM/SAM).
4 frigates with Mk 2 *Seakiller* SSM and *Seacat* SAM.
4 corvettes (ex-US patrol frigates).
7 large patrol craft.
5 *Combattante*-II-class FPBG with *Harpoon* SSM.
5 minesweepers (3 coastal, 2 inshore).
2 landing ships logistic.
2 landing craft utility.
2 log spt ships.
8 SRN-6, 6 *Wellington* BH-7 hovercraft.
(3 *Tang*-class trg, 6 Type 209 submarines, 4 *Spruance*-class destroyers, 6 *Lupo*-class frigates, 7 FPBG with *Harpoon* SSM, 4 log spt ships on order.)

Naval Air:
1 MR sqn with 6 P-3F *Orion*.
1 ASW sqn with 12 SH-3D.
1 tpt sqn with 6 *Shrike Commander*, 4 F-27.
Hel incl 5 AB-205A, 7 AB-212, 6 RH-53D, 10 SH-3D.
3 Marine bns.
(39 P-3C MR ac, 15 SH-3D hel on order.)

Air Force: 100,000; 459 combat aircraft.
10 FB sqns with 32 F-4D, 177 F-4E.
10 FGA sqns with 12 F-5A, 140 F-5E.
3 fighter sqns with 56 F-14A *Tomcat*.
1 recce sqn with 16 RF-4E.
1 tanker sqn with 13 Boeing 707-320L.
4 med tpt sqns with 64 C-130E/H, 6 Boeing 747.
4 lt tpt sqns with 18 F-27, 4 F-28, 3 Aero *Commander* 690, 4 *Falcon* 20.
10 HH-43F, 6 AB-205, 84 AB-206A, 5 AB-212, 39 Bell 214C SAR, 2 CH-47C, 16 *Super Frelon*, 2 S-61A hel.
Trainers include 9 T-33, 28 F-5F, 49 *Bonanza* F33A/C.
Phoenix, Sidewinder, Sparrow AAM; AS.12, *Maverick, Condor* ASM.
5 SAM sqns with *Rapier* and 25 *Tigercat*.
(5 RF-4E, 24 F-14, 160 F-16A/B fighters; 7 E-3A AWACS ac, 3 F-27 tpts; 4 Boeing 747 tpts; 50 CH-47 hel; *Blindfire* SAM radar on order.)

Para-Military Forces: 74,000 Gendarmerie with O-2 lt ac and hel; 32 patrol boats.

IRAQ

Population: 12,470,000.
Military service: 2 years.
Total armed forces: 212,000.
Estimated GNP 1977: $16.3 bn.
Defence expenditure 1977–78: 491.5 m dinars ($6.66 bn).
$1 = 0.290 dinars (1978), 0.296 dinars (1977).

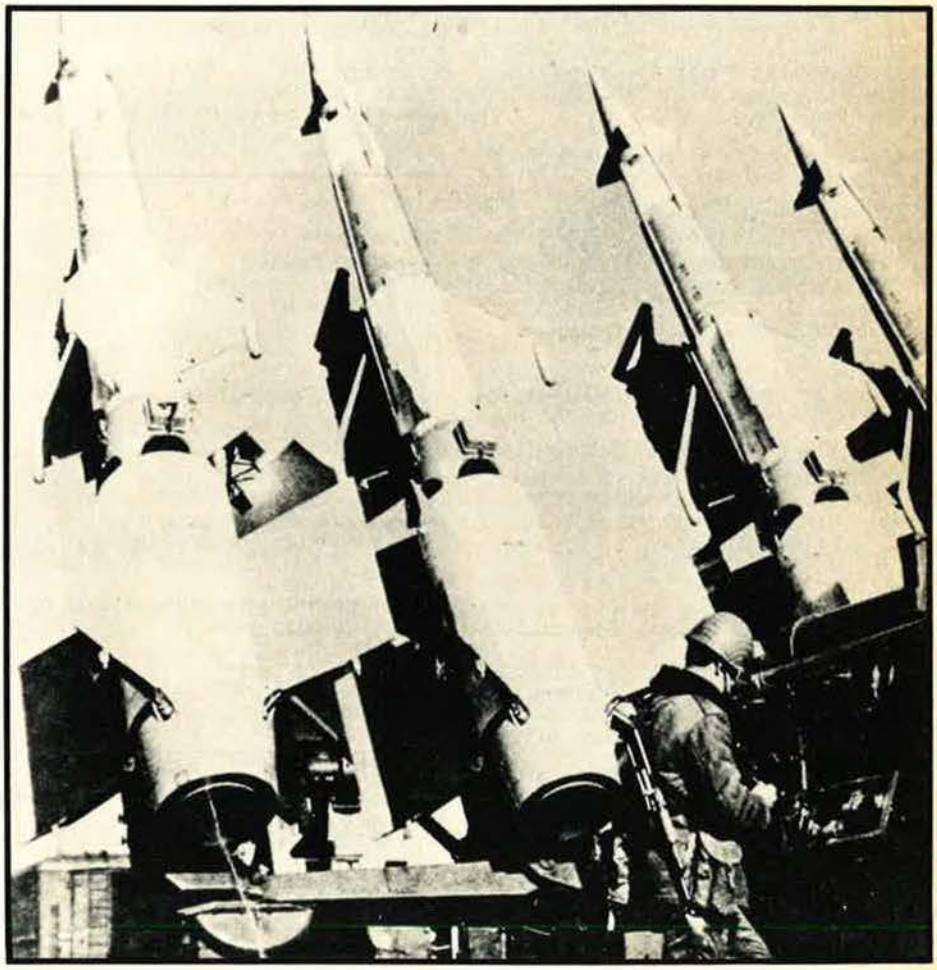
Army: 180,000.
4 armd divs (each with 2 armd, 1 mech bde).
2 mech divs.
4 inf divs.
1 indep armd bde.
1 Republican Guard mech bde.
1 indep inf bde.
1 special forces bde.
1,700 T-54/-55/-62, 100 T-34, AMX-30 med, 100 PT-76 lt tks; 120 BMP MICV; about 1,500 AFV, incl BTR-50/-60/-152, OT-62, VCR APC; 800 75mm, 85mm, 122mm, 130mm, 152mm guns/how; 90 SU-100, 40 ISU-122 SP guns; 120mm, 160mm mor; BM-21 122mm RL; 26 *FROG*-7, 12 *Scud* B SSM; *Sagger*, SS-11 ATGW; 1,200 23mm, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-7 SAM. (T-62 med tks, *Scud* SSM on order.)

Reserves: 250,000.

Navy: 4,000.
3 SO-1 submarine chasers.
6 *Osa*-I, 8 *Osa*-II FPBG with *Styx* SSM.
10 P-6 torpedo boats.
2 large patrol craft (ex-Soviet *Poluchat*-class).
6 coastal patrol boats (under 100 tons).
5 minesweepers (2 ex-Soviet T-43, 3 inshore).
3 LCT (*Polnocny*-class).

Air Force: 28,000 (10,000 AD personnel); about 339 combat aircraft.
1 bbr sqn with 12 Tu-22.
1 lt bbr sqn with 10 Il-28.
12 FGA sqns: 4 with 80 MiG-23B, 3 with 60 Su-7B, 3 with 30 Su-20, 2 with 20 *Hunter* FB59/FR10.
5 interceptor sqns with 115 MiG-21.
1 COIN sqn with 12 *Jet Provost* T52.
2 tpt sqns with 10 An-2, 8 An-12, 8 An-24, 2 An-26, 2 Tu-124, 13 Il-14, 2 *Heron*.
8 hel sqns with 35 Mi-4, 14 Mi-6, 80 Mi-8, 47 *Alouette* III, 8 *Super Frelon*, 40 *Gazelle*, 3 *Puma*.
Trainers incl MiG-15/-21/-23U, Su-7U, *Hunter* T69, 10 Yak-11, 12 L-29, 8 L-39.
AA-2 *Atoll* AAM; AS.11/12 ASM (R.550 *Magic* AAM, *Exocet* ASM on order).
SA-2, SA-3, and 25 SA-6 SAM.
(32 *Mirage* F-1C fighters, 4 *Mirage* F-1B trainers, Il-76 tpts on order.)

Para-Military Forces: 4,800 security troops, 75,000 People's Army.



The USSR has provided sophisticated air defense equipment to many client states in the area. These SA-3s, with a slant range of twenty-five miles and a ceiling of 60,000 feet, were furnished to Iraq, Syria, and (in the past) Egypt.

ISRAEL

Population: 3,730,000.
Military service: men 36 months, women 24 months (Jews and Druses only; Muslims and Christians may volunteer). Annual training for reservists thereafter up to age 54 for men, up to 25 for women.
Total armed forces: 164,000 (123,000 conscripts); mobilization to 400,000 in about 24 hours.
Estimated GNP 1977: $14.2 bn.
Defence expenditure 1978–79: £I 54.4 bn ($3.31 bn).
$1 = £I 16.44 (1978), £I 9.42 (1977).

Army: 138,000 (120,000 conscripts, male and female), 375,000 on mobilization. (11 bdes (5 armd, 4 inf, 2 para)) normally are kept near full strength; 6 (1 armd, 4 mech, 1 para) between 50 per cent and full strength; the rest at cadre strength.)
20 armd bdes.
9 mech bdes.
9 inf bdes.
5 para bdes.
3,000 med tks, incl 1,000 *Centurion*, 650 M-48, 810 M-60, 400 T-54/-55, 150 T-62, 40 *Merkava;* 65 PT-76 lt tks; about 4,000 AFV, incl AML-60, 15 AML-90 armd cars; RBY *Ramta,* BRDM recce vehs; M-2/-3/-113, BTR-40/-50P(OT-62)/-60P/-152 APC; 500 105mm how; 450 122mm, 130mm, and 155mm guns/how; 24 M-109 155mm, L-33 155mm, 60 M-107 175mm, M-110 203mm SP guns/how; 900 81mm, 120mm, and 160mm mor (some SP); 122mm, 135mm, 240mm RL; *Lance, Ze'ev (Wolf)* SSM; 106mm RCL; *TOW, Cobra, Dragon,* SS-11, *Sagger* ATGW; about 900 *Vulcan/Chaparral* 20mm msl/gun systems, 30mm and 40mm AA guns; *Redeye* SAM.
(125 M-60 med tks, 700 M-113 APC, 94 155mm how, 175mm guns, *Lance* SSM, *TOW* ATGW on order.)

Navy: 5,000 (1,000 conscripts), 8,000 on mobilization.
3 Type 206 submarines.
6 *Reshef*-class FPBG with *Gabriel* SSM.
12 *Saar*-class FPBG with *Gabriel* SSM.
About 40 small patrol boats (under 100 tons).
3 medium landing ships.
6 LCT.
3 *Westwind* 1124N MR ac.
Naval cdo: 300.
(4 *Reshef*-class FPBG, 2 Qu-9-35 Type corvettes with *Gabriel* SSM, 2 *Flagstaff*-class hydrofoils, 3 *Westwind* MR ac on order.)

Air Force: 21,000 (2,000 conscripts, AD only), 25,000 on mobilization; 543 combat aircraft.
11 FGA/interceptor sqns: 1 with 25 F/TF-15, 5 with 170 F-4E, 3 with 30 *Mirage* IIICJ/BJ, 2 with 50 *Kfir/Kfir* C2.
6 FGA sqns with 250 A-4E/H/M/N *Skyhawk.*
1 recce sqn with 12 RF-4E, 2 OV-1, 4 E-2C AEW ac.
Tpts incl 10 Boeing 707, 24 C-130E/H, 6 C-97, 18 C-47, 2 KC-130H.
Liaison ac incl 14 *Arava,* 8 *Islander,* 23 Do-27, 9 Do-28, 25 Cessna U206, 1 *Westwind,* 16 *Queen Air.*
Trainers incl 24 TA-4E/H, 70 *Magister,* 30 *Super Cub.*
Hel incl 8 *Super Frelon,* 28 CH-53G, 6 AH-1G, 40 Bell-205A, 20 Bell-206, 12 Bell-212, 25 UH-1D, 19 *Alouette* II/III.
Sidewinder, AIM-7E/F *Sparrow, Shafrir* AAM; *Maverick, Shrike, Walleye, Bullpup* ASM.
15 SAM btys with 90 *HAWK.*
(15 F-15, 75 F-16 fighters, 30 Hughes 500 hel gunships on order.)

Reserves (all services): 460,000.

Para-Military Forces: 4,500 Border Guards and 5,000 *Nahal* Militia.

JORDAN

Population: 2,970,000.
Military service: 24 months.
Total armed forces: 67,850.
Estimated GNP 1977: $1.3 bn.
Defence expenditure 1978: 95.3 m dinars ($304 m).
$1 = 0.313 dinars (1978), 0.334 dinars (1977).

Army: 61,000.
2 armd divs.
2 mech divs.
3 special forces bns.
2 AA bdes incl 6 btys with *Improved HAWK* SAM. 320 M-47/-48/-60, 180 *Centurion* med tks; 140 *Ferret* scout cars; 600 M-113 and 120 *Saracen* APC; 110 25-pdr, 90 105mm, 16 155mm, 203mm how; 35 M-52 105mm, 20 M-44 155mm SP how; 81mm, 107mm, 120mm mor; 106mm, 120mm RCL; *TOW, Dragon* ATGW; *Vulcan* 20mm, 200 M-42 40mm SP AA guns; *Redeye* SAM, *Improved HAWK* SAM.
(100 M-113 APC, M-110 203mm SP how, 100 M-163 *Vulcan* 20mm AA guns, *Improved HAWK* SAM on order.)

Navy: 200.
10 small patrol craft.

Air Force: 6,650; 76 combat aircraft.
1 FGA sqn, 1 OCU with 8 F-5A/B, 24 F-5E/F.
2 interceptor sqns with 20 F-104A/B, 24 F-5E/F.
4 C-130B, 1 *Boeing 727,* 1 *Falcon* 20, 4 CASA C-212A *Aviocar* tpts.
14 *Alouette* III, 2 S-76 hel.
8 T-37C, 12 *Bulldog,* 1 *Dove* trainers.
Sidewinder AAM.
(1 C-130H tpts; 10 AH-1H, 4 S-76 hel on order.)

Reserves: 30,000.

Para-Military Forces: 10,000; 3,000 Mobile Police Force, 7,000 Civil Militia.

KUWAIT

Population: 1,160,000.
Military service: 18 months.
Total armed forces: 12,000.
Estimated GNP 1977: $12.0 bn.
Defence expenditure 1977: 93 m dinars ($322.2 m).
$1 = 0.277 dinars (1977).

Army: 10,500.
1 armd bde.
2 inf bdes.
24 *Chieftain,* 50 Vickers, 50 *Centurion* med tks; 100 *Saladin* armd, 20 *Ferret* scout cars; 130 *Saracen* APC; 10 25-pdr guns; 20 AMX 155mm SP how; SS-11, *HOT, TOW, Vigilant, Harpon* ATGW.
(129 *Chieftain* med tks; *Scorpion* lt tks; APC; arty; SA-7 SAM on order.)

Navy: 500 (Coastguard).
5 FPB.
12 inshore patrol craft.
16 patrol launches.
3 landing craft.

Air Force: 1,000 (excluding expatriate personnel); 49 combat aircraft.
2 FB sqns (forming) with 20 A-4KU.
1 interceptor sqn with 20 *Mirage* F-1B/C.
1 COIN sqn with 9 *Strikemaster* Mk 83.
2 DC-9, 2 L-100-20 tpts.
3 hel sqns with 30 *Gazelle,* 12 *Puma.*
Trainers incl 4 *Hunter* T67, 2 TA-4KU.
Red Top, Firestreak, R.550 *Magic, Sidewinder* AAM; *Super* 530 ASM.
50 *Improved HAWK* SAM.
(14 A-4KU, 4 TA-4KU FGA on order.)

LEBANON

Population: 3,060,000.
Total armed forces: 7,800.
Estimated GNP 1977: $2.9 bn.
Defence expenditure 1978: £L 491 m ($167 m).
$1 = £L 2.93 (1978), £L 3.03 (1977).

Army: 7,000 (planned to rise to 15,500).
2 armd recce bns.
6 inf bns (some incomplete).
2 arty bns.
Saladin armd cars; *Saracen,* 80 M-113 APC; 10 122mm, 155mm guns.

Navy: 300.
1 large, 3 coastal patrol craft (under 100 tons).

Air Force: 500; 21 combat aircraft.
1 FGA sqn with 9 *Hunter* F70 and 2 T66.
1 interceptor sqn with 10 *Mirage* IIIEL/BL (not in use).
1 hel sqn with 12 *Alouette* II/III, 6 AB-212.
6 SA *Bulldog,* 6 *Magister,* and 1 *Chipmunk* trainers.
1 *Dove,* 1 *Turbo-Commander* 690A tpts.
R.530 AAM.
Some French EW/ground-control radars.

Para-Military Forces: Internal Security Force 5,000; small arms, 40 *Saladin* armd cars, 5 *Saracen* APC.

LIBYA

Population: 2,760,000.
Military service: conscription.
Total armed forces: 37,000.
Estimated GDP 1977: $18.5 bn.
Defence expenditure 1978: 130 m Libyan dinars ($448 m).
$1 = 0.290 dinars (1978), 0.296 dinars (1977).

Army: 30,000.
1 armd bde.
2 mech inf bdes.
1 National Guard bde.
1 special forces bde.
3 arty, 2 AA arty bns.
2,000 T-54/-55/-62 med tks (many in storage); 100 *Saladin,* Panhard, 200 EE-9 *Cascavel* armd cars; 140 *Ferret* scout cars; BMP MICV; 400 BTR-40/-50/-60, 140 OT-62/-64, 70 *Saracen,* 100 M-113A1 APC; 40 105mm, 80 130mm how; M-109 155mm SP how; 300 *Vigilant,* SS-11, *Sagger* ATGW; 25 *Scud* B SSM; 180 23mm, L/70 40mm, 57mm, ZSU-23-4 SP AA guns; SA-7 SAM; 6 AB-47, 5 AB-206, 4 *Alouette* III hel; some Cessna O-1 lt ac. (16 CH-47C hel on order.)

Navy: 3,000.
3 F-class submarines.
1 frigate (with *Seacat* SAM).
2 corvettes (1 with *Otomat* SSM).
8 FPBG: 3 *Susa*-class with SS-12M SSM, 5 *Osa*-II-class with *Styx* SSM.
14 patrol craft.
2 log support ships, 2 LST (1 *Bidassoa*-, 1 *Polnocny*-class).
(3 F-class submarines; 3 corvettes with *Otomat* SSM, 10 FPBG, 80 *Otomat* SSM on order.)

Air Force: 4,000; 178 combat aircraft. (Some may be in storage.)
1 bbr sqn with 12 Tu-22 *Blinder.*
2 interceptor sqns (1 OCU) with 24 MiG-23 *Flogger.*
4 FGA sqns and OCU with 90 *Mirage* VD/DE, 10 VDR, 10 VDD.
2 COIN sqns with 32 *Galeb.*
2 tpt sqns with 8 C-130H, 1 Boeing 707, 9 C-47, 2 *Falcon,* 1 *JetStar.*
Trainers incl 2 *Mystère* 20, 5 MiG-23U, 12

Magister, Falcon ST 2, 20 SF-260, 17 *Galeb.*
4 hel sqns with 13 *Alouette* II/III, 6 AB-47, 9 *Super Frelon*, 10 CH-47C.
AA-2 *Atoll*, R.550 *Magic* AAM.
3 SAM regts with 60 *Crotale* and 9 btys with 60 SA-2, SA-3, and SA-6 SAM.
(32 *Mirage* F-1AD/ED fighters; 6 *Mirage* F-1BD, 150 SF-260 trainers; 20 CH-47C, 1 AS-61A hel on order.)

MOROCCO

Population: 18,590,000.
Military service: 18 months.
Total armed forces: 89,000
Estimated GNP 1977: $9.5 bn.
Defence expenditure 1978: 2.89 bn dirham ($681 m).
$1 = 4.25 dirham (1978), 4.51 dirham (1977).

Army: 81,000.
1 lt security bde.
1 para bde.
5 armd bns.
9 mot inf bns.
18 inf bns.
2 Royal Guard bns.
7 camel corps bns.
2 desert cav bns.
7 arty gps.
2 engr bns.
50 M-48, 40 T-54 med, 80 AMX-13 lt tks; 36 EBR-75, 50 AML, and M-8 armd cars; 40 M-3 half-track, 60 OT-62/-64, 30 UR-416, 100 M-113 APC; 150 75mm, 105mm, 34 M-114 155 mm how; 20 AMX-105, 36 155mm SP how; 81mm, 82mm, 120mm mor; 75mm, 106mm RCL; *ENTAC, Dragon, TOW* ATGW; 50 37mm, 57mm, 100mm AA guns; SA-7, 10 *Chaparral* SAM.
(60 M-48 med tks; 234 M-113 APC; *Crotale* SAM on order.)

Deployment: Mauritania: 6 bns (8,000). *Zaire:* 1,700.

Navy: 2,000 (600 Marines).
5 large patrol craft (2 French PR 72 Type, 1 under 100 tons).
1 coastal minesweeper.
15 coastal patrol craft.
2 *Batral*-class landing ship log.
1 landing craft.
1 naval inf bn.
(4 large patrol craft, 1 landing ship log on order.)

Air Force: 6,000; 61 combat aircraft. (Some ac, incl 2 MiG-15, 12 MiG-17 FGA in storage.)
2 FB sqns with 34 F/RF-5A, 5 F-5B.
1 COIN sqn with 22 *Magister*.
1 tpt sqn with 12 C-130H, 8 C-119G, 8 C-47, 1 *Gulfstream*, 6 *King Air*, 12 *Broussard*.
2 hel sqns with 40 AB-205A, 2 AB-206, 2 AB-212, 40 *Puma*.
12 T-6, 12 T-34C, 10 AS. 201/18 *Bravo* trainers.
Sidewinder AAM.
(50 *Mirage* F-1CH fighters, 24 *Alpha Jet* trainers, 6 CH-47 hel, R.550 *Magic* AAM on order.)

Para-Military Forces: 30,000, incl 11,000 *Sureté Nationale.*

OMAN

Population: 837,000.
Military service: voluntary.
Total armed forces: 19,200. (Excluding expatriate personnel.)
Estimated GNP 1977: $2.5 bn.
Defence expenditure 1978: 265 m rial omani ($767 m).
$1 = 0.346 rial (1978), 0.346 rial (1977).

Army: 16,200.
2 bde HQ.
8 inf bns.
1 Royal Guard regt.
1 arty regt.
1 sigs regt.
1 armd car sqn.
1 para sqn.
1 engr sqn.
36 *Saladin* armd cars; 36 105mm guns; 81mm, 120mm mor; *TOW* ATGW.

Navy: 900.
3 patrol vessels (1 Royal Yacht, 2 ex-Dutch MCM).
1 trg ship (500-ton ex-log ship).
7 FPB (3 with *Exocet* SSM).
4 coastal patrol craft (under 100 tons).
3 small landing craft.
(1 log support ship on order.)

Air Force: 2,100; 32 aircraft.
1 FGA/recce sqn with 12 *Hunter*.
1 FGA sqn with 12 *Jaguar*.
1 COIN/trg sqn with 8 *BAC-167*.
3 tpt sqns: 1 with 3 BAC-111, 2 with 10 *Defender/Skyvan*.
Royal flt with 1 VC-10, 1 *Gulfstream*, 2 AS.202 *Bravo* trainers.
1 hel sqn with 20 AB-205, 2 AB-206, 5 AB-214A/B hel.
2 AD sqns with 28 *Rapier* SAM.
(R.550 *Magic* AAM on order.)

Para-Military Forces: 3,300 tribal Home Guard (Firqats). Police Air Wing: 1 *Learjet*, 2 *Turbo-Porter*, 2 *Merlin* 1VA, 4 AB-205, 2 AB-206 hel.

QATAR

Population: 205,000.
Total armed forces: 4,000. (All services form part of the Army.)
Estimated GNP 1977: $2.4 bn.
Defence expenditure 1978: 238 m ryal ($61 m).
$1 = 3.87 ryal (1978), 3.95 ryal (1977).

Army: 3,500.
2 armd car regts.
1 Guards inf bn.
1 mobile regt.
12 AMX-30 med tks; 30 *Saladin*, 20 EE-9 *Cascavel* armd, 10 *Ferret* scout cars; 12 AMX-10P MICV; 8 *Saracen* APC; 4 25-pdr guns; 81mm mor.
(*HAWK* SAM on order.)

Navy: 200 (Coastguard).
6 large Vosper Type patrol craft.
31 small coastal patrol craft.

Air Force: 300; 4 combat aircraft.
3 *Hunter* FGA, 1 T79.
1 *Islander* tpt.
2 *Whirlwind*, 4 *Commando*, 2 *Gazelle*, 3 *Lynx* hel.
Tigercat SAM.
(30 *Mirage* F-1 fighters, 3 *Lynx* hel on order.)

SAUDI ARABIA

Population: 7,730,000.
Military service: voluntary.
Total armed forces: 58,500.
Estimated GNP 1977: $55.4 bn.
Defence expenditure 1978–79: 33.30 bn Saudi riyals ($9.63 bn).
$1 = 3.46 riyals (1978), 3.54 riyals (1977).

Army: 45,000.
2 armd bdes.
4 inf bdes.
2 para bns.
1 Royal Guard bn.
3 arty bns.
6 AA arty btys.
10 SAM btys with *HAWK*.
250 AMX-30, 75 M-60 med tks; 200 AML-60/-90 armd, *Ferret*, 50 *Fox* scout cars; 300 AMX-10P MICV; M-113, Panhard M-3 APC; 105mm pack how, 105mm and 155mm SP how; 75mm RCL; *TOW* ATGW; M-42 40mm SP, AMX-30 SP AA guns; *HAWK* SAM.
(175 M-60 med tks; 50 *Fox* scout cars; 200 AMX-10P MICV; *Dragon* ATGW; M-163 *Vulcan* 20mm SP AA guns; *Redeye, Shahine (Crotale)*, 6 btys *Improved HAWK* SAM on order.)

Deployment:
Lebanon (Arab Peace-keeping Force): 700.

Navy: 1,500.
3 FPB (*Jaguar*-class).
1 large patrol craft (ex-US coastguard cutter).
4 coastal minesweepers.
2 utility landing craft.
(6 corvettes with *Harpoon* SSM, 4 FPBG, 4 gunboats, 4 landing craft on order.)

Air Force: 12,000; 171 combat aircraft.
3 FB sqns with 60 F-5E.
2 COIN/trg sqns with 35 BAC-167.
1 interceptor sqn with 16 *Lightning* F53, 2 T55.
3 OCU with 24 F-5F, 16 F-5B, 16 *Lightning* F53, 2 T55.
2 tpt sqns with 35 C-130E/H.
2 hel sqns with 16 AB-206 and 24 AB-205.
Other ac incl 4 KC-130 tankers, 1 Boeing 707, 2 *Falcon* 20, 2 *JetStar* tpts; 22 *Alouette* III, 1 AB-206, 1 Bell-212, 2 AS-61A hel.
Trainers incl 12 T-41A.
Red Top, Firestreak, Sidewinder, R.530, R.550 *Magic* AAM; *Maverick* ASM.
(45 F-15 fighters; 15 TF-15 trainers; 1 Boeing 747, 4 KC-130H tpt ac; 6 KV-107 hel on order.)
Para-Military Forces: 35,000 National Guard in 20 regular and semi-regular bns with 150 V-150 *Commando* APC, 6,500 Frontier Force and Coastguard with 50 small patrol boats and 8 SRN-6 hovercraft.

SUDAN

Population: 19,120,000.
Military service: conscription.
Total armed forces: 52,100.
Estimated GNP 1977: $4.4 bn.
Defence expenditure 1977–78: £S 82.6 m ($237 m).
$1 = £S 0.348 (1977), £S 0.35 (1975).

Army: 50,000.
2 armd bdes.
7 inf bdes.
1 para bde.
3 arty regts.
3 AD arty regts.
1 engr regt.
70 T-54, 60 T-55 med tks; 30 T-62 lt tks (Chinese); 50 *Saladin* armd cars; 60 *Ferret* scout cars; 100 BTR-40/-50/-152, 60 OT-64, 49 *Saracen*, 45 *Commando* APC; 55 25-pdr, 40 100mm, 20 105mm, 18 122mm guns/how; 30 120mm mor; 30 85mm ATK guns; 80 40mm, 80 37mm, 85mm AA guns.
(50 AMX-10 APC on order.)

Deployment:
Lebanon (Arab Peace-keeping Force): 1,000.

Navy: 600.
6 large patrol craft (2 ex-Yugoslav *Kraljevica*-class).
3 patrol craft (ex-Iranian) under 100 tons.
6 FPB (ex-Yugoslav '101'-class).
2 LCT, 1 landing craft utility.

Air Force: 1,500; 22 combat aircraft.
1 interceptor sqn with 10 MiG-21 MF.
1 FGA sqn with 12 MiG-17 (ex-Chinese).
5 BAC-145 and 6 *Jet Provost* Mk 55.
1 tpt sqn with 6 C-130H, 6 An-12, 5 An-24, 4 F-27, 1 DHC-6, 2 DHC-5D, 8 *Turbo-Porter*.
1 hel sqn with 10 Mi-8, 10 BO-105.
AA-2 *Atoll* AAM.

(10 F-5E, 2 F-5B, 24 *Mirage* 50 fighters; 6 EMB-111P2, 2 DHC-5D tpts, 10 *Puma* hel on order.)

Para-Military Forces: 3,500: 500 National Guard, 500 Republican Guard, 2,500 Border Guard.

SYRIA

Population: 8,110,000.
Military service: 30 months.
Total armed forces: 227,500.
Estimated GNP 1977: $6.5 bn.
Defence expenditure 1978: £Syr 4.4 bn ($1.12 bn).
$1 = £Syr 3.93 (1978), £Syr 3.68 (1977).

Army: 200,000, incl 15,000 AD Comd.
2 armd divs (each 2 armd, 1 mech bde).
3 mech divs (each 1 armd, 2 mech bdes).
3 armd bdes.
1 mech bde.
3 inf bdes.
2 arty bdes.
6 cdo bns.
4 para bns.
1 SSM bn with *Scud*, 2 btys with *FROG*.
48 SAM btys with SA-2/-3/-6.
200 T-34, 1,500 T-54/-55, 800 T-62 med, 100 PT-76 lt tks; BRDM recce vehs; BMP MICV; 1,600 BTR-40/-50/-60/-152, OT-64 APC; 800 122mm, 130mm, 152mm, and 180mm guns/how; ISU-122/-152, 75 SU-100 SP guns; 122mm, 140mm, 240mm RL; 30 *FROG*-7, 36 *Scud* SSM; 82mm, 120mm, 160mm mor; 57mm, 85mm, 100mm ATK guns; *Snapper, Sagger, Swatter* ATGW; 23mm, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-7/-9 SAM; 25 *Gazelle* hel.
(60 T-62 tks, *Milan, HOT* ATGW, SA-6/-8/-9 SAM; 24 *Gazelle* hel on order.)

Deployment:
Lebanon: (Arab Peace-keeping Force): 30,000.

Reserves: 100,000.

Air Defence Command: (Under Army Command, with Army and Air Force manpower.)
24 SAM btys with SA-2/-3, 14 with SA-6, AA arty, interceptor ac, and radar.

Navy: 2,500.
2 *Petya*-I-class frigates.
6 *Osa*-I and 6 *Komar*-class FPBG with *Styx* SSM.
1 T-43-class, 2 coastal minesweepers.
1 large patrol craft (ex-French CH Type).
8 MTB (ex-Soviet P-4).

Reserves: 2,500.

Air Force: 25,000; about 392 combat aircraft. (Some aircraft believed to be in storage.)
6 FGA sqns: 3 with 50 MiG-17, 3 with 60 Su-7.
3 fighter sqns with 50 MiG-23, 12 MiG-27.
12 interceptor sqns with 220 MiG-21PF/MF.
Tpts incl 8 Il-14, 6 An-12, 2 An-24, 4 An-26.
Trainers incl Yak-11/-18, 23 L-29, MiG-15UTI, 32 MBB 223 *Flamingo*.
Hel incl 4 Mi-2, 8 Mi-4, 10 Mi-6, 50 Mi-8, 9 Ka-25 ASW, 15 *Super Frelon*, 6 CH-47C.
AA-2 *Atoll* AAM.
(12 MiG-23 fighters, 18 AB-212, 21 *Super Frelon* hel on order.)

Para-Military Forces: 9,500. 8,000 Gendarmerie; 1,500 Desert Guard (Frontier Force).

TUNISIA

Population: 6,250,000.
Military service: 12 months selective.
Total armed forces: 22,200 (13,000 conscripts).
Estimated GNP 1977: $5.0 bn.
Defence expenditure 1978–79: 77 m dinars ($185 m).
$1 = 0.416 dinars (1978), 0.44 dinars (1977).

Army: 18,000 (12,000 conscripts).
2 combined arms regts.
1 Sahara regt.
1 para-cdo bn.
1 arty bn.
1 engr bn.
30 AMX-13, 20 M-41 lt tks; 20 *Saladin*, 15 EBR-75 armd cars; 40 105mm, 10 155mm how, SS-11 ATGW; 40mm AA guns.
(*Chaparral* SAM, 45 *Kuerassier* SP ATK guns on order.)

Navy: 2,500 (500 conscripts).
1 destroyer escort (ex-US radar picket).
1 coastal minesweeper.
1 large patrol craft (ex-French *Fougeux*-class).
3 P48-class with SS-12 SSM, 2 Vosper patrol craft.
10 coastal patrol boats (less than 100 tons).

Air Force: 1,700 (500 conscripts); 10 combat aircraft.
1 fighter/trg sqn with 10 F-86F.
1 trg sqn with 12 MB-326B/K, 2 MB-326L.
12 SF-260W, 12 T-6 trainers.
8 *Alouette* II, 6 *Alouette* III, 4 UH-1H, 1 *Puma* hel.
(6 SF-260C trainers on order.)

Para-Military Forces: 2,500; 1,500 Gendarmerie (3 bns), 1,000 National Guard.

UNITED ARAB EMIRATES (UAE)

Population: 875,000.
Military service: voluntary.
Total armed forces: 25,900. (The Union Defence Force and the armed forces of Abu Dhabi, Dubai, Ras Al Khaimah, and Sharjah were formally merged in May 1976.)
Estimated GNP 1977: $7.7 bn.
Defence expenditure 1978–79: 2.57 bn dirhams ($661 m).
$1 = 3.88 dirhams (1978), 3.90 dirhams (1977).

Army: 23,500.
1 Royal Guard 'bde'.
3 armd/armd car bns.
7 inf bns.
3 arty bns.
3 AD bns.
30 *Scorpion* lt tks; 80 *Saladin*, 6 *Shorland*, Panhard armd cars; 60 *Ferret* scout cars; AMX VCI, Panhard M-3, 12 *Saracen* APC; 22 25-pdr, 105mm guns; 16 AMX 155mm SP how; 81mm mor; 120mm RCL; *Vigilant* ATGW; *Rapier, Crotale* SAM.
(*Scorpion* lt tks on order.)

Deployment:
Lebanon (Arab Peace-keeping Force): 700.

Navy: 600.
6 Vosper Type large patrol craft.
9 coastal patrol craft (under 100 tons).
(4 *Jaguar* II FPB on order.)

Air Force: 1,800; 46 combat aircraft.
2 interceptor sqns with 32 *Mirage* VAD/DAD/RAD.
1 FGA sqn with 7 *Hunter* FGA76, 2 T77.
1 COIN sqn with 4 MB-326KD/LD, 1 SF-260WD.
Tpts incl 2 C-130H, 1 Boeing 720-023B, 1 G-222, 4 *Islander*, 1 *Falcon*, 3 DHC-4, 1 DHC-5D, 1 Cessna 182.
Hel incl 8 AB-205, 6 AB-206, 3 AB-212, 10 *Alouette* III, 10 *Puma*.
R.550 *Magic* AAM; AS.11/12 ASM.
(1 G-222, 3 DHC-5D tpts, *Lynx* hel on order.)

YEMEN ARAB REPUBLIC (NORTH)

Population: 7,270,000.
Military service: 3 years.
Total armed forces: 38,000.
Estimated GNP 1977: $1.2 bn.
Defence expenditure 1977–78: 360 m riyals ($79 m).
$1 = 4.54 riyals (1977), 4.33 riyals (1975).

Army: 36,000.
2 inf divs (10 inf bdes, incl 3 reserve).
2 armd bdes.
1 para bde.
2 cdo bdes.
5 arty bns.
2 AA arty bns.
220 T-34, T-54 med tks; 50 *Saladin* armd, *Ferret* scout cars; 350 BTR-40/-152, *Walid* APC; 50 76mm, 122mm guns; 50 SU-100 SP guns; 82mm, 120mm mor; 75mm RCL; 20 *Vigilant* ATGW; 37mm, 57mm AA guns. (How, AA guns on order.)

Deployment:
Lebanon (Arab Peace-keeping Force): 1,500.

Navy: 500.
4 large patrol craft (ex-Soviet *Poluchat*-class).
4 MTB (ex-Soviet P-4-class).

Air Force: 1,500; some 26 combat aircraft. (Some aircraft are believed to be in storage.)
1 lt bbr sqn with 14 Il-28.
1 fighter sqn with 12 MiG-17.
3 C-47, 2 *Skyvan*, 1 Il-14 tpts.
4 F-5B, 4 MiG-15UTI, 18 Yak-11 trainers.
1 Mi-4, 2 AB-205 hel.
AA-2 *Atoll* AAM.

Para-Military Forces: 20,000 tribal levies.

YEMEN: PEOPLE'S DEMOCRATIC REPUBLIC (SOUTH)

Population: 1,830,000.
Military service: conscription, 18 months.
Total armed forces: 20,900.
Estimated GNP 1977: $224 m.
Defence expenditure 1978: 19 m South Yemeni dinars ($56 m).
$1 = 0.34 dinars (1978), 0.35 dinars (1977).

Army: 19,000.
10 inf bdes, each of 3 bns.
2 armd bns.
5 arty bns.
1 sigs unit.
1 trg bn.
260 T-34, T-54 med tks; 10 *Saladin* armd cars; 10 *Ferret* scout cars; BTR-40/-152 APC; 25-pdr, 105mm pack, 122mm, 130mm how; 120mm mor; 122mm RCL; 37mm, 57mm, 85mm, ZSU-23-4 SP AA guns; SA-7 SAM.

Navy: 600 (subordinate to Army).
3 large patrol craft (ex-Soviet, 2 SO-1, 1 *Poluchat*).
2 MTB (ex-Soviet P-6-class).
3 minesweepers (ex-British *Ham*-class).
4 small patrol craft (under 100 tons).
2 LCT (ex-Soviet *Polnocny*-class).

Air Force: 1,300; 34 combat aircraft. (Some aircraft are believed to be in storage.)
1 lt bbr sqn with 7 Il-28.
1 FGA sqn with 15 MiG-17.
1 interceptor sqn with 12 MiG-21F.
1 tpt sqn with 4 Il-14, 3 An-24.
1 hel sqn with 8 Mi-8, some Mi-4.
3 MiG-15UTI trainers.
AA-2 *Atoll* AAM.

Para-Military Forces: Popular Militia; 15,000 Public Security Force.

SUB-SAHARAN AFRICA

MULTILATERAL AGREEMENTS

The Organization of African Unity (OAU), constituted in May 1963, includes all internationally recognized independent African states except South Africa. It has a Defence Commission which is responsible for defence and security co-operation and the defence of the sovereignty, territorial integrity, and independence of its members; however, this has rarely met.

BILATERAL AGREEMENTS

The US has security assistance agreements with Ghana, Kenya, Liberia, Senegal, and Zaire.

The Soviet Union signed Treaties of Friendship with Somalia in July 1974 (abrogated in November 1977), with Angola in October 1976, and with Mozambique in March 1977. Military aid is given to Angola, Ethiopia, Guinea, Guinea-Bissau, Mali, Mozambique, Nigeria, and Uganda.

China has military assistance agreements with Cameroon, Equatorial Guinea, Guinea, Mali, and Tanzania, and has given aid to Mozambique.

Britain maintains overflying, training, and defence arrangements with Kenya.

France has agreements on defence and military co-operation with the Central African Empire, Gabon, Ivory Coast, Niger, and Upper Volta. The military agreement with the Malagasy Republic has been terminated but military co-operation between the two countries maintained. Since March 1974 France has had a co-operation agreement for defence with Senegal, and since February 1974 a co-operation agreement including military clauses with Cameroon. The defence agreements between France and Benin, Chad, and Togo have been terminated but replaced by agreements on technical military co-operation. Similarly, a defence agreement with the People's Republic of Congo has been terminated and replaced by an agreement on training and equipment for the Congolese armed forces. An agreement has been concluded with Djibouti for the continued stationing of French forces there. Military assistance has been given to Zaire and Mauritania.

Cuba has given military aid to the People's Republic of Congo, Guinea, and Ethiopia, and has some 23–25,000 men in Angola, now engaged in training Angola's armed forces and assisting with internal security, and 16–17,000 in Ethiopia. Cuban advisers are present in a number of other African countries.

A number of countries have given military assistance to Zaire.

Military links exist between South Africa and Israel.

ARRANGEMENTS WITHIN THE REGION

Kenya and Ethiopia signed a defence agreement in 1963.

Military links have existed in practice between South Africa and Rhodesia, with South Africa giving certain defence assistance. There is, however, no known formal agreement.

ANGOLA: PEOPLE'S REPUBLIC OF

Population: 6,300,000.
Military service: conscription.
Total armed forces: 33,000.
Defence expenditure 1975: 2.5 bn escudos ($98.0 m).
$1 = 25.5 escudos (1975).

Army: 30,000.
1 armd regt.
9 inf regts.
1 cdo regt.
1 AD regt.
85 T-34, 75 T-54 med, some 50 PT-76 lt tks; 200 BRDM-2 armd cars; 150 BTR-50/-60/-152, OT-62 APC; 120 guns, incl 76mm, 105mm, 122mm; 500 82mm, 120mm mor; 110 BM21 122mm multiple RL; ZIS-3 76mm ATK guns; 75mm, 82mm, 107mm RCL; *Sagger* ATGW; 23mm, 37mm AA guns; SA-7 SAM. (Equipment totals uncertain. Some 23–25,000 Cubans serve with the Angolan forces and operate ac and hy eqpt. Some Portuguese also serve; several hundred Soviet advisers and technicians are reported in Angola.)

Navy: 1,500.
4 *Argos*-class patrol boats.
1 *Zhuk*-class patrol boat (under 100 tons).
6 small coastal patrol boats.
2 LCT, 5 utility landing craft.

Air Force: 1,500; 31 combat aircraft.
15 MiG-17, 12 MiG-21, 4 G-91 fighters.
Tpts incl 6 *Noratlas*, 2 C-45, 3 C-47, 10 Do-27, 5 An-26, 2 *Turbo-Porter*, *Islander*.
Some 7 Mi-8, 24 *Alouette* III, 2 Bell 47 hel.
3 MiG-15UTI trainers.
AA-2 *Atoll* AAM.

CONGO: PEOPLE'S REPUBLIC OF

Population: 1,470,000.
Military service: voluntary.
Total armed forces: 7,000.
Estimated GNP 1977: $610 m.
Defence expenditure 1976: 8.89 bn CFA francs ($37.2 m).
$1 = 249 CFA francs (1977), 239 CFA francs (1976).

Army: 6,500.
1 armd bn (5 sqns).
1 inf bn.
1 para-cdo bn.
1 arty gp.
1 engr bn.
T-59 med, 14 Chinese T-62, 3 PT-76 lt tks; 10 BRDM-1 scout cars; 44 BTR-152 APC; 6 75mm, 10 100mm guns; 8 122mm how; 82mm, 10 120mm mor; 57mm, 76mm ATK guns; 10 14.5mm, 37mm, 57mm AA guns.

Navy: 200.
3 patrol boats (ex-Chinese *Shanghai*-class).
4 river patrol craft (under 100 tons).

Air Force: 300; 10 combat aircraft.
10 MiG-15/-17 fighters.
3 C-47, 4 An-24, 1 F-28, 1 *Frégate*, 5 Il-14, 3 *Broussard* tpts.
4 *Alouette* II/III hel.

Para-Military Forces: 1,400 Gendarmerie; 2,500 militia.

ETHIOPIA

Population: 30,010,000.
Military service: conscription.

Total armed forces: 93,500.
Estimated GNP 1976: $2.9 bn.
Defence expenditure 1978: 345 m birr ($165 m). Plus 105 m birr ($50 m) for Law and Security.
$US 1 = 2.09 birr (1978), 2.08 birr (1976).

Army: 90,000. (Augmented by 100,000 People's Militia, with a further 50,000 under training. Some 16–17,000 Cubans also serve with the Ethiopian forces and operate ac and hy equipment.)
8 inf divs with some 12 tk bns.
3 lt divs.
2 para/cdo bdes.
5 arty, 2 engr bns.
24 M-60, 30 M-47, 50 T-34, 400 T-54/-55 med, 50 M-41 lt tks; 56 AML-60 armd cars; BRDM-2 scout cars; BMP-1 MICV; about 70 M-113, *Commando*, 300 BTR-40/-60/-152 APC; 52 105mm, 150 122mm, 130mm, 152mm, 12 155mm towed, 12 M-109 155mm SP how; 82mm, 120mm, 280 M-2/-30 4.2in mor; BM-21 122mm RL; *Sagger* ATGW; ZU-23, 37mm, ZU-57 AA guns.

Navy: 1,500.
1 coastal minesweeper (ex-Netherlands).
1 training ship (ex-US seaplane tender).
9 large patrol craft (5 ex-US PGM, 4 ex-US *Sewart*-type, 1 ex-Yugoslav *Kraljevica*-class).
2 *Osa*-II class FPBG with *Styx* SSM.
4 *Swift*-class FPB.
4 coastal patrol craft (under 50 tons).
4 landing craft (ex-US, under 100 tons).

Air Force: 2,000; 99 combat aircraft.
1 lt bbr sqn with 2 *Canberra* B2.
6 FGA sqns: 2 with 14 F-5A/E, 1 with 7 F-86F, 2 with 50 MiG-21, 1 with 20 MiG-23.
1 COIN sqn with 6 T-28A.
1 tpt sqn with 5 C-47, 2 C-54, 7 C-119G, 3 *Dove*, 1 Il-14, 1 DHC-3, 3 DHC-6, 8 An-12, 4 An-22.
3 trg sqns with 20 *Safir*, T-28A/D, 11 T-33A, 2 F-5B.
Hels incl 10 AB-204, 5 *Alouette* III, 30 Mi-8, Mi-6, 10 UH-1H, 1 *Puma*.

Para-Military Forces: 119,000: 9,000 mobile emergency police force; 100,000 People's Militia, in 8 divs with mor, ATK guns; 10,000 People's Protection bdes.

GHANA

Population: 10,680,000.
Military service: voluntary.
Total armed forces: 17,700.
Estimated GNP 1977: $4.1 bn.
Defence expenditure 1977: 113.5 m cedi ($130.5 m).
$1 = 1.15 cedi (1977).

Army: 15,000.
2 bdes (6 inf bns and support units).
1 recce bn.
1 mor bn.
1 fd engr, 1 sigs bn.
1 AB coy.
9 *Saladin* armd cars; 26 *Ferret* scout cars; 81mm, 10 120mm mor.

Deployment: Egypt (UNEF): 1 bn, 597 men.

Navy: 1,300.
2 Vosper Mk 1 ASW corvettes.
1 minesweeper (ex-British *Ton*-class).
4 large patrol craft (2 ex-British *Ford*-class).
1 ex-LCT trg vessel.
(4 *Jaguar*-class FPB on order.)

Air Force: 1,400; 12 combat aircraft.
1 COIN sqn with 6 MB-326F, 6 MB-326K.
2 tpt sqns with 8 *Islander*, 6 *Skyvan* 3M.
1 comms and liaison sqn with 6 F-27, 1 F-28.
1 hel sqn with 2 Bell 212, 4 *Alouette* III, 3 Hughes 269.

Congo, Mozambique, and Somalia all have these Soviet-built An-24 transports.

12 *Bulldog* trainers.

Para-Military Forces: 3,000, 3 Border Guard bns.

KENYA

Population: 14,870,000.
Military service: voluntary.
Total armed forces: 9,100.
Estimated GNP 1977: $3.7 bn.
Defence expenditure 1977: 668 m shillings ($80 m).
$1 = 7.81 shillings (1978), 8.35 shillings (1977).

Army: 7,500.
4 inf bns.
1 arty bn.
1 spt gp, 1 engr bn.
3 *Saladin*, 30 AML-60/-90 armd, 14 *Ferret* scout cars; 15 UR-416, 10 Panhard M3 APC; 8 105mm lt guns; 20 81mm, 8 120mm mor; 56 84mm *Carl Gustav* and 120mm RCL. (38 Vickers Mk3 med tks on order.)

Navy: 400.
7 large patrol craft.

Air Force: 1,200; 13 combat aircraft.
1 FGA sqn with 4 Hunter FGA9, 4 F-5E/F.
1 COIN sqn with 5 BAC-167 *Strikemaster*.
1 trg sqn with 14 *Bulldog*.
2 lt tpt sqns: 1 with 6 DHC-4, 1 with 7 DHC-2, 2 DHC-5, 2 Do-28D.
Other ac incl 1 *Turbo Commander*, 2 *Navajo* ac; 2 *Puma*, 2 Bell 47G hel.
(8 F-5E/F fighters, 12 *Hawk* trainers, 4 DHC-5D, 4 Do-28D tpts on order.)

Para-Military Forces: 1,500 police (General Service Unit), 9 Cessna lt ac.

MOZAMBIQUE

Population: 9,870,000.
Military service: voluntary.
Total armed forces: 21,200. (The aim is to have 30,000 trained troops organized into 4 bdes. Chinese, Cuban, East German, Romanian, and Soviet advisers reported with Mozambique forces.)
Defence expenditure 1978: 3,650 m escudos ($109 m).
$1 = 33.51 escudos (1978).

Army: 20,000.
1 tk bn.
28 inf bns.
2–3 arty bns.
150 T-34/-54/-55 med, some PT-76 lt tks; BTR-40, BRDM armd cars; BTR-40/-152 APC; 76mm, 85mm, 100mm, 122mm guns/how; BM-21 multiple RL; 60mm, 82mm, 120mm mor; 82mm, 107mm RCL; *Sagger* ATGW; 23mm, 37mm, 57mm AA guns; 24 SA-6, SA-7 SAM.

Navy: 700.
1 *Poluchat*-class large patrol craft.
6 patrol craft (ex-Portuguese, 1 *Antares*-, 3 *Jupiter*-, 2 *Bellatrix*-class).
1 *Alfange*-class LCT.

Air Force: 500; 47 combat aircraft. (Not all the aircraft shown are necessarily airworthy.)
47 MiG-21 fighters.
Tpts incl 6 *Noratlas*, 5 C-47, An-24.
Lt ac incl 7 Zlin.
15 *Harvard* trainers.
2 *Alouette* II/III, some Mi-8 hel.
AA-2 *Atoll* AAM.

NIGERIA

Population: 68,290,000.
Military service: voluntary.
Total armed forces: 231,500. (Large-scale demobilization has been planned.)
Estimated GNP 1977: $34.2 bn.
Defence expenditure 1977–78: 1,718 bn naira ($2.67 bn).
$1 = 0.623 naira (1978), 0.643 naira (1977).

Army: 221,000.
4 inf divs.
4 engr bdes.
4 recce regts.
4 arty regts.
50 *Scorpion* lt tks; 20 *Saladin*, 15 AML-60/-90 armd cars; 25 *Ferret*, 20 *Fox* scout cars; 8 *Saracen* APC; 105mm, 122mm guns/how; 76mm ATK guns; 20mm, 40mm AA guns.

Deployment: Lebanon (UNIFIL): 1 bn (669).

Navy: 4,500.
1 ASW frigate.
2 corvettes.
10 large patrol craft (4 under 100 tons).
1 LCT.
(1 GW frigate, 2 corvettes, 6 FPBG with *Otomat* and *Exocet* SSM, *Seacat* SAM on order.)

Reserves: 2,000.

Air Force: 6,000; 24 combat aircraft. (There are additional unserviceable aircraft.)
2 FGA/interceptor sqns: 1 with 4 MiG-17, 1 with 20 MiG-21J.
2 tpt sqns with 6 C-130H, 2 F-27, 1 F-28, 1 *Gulfstream* II.
1 hel sqn with 3 *Whirlwind*, 4 BO-105, 10 *Puma*, 10 *Alouette* III.
3 trg/service sqns with 2 MiG-15, 2 MiG-21U, 32 SA *Bulldog*, 19 Do-27/-28, 3 Piper *Navajo*, 15 L-29.

(6 CH-47, 6 BO-105 hel on order.)

RHODESIA

Population: 6,990,000 (250,000 White).
Military service: 18 months (White, Asian, and Coloured population; Black doctors and apprentices are liable for conscription).
Total armed forces: 10,800.
Estimated GNP 1977: $US 3.1 bn.
Defence expenditure 1978–79: $R 149 m ($US 242 m). (A further $R 60 m is in the Police vote.)
$US 1 = $R 0.668 (1978), $R 0.617 (1977).

Army: 9,500 (3,250 conscripts). (Plus about 15,000 Territorial Army and Police Reserve called up for service at any one time.)
1 armd car regt.
6 inf bns. (1 White bn (1,200), 4 Black bns (4,000); a fifth Black forming. There is an establishment for 3 bdes, to be brought up to strength by mobilizing Territorials. Black regular soldiers are allocated to White Territorial Army bns to bring them up to strength.)
4 Special Air Service sqns.
Selous Scouts (Special Forces unit).
Grey's Scouts, mounted inf (250).
1 arty regt.
6 engr sqns.
7 signals sqns.
60 AML-90 *Eland* armd cars; *Ferret* scout cars; *Hippo, Hyena,* and *Leopard* (local-built) lt APC; 25-pdr, 105mm how, 5.5-in guns/how; 105mm RCL; *Tigercat* SAM.

Air Force: 1,300; 84 combat aircraft.
1 lt bbr sqn with 5 *Canberra* B2 and 2 T4.
2 FGA sqns: 1 with 10 *Hunter FGA9*, 1 with 18 *Vampire* FB9.
1 trg/recce sqn with 8 *Provost* T-52, 11 *Vampire* T55.
1 COIN/recce sqn with 12 AL-60C4, 18 Cessna 337 *(Lynx)*.
1 tpt sqn with 10 C-47, 1 *Baron* 55, 6 *Islander*.
2 hel sqns with 66 *Alouette* II/III.

Reserves:
White, Asian, and Coloured citizens aged 17–25 undergo 18 months National Service before joining Territorial Army units (8 bns). Thereafter operational duties amount to about 4 months a year in periods of 30 or 56 days at one time. Those aged 26–37 without previous military training usually receive 84 days basic training for the Territorial Army or 56 days for the Police Reserve or Ministry of Internal Affairs. Commitments thereafter are for up to 4 months a year on a periodic basis. Men aged 38–50 undergo 3 weeks' basic training before being posted to the Police Reserve, operational duty consists of up to 70 days a year in periods of 2–4 weeks. Those over 50 are posted to the Rhodesia Defence Regiment (RDR). The RDR includes all Asians and Coloureds and those not fit for more active duty. Some men over 50 join the Special Reserves with police duties.

Para-Military Forces: British South African Police (BSAP): 8,000 active, 35,000 reservists (the White population provides about a third of the active strength but nearly three-quarters of the reservist strength). Guard Force: establishment 1,000.

SENEGAL

Population: 4,750,000.
Military service: 2 years selective.
Total armed forces: 6,550.
Estimated GNP 1977: $1.7 bn.
Defence expenditure 1978: 11.14 bn CFA francs ($48 m).
$1 = 231 CFA francs (1978), 249 CFA francs (1977).

Army: 6,000.
4 inf bns.
1 engr bn.
1 recce sqn.
2 para coys.
2 cdo coys.
1 arty bty.
AML armd cars; 12 VXB-170 APC; 75mm pack how, 6 105mm how; 8 81mm mor; 30mm, 40mm AA guns.

Deployment: Lebanon (UNIFIL): 1 bn (634).

Navy: 350.
3 large patrol craft.
2 ex-French VC Type patrol craft (under 100 tons).
1 coastal patrol craft (under 100 tons).
1 LCT, 6 landing craft.

Air Force: 200; no combat aircraft.
2 *Magister;* 6 C-47, 4 F-27, 4 *Broussard*, 1 Cessna 337 tpts.
2 *Alouette* II, 1 *Gazelle* hel.

Para-Military Forces: 1,600.

SOMALI DEMOCRATIC REPUBLIC

Population: 3,430,000.
Military service: voluntary.
Total armed forces: 51,500.
Estimated GNP 1977: $425 m.
Defence expenditure 1976: 165 m shillings ($25 m).
$1 = 6.30 shillings (1977), 6.6 shillings (1976). (Spares are short in all services and not all equipment is serviceable.)

Army: 50,000 (plus 20,000 Militia).
3 div HQ.
20 bde HQ.
7 tk bns.
8 mech inf bns.
14 mot inf bns.
16 inf bns.
2 cdo bns.
13 fd, 10 AA arty bns.
50 T-34, 30 T-54/-55 med tks; BRDM-2 scout cars: 50 BTR-40/-50/-60, 100 BTR-152 APC; about 100 76mm, 85mm, 80 122mm, 130mm guns/how; 81mm mor; 100mm ATK guns; 106mm RCL; *Milan* ATGW; 150 14.5mm, 37mm, 57mm, and 100mm towed, ZSU-23-4 SP AA guns; SA-2/-3 SAM.

Navy: 500.
4 *Mol*-class patrol craft (2 with torpedo tubes).
3 *Osa*-II-class FPBG with *Styx* SSM.
6 large patrol craft (ex-Soviet *Poluchat*-class).
4 MTB (ex-Soviet P-6-class).
1 LCT (ex-Soviet *Polnocny*-class).
4 medium landing craft (ex-Soviet T-4-class).

Air Force: 1,000; 25 combat aircraft.
1 lt bbr sqn with 3 Il-28.
2 FGA sqns with 15 MiG-17 and MiG-15UTI.
1 fighter sqn with 7 MiG-21MF.
1 tpt sqn with 3 An-2, 3 An-24/-26.
Other aircraft incl 3 C-47, 1 C-45, 6 P-148, 15 Yak-11, 2 Do-28.
1 hel sqn with 5 Mi-4, 5 Mi-8, 1 AB-204.
AA-2 *Atoll* AAM.

Para-Military Forces: 29,500: 8,000 Police; 1,500 border guards; 20,000 People's Militia.

SOUTH AFRICA

Population: 27,580,000.
Military service: 24 months.
Total armed forces: 65,500 (48,900 conscripts; total mobilizable strength 404,500).
Estimated GNP 1977: $43.8 bn.
Defence expenditure 1978–79: 2.28 bn rand ($2.62 bn).
$1 = 0.87 rand (1978), 0.87 rand (1977).

Army: 50,000 (43,000 conscripts, 2,100 women).
1 corps, 2 div HQ (1 armd, 1 inf). (Following are cadre units, forming 2 divs when brought to full strength on mobilization of Citizen Force.)
1 armd bde.
2 mech bdes.
4 mot bdes.
3 para bns.
11 fd and 1 med arty regts.
9 lt AA arty regts.
10 fd engr sqns.
5 sigs regts.
Some 150 *Centurion*, 20 *Comet* med, 90 M-41 lt tks; 1,400 *Eland* (AML-60/-90), Mk IV armd cars; 230 scout cars incl *Ferret*, M-3A1; 280 *Saracen, Ratel* APC; 500 lt APC incl *Hippo, Rhino;* 125 25-pdr, 5.5-in towed, 50 *Sexton* 25-pdr SP guns, 81mm, 120mm mor; 15 17-pdr, 900 90mm ATK guns; SS-11, *ENTAC* ATGW; 204GK 20mm, 55 K-63 twin 35mm, 25 L/70 40mm, 15 3.7-in AA guns; 18 *Cactus (Crotale), Tigercat* SAM.

Reserves: 138,000 Active Reserve (Citizen Force).
Reservists serve 30 days per year for 8 years. Some Citizen Force units have been deployed on the Angola border for up to 90 days.

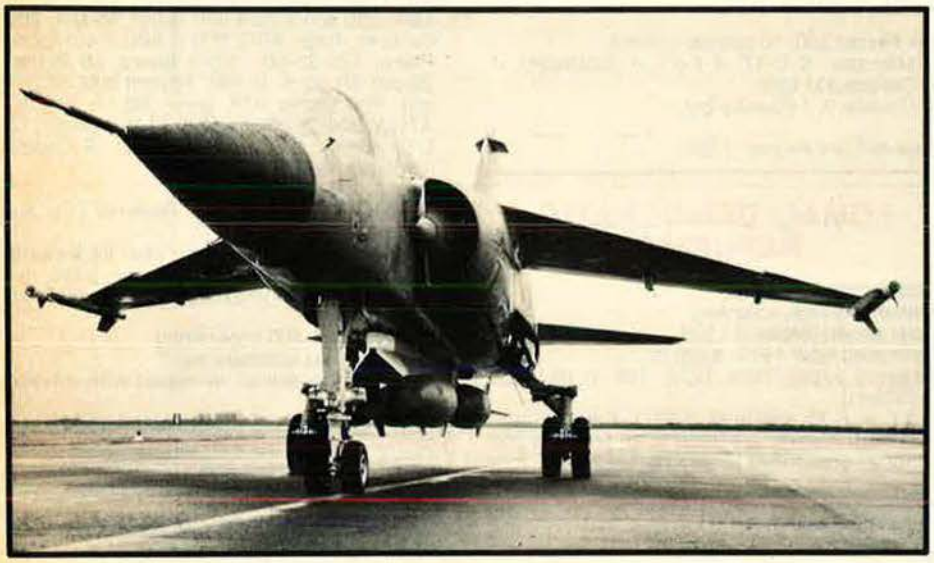
Navy: 5,500 (1,400 conscripts).
3 *Daphne*-class submarines.
1 destroyer (ex-British 'W'-class) with 2 *Wasp* ASW hel.
3 ASW frigates (each with 1 *Wasp* hel).
3 *Reshef*-class FPBG with *Gabriel* SSM.
1 escort minesweeper (training ship).
10 coastal minesweepers (ex-British *Ton*-class).
5 large patrol craft (ex-British *Ford*-class).
(3 *Reshef*-class FPBG on order.)

Reserves: 10,500 Citizen Force.

Air Force: 10,000 (4,500 conscripts); 345 combat aircraft (incl 70 with Citizen Force and operational trainers).
2 lt bbr sqns: 1 with 6 *Canberra* B(I)12, 3 T4; 1 with 9 *Buccaneer* S50.
1 FGA sqn with 32 *Mirage* F-1AZ.
1 fighter/recce sqn with 36 *Mirage* IIICZ/EZ/RZ/R2Z.
1 interceptor sqn with 16 *Mirage* F-1CZ.
2 MR sqns with 7 *Shackleton* MR3, 18 Piaggio P166S.
3 tpt sqns with 7 C-130B, 9 Transall C-160Z, 28 C-47, 5 DC-4, 1 *Viscount* 781, 4 HS-125, 7 Swearingen *Merlin* IVA.
4 hel sqns: 2 with 40 *Alouette* III, 1 with 19 SA-330 *Puma*, 1 with 14 SA-321L *Super Frelon*.
1 flt of 11 *Wasp* with AS.11 (naval assigned), 2 *Alouette* II.
Other hels incl 17 *Alouette* III, 40 SA-330 *Puma*.
4 comms and liaison sqns (army assigned) with 20 Cessna 185A/D/E, 36 AM-3C *Bosbok*, 20 C-4M *Kudu*.
Operational trainers incl 16 *Mirage* IIIBZ/DZ/D2Z, 12 F-86, 120 MB-326M/K *Impala* I/II; other trg ac incl 110 *Harvard* (some armed), 5 C-47 ac, 10 *Alouette* III hel.
R.530, R.550 *Magic* AAM; AS.20/30 ASM.

Reserves: 25,000 Active Citizen Force.
5 COIN/trg sqns with 60 *Impala* I/II, 10 *Harvard*.

Para-Military Forces: 110,000 Commandos (in inf bn-type units grouped in formations of 5 or more with local industrial and rural protection duties). Members do 12 months' initial and 19 days' annual training. There are 13 Air Cdo sqns with private aircraft. 35,500 South African Police (SAP) (19,500 Whites, 16,000 Non-Whites), 20,000 Police Reserves.



South Africa and Zaire use the French Super Frelon helicopter (top). South Africa has one squadron of Mach 2.2 Mirage F-1 all-weather interceptors (below).

TANZANIA

Population: 16,520,000.
Military service: voluntary.
Total armed forces: 26,700.
Estimated GNP 1977: $2.9 bn.
Defence expenditure 1977: 1.17 bn shillings ($140 m).
$1 = 8.35 shillings (1977).

Army: 25,000.
4 bde HQ.
1 tk regt.
13 inf bns.
3 arty bns.
1 engr regt.
20 T-59 med, T-60, 14 T-62 lt tks; BTR-40/-152, K-63 APC; 24 76mm guns, 30 122mm how; 82mm, 50 120mm mor; 14.5mm, 37mm AA guns; SA-3 SAM.

Deployment: Mozambique: 1 inf bn.

Navy: 700.
1 large patrol craft (ex-Soviet *Poluchat*-class).
7 FPB (*Shanghai*-class).
3 P-6-, 4 P-4-class MTB, 4 *Hu-Chwan* hydrofoils.
8 coastal patrol craft (under 100 tons).

Air Force: 1,000; 29 combat aircraft.
3 fighter sqns with 11 MiG-21/F-8, 3 MiG-17/F-4, 15 MiG-19/F-6.
1 tpt sqn with 1 An-2, 3 HS-748, 12 DHC-4, 6 Cessna 310.
2 MiG-15UTI, 6 *Cherokee* trainers.
2 Bell 47G, 4 AB-206 hel.
(4 DHC-5D tpts on order.)

Para-Military Forces: 1,400 Police Field Force and a police marine unit; 35,000 Citizen's Militia.

UGANDA

Population: 12,700,000.
Military service: voluntary.
Total armed forces: 21,000.
Estimated GDP 1976: $3.2 bn.
Defence expenditure 1976–77: 429 m shillings ($52 m).
$1 = 8.38 shillings (1976).
(Not all eqpt and ac are likely to be serviceable.)

Army: 20,000.
2 bdes, each of 4 bns.
1 recce bn.
1 mech inf bn.
1 para/cdo, 1 marine/cdo bn.
1 trg bn.
1 arty regt.
10 T-34, 15 iT-54/-55, 10 M-4 med, PT-76 lt tks; BRDM-2, *Saladin* armd, 15 *Ferret* scout cars; 120 BTR-40/-152, OT-64, *Saracen* APC; 76mm, 122mm guns; 82mm, 120mm mor; *Sagger* ATGW; 50 40mm AA guns; SA-7 SAM.

Navy: A small lake patrol service being formed.

Air Force: 1,000. (Excluding expatriate instructors and maintenance personnel.) 37 combat aircraft.
2 fighter sqns with 25 MiG-21, 10 MiG-17, 2 MiG-15UTI.
1 tpt sqn with 1 L-100-20, 6 C-47, 1 DHC-6.
1 hel sqn with 6 AB-205, 4 AB-206.
Trainers incl 5 L-29, 10 Piper *Super Cub*, 6 AS 202 *Bravo*.

AA-2 *Atoll* AAM.

ZAIRE REPUBLIC

Population: 27,080,000.
Military service: conscription.
Total armed forces: 33,400.
Estimated GNP 1977: $3.5 bn.
Defence expenditure 1976: 142 m zaires ($164 m).
$1 = 0.86 zaires (1977), 0.81 zaires (1976).

Army: 30,000.
2 tk bns.
2 armd bns.
1 mech bn.
14 inf bns.
5 para, 2 cdo bns.
4 'Guard' bns.
60 Type-62 lt tks (ex-Chinese); 44 AML-90, 122 AML-60 armd cars; 60 M-3 APC; 75mm pack, 122mm, 130mm guns/how; 82mm, 120mm mor; 107mm RL; 57mm ATK guns; 75mm, 106mm RCL; *Snapper* ATGW; 20mm, 37mm, 40mm AA guns.
(10 M-60 tks, 10 M-113 APC on order.)

Navy: 400.
2 FPB (*Shanghai*-class).
3 P4 torpedo boats (ex-Korean).
21 coastal patrol craft (6 ex-US *Stewart* type).

Air Force: 3,000; 49 combat aircraft.
1 fighter sqn with 14 *Mirage* VM, 3 VDM.
2 COIN sqns with 12 MB-326GB, 8 AT-6G, 12 AT-28D.
1 observation sqn with 20 Reims Cessna FTB 337.
1 tpt wing with 7 C-130H, 2 DC-6, 2 DHC-4A, 3 DHC-5, 4 C-54, 8 C-47, 2 Mu-2.
1 hel sqn with 14 *Alouette* III, 8 *Puma*, 1 *Super Frelon*, 7 Bell 47.
Trg ac incl 23 SF-260MC, 15 T-6, 15 Cessna A150, 15 Cessna 310.
(3 DHC-5 tpts on order.)

Para-Military Forces: 35,000: 8 National Guard, 6 Gendarmerie bns.

ZAMBIA

Population: 5,400,000.
Military service: voluntary.
Total armed forces: 14,300.
Estimated GNP 1976: $2.2 bn.
Defence expenditure 1977: 246 m kwacha ($310 m).
$1 = 0.796 kwacha (1977), 0.643 kwacha (1976).

Army: 12,800.
1 armd car regt.
8 inf bns.
1 arty bty.
1 AA arty regt.
1 engr sqn.
1 sigs sqn.
10 T-54 tks; 28 *Ferret* scout cars; 8 M-56 105mm pack how; 24 20mm AA guns.

Air Force: 1,500; 30 combat aircraft.
1 FGA sqn with 6 *Galeb*, 6 *Jastreb*.
1 COIN/trg sqn with 18 MB-326G.
2 tpt sqns: 1 with 2 Yak-40, 2 DC-6, 5 DHC-4, 7 DHC-5, 10 C-47, 1 HS-748; 1 with 7 DHC-2, 10 Do-28.
1 liaison sqn with 20 Saab *Supporter*.
Trainers incl 6 *Chipmunk*, 8 SF-260MZ.
1 hel sqn with 3 AB-205, 5 AB-206, 3 AB-212, 21 Bell 47G, 7 Mi-8.
1 SAM unit with 12 *Rapier*.

Para-Military Forces: 1,200; Police Mobile Unit (PMU) 700 (1 bn of 4 coys); Para-Military Police Unit (PMPU) 500 (1 bn of 3 coys). 2 hels.

CHINA

Chinese defence policy has for many years maintained a balance, at times uneasy, between the two extremes 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. With Mao's death in September 1976 and the attack on the 'Gang of Four' thereafter, the strongest adherents of the strategic concept that men are more important than weapons were removed. There is now some indication of an effort to develop more modern general-purpose forces in order to meet more limited military contingencies than the extremes of nuclear deterrence or mass war.

The People's Liberation Army (PLA) was probably the key factor in the accession to power of Hua Kuo-feng, despite some division within its leadership. The PLA can therefore be expected to have increased influence over military policy, and it has not hidden its desire for more modern weapons and for increased spending. Military conferences have covered air defence, aircraft and missiles, and planning, research, and production. While this foreshadows efforts at modernization, there is continuing debate about its pace and nature. It is too early yet to see whether, or how soon, the money for it will be forthcoming (but see the note on defence expenditure on the following page). It is also too early to foresee the effect of Teng Hsiao-ping's reappointment at the end of July 1977 to his three major positions, including Chief of the PLA General Staff. The picture that can be drawn of Chinese forces accordingly is not dissimilar from that of last year.

NUCLEAR WEAPONS

The testing programme continued, with two 20KT atmospheric tests in the year: one in September 1977, the other in March 1978, bringing the total to twenty-three since testing started in 1964. A theatre nuclear force is operational, capable of reaching large parts of the Soviet Union and Asia. The stockpile of weapons, both fission and fusion, probably amounts to several hundreds and could continue to grow rapidly. Fighter aircraft could be used for tactical delivery, and for longer ranges there is the Tu-16 medium bomber, with a radius of action up to 2,000 miles. MRBM with a range of some 600–700 miles are operational but may be phased out and replaced by IRBM, also operational now, with a range of 1,500–1,750 miles. The missile force seems to be controlled by the Second Artillery, apparently the missile arm of the PLA.

A multi-stage ICBM with a limited range of 3,000–3,500 miles was first tested in 1976 and some may have been deployed. An ICBM thought to have a range of 8,000 miles has also been under development but is unlikely to become operational for some years yet. Full-range testing, which would require impact areas in the Indian or Pacific Oceans, has not yet been carried out, but the missile has been successfully used (and thus tested) as a launcher for satellites. China has one G-class submarine with missile launching tubes, but does not appear to have missiles for it. All the present missiles are liquid-fuelled, but solid propellants are being developed.

CONVENTIONAL FORCES

The PLA is organized in 11 Military Regions and divided into Main and Local Forces. Main Force (MF) divisions, administered by the Military Regions in which they are stationed but commanded by the Ministry of National Defence, are available for operations in any region and are better equipped. Local Forces (LF), which include Border Defence and Internal Defence units, are predominantly infantry and concentrate on the defence of their own localities in co-operation with paramilitary units.

The PLA is generally equipped and trained for the environment of People's War, but new efforts are being made to arm a proportion of the formations with modern weapons. Infantry units account for most of the manpower and 121 of the 136 Main Force divisions; there are only 12 armoured divisions. The naval and air elements of the PLA have only about one-seventh of the total manpower, compared with about a third for their counterparts in the Soviet Union, but naval strength is increasing, and the equipment for both arms is 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 MiG-19 and F-9 fighters (the last Chinese-designed), SA-2 SAM, Type 59 medium and Type 60 amphibious tanks, and a Chinese-designed Type 62 light tank and APC. R- and W-class medium-range diesel submarines are being built in some numbers, together with SSM destroyers and fast patrol boats; a nuclear-powered attack submarine (armed with conventional torpedoes) has been under test for some years. Most military equipment is 10–20 years out of date, but China has shown increasing interest in acquiring Western military technology.

BILATERAL AGREEMENTS

China has a 30-year Treaty of Alliance and Friendship with the Soviet Union, signed in 1950, which contains mutual defence obligations, but it is highly unlikely that this remains in force. 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 Cambodia. Chinese military equipment and logistic support has been offered to a number of countries. Major recipients of arms in the past have been Albania, Pakistan, and Tanzania.

CHINA

Population: 960—975,000,000.
Military service: Army 2–4 years, Air Force 4 years, Navy 5 years.
Total regular forces: 4,325,000.
GNP and defence expenditure—see note below.

Strategic Forces:
IRBM: 30–40 CSS-2.
MRBM: 30–40 CSS-1.
Aircraft: about 80 Tu-16 med bbrs.

Army: 3,625,000.
Main Forces:
11 armd divs.
121 inf divs.
3 AB divs.
40 arty divs (incl AA divs).
15 railway and construction engr divs.
150 indep regts.
Local Forces:
70 inf divs.
130 indep regts.
10,000 Soviet IS-2 hy, T-34, and Chinese-produced Type-59/-63 med, Type-60 (PT-76) amph and Type-62 lt tks; 3,500 M-1967, K-63 APC; 18,000 122mm, 130mm, 152mm guns/how, incl SU-76, SU-85, SU-100, and ISU-122 SP arty; 20,000 82mm, 90mm, 120mm, 160mm mor; 132mm, 140mm RL; 57mm, 75mm, 82mm RCL; 57mm, 85mm, 100mm ATK guns; 37mm, 57mm, 85mm, 100mm AA guns.

Deployment:
China is divided into 11 Military Regions (MR), in turn divided into Military Districts (MD), with usually two or three Districts to a Region. Divs are grouped into some 40 armies, generally of 3 inf divs, 3 arty regts, and, in some cases, 3 armd regts. Main Force (MF) divs are administered by Regions but are under central comd.
The distribution of divs, including the equivalent of 2 to 3 divs of border troops in Shenyang, Peking, Chengtu, and Kunming MRs but excluding arty and engrs, is believed to be:
North and North-East China (Shenyang and Peking MR): 55 MF, 25 LF divs.
North and North-West China (Lanchow and Sinkiang MR): 15 MF, 8 LF divs.
East and South-East China (Tsinan, Nanking, Foochow, and Canton MR and Hainan island): 32 MF, 22 LF divs.
Central China (Wuhan MR): 15 MF (incl 3 AB), 7 LF divs.
West and South-West China (Chengtu and Kunming MR): 18 MF, 8 LF divs.

Navy: 300,000, incl 30,000 Naval Air Force and 38,000 Marines; 23 major surface combat ships.

China's very large ground forces are made up largely of infantry divisions. Armored forces have about 10,000 tanks, many of them obsolete Soviet T-34s.

1 *Han*-class nuclear-powered submarine.
1 G-class submarine (with SLBM tubes). (China is not known to have any missiles for this boat.)
73 fleet submarines (incl 50 Soviet R-, 21 W-, 2 *Ming*-class). (Incl trg vessels.)
7 *Luta*-class destroyers with *Styx* SSM (more building).
4 ex-Soviet *Gordy*-class destroyers with *Styx* SSM.
12 frigates (4 *Riga*-type with *Styx* SSM).
14 patrol escorts.
39 sub chasers (20 *Kronstadt*-, 19 *Hainan*-class).
70 *Osa*- and 70 *Hoku/Komar*-type FPBG with *Styx* SSM (more building).
140 P-4/-6-class MTB (under 100 tons).
105 *Hu Chwan* hydrofoils (under 100 tons).
440 MGB (*Shanghai*-, *Swatow*-, *Whampoa*-classes).
30 minesweepers (18 Soviet T-43-type).
15 LST, 14 LSM, 15 inf landing ships, some 450 landing craft.
300 coast and river defence vessels (most under 100 tons).

Deployment:
North Sea Fleet: about 300 vessels deployed from the mouth of the Yalu river to south of Lienyunkang; major bases at Tsingtao, Lushun, Luta.
East Sea Fleet: about 450 vessels; deployed from south of Lienyunkang to Tangshan; major bases at Shanghai, Chou Shan, Ta Hsiehtao.
South Sea Fleet: about 300 vessels; deployed from Tangshan to the Vietnamese frontier; major bases at Huangpu, Chanchiang, Yulin.

Naval Air Force: 30,000; about 700 shore-based combat aircraft, organized into 4 bbr and 5 fighter divs, incl about 130 Il-28 torpedo-carrying, Tu-16 med, and Tu-2 lt bbrs and some 500 fighters, incl MiG-17, MiG-19/F-6, and some F-9; a few Be-6 *Madge* MR ac; 50 Mi-4 *Hound* hel and some lt tpt ac. Naval fighters are integrated into the AD system.

Air Force: 400,000, incl strategic forces and 120,000 AD personnel; about 5,000 combat aircraft.
About 80 Tu-16 *Badger* and a few Tu-4 *Bull* med bbrs.
About 300 Il-28 *Beagle* and 100 Tu-2 *Bat* lt bbrs.
About 500 MiG-15 and F-9 *Fantan* FB.
About 4,000 MiG-17/-19, 80 MiG-21, and some F-9 fighters organized into air divs and regts.
About 450 fixed-wing tpt ac, incl some 300 An-2, about 100 Li-2, 50 Il-14 and Il-18, some An-12/-24/-26 and *Trident*. 350 hel, incl Mi-4, Mi-8, and 16 *Super Frelon*. These could be supplemented by about 500 ac from the Civil Aviation Administration, of which about 150 are major tpts.
There is an AD system, capable of providing a limited defence of key urban and industrial areas, military installations, and weapon complexes. Up to 4,000 naval and air force fighters are assigned to this role, also about 100 CSA-1 (SA-2) SAM and more than 10,000 AA guns.

Para-Military Forces: Public security force and a civilian militia with various elements: the Armed Militia, up to 7 million, organized into about 75 divs and an unknown number of regts; the Urban Militia, of several million; the Civilian Production and Construction Corps, about 4 million; and the Ordinary and Basic Militia, 75–100 million, who receive some basic training but are generally unarmed.

GROSS NATIONAL PRODUCT AND DEFENCE EXPENDITURES

Gross National Product

There are no official Chinese figures for GNP or National Income. Western estimates have varied greatly, and it is difficult to choose from a range of figures, variously defined and calculated. The United States Arms Control and Disarmament Agency (ACDA) has estimated GNP for 1975 to be $299 bn, while a recent British estimate for 1976 was $350 bn.

Defence Expenditure

China has not made public any budget figures since 1960, and there is no general agreement on the volume of resources devoted to defence. Such estimates as there are have been speculative. Western estimates place Chinese defence spending at roughly 10 per cent of GNP, or about $35 bn. The National Defence, Scientific, and Technological Commission of China would like to see the defence budget increased, principally for the development and deployment of modern weapons, and there has been much talk of buying technologically advanced weapons in Europe and Japan. This suggests that defence expenditure will be significantly increased, but probably not before the 1980s. Even then, China will wish to build under licence rather than buy outright from others.

OTHER ASIAN COUNTRIES AND AUSTRALASIA

BILATERAL AGREEMENTS

The United States has bilateral defence treaties with Japan, the Republic of China (Taiwan), and the Republic of Korea, and one (being renegotiated) with the Philippines. Under several other arrangements in the region, she provides military aid on either grant or credit basis to Taiwan, Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand, and sells military equipment to many countries, notably Australia, Japan, Korea, and Taiwan. There are military facilities agreements with Australia, Japan, the Republic of Korea, the Philippines, and Taiwan. There are major bases in the Philippines and on Guam. The 1973 Diego Garcia Agreement between the British and American governments provides for the development of the present limited US naval communications facility on Diego Garcia into a US naval support facility.

The Soviet Union has treaties of friendship, co-operation, and mutual assistance with India, Bangladesh, Mongolia, and the Democratic People's Republic of Korea. Military assistance agreements exist with Sri Lanka (Ceylon) and the Socialist Republic of Vietnam. Important Soviet military aid is also given to Afghanistan.

Australia has supplied a small amount of defence equipment to Malaysia and Singapore and is giving defence equipment and assistance to Indonesia, including the provision of training facilities.

Vietnam and Laos signed in July 1977 a series of agreements which contained military provisions and a border pact and may have covered the stationing of Vietnamese troops in Laos.

MULTILATERAL AGREEMENTS

In 1954 the United States, Australia, Britain, France, New Zealand, Pakistan, the Philippines, and Thailand signed the South-East Asia Collective Defence Treaty, which came into force in 1955 and brought the Treaty Organization, SEATO, into being. Pakistan left SEATO in 1973. The SEATO Council decided in 1975 that the Organization should be phased out, and it was formally closed down on 30 June 1977.

Australia, New Zealand, and the United States are members of a tripartite treaty known as ANZUS, which was signed in 1951 and is of indefinite duration. Under this treaty 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.

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 from Singapore, except for a small contribution to the integrated air-defence system, by 31 March 1976. New Zealand troops remained, as did Australian air forces in Malaysia.

AFGHANISTAN

Population: 20,470,000.
Military service: 2 years.
Total armed forces: 110,000.
Estimated GNP 1977: $2.3 bn.
Defence expenditure 1977–78: 2.73 bn afghanis ($60.7 m).
$1 = 45 afghanis (1977).

Army: 100,000.
3 armd divs.
10 inf divs.
3 mountain inf bdes.
1 arty bde, 3 arty regts.
2 cdo regts.
200 T-34, 500 T-54/-55, T-62 med, 40 PT-76 lt tks; BMP MICV; 400 BTR-40/-50/-60/-152 APC; 900 76mm, 100mm, 122mm, and 152mm guns/how; 100 120mm mor; 50 132mm multiple RL; 350 37mm, 85mm, 100mm towed, 20 ZSU-23-4 SP AA guns; *Sagger, Snapper* ATGW; SA-7 SAM.

Reserves: 150,000.

Air Force: 10,000; 144 combat aircraft.
3 lt bbr sqns with 30 Il-28.
6 FGA sqns: 4 with 50 MiG-17, 2 with 24 Su-7BM.
3 interceptor sqns with 40 MiG-21.
2 tpt sqns with 10 An-2, 10 Il-14, 2 Il-18.
3 hel sqns with 18 Mi-4, 13 Mi-8.
Trainers incl 20 MiG-15/-17UTI/-21U, 2 Il-28U.
AA-2 *Atoll* AAM.
1 AD div: 1 SAM bde (3 bns with 48 SA-2), SA-3, 1 AA bde (2 bns with 37mm, 85mm, 100mm guns), 1 radar bde (3 bns).

Reserves: 12,000.

Para-Military Forces: 30,000 Gendarmerie.

AUSTRALIA

Population: 14,200,000.
Military service: voluntary.
Total armed forces: 70,057.
Estimated GNP 1977: $US 92 bn.
Defence expenditure 1977–78: $A 2.43 bn ($US 2.68 bn).
$1 = $A 0.875 (1978), $A 0.908 (1977).

Army: 32,084.
1 inf div HQ and 3 task force HQ.
1 armd regt.
1 recce regt.
1 APC regt.
6 inf bns.
1 Special Air Service regt.
4 arty regts (1 med, 2 fd, 1 lt AA).
1 aviation regt.
3 fd engr, 1 fd survey regt.
2 sigs regts.
87 *Leopard* med tks; 778 M-113 APC; 34 5.5-in guns; 254 105mm how; 72 M-40 106mm RCL; *Redeye* SAM; 17 Pilatus *Porter*, 9 *Nomad* ac; 50 Bell 206B-1 hel; 32 watercraft. (16 *Leopard* med tks, 13 M-113 APC, 20 *Rapier* SAM, 10 *Blindfire* AD radar on order.)

Deployment: Egypt (UNEF/UNTSO): 10.

Reserves: 22,900 (with trg obligations) in combat, support, log, and trg units.

Navy: 16,342 (incl Fleet Air Arm).
6 *Oberon*-class submarines.
1 aircraft carrier (carries 8 A-4, 6 S-2, 10 hel).
3 *Perth*-class ASW destroyers with *Tartar* SAM, *Ikara* ASW msls.
2 modified *Daring*-class destroyers.

6 *River*-class destroyers with *Seacat* SAM/SSM, *Ikara* ASW msls.
1 trg ship.
1 coastal minesweeper, 2 coastal minehunters (modified British *Ton*-class).
12 *Attack*-class patrol boats.
1 oiler, 1 destroyer tender, 6 landing craft.
(3 frigates, 1 amph hy lift ship, 15 patrol craft on order.)

Fleet Air Arm: 22 combat aircraft.
1 FB sqn with 8 A-4G *Skyhawk*.
2 ASW sqns with 3 S-2E, 11 S-2G *Tracker* (5 in reserve).
1 ASW/SAR hel sqn with 7 *Sea King*, 2 *Wessex* 31B.
1 hel sqn with 5 Bell UH-1H, 2 Bell 206B, 4 *Wessex* 31B.
1 trg sqn with 8 MB-326H, 3 TA-4G, 5 A-4G.
2 HS-748 ECM trg ac.

Reserves: 925 (with trg obligations).

Air Force: 21,631; 117 combat aircraft.
2 strike/recce sqns with 22 F-111C.
3 interceptor/FGA sqns with 48 *Mirage* IIIO.
1 recce sqn with 13 *Canberra* B20.
2 MR sqns: 1 with 10 P-3B *Orion;* 1 with 10 P-3C (being delivered).
5 tpt sqns: 2 with 24 C-130A/E; 2 with 22 DHC-4; 1 with 2 BAC-111, 2 HS-748, 3 *Mystère* 20.
Tpt flts with 17 C-47.
1 Forward Air Controller flight with 6 CA-25.
1 OCU with 14 *Mirage* IIIO/D.
1 hel tpt sqn with 6 CH-47 *Chinook* (6 more in reserve).
3 utility hel sqns with 47 UH-1H *Iroquois*.
Trainers incl 80 MB-326, 8 HS-748T2, 37 CT-4 *Airtrainer*.
Sidewinder, R.530 AAM.
(12 C-130H tpts on order.)

Deployment: Malaysia/Singapore: 2 sqns with *Mirage* IIIO.

Reserves: 475 (with trg obligations) in 5 Citizens Air Force sqns.

In addition to three squadrons of Mirage III-O fighters (top), the Royal Australian Air Force has two strike/recce squadrons of US-built F-111Cs. India's air force numbers 661 combat aircraft, some of them locally designed and produced. The Ajeet lightweight fighter (bottom) was developed from the Hawker Siddeley Gnat.

BANGLADESH

Population: 82,450,000.
Military service: voluntary.
Total armed forces: 73,500.
Estimated GDP 1977: $6.9 bn.
Defence expenditure 1977–78: 2.35 bn taka ($151 m).
$1 = 14.78 taka (1978), 15.55 taka (1977).

Army: 65,000.
5 inf div HQ.
11 inf bdes (33 inf bns).
1 tk regt.
7 arty regts.
3 engr bns.
30 T-54 med tks; 30 105mm, 5 25-pdr guns/how; 81mm, 50 120mm mor; 106mm RCL.
(Army and Air Force spares are short; some equipment is unserviceable.)

Navy: 3,500.
2 frigates (ex-British, 1 Type 61, 1 Type 41).
4 patrol craft (2 *Kraljevica*-class).
5 armed river patrol boats.
1 trg ship.

Air Force: 5,000; 9 combat aircraft.
1 FB sqn with 9 MiG-21 MF.
1 tpt sqn with 1 An-24, 2 An-26.
1 hel sqn with 4 *Alouette* III, 2 *Wessex* HC2, 6 Bell 212, 8 Mi-8.
Trainers incl 2 MiG-21U, 6 *Magister*.
AA-2 *Atoll* AAM.

Para-Military Forces: 20,000 Bangladesh Rifles, 36,000 Armed Police Reserve.

BRUNEI

Population: 190,000.
Military service: voluntary.
Total armed forces: 2,750. (All services form part of the Army.)
Estimated GNP 1976: $381.7 m.
Defence expenditure 1978: $B 297.2 m ($US 128.7 m).
$1 US = $B 2.31 (1978), $B 2.62 (1976).

Army: 2,750.
2 inf bns.
1 armd recce sqn.
16 *Scorpion* lt tks; 24 Sankey APC, 16 81mm mor.

Navy:
3 FPBG
3 coastal, 3 river patrol craft } All under 100 tons
2 landing craft

Air Force:
1 HS-748 tpt, 2 *Cherokee* trg ac.
3 Bell 205, 3 Bell 206, 4 Bell 212 hel.

Para-Military Forces: 1,700 Royal Brunei Police.

BURMA

Population: 33,260,000.
Military service: voluntary.
Total armed forces: 169,500.
Estimated GNP 1977: $4.2 bn.
Defence expenditure 1977: 1.09 bn kyat ($164 m).
$1 = 6.64 kyat (1977).

Army: 153,000.
3 inf divs, each with 10 bns.
2 armd bns.
84 indep inf bns (in regional comds).
5 arty bns.
Comet med tks; 40 Humber armd cars; 45 *Ferret* scout cars; 50 25-pdr, 5.5-in guns/how; 120 76mm, 80 105mm how; 120mm mor; 50 6-pdr and 17-pdr ATK guns; 10 40mm, 3.7-in AA guns. (Spares are short for all three services; some equipment is unserviceable.)

Navy: 9,000 (800 marines).
2 frigates (ex-British, 1 *River*-, 1 *Algerine*-class).
4 coastal escorts.
37 gunboats (17 under 100 tons).
35 river patrol craft (under 100 tons).
1 support ship.
9 landing craft (1 utility, 8 med).

Air Force: 7,500; 16 combat aircraft.
2 COIN sqns with 6 AT-33, 10 SF-260M.
Tpts incl 4 C-47, 4 F-27, 7 Pilatus PC-6/-6A, 6 Cessna 180.
Hel incl 10 KB-47G, 2 KV-107/II, 7 HH-43B, 10 *Alouette* III, 14 UH-1.
Trainers incl 10 T-37C (18 PC-7 *Turbo-Trainers* on order).

Para-Military Forces: 38,000 People's Police Force, 35,000 People's Militia.

CHINA: REPUBLIC OF (TAIWAN)

Population: 17,630,000.
Military service: 2 years.
Total armed forces: 474,000.
Estimated GNP 1977: $20.1 bn.
Defence expenditure 1977: $NT 63.47 bn ($US 1.67 bn).
$US 1 = $NT 37.97 (1977).

Army: 330,000.
2 armd divs.
12 hy inf divs.
6 lt inf divs.
2 armd cav regts.
2 AB bdes.
4 special forces gps.
1 SSM bn with *Honest John*.
3 SAM bns: 2 with 80 *Nike Hercules*, 1 with 24 *HAWK*.
150 M-47/-48 med, 625 M-41 lt tks; 300 M-113 APC; 550 105mm, 300 155mm guns/how; 350 75mm M-116 pack, 90 203mm, 10 240mm how; 225 105mm SP how; 81mm mor; *Honest John* SSM; 150 M-18 76mm SP ATK guns; 500 106mm RCL; 300 40mm AA guns (some SP); *Nike Hercules*, 20 *Chaparral* SAM; 80 UH-1H, 2 KH-4, 7 CH-34 hel. (*TOW* ATGW, 24 *Improved HAWK* SAM, 118 UH-1H hel on order.)

Deployment: Quemoy: 60,000; *Matsu:* 20,000.

Reserves: 1,000,000.

Navy: 35,000.
2 submarines (ex-US *Guppy*-II-class).
22 destroyers (ex-US: 8 *Gearing*-class, 2 with *Gabriel* 7 SSM, 3 with *ASROC;* 8 *Sumner*-class, 3 with *Gabriel;* 4 *Fletcher*-class with *Chaparral* SAM).
11 frigates (10 ex-US armed transports).
3 corvettes (ex-US *Auk*-class).
6 MTB (under 100 tons).
14 coastal minesweepers.
51 landing vessels: 2 LSD, 1 comd, 22 LST, 4 LSM, 22 utility.
(2 FPBG with *Otomat* SSM, *Harpoon, Gabriel* SSM on order.)

Reserves: 45,000.

Marines: 39,000.
2 divs.
M-47 med tks; LVT-4 APC; 105mm, 155mm how; 106mm RCL.

Reserves: 35,000.

Air Force: 70,000; 316 combat aircraft.
12 fighter sqns with 90 F-100A/F, 165 F-5A/E.
3 interceptor sqns with 44 F-104G.
1 recce sqn with 8 RF-104G.
1 MR sqn with 9 S-2A *Tracker*.
1 SAR sqn with 8 HU-16A ac.
Tpts incl 25 C-46, 40 C-47, 30 C-119, 10 C-123, 1 Boeing 720B.
160 trainers, incl 55 PL-1B *Chien Shou*, 32 T-33, 30 T-38, F-5B/F, 3 TF-104G, 6 F-104D, F-100F.
Hels incl 95 UH-IH, 7 UH-19, 10 Bell 47G.
Sidewinder AAM, *Bullpup* ASM.
(25 F-5E fighters, 21 F-5F trg ac, *Shafrir* AAM on order.)

Reserves: 90,000.

Para-Military Forces: 100,000 militia.

INDIA

Population: 635,440,000.
Military service: voluntary.
Total armed forces: 1,096,000.
Estimated GNP 1977: $101 bn.
Defence expenditure 1978: 29.45 bn rupees ($3.57 bn).
$1 = 8.25 rupees (1978), 8.83 rupees (1977).

Army: 950,000.
2 armd divs.
17 inf divs (1 more forming).
10 mountain divs.
5 indep armd bdes.
1 indep inf bde.
1 para bde.
14 indep arty bdes, incl about 20 AA arty regts, 4 arty observation sqns, and indep flts.
100 *Centurion* Mk 5/7, 900 T-54/-55, some 700 *Vijayanta* med, 150 PT-76, AMX-13 lt tks; 700 BTR-50/-152, OT-62/-64(2A) APC; about 2,000 75mm, 25-pdr (mostly towed), about 300 100mm, 105mm (incl pack how), and *Abbot* 105mm SP, 550 130mm, 5.5-in, 155mm, 203mm guns/how; 500 120mm, 160mm mor; 106mm RCL; SS-11, *ENTAC* ATGW; 57mm, 100mm ATK guns; ZSU-23-4 SP, 30mm, 40mm AA guns; 40 *Tigercat* SAM; 40 *Krishak*, 20 *Auster* AOP9 lt ac; some *Alouette* III, 38 *Cheetah* hel. (70 T-72 med tks, 75 *Cheetah* hel on order.)

Reserves: 200,000. Territorial Army 40,000.

Navy: 46,000, incl Naval Air Force.
8 submarines (Soviet F-class).
1 aircraft carrier (capacity 25 ac, incl 12 *Sea Hawk*, 4 *Alizé*, 2 *Alouette* III).
1 cruiser.
25 frigates (4 *Leander*-class with 2 *Seacat* SAM, 1 hel; 2 *Whitby*-class with *Styx* SSM, 12 *Petya*-II-class, 5 GP, 2 trg).
3 *Nanuchka*-class corvettes with SSM, SAM.
16 *Osa*-I/-II-class FPBG with *Styx* SSM.
4 large patrol craft.
7 coastal patrol craft (incl 5 *Poluchat*-class).
8 minesweepers (4 inshore).
1 LST, 6 LCT (*Polnocny*-class).
(2 *Kashin*-class destroyers, 2 *Leander*-class frigates, 5 *Nanuchka*-class corvettes, 3 landing craft on order.)

Naval Air Force: 2,000.
1 attack sqn with 25 *Sea Hawk* (12 in carrier).
1 MR sqn with 12 *Alizé* (4 in carrier).
3 MR sqns with 5 *Super Constellation*, 3 II-38, 5 *Defender*, 2 *Devon*.
1 hel sqn with 10 *Alouette* III.
3 ASW sqns with 12 *Sea King*, 8 *Alouette* III hel.
7 HJT-16 *Kiran*, 4 *Vampire* T55, 4 *Sea Hawk* ac, 4 Hughes 300 hel.
(8 *Sea Harrier*, 3 II-38 MR ac, 3 *Sea King* ASW, 5 Ka-25 hel on order.)

Air Force: 100,000; about 661 combat aircraft.
3 lt bbr sqns with 50 *Canberra* B(I)58, B(I)12.
13 FGA sqns: 5 with 100 Su-7B, 4 with 80 HF-24 *Marut* 1A, 4 with 65 *Hunter* F56.
11 interceptor sqns with 200 MiG-21F/PFMA/FL/MF/bis.
8 interceptor sqns with 160 *Gnat* F1.
1 recce sqn with 6 *Canberra* PR57.
10 tpt sqns: 1 with 16 HS-748, 2 with 32 C-119G; 2 with 30 An-12; 1 with 29 DHC-3; 3 with 50 C-47; 1 with 20 DHC-4.
12 hel sqns: 6 with 100 Mi-4; 3 with 35 Mi-8; 3 with 120 *Chetak (Alouette* III); 12 AB-47, 2 S-62.
Comms flts with 1 Tu-124, 6 HS-748, C-47, *Devon*.
OCU with MiG-21U, 5 Su-7U, *Hunter* T66, *Mystère* IVA, *Canberra* T13.
Trainers incl 110 *Kiran*, 70 HT-2, 32 HS-748, C-47, 45 *Iskra*, 15 *Marut* ac, *Alouette* III hel.
AA-2 *Atoll* AAM; AS.30 ASM.
20 SAM sites with 120 SA-2/-3.
(110 MiG-21MF, 100 *Ajeet (Gnat)*, 20 HS-748M, 45 *Marut* Mk 1T, 40 *Iskra* ac, 45 *Chetak* hel on order.)

Para-Military Forces: About 200,000 Border Security Force, 100,000 in other organizations.

INDONESIA

Population: 139,300,000.
Military service: selective.
Total armed forces: 247,000.
Estimated GNP 1977: $43.1 bn.
Defence expenditure 1978–79: 701.8 bn rupiahs ($1.69 bn).
$1 = 415 rupiahs (1977 and 1978).

Army: 180,000. (About one-third of the Army is engaged in civil and administrative duties.)
1 armd cav bde (1 tk bn, support units). (In Strategic Reserve Command.)
14 inf bdes (90 inf, 14 arty, 13 AA, 10 engr bns, 1 in Strategic Reserve Command).
2 AB bdes (6 bns). (In Strategic Reserve Command.)
5 fd arty regts.
4 AA arty regts.
Stuart, 150 AMX-13, 75 PT-76 lt tks; 75 *Saladin* armd, 55 *Ferret* scout cars; AMX-VCI MICV; *Saracen*, 130 BTR-40/-152 APC; 50 76mm, 40 105mm, 122mm guns/how; 200 120mm mor; 106mm RCL; *ENTAC* ATGW; 20mm, 40mm, 200 57mm AA guns; 2 C-47, 2 Aero *Commander* 680, 1 Beech 18, Cessna 185, 18 *Gelatik* ac; 16 Bell-205, 7 *Alouette* III hel. (Some equipment non-operational for lack of spares.)

Deployment: Egypt (UNEF): 1 bn (510).

Navy: 39,000, incl Naval Air and 12,000 Marines. (Some equipment and ships non-operational for lack of spares.)
3 submarines (ex-Soviet W-class).
11 frigates (3 ex-Soviet *Riga*-, 4 ex-US *Jones*-class).
22 large patrol craft (6 ex-Soviet *Kronstadt*-, 2 ex-Australian *Attack*-, 5 ex-Yugoslav *Kraljevica*-class).
9 *Komar*-class FPBG with *Styx* SSM.
5 MTG (Lurssen TNC-45-class).
8 coastal patrol craft (under 100 tons).
5 ex-Soviet T-43 ocean, 2 R-class coastal minesweepers.
3 comd/spt ships.
9 LST, 2 landing craft utility.
1 marine bde.
(2 Type 206 submarines, 3 corvettes, 5 minesweepers, 4 FPBG, 6 patrol boats, *Exocet* SSM on order.)

Naval Air: 1,000.
5 HU-16, 6 C-47, 6 *Nomad* MR ac; 4 Bell 47G, 6 *Alouette* II/III hel. (6 *Nomad* on order.)

Air Force: 28,000; 32 combat aircraft.
(Some aircraft non-operational for lack of spares. In addition to the aircraft shown above, some 22 Tu-16, 10 II-28, 40 MiG-15/-17, 35 MiG-19, 15 MiG-21, 10 II-14, 10 An-12 ac, 20 Mi-4, 9 Mi-6 hel are in store.)
2 FGA sqns with 16 CA-27 *Avon-Sabre*.
1 COIN sqn with 16 OV-10F.
Tpts incl 11 C-130B, 1 C-140 *JetStar*, 12 C-47, 3 *Skyvan*, 8 F-27, 6 CASA C-212, 5 *Nomad*, 12 Cessna 207/401/402, 7 DHC-3, 18 *Gelatik*.
2 hel sqns with 12 UH-34D, 5 Bell 204B, 4 *Alouette* III, 1 S-61A, 46 BO-105, 19 *Puma*, 16 Bell 47.
Trainers incl 4 T-6, 10 T-33, 31 T-34, *Airtourer*.
(12 F-5E, 4 F-5F fighters, 16 CASA C-212, 4 F-27, 6 *Nomad* tpts, 8 *HAWK* trg ac; 6 *Puma* hel on order.)

Para-Military Forces: 12,000 Police Mobile bde; about 100,000 Militia.

JAPAN

Population: 115,120,000.
Military service: voluntary.
Total armed forces: 240,000.

Estimated GNP 1977: $677 bn.
Defence expenditure 1978–79: 1,901 bn yen ($8.57 bn).
$1 = 221.9 yen (1978), 277.6 yen (1977).

Army: 155,000.
1 mech div.
12 inf divs (7–9,000 men each).
1 tk bde.
1 AB bde.
1 composite bde.
1 arty bde.
5 engr bdes.
1 sigs bde.
8 SAM gps (each of 4 btys) with *HAWK*.
1 hel wing and 34 aviation sqns.
690 Type 61 and Type 74 med, 100 M-41 lt tks; 640 Type 60 and Type 73 APC; 900 75mm, 105mm, 155mm, 203mm guns/how; 470 105mm, 155mm SP how; 1,900 81mm and 107mm mor (some SP); 4 Type 75 130mm SP RL; 1,100 57mm, 75mm, 106mm, 106mm SP RCL; Type 30 SSM; Type 64, KAM-9 ATGW; 260 35mm twin, 37mm, 40mm, and 75mm AA guns; *HAWK* SAM; 90 L-19, 20 LM-1/2, 7 LR-1 ac; 50 KV-107, 40 UH-1H, 80 UH-1B, 70 OH-6J, 50 H-13 hel.
(48 Type 74 tks; *Carl Gustav* 84mm RL; *HAWK* SAM; 2 LR-1 ac, 3 KV-107, 13 UH-1H, 10 OH-6D, 1 AH-1S hel on order.)

Reserves: 39,000.

Navy: 41,000 (including Naval Air).
14 submarines.
31 destroyers (2 with 3 hel and *ASROC;* 2 with *Tartar* SAM, *ASROC;* 4 with 2 hel, *ASROC;* 9 with *ASROC;* 12 GP, 2 trg).
15 frigates (11 with *ASROC*, 4 GP).
12 coastal escorts.
5 MTB.
9 coastal patrol craft (under 100 tons).
39 MCM (3 spt ships, 30 coastal, 6 inshore).
6 LST.
(5 destroyers, 1 frigate, 2 submarines, 4 MCM, *Harpoon* SSM on order.)

Naval Air: 12,000.
11 MR sqns with 110 P-2J, P2V-7, S2F-1, 18 PS-1.
7 hel sqns with 7 KV-107, 61 HSS-2.
1 tpt sqn with 4 YS-11M, 1 S2F-C.
5 SAR flts with 3 US-1 ac, 1 S-61A, 8 S-62A hel.
Trainers incl 6 YS-11T, 5 TC-90, 30 B-65; 8 T-34, 30 KM-2 ac; S-61A, 7 Bell 47, 4 OH-6J hel.
(8 P-3C MR, 5 PS-1, 18 KM-2, 2 US-1, 11 P-2J, 1 TC-90 ac, 14 HSS-2, 4 SH-3, 2 S-61A hel on order; 1 P2V-7, 6 S2F-1 in store.)

Reserves: 600.

Air Force: 44,000; 358 combat aircraft.
3 FGA sqns with 87 F-86F, 9 F-1.
10 interceptor sqns: 6 with 150 F-104J, 4 with 98 F-4EJ.
1 recce sqn with 14 RF-4E.
3 tpt sqns with 13 YS-11, 22 C-1A.
1 SAR wing with 20 MU-2 ac, 22 KV-107, 26 S-62 hel.
Trainers incl 57 T-1A/B, 40 T-2A, 18 T-3, 185 T-33, 82 T-34, F-104DJ, 4 C-46, YS-11E, MU-2J.
AAM-1, *Sparrow, Falcon, Sidewinder* AAM.
5 SAM gps with *Nike-J* (6th forming).
A Base Defence Ground Environment with 28 control and warning units.
(23 F-15, 14 TF-15, 50 F-4EJ, 59 F-1, 10 T-2, 14 T-3, 7 C-1, 2 MU-2, 2 MU-2J ac, 3 KV-107 hel on order.)

KAMPUCHEA (CAMBODIA)

Population: 7,300,000.
Total armed forces: 70,000.

Army: The former Khmer Liberation Army, which was organized into some 4 divs and 3 indep regts, appears still to have the same strength it had at the end of hostilities in 1975, and none of the former regime's troops seem to have been incorporated into the structure. Equipment, a mixture of Soviet, Chinese, and American arms, includes AMX-13 lt tks; 10 BTR-152, 200 M-113 APC; 300 105mm, 122mm, 130mm, 20 155mm guns/how; 107mm, 120mm mor; 57mm, 75mm, 82mm, 107mm RCL, 40mm AA guns.

Navy: Some 150 small patrol, river, and 6 landing craft. (Both Navy and Air Force may be part of the Army.)

Air Force: Aircraft are thought to include some 10 AU-24 COIN, 9 C-47 and C-123 tpts, 15 T-41, 20 T-28 trainers, 25 UH-1H hel gunships. However, their condition is not known.

KOREA: DEMOCRATIC PEOPLE'S REPUBLIC (NORTH)

Population: 17,170,000.
Military service: Army, Navy 5 years, Air Force 3–4 years.
Total armed forces: 512,000.
Estimated GNP 1977: $9.8 bn.
Defence expenditure 1977: 2.12 bn won ($1.03 bn). (It is uncertain whether this covers all defence expenditure, and there is no consensus on a suitable exchange rate for the dollar conversion.)
$1 = 2.05 won.

Army: 440,000.
2 tk divs.
3 mot inf divs.
20 inf divs.
4 inf bdes.
3 recce bdes.
8 lt inf bdes.
3 AA arty divs.
5 indep tk regts.
5 AB bns.
3 SSM bns with *FROG*.
20 arty regts.
10 AA arty regts.
350 T-34, 1,600 T-54/-55 and Type 59 med, 100 PT-76, 50 T-62 lt tks; 800 BTR-40/-60/-152, M-1967 APC; 3,000 guns and how up to 152mm; 1,300 RL; 9,000 82mm, 120mm, and 160mm mor; 1,500 82mm RCL; 57mm to 100mm ATK guns; 9 *FROG*-5 SSM; 5,000 AA guns, incl 37mm, 57mm, 85mm, 100mm, ZSU-57-2 SP.

Navy: 27,000.
15 submarines (4 ex-Soviet W-, 11 ex-Chinese R-class).
3 frigates (1 building).
21 large patrol craft (15 ex-Soviet SO-1-class).
10 *Komar*-I-, 8 *Osa*-I-class FPBG with *Styx* SSM.
100 MGB (incl 8 ex-Chinese *Shanghai*- and 8 *Swatow*-class; 28 under 100 tons).
157 MTB (incl 4 ex-Soviet *Shershen*-, 12 P-4-, 60 P-6-class).
90 landing craft.

Air Force: 45,000; 655 combat aircraft.
3 lt bbr sqns with 85 Il-28.
13 FGA sqns with 20 Su-7, 320 MiG-15/-17.
10 interceptor sqns with 120 MiG-21 and 110 MiG-19.
250 tpts, incl 200 An-2, An-24, 10 Il-14/-18, 1 Tu-154.
Hel incl 50 Mi-4, 10 Mi-8.
Trainers incl 50 Yak-18, 60 MiG-15UTI/-21U, Il-28.
AA-2 *Atoll* AAM.
3 SAM bdes with 250 SA-2.

Para-Military Forces: 40,000 security forces and border guards; civilian militia of 1,000,000 to 2,000,000 with small arms, some AA arty.

KOREA: REPUBLIC OF (SOUTH)

Population: 35,940,000.
Military service: Army and Marines 2½ years, Navy and Air Force 3 years.
Total armed forces: 642,000.
Estimated GNP 1977: $31.5 bn.
Defence expenditure 1978: 1.26 bn won ($2.60 bn).
$1 = 484 won.

Army: 560,000.
1 mech div.
19 inf divs.
2 armd bdes.
5 special forces bdes.
2 AD bdes.
7 tk bns.
30 arty bns.
1 SSM bn with *Honest John*.
2 SAM bdes with *Improved HAWK* and *Nike Hercules*.
M-60, 880 M-47/-48 med tks; 500 M-113/-577, 20 Fiat 6614 APC; 2,000 105mm, 155mm, 203mm towed, M-107 175mm and M-110 203mm SP guns/how; 5,300 81mm and 107mm mor; *Honest John* SSM; M-18 76mm SP ATK guns; 57mm, 75mm, 106mm RCL; *TOW, LAW* ATGW; *Vulcan* 20mm, 40mm AA guns; 80 *HAWK*, 45 *Nike Hercules* SAM; 14 O-2A ac; 44 OH-6A, 5 KH-4 hel. (150 Fiat 6614 APC; *TOW* ATGW, 56 OH-6A hel on order.)

Reserves: 1,100,000.

Navy: 32,000.
9 destroyers (4 *Gearing*-, 2 *Sumner*-, 3 *Fletcher*-class).
9 destroyer escorts.
10 coastal escorts.
10 large, 23 coastal patrol craft (31 under 100 tons).
8 FPBG with *Standard* SSM (7 PSMM, 1 *Asheville*-class).
5 FPB.
11 coastal minesweepers.
22 landing ships (8 LST, 11 LSD, 12 LSM, 1 utility).
(120 *Harpoon* SSM on order.)

Reserves: 25,000.

Marines: 20,000; 1 div, 2 bdes with LVTP-7 APC.

Reserves: 60,000.

Air Force: 30,000; 276 combat aircraft.
15 FB sqns: 4 with 37 F-4D/E, 9 with 35 F-5A, 126 F-5E; 2 with 48 F-86F.
1 recce sqn with 10 RF-5A.
1 ASW sqn with 20 S-2F.
1 SAR sqn with 2 UH-19, 5 UH-1D, 6 Bell 212 hel.
Tpts incl 12 C-46, 10 C-54, 10 C-123, 2 HS-748, Aero *Commander*.
Trainers incl 20 T-28D, 30 T-33A, 20 T-41D, 30 F-5B, 3 F-5F.
4 UH-19, 50 Hughes 500MD hel.
Sidewinder, Sparrow AAM.
(18 F-4E, 9 F-5F fighters, 24 OV-10G COIN, 6 C-130H tpts, 6 CH-47C, 50 Hughes 500MD hel, AIM-9L *Super Sidewinder* AAM, *Maverick* ASM on order.)

Reserves: 55,000.

Para-Military Forces: A local defence militia, 1,000,000 Homeland Defence Reserve Force.

LAOS

Population: 3,530,000.
Military service: conscription, term unknown.

Total armed forces: 48,550.
Estimated GNP 1977: $256 m.
Defence expenditure 1977: 8.4 bn kip ($42 m).
$1 = 200 kip (1977).

Army: (Lao People's Liberation Army): 46,000.
(The Royal Lao Army has been disbanded; some men may have been absorbed into the Liberation Army.)
100 inf bns (under Military Regions).
Supporting arms and services.
M-24, PT-76 lt tks; BTR-40, M-113 APC; 75mm, 85mm, 105mm, 155mm how; 81mm, 82mm, 4.2-in mor; 107mm RCL; 37mm AA guns; 4 U-17A lt ac.

Navy: About 550.
20 river patrol craft.
14 landing craft/tpts (all under 100 tons).

Air Force: 2,000; 55 combat aircraft.
(Most aircraft inherited from the Royal Lao Air Force; degree of serviceability unknown.)
1 sqn with 10 MiG-21.
40 T-28A/D COIN ac.
5 AC-47 gunships.
Tpts incl 1 Yak-40, 10 C-47, 10 C-123, 6 An-24, 1 Aero *Commander*, 1 *Beaver*.
6 T-41D trainers.
4 *Alouette* III, 42 UH-34, 6 Mi-8 hel.
AA-2 *Atoll* AAM.

MALAYSIA

Population: 12,995,000.
Military service: voluntary.
Total armed forces: 64,500.
Estimated GNP 1977: $US 12.3 bn.
Defence expenditure 1978: $M 1.65 bn ($US 699 m).
$1 = $M 2.36 (1978), $M 2.49 (1977).

Army: 52,500.
2 div HQ.
9 inf bdes, consisting of:
29 inf bns.
3 recce regts.
3 arty regts.
2 AD btys.
1 special service unit.
5 engr, 4 sigs regts.
Administrative units.
140 Panhard, M-3 armd, 60 *Ferret* scout cars; 200 V-150 *Commando*, M-3 APC; 80 105mm how; 81mm mor; 120mm RCL; 35 40mm AA guns.
(AT-105 APC; 12 105mm how on order.)

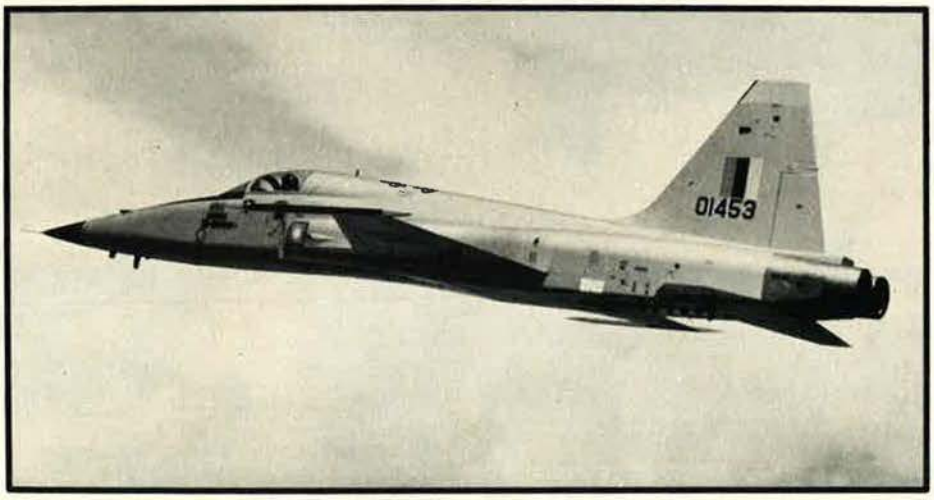
Reserves: About 26,000.

Navy: 6,000.
2 frigates (1 ASW with *Seacat* SAM).
4 FPBG (*Combattante*-II-class with *Exocet* SSM).
4 FPB.
22 large patrol craft.
6 coastal minesweepers (ex-British *Ton*-class).
3 LST.
(4 *Spica*-class FPB, *Exocet* SSM on order.)

Reserves: 1,000.

Air Force: 6,000; 36 combat aircraft.
2 FB sqns with 16 F-5E/B.
2 COIN/trg sqns with 20 CL-41G *Tebuan*.
4 tpt, 1 liaison sqns with 6 C-130H, 3 *Heron*, 2 HS-125, 2 F-28, 16 DHC-4A, 2 *Dove*.
4 hel sqns with 36 S-61A-4, 28 *Alouette* III, 5 Bell 206B, 3 AB-212.
1 trg sqn with 15 *Bulldog* 102, 12 Cessna 402B ac, 6 Bell 47G, 3 *Sioux* hel.
Sidewinder AAM.
(20 *Gazelle* hel, *Super Sidewinder* AAM on order.)

Para-Military Forces: Police Field Force of 13,000: 17 bns, 200 V-150 *Commando* APC, 40 patrol boats. People's Volunteer Corps more than 200,000.



Japan's aircraft industry produces several US designs under license, such as the Kawasaki/Boeing helicopter (top), and also indigenous designs, including a supersonic trainer. Below, a Northrop F-5E of the Royal Malaysian Air Force.

MONGOLIA

Population: 1,580,000.
Military service: 2 years.
Total armed forces: 30,000.
Estimated GNP 1974: $2.8 bn.
Defence expenditure 1978: 405 m tugrik ($120 m).
$1 = 3.36 tugrik (1978), 4.00 tugrik (1974).

Army: 28,000.
2 inf bdes.
1 construction bde.
30 T-34, 100 T-54/-55 med tks; 40 BTR-60, 50 BTR-152 APC; 76mm, 100mm, 130mm, 152mm guns/how; 10 SU-100 SP guns; *Snapper* ATGW; 37mm, 57mm AA guns.

Reserves: 30,000.

Air Force: 2,000 (excluding expatriate personnel); 10 combat aircraft.
1 FGA sqn with 10 MiG-15.
20 An-2, 6 Il-14, 4 An-24 tpts.
10 Mi-1 and Mi-4 hel.
Yak-11/-18 trainers.

Para-Military Forces: about 18,000 frontier guards and security police.

NEPAL

Population: 13,480,000.
Military service: voluntary.
Total armed forces: 20,000.
Estimated GNP 1976: $1.6 bn.
Defence expenditure 1977: 173 m rupees ($13.8 m).
$1 = 12.53 rupees (1977), 12.50 rupees (1976).

Army: 20,000. (There is no Air Force: the 70-man Army Air Flight Department operates the aircraft.)
5 inf bdes (1 Palace Guard).
1 para bn.
1 arty regt.
1 engr regt.
1 sigs regt.
AMX-13 lt tks; 4 3.7-in pack how; 4 4.2-in, 18 120mm mor; 2 40mm AA guns; 3 *Skyvan*, 1 HS-748 tpts; 5 *Alouette* III, 2 *Puma* hel.

Deployment: Lebanon (UNIFIL): 1 bn (642).

Para-Military Forces: 12,000 Police Force.

NEW ZEALAND

Population: 3,200,000.
Military service: voluntary, supplemented Territorial service of 12 weeks for the Army.
Total armed forces: 12,623.
Estimated GNP 1977: $US 13.6 bn.
Defence expenditure 1977–78: $NZ 254 m ($US 242 m).
$1 = $NZ 0.97 (1978), $NZ 1.05 (1977).

Army: 5,730.
2 inf bns.
1 arty bty.
Regular troops also form the nucleus of 2 bde gps and a log gp; these would be completed by mobilization of Territorials.
7 M-41 lt tks; 9 *Ferret* scout cars; 66 M-113 APC; 15 5.5-in guns; 44 105mm how; 24 106mm RCL.

Deployment: Singapore: 1 inf bn with log support.

Reserves: 1,571 Regular, 5,812 Territorial.

Navy: 2,734.
4 frigates with *Seacat* SAM (2 Type 12, 2 *Leander*-class with *Wasp* hel).
4 large patrol craft.
1 survey ship.

Deployment: 1–2 frigates in Pacific area.

Reserves: 2,898 Regular, 304 Territorial.

Air Force: 4,159; 34 combat aircraft.
1 FB sqn with 10 A-4K, 3 TA-4K *Skyhawk.*
1 FB/trg sqn with 16 BAC-167.
1 MR sqn with 5 P-3B *Orion.*
2 med tpt sqns with 5 C-130H, 6 *Andover.*
1 tpt hel sqn with 7 *Sioux,* 3 *Wasp,* 10 UH-1D/H.
1 comms sqn with 4 *Andover,* 2 *Devon.*
Trainers: 8 *Devon,* 13 *Airtrainer,* 4 *Airtourer* ac, 3 *Sioux* hel. (6 *Airtrainer* on order.)

Deployment: Singapore: 1 hel flt (3 UH-1).

Reserves: 713 Regular, 160 Territorial.

PAKISTAN

Population: 76,780,000.
Military service: voluntary.
Total armed forces: 429,000.
Estimated GNP 1977: $17.6 bn.
Defence expenditure 1978–79: 9.15 bn rupees ($938 m).
$1 = 9.75 rupees (1978), 9.89 rupees (1977).

Army: 400,000 (incl 29,000 *Azad Kashmir* troops).
2 armd divs.
16 inf divs.
3 indep armd bdes.
3 indep inf bdes.
6 arty, 2 AD bdes.
5 army aviation sqns.
M-4, 250 M-47/-48, 50 T-54/-55, 700 T-59 med, 15 PT-76, T-60, 50 M-24 lt tks; 550 M-113 APC; about 1,000 75mm pack, 25-pdr, 100mm, 105mm, 130mm, and 155mm guns/how; M-7 105mm SP guns; 270 107mm, 120mm mor; 57mm, M-36 90mm SP ATK guns; 75mm, 106mm RCL; *Cobra* ATGW; ZU-23, 30mm, 37mm, 40mm, 57mm, 90mm, 3.7-in AA guns; 9 *Crotale* SAM; 40 O-1E lt ac; 12 Mi-8, 6 *Puma,* 20 *Alouette* III, 12 UH-1, 15 Bell 47G hel. (*TOW* ATGW, 29 *Puma* hel on order.)

Reserves: 500,000.

Navy: 11,000.
4 submarines (*Daphne*-class).
5 SX-404 midget submarines.
1 lt cruiser (trg ship).
6 destroyers (1 ex-British *Battle*-, 1 CH-, 2 CR-, 2 ex-US *Gearing*-class).
1 frigate (ex-British Type 16).
3 large patrol craft (2 ex-Chinese *Hainan*-class).
12 FPB (ex-Chinese *Shanghai*-class), 4 *Hu Chwan* hydrofoils.
7 coastal minesweepers.
4 *Alouette* III, 6 *Sea King* SAR hel.
(3 *Hainan*-class patrol craft on order.)

Reserves: 5,000.

Air Force: 18,000; 257 combat aircraft.
1 lt bbr sqn with 11 B-57B *(Canberra).*
4 fighter sqns with 21 *Mirage* IIIEP/DP, 28 VPA.
9 FGA sqns; 7 with 135 MiG-19/F-6, 2 with 40 F-86.
1 recce sqn with 13 *Mirage* IIIRP, 4 RT-33A.
1 MR sqn with 3 *Atlantic,* 2 HU-16B.
Tpts incl 12 C-130B/E, 1 L-100, 1 *Falcon* 20, 1 F-27, 1 *Super King Air,* 1 *Bonanza.*
10 HH-43B, 4 *Super Frelon.* 12 *Alouette* III, 1 *Puma,* 12 Bell 47 hel.
Trainers incl MiG-15UTI, 45 Saab *Supporter,* 12 T-33A, 30 T-37, F-86.
Sidewinder, R.530, R.550 *Magic* AAM.

Reserves: 8,000.

Para-Military Forces: 109,100. 22,000 National Guard, 65,000 Frontier Corps, 15,000 Pakistan Rangers, 2,000 Coastguard, 5,100 Frontier Constabulary.

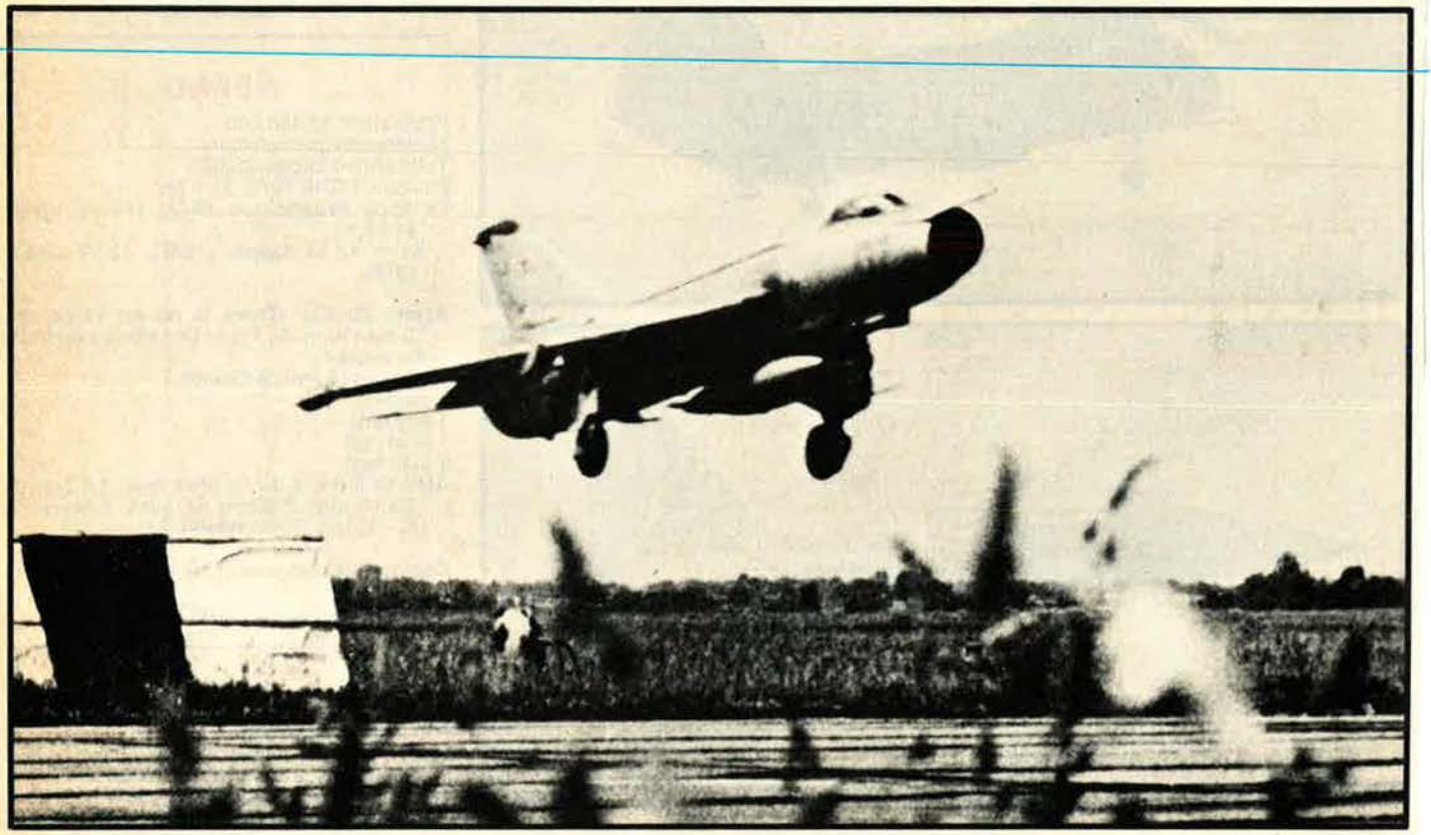
PHILIPPINES

Population: 46,600,000.
Military service: selective.
Total armed forces: 99,000.
Estimated GNP 1977: $20.0 bn.
Defence expenditure 1978–79: 5.85 bn pesos ($793 m).
$1 = 7.37 pesos (1978), 7.35 pesos (1977).

Army: 63,000.
4 lt inf divs.
1 indep inf bde.
21 *Scorpion,* 7 M-41 lt tks; 60 M-113, 20 V-150 *Commando* APC; 120 105mm, 5 155mm how; 81mm, 40 107mm mor; 75mm, 106mm RCL; *HAWK* SAM.

Reserves: 17,000.

Navy: 20,000 (7,000 Marines and naval engrs).
8 frigates.
11 corvettes.
76 patrol craft: 15 large, 61 coastal (under 100 tons).
2 coastal minesweepers.



The USSR has provided Su-7 ground-attack fighters to India, Afghanistan, Vietnam, and North Korea. The North Korean Air Force is probably the sixth largest in the world, with at least 655 combat aircraft. Its army has more than 2,100 tanks.

2 command ships.
39 landing ships (27 LST, 4 med, 8 spt), 71 landing craft.
1 SAR sqn with 10 *Islander.*
3 BO-105 hel.
6 marine bns.

Reserves: 12,000.

Air Force: 16,000; 111 combat aircraft.
2 FB sqns with 20 F-5A/B, 20 F-86.
1 fighter/trg sqn with 17 T-34A.
3 COIN sqns with 18 SF-260WP, 24 T-28.
1 gunship sqn with 12 AC-47.
1 SAR sqn with 8 HU-16 ac, UH-19, 3 SH-34G, 12 UH-1H, H-13, Hughes 300 hel.
1 hel sqn with 18 UH-1H.
6 tpt sqns with 6 C-130H, 3 L-100-20, 1 Boeing 707, 1 BAC-111, 30 C-47, 10 F-27, 4 YS-11, 15 C-123K, 12 *Nomad.*
1 liaison sqn with O-1E, Cessna 180, 6 U-17A/B, Cessna 310K, 21 DHC-2.
3 trg sqns with 10 T/RT-33A, 12 T-41A, 8 F-86F, 32 SF-260MP.
Other hel incl 12 UH-1D, 8 FH-1100, 5 UH-19, 2 H-34, 2 S-62A.
Sidewinder AAM.
(11 F-5E, 25 F-8H fighters; 38 BO-105, 17 UH-1 hel on order.)

Reserves: 16,000.

Para-Military Forces: 65,000: 40,000 Philippine Constabulary, 25,000 Local Self-Defence Force.

SINGAPORE

Population: 2,375,000.
Military service: 24–36 months.
Total armed forces: 36,000.
Estimated GNP 1977: $US 6.5 bn.
Defence expenditure 1977–78: $S 1.01 bn ($US 410 m).
$US 1 = $2.46 (1977).

Army: 30,000.
1 armd bde (1 tk, 2 APC bns).
4 inf bdes (9 inf, 5 arty, 3 engr, 3 sigs bns).
75 AMX-13 tks; 250 M-113, 30 V-100, 250 V-200 *Commando* APC; 60 155mm how; 50 120mm mor; 90 106mm RCL. (294 M-113 APC on order.)

Reserves: 45,000, 18 reserve battalions.

Navy: 3,000.
6 FPBG (*Jaguar*-class with *Gabriel* SSM).
6 FPB (Vosper).
2 large patrol craft.
2 coastal minesweepers.
6 ex-US LST and 6 landing craft.

Air Force: 3,000; 103 combat aircraft.
2 FGA/recce sqns with 31 *Hunter* FGA74, 4 FR74, 7 T75.
2 FGA sqns with 40 A-4S, 6 TA-4S.
1 COIN/trg sqn with 15 BAC-167.
1 tpt sqn with 2 C-130B, 6 *Skyvan.*
1 SAR hel sqn with 7 *Alouette* III, 3 AB-212.
Hel incl 15 UH-1H.
Trainers incl 14 SF-260MS.
2 SAM sqns: 1 with 28 *Bloodhound,* 1 with 10 *Rapier.*
(21 F-5E/F FGA, AIM-9L *Super Sidewinder* AAM on order.)

Para-Military Forces: 7,500 police/marine police; Gurkha guard units; 30,000 Home Guard.

SRI LANKA (CEYLON)

Population: 14,900,000.
Military service: voluntary.
Total armed forces: 13,300.
Estimated GNP 1977: $4.0 bn.
Defence expenditure 1978: 211 m rupees ($14.3 m).
$1 = 14.7 rupees (1978), 7.27 rupees (1977).

Army: 8,900.
1 bde of 3 bns.
1 recce regt.
1 arty regt.
1 engr regt.
1 sigs regt.
6 *Saladin* armd cars, 30 *Ferret* scout cars; 10 BTR-152 APC; 76mm, 85mm guns.

Reserves: 12,000; 7 bns, supporting services, and a Pioneer Corps.

Navy: 2,400.
6 fast gunboats (5 *Shanghai-,* 1 ex-Soviet *Mol*-class).
5 FPB.
20 coastal patrol craft (under 100 tons).

Air Force: 2,000; 8 combat aircraft.
1 FGA sqn with 4 MiG-17F, 1 MiG-15UTI, 3 *Jet Provost* Mk 51.
1 tpt sqn with 1 CV-440, 2 DC-3, 2 Riley *Heron,* 1 HS *Heron.*
1 comms sqn with 3 Cessna 337.
1 hel sqn with 7 AB-206, 6 Bell 47G, 2 SA-365 *Dauphin* 2.
4 Cessna 150, 7 *Chipmunk,* 5 *Dove* trainers.

Reserves: 1,000; 4 sqns Air Force Regt, 1 sqn Airfield Construction Regt.

Para-Military Forces: 14,500 Police Force, 4,500 Volunteer Force.

THAILAND

Population: 46,390,000.
Military service: 2 years.
Total armed forces: 212,000.
Estimated GNP 1977: $18.1 bn.
Defence expenditure 1977–78: 15.21 bn baht ($746 m).
$1 = 20.40 baht (1977).

Army: 141,000.
1 cav div.
6 inf divs (incl 4 tk bns).
3 indep regimental combat teams.
4 AB and special forces bns.
1 SAM bn with 40 *HAWK.*
5 aviation coys and some flts.
150 M-41 lt tks; 20 *Saracen* armd cars; 32 *Shorland* Mk 3 recce; 250 M-113, LVTP-7 APC; 300 105mm, 50 155mm how; 81mm mor; 57mm RCL; 40mm AA guns; 90 O-1 lt ac; 90 UH-1B/D, 4 CH-47, 24 OH-13, 16 FH-1100, 3 Bell 206, 2 Bell 212, 6 OH-23F, 28 KH-4 hel. (*Scorpion* lt tks, 80 APC and armd cars, 24 how, 3 *Merlin* IVA tpt ac, 2 Bell 214B hel on order.)

Reserves: 500,000.

Navy: 28,000 (8,000 Marines).
3 frigates (1 with *Seacat* SAM).
26 large patrol craft.
3 FPBG with *Gabriel* SSM.
20 coastal patrol craft (under 100 tons).
2 coastal minelayers.
4 coastal minesweepers.
1 MCM spt ship.
30 coastal gunboats (29 under 100 tons).
9 landing ships (5 LST, 3 LSM, 1 inf), 32 landing craft (26 med, 6 utility).
3 trg ships.
1 MR sqn with 10 S-2F *Tracker,* 2 HU-16B *Albatross.*
1 Marine bde (3 inf, 1 arty bns).
(3 FPBG, *Exocet* SSM, 2 CL-215 tpt ac on order.)

Air Force: 43,000; 149 combat aircraft.
1 FGA/recce sqn with 12 F-5A, 2 F-5B, 4 RF-5A.
7 COIN sqns with 45 T-28D, 32 OV-10C, 16 A-37B, 31 AU-23A *Peacemaker.*
1 recce sqn with 4 T-33, 3 RT-33A.
1 utility sqn with 35 O-1 lt ac.
3 tpt sqns with 15 C-47, 30 C-123B, 2 HS-748, 1 *Islander,* 3 *Skyvan,* 15 AC-47, 2 *Merlin* IVA, 10 *Turbo-Porter.*
2 hel sqns with 18 S-58T, 30 UH-1H, 40 CH-34C, 13 UH-19, 3 HH-43B.
Trainers incl 10 *Chipmunk,* 14 T-37B, 15 T-41D, 12 SF-260, 15 CT-4.
Sidewinder AAM.
4 bns of airfield defence troops.
(20 F-5E/F FGA, 6 OV-10C COIN, 4 CASA C-212 tpts, 18 S-58T, 13 UH-1H hel on order.)

Para-Military Forces: 52,000 Volunteer Defence Corps, 14,000 Border Police, 20 V-150 *Commando* APC, 16 lt ac, 27 hel.

VIETNAM: SOCIALIST REPUBLIC OF

Population: 48,090,000.
Military service: 2 years minimum.
Total armed forces: 615,000.
Estimated GNP 1977: $7.1 bn. (Equipment of the former forces of South Vietnam are not included here. It is estimated to have included up to 550 M-48 med and M-41 lt tks; 1,200 M-113 APC; 1,330 105mm and 155mm guns/how (some SP); 2 frigates; 2 patrol vessels; 42 patrol gunboats; 13 landing ships; 17 landing craft; 800 riverine craft; 11 support vessels; 1,000 ac of all types, incl 75 F-5A, 113 A-37B, 10 C-130, 25 A-1H/J, 37 AC-119C/K, 10 AC-47, 114 O-1, 33 DHC-2, 13 C-47; 36 CH-47, 430 UH-1 hel. Inf divs, normally totalling 8–10,000 men, include 1 tk bn, 3 inf, 1 arty regts, and support elements.)

Army: 600,000.
25 inf divs, 2 trg divs.
1 arty comd (of 10 regts).
1 engr comd.
About 15 indep inf regts.
35 arty regts.
40 AA arty regts.
20 SAM regts (each with 18 SA-2 launchers).
15 indep engr regts.
900 T-34, T-54, and T-59 med, PT-76, Type 60 lt tks; BTR-40/-50/-60 APC; 75mm, 76mm, 85mm, 100mm, 105mm, 122mm, 130mm, 152mm, 155mm guns/how; SU-76, ISU-122 SP guns; 82mm, 100mm, 107mm, 120mm, 160mm mor; 107mm, 122mm, 140mm RL; *Sagger* ATGW; 23mm, 37mm, 57mm, 85mm, 100mm, 130mm towed, ZSU-57-2 SP AA guns; SA-2/-3/-6/-7 SAM.

Deployment: 40,000 in Laos (numbers fluctuate).

Navy: 3,000.
3 coastal escorts (ex-Soviet SO-1-class).
2 *Komar*-class FPBG with *Styx* SSM.
22 MGB (8 *Shanghai-,* 14 *Swatow*-class).
4 MTB (ex-Soviet P-4-, P-6-class).
About 30 small patrol boats (under 100 tons).
Some 20 landing craft.
10 Mi-4 SAR hel.

Air Force: 12,000; 300 combat aircraft.
1 lt bbr sqn with 10 Il-28.
8 FGA sqns with 120 MiG-17, 30 Su-7.
6 interceptor sqns with 70 MiG-19/F-6, 70 MiG-21F/PF.
Tpts incl 20 An-2, 4 An-24, 12 Il-14, 4 Il-18, 23 Li-2.
Hels incl 20 Mi-4, 10 Mi-6, 9 Mi-8.
AA-2 *Atoll* AAM.
About 30 trainers incl Yak-11/-18, MiG-15UTI/-21U.

Para-Military Forces: 70,000 Frontier, Coast Security, and People's Armed Security Forces; Armed Militia of about 1,500,000.

LATIN AMERICA

CONTINENTAL TREATIES AND AGREEMENTS

In March and April 1945 the Act of Chapultepec was signed by Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, Uruguay, and Venezuela. This Act declared that any attack upon a member party would be considered an attack upon all and provided for the collective use of armed force to prevent or repel such aggression.

In September 1947 all the parties to the Chapultepec Act—except Ecuador and Nicaragua—signed the Inter-American Treaty of Reciprocal Assistance, otherwise known as the Rio Defence Treaty (Cuba withdrew from the Treaty in March 1960). This Treaty constrained signatories to the peaceful settlement of disputes among themselves and provided for collective self-defence should any member party be subject to external attack.

The Charter of the Organization of American States (OAS), drawn up in 1948, embraced declarations based upon the Rio Defence Treaty. The member parties—the signatories to the Act of Chapultepec plus Barbados, El Salvador, Jamaica, 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. Legally, Cuba is a member of the OAS but has been excluded—by a decision of OAS Foreign Ministers—since January 1962. Barbados and Trinidad and Tobago signed the Charter in 1967.

The Act of Havana (1940), signed by representatives of all the then 21 American Republics, provides for the collective trusteeship by American nations of European colonies and possessions in the Americas, should any attempt be made to transfer the sovereignty of these colonies from one non-American power to another. The Havana Convention (1940), which makes the Act of Havana legally binding, was signed by the same states, although not ratified by Bolivia, Chile, Cuba, and Paraguay.

A Treaty for the Prohibition of Nuclear Weapons in Latin America (The Tlatelolco Treaty) was signed in February 1967 by 22 Latin American countries; 20 countries have now ratified it (Argentina has signed but not ratified, and Brazil has ratified but reserved her position on peaceful nuclear explosions). Britain and the Netherlands have ratified it for the territories within the Treaty area for which they are internationally responsible. Britain and the Netherlands 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); France has not; the United States has announced her intention of doing so. The United States, Britain, France, and China have signed Protocol II to the Treaty (an undertaking not to use or threaten to use nuclear weapons against the parties to the Treaty); the Soviet Union has not. An Agency has been set up by the contracting parties to ensure compliance with the Treaty.

OTHER AGREEMENTS

In July 1965, El Salvador, Guatemala, Honduras, and Nicaragua agreed to form a military bloc for the co-ordination of all resistance against possible Communist aggression.

The United States has bilateral military assistance agreements or representation with Argentina, Bolivia, Brazil, Chile, Colombia, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. She has a bilateral agreement with Cuba for jurisdiction and control over Guantanamo Bay. This agreement was confirmed in 1934. In 1960 the United States stated that it could be modified or abrogated only by agreement between the parties, and that she had no intention of agreeing to modification or abrogation. She also had a treaty with the Republic of Panama granting the United States, in perpetuity, virtual sovereign rights over the Canal Zone. This has been superseded by two new treaties: the first, the so-called 'Neutrality Treaty'(ensuring the perpetual neutrality of the zone), was ratified by the Senate on 16 March 1978; the second, the 'Basic Treaty' (covering arrangements for the canal's transfer to Panama by the year 2000), on 18 April 1978.

The Soviet Union has no defence agreements with any of the states in this area, although she has supplied military equipment to Cuba and Peru.

ARGENTINA

Population: 26,390,000.
Military service: Army and Air Force 1 year, Navy 14 months.
Total armed forces: 132,900.
Estimated GNP 1977: $76.4 bn. (Rapid inflation makes defence expenditure and GNP figures in local currency and dollar terms unreliable.)
Defence expenditure 1978: 1,186 bn pesos ($1.66 bn).
$1 = 715 pesos (1978), 329 pesos (1977).

Army: 80,000.
2 armd bdes.
4 inf bdes.
2 mountain bdes.
1 airmobile bde.
5 AD bns.
1 aviation bn.
100 M-4 *Sherman* med, 80 AMX-13 lt tks; *Shorland* armd cars; 140 M-113, 60 Mowag, AMX-VCI, M-3 APC; 155mm towed, M-7 155mm SP guns; 105mm (incl pack), 155mm towed, 24 Mk F3 155mm SP how; 81mm, 120 mm mor; 75mm, 90mm, 105mm RCL; SS-11/-12, *Bantam, Cobra* ATGW; 30mm, 35mm, 40mm, 90mm AA guns; *Tigercat* SAM; 5 *Turbo Commander* 690A, 2 DHC-6, 3 G-222, 4 Swearingen *Metro* IIIA, 4 *Queen Air*, 1 *Sabreliner*, 5 Cessna 207, 15 Cessna 182, 20 U-17 A/B, 5 T-41 ac; 7 Bell 206, 4 FH-1100, 20 UH-IH, 4 Bell 47G, 2 Bell 212 hel. (5 *Turbo Commander* ac; 3 CH-47C hel on order.)
Reserves: 250,000: 200,000 National Guard, 50,000 Territorial Guard.

Navy: 32,900 (12,000 conscripts), incl Naval Air Force and Marines.
4 submarines (2 Type 209, 2 ex-US *Guppy-*

class).
1 aircraft carrier (15 A-4Q, 6 S-2A/E, 4 S-61D).
2 cruisers (ex-US *Brooklyn*-class) with *Seacat* SAM, 2 hel.
9 destroyers (1 Type 42 with *Sea Dart* SAM, 5 *Fletcher*-, 2 *Sumner*-, 1 *Gearing*-class).
12 patrol vessels (2 trg, 1 coastguard).
5 large patrol craft (3 in coastguard).
6 coastal minesweepers/minehunters.
2 *Combattante* II-class FPB.
1 LSD, 5 LST, 28 landing craft (1 LCT).
(2 Type 209 subs, 1 Type 42 destroyer, 2 Type 148 FPBG on order.)

Naval Air Force: 4,000; 34 combat aircraft.
1 FB sqn with 15 A-4Q.
1 MR sqn with 6 S-2A/E, 10 SP-2H, 3 HU-16B, PBY-5A.
Tpts incl 3 *Electra*, 2 C-54, 2 DC-4, 8 C-47, 1 HS-125, 1 *Guarani* II, 1 *Sabreliner*.
Other ac incl 2 DHC-2, 1 DHC-6, 2 *Super King Air*, 4 *Queen Air*, 4 Piper *Navajo*, 4 *Turbo-Porter*.
Hel incl 4 S-61D, 6 *Alouette* III, 3 UH-19, 5 S-55, 3 Bell 47G.
Trainers incl 12 MB-326GB, 12 T-6/-28, 2 AT-11, 3 T-34C.
(12 T-34C trg ac, 3 *Lynx* hel on order.)

Marines: 7,000.
5 bns.
1 cdo bn.
1 fd arty bn.
1 AD regt.
1 engr bn, 1 sigs bn.
7 indep inf coys.
20 LVTP-7, 15 LARC-5 APC; 105mm how; 106mm, 120mm mor; 75mm, 105mm RCL; *Bantam* ATGW; 88mm AA guns; 10 *Tigercat* SAM.

Air Force: 20,000; 184 combat aircraft.
1 bbr sqn with 9 *Canberra* B62, 2 T64.
4 FB sqns with 70 A-4P *Skyhawk*.
1 FB sqn with 20 F-86F.
3 FGA sqns with 48 MS-760A *Paris* I.
1 interceptor sqn with 16 *Mirage* IIIEA, 2 IIIDA.
1 COIN sqn with 17 IA-58 *Pucará*.
1 assault hel sqn with 14 Hughes 500M, 6 UH-1H.
1 SAR sqn with 3 HU-16B ac, 12 *Lama*, 2 S-58T, 2 S-61N/R hel.
5 tpt sqns with 1 Boeing 707-320B, 7 C-130E/H, 1 *Sabreliner*, 2 *Learjet* 35A, 3 G-222, 13 C-47, 10 F-27, 6 F-28, 6 DHC-6, 22 IA-50 *Guarani* II, 2 *Merlin* IVA.
1 Antarctic sqn with 2 DHC-2, 3 DHC-3, 1 LC-47 ac, 1 S-61R hel.
1 comms sqn with 4 *Commander*, 14 *Shrike Commander*, *Paris*, T-34, IA-35 *Huanquero*.
Hel incl 4 UH-1D, 3 UH-19, 3 Bell 47G.
Trainers incl 35 T-34, 12 *Paris*, 37 Cessna 182.
R.530 AAM, AS.11/12 ASM.
(7 *Mirage* IIIEA, 33 IA-58 *Pucará*, 16 *Turbo Commander* ac; 3 CH-47, 8 Bell 212 hel on order.)

Para-Military Forces: 42,000. Gendarmerie: 11,000; M-113 APC, 20 lt ac, 10 hel under Army command, mainly for frontier duties. National Maritime Prefecture: 9,000. *Policia Federal:* 22,000; APC, 4 BO-105 hel.

BOLIVIA

Population: 6,100,000.
Military service: 12 months selective.
Total armed forces: 22,500.
Estimated GNP 1977: $2.5 bn.
Defence expenditure 1978: 1.82 bn pesos ($90 m).
$1 = 20.2 pesos (1978), 20.2 pesos (1977).

Army: 17,000.
4 cav regts.
1 mech regt.
1 mot regt.
13 inf regts (1 Palace Guard).
2 ranger regts.
1 para bn.
3 arty regts.
6 engr bns.
18 M-113, 10 V-200 *Commando*, 20 Mowag APC; 6 75mm guns; 25 75mm pack, 20 FH-18, 25 M-101 105mm how.

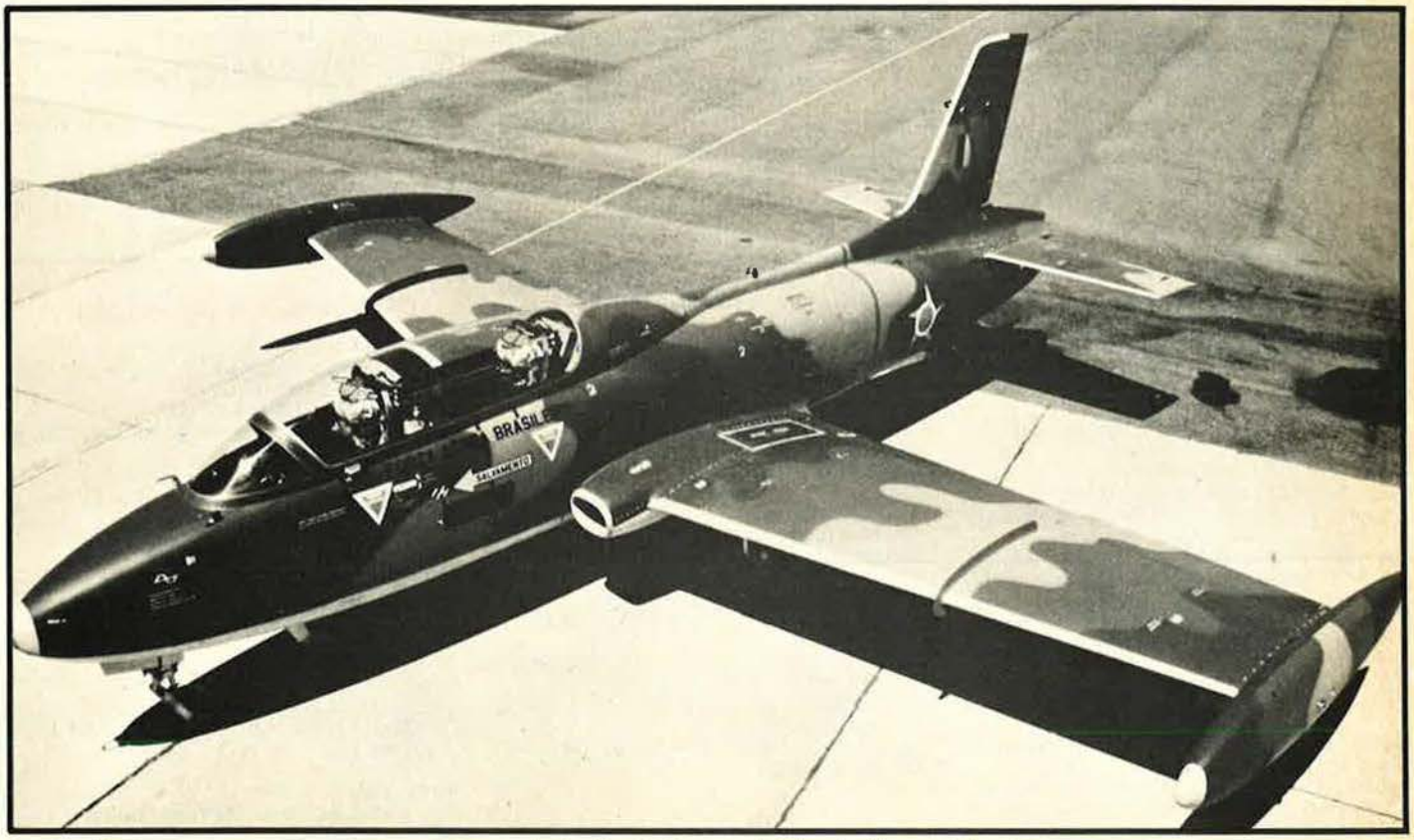
Navy: 1,500.
16 small patrol craft.
1 river transport.

Air Force: 4,000; 42 combat aircraft.
1 fighter/trg sqn with 10 T-33A/N.
2 COIN sqns with 18 EMB-326GB, 10 T-6D, 4 T-28A/D.
Tpts incl 3 C-130H, 1 *Electra*, 2 C-54, 1 *Sabreliner*, 1 *Learjet*, 5 *Arava*, 4 CV-440, 10 C-47, 1 C-46, 2 Cessna 402, 1 *Turbo-Porter*, 2 *Turbo Centurion*, 11 Cessna 185, 1 *Super King Air*, 1 Cessna 421.
1 hel sqn with 9 Hughes 500M, 3 Hiller OH-23C/D.
Trainers incl Cessna 310, 6 T-41D, 12 T-23 *Uirapuru*, 5 Fokker S-11, 6 SF-260M.
(1 *Arava*, 16 PC-7 *Turbo-Trainer* on order.)

BRAZIL

Population: 115,850,000.
Military service: 1 year.
Total armed forces: 273,800 (113,000 conscripts).
Estimated GNP 1977: $177 bn.
Defence expenditure 1978: 34.4 bn cruzeiros ($2.04 bn).
$1 = 16.90 cruzeiros (1978), 13.0 cruzeiros (1977).

Army: 182,000 (110,000 conscripts).
8 divs: each up to 4 armd, mech, or mot inf bdes.
2 indep inf bdes.
1 indep para bde.
5 lt 'jungle' inf bns.
60 M-4 med, 220 M-3A1, 250 M-41, 25 X-1 lt tks; 120 *Cascavel*, M-8 armd cars; *Urutu*, M-59, 600 M-113 APC; 500 75mm pack, 450 105mm (some M-7, M-108 SP), 90 155mm how; 81mm



Brazil's AT-26 ground attack aircraft is essentially the Italian M. B. 326, assembled under license in Brazil.

mor; 108-R, 114mm RL; 106mm RCL; *Cobra* ATGW; 40mm, 90mm AA guns; 20 *Roland* SAM; 40 L-42 *Regente*, O-1E lt ac; 10 AB-206A hel.

Navy: 49,000 (3,000 conscripts, 13,500 Naval Air Force, Marines, and Auxiliary Corps).
10 submarines (3 *Oberon*-, 7 ex-US *Guppy* II/III-class).
1 aircraft carrier (20 ac, incl 7 S-2A, 4 *Sea King* hel).
15 destroyers (1 with *Exocet* SSM, *Seacat* SAM, 1 hel; 2 with *Ikara* ASW, *Seacat* SAM, 1 hel; 2 with *Seacat* SAM).
10 corvettes (fleet tugs).
5 river patrol ships.
1 river monitor.
6 large, 10 river patrol craft.
6 coastal minesweepers.
4 coastal auxiliaries, 2 LST, 25 small landing craft.
(3 destroyers on order.)

Naval Air Force:
1 ASW sqn with 5 SH-3D *Sea King* hel.
1 utility sqn with 5 *Whirlwind*, 6 *Wasp*, 1 FH-1100, 2 Bell 47G, 18 AB-206B, 2 *Lynx* hel.
1 trg sqn with 10 Hughes 269/300 hel.
(7 *Lynx* hel on order.)

Air Force: 42,800; 135 combat aircraft.
1 interceptor sqn with 11 *Mirage* IIIEBR, 4 DBR.
2 FGA sqns with 34 F-5E, 5 F-5B.
8 COIN/recce sqns with 39 AT-26 *Xavante*, 20 T-25 *Universal* ac, 6 UH-1D, 4 Bell 206, 4 OH-6A hel.
1 ASW sqn with 8 S-2E, 8 S-2A (7 in carrier).
1 MR sqn with 6 EMB-111M.
4 SAR sqns with 11 SA-16 *Albatross*, 3 RC-130E, 6 PBY-5A ac, 5 SH-1D, UH-1H, Bell 47G hel.
12 tpt sqns with 2 Boeing 737, 10 C-130E/H, 2 KC-130H, 9 HS-125, 1 *Viscount*, 12 HS-748, 21 DHC-5, 74 EMB-110 *Bandeirante* (56 C-95, 6 R-95, 4 EC-95, 8 C-95A), 5 EMB-121 *Xingu* ac, 6 AB-206 hel.
3 liaison sqns with L-42, T-25, O-1E, 10 EMB-810C (*Seneca* II) ac, UH-1H hel.
Trainers incl 100 T-23 *Uirapuru*, 130 T-25, 10 T-33, 50 AT-26
R.530 AAM.
(4 *Mirage* IIIEBR interceptors, 50 AT-26 trg, 12 EMB-110 (C-95A) tpts, 6 EMB-111M MR ac on order.)

Para-Military Forces: Public security forces about 200,000; state militias in addition.

CHILE

Population: 11,100,000.
Military service: 1 year.
Total armed forces: 85,000 (21,600 conscripts).
Estimated GNP 1977: $9.8 bn. (Rapid inflation makes defence expenditure and GNP figures in local currency and dollar terms unreliable.)
Defence expenditure 1978: 22.6 bn pesos ($750 m).
$1 = 30.14 pesos (1978), 17.8 pesos (1977).

Army: 50,000 (20,000 conscripts).
6 divs, incl 7 cav regts (3 armd, 3 horsed, 1 heliborne), 20 inf regts (incl 9 mot, 3 mountain), 6 arty groups, some AA arty spt dets.
M-4 med, 10 M-3, 60 M-41, 47 AMX-13 lt tks; M-113, Mowag MR-8 APC; 105mm, M-56 105mm pack how; Mk F3 155mm SP how; 81mm, 120mm mor; 106mm RCL; 20mm, 40mm AA guns; 4 O-1, 5 T-25 trg ac, 9 *Puma*, 3 UH-1H, 2 AB-206 hel.

Reserves: 160,000.

Navy: 24,000 (1,600 conscripts), incl Naval Air and Marines.
3 submarines (2 *Oberon*-, 1 ex-US *Balao*-class).
3 cruisers (2 ex-US *Brooklyn*-, 1 ex-Swedish *Tre Kroner*-class).
6 destroyers (2 *Almirante*-class with *Exocet* SSM and *Seacat* SAM, 2 ex-US *Sumner*-, 2 *Fletcher*-class).
2 frigates (*Leander*-class with *Exocet* SSM, *Seacat* SAM, 1 hel).
3 destroyer escorts (ex-US fast transports).
4 corvettes.
2 large patrol craft (under 100 tons).
4 MTB.
7 landing ships/craft (4 ex-US LST, 3 medium).

Naval Air Force: 500.
1 ASW/SAR sqn with 6 EMB-111, 2 PBY-5A, 3 PBY-6A, 4 SP-2E, 5 Beech D18S, 1 Piper *Navajo*, 1 F-27 ac, 4 UH-19, 2 UH-1D hel.
Tpts incl 4 C-47, 6 EMB-110C *Bandeirante*.
Hel incl 4 AB-206, 3 UH-19, 2 UH-1D, 12 Bell 47G, 6 *Alouette* III.
5 T-34 trainers.
(5 EMB-111N on order.)

Marines: 3,800.
1 bde; coast-defence units.

Air Force: 11,000; 97 combat aircraft.
3 FB sqns with 20 *Hunter* F71, 18 F-5E/F.
1 fighter/trg sqn with 9 F-80C, 8 T-33A.
2 COIN sqns with 34 A-37B.
1 SAR/ASW sqn with 8 HU-16B *Albatross*.
Tpts incl 2 C-130H, 5 C-118, 6 DC-6B, 12 C-47.
2 utility sqns with 11 DHC-6, 10 C-45, 1 *King Air*, 5 *Twin Bonanza*, 10 Cessna 180.
Hel incl 6 S-55T, 6 SL-4, 2 UH-1H, 6 UH-12E, 6 *Lama*.
Trainers incl 30 T-34, 30 T-37B, 8 T-41, 11 *Vampire* T22/55, 4 *Hunter* T77, 5 T-6, 9 Beech 99, 5 T-25, 1 F-27.
Sidewinder AAM.
1 AA arty regt.
(*Shafrir* AAM on order.)

Para-Military Forces: 30,000 *Carabineros*, with 15 Mowag MR-8 APC, 25 lt ac.

COLOMBIA

Population: 27,000,000.
Military service: 2 years.
Total armed forces: 75,500.
Estimated GNP 1977: $12.9 bn.
Defence expenditure 1978: 6.58 bn pesos ($173 m).
$1 = 38.1 pesos (1978), 36.5 pesos (1977).

Army: 60,000.
11 inf bdes ('Regional Bdes').
1 Presidential Guard.
1 ranger bn.
4 AB bns.
1 AA arty bn.
7 mech cav, 25 inf, 7 arty, 7 engr units.
M-4A3 med, M-3A1 lt tks; M-8, M-20 armd cars; M-101 105mm how; mor; 40mm AA guns.

Reserves: 425,000.

Navy: 9,000 (2,800 Marines).
4 submarines (2 midget, 2 Type 209).
3 destroyers (2 Swedish *Halland*-class, 1 ex-US *Sumner*-class).
9 frigates (1 ex-US *Courtney*-class, 1 former fast transport, 3 *Cherokee*-, 4 ex-Port *J. Coutinho*-class).
21 coastal patrol craft (13 under 100 tons).
2 marine bns.

Air Force: 6,500; 18 combat aircraft.
1 fighter/recce sqn with 14 *Mirage* VCOA, 4 VCOR/D.
Tpts incl 2 C-130B, 8 C-54, C-45, 29 C-47, 3 HS-748, 1 F-28, 9 DHC-2, 4 DHC-3.
Hel incl 13 AH-1H, 3 UH-1B, 6 UH-1H, 1 UH-1N, 20 OH-6A, 8 OH-13.
Trainers incl 10 T-37, 6 T-38, 30 T-41D, 31 AT-33, 30 T-34.
R.530 ASM.

Para-Military Forces: 50,000 National Police Force.

CUBA

Population: 9,750,000.
Military service: 3 years.
Total armed forces: 159,000.
Estimated GNP 1970: $4.5 bn.
Estimated defence expenditure 1977: 784 m pesos ($784 m).
$1 = 1 peso.

Army: 130,000.
15 inf 'divs' (bdes).
3 armd regts.
Some indep 'regts' (bn gps).
Over 600 tks, incl 60 IS-2 hy, T-34/-54/-55, 50 T-62 med, PT-76 lt; BRDM-1 armd cars; 400 BTR-40/-60/-152 APC; 75mm pack, 122mm, 130mm, 152mm guns/how; 100 SU-100 SP guns; 45 *FROG*-4 SSM; 57mm, 76mm, 85mm ATK guns; 57mm RCL; *Snapper* ATGW; ZU-23, 37mm, 57mm, 85mm, 100mm, ZSU-23-4 SP AA guns; SA-7 SAM.

Deployment: Angola: 23–25,000; *Ethiopia:* 16–17,000. (Cuban advisers and technicians are also reported in Algeria, Benin, Congo, Guinea, Libya, Mozambique, Sierra Leone, Tanzania, Uganda, South Yemen, Zambia.)

Reserves: 90,000.

Navy: 9,000.
18 submarines chasers (12 ex-Soviet SO-1, 6 *Kronstadt*).
5 *Osa*-I-, 3 *Osa*-II-, 18 *Komar*-class FPBG with *Styx* SSM.
24 MTB (ex-Soviet P-4 and P-6).
30 armed patrol boats (under 100 tons).
7 med landing craft.
Some 50 *Samlet* coast-defence SSM.

Air Force: 20,000, incl Air Defence Forces; 163 combat aircraft.
2 FB sqns with 30 MiG-17.
7 interceptor sqns: 3 with 48 MiG-21F, 2 with 30 MiG-21MF, 2 with 40 MiG-19.
1 trg sqn with 15 MiG-15.
Tpts incl 50 Il-14, An-24, and An-2.
Hel incl 30 Mi-1, 24 Mi-4.
Trainers incl MiG-15UTI, 60 Zlin 326.
AA-2 *Atoll* AAM.
24 SAM bns with 144 SA-2 *Guideline* and SA-3 *Goa*.

Para-Military Forces: 10,000 State security troops; 3,000 border guards; 100,000 People's Militia.

DOMINICAN REPUBLIC

Population: 5,130,000.
Military service: voluntary.
Total armed forces: 18,500.
Estimated GNP 1977: $4.3 bn.
Defence expenditure 1978: 49.6 m pesos ($49.6 m).
$1 = 1 peso.

Army: 11,000.
3 inf bdes.
1 mixed armd bn.
1 mountain inf bn.
1 para 'bn'.
1 Presidential Guard bn.
1 arty regt.
1 AA arty regt.
1 engr bn.
1 armd recce sqn.
20 AMX-13 lt tks; AML armd cars; M-3 APC; 105mm how.

Navy: 4,000.
3 patrol frigates (2 ex-US *Tacoma*-class, 1 ex-Canadian *River*-class trg ship).
2 corvettes (ex-Canadian *Flower*-class).

2 fleet minesweepers.
14 patrol craft (12 under 100 tons).
1 LCT, 1 med landing craft.
1 cdo bn.

Air Force: 3,500; 43 combat aircraft.
1 bbr sqn with 7 B-26K.
1 fighter sqn with 10 *Vampire* F1/FB50.
1 fighter/trg sqn with 20 F-51D.
1 COIN/trg sqn with 6 T-28D.
2 PBY-5A SAR ac.
1 tpt sqn with 6 C-46, 6 C-47, 3 DHC-2.
Hel incl 3 *Alouette* II/III, 2 H-19, 2 UH-12E, 7 OH-6A.
Trainers incl 4 Cessna 172, T-6, T-11.

Para-Military Forces: 10,000 Gendarmerie.

ECUADOR

Population: 7,790,000.
Military service: 2 years, selective.
Total armed forces: 25,300.
Estimated GNP 1977: $5.9 bn.
Defence expenditure 1977: 2.86 bn sucres ($114 m).
$1 = 25 sucres (1977).

Army: 17,500.
11 inf bns (2 mot).
1 para bn.
3 recce, 4 horsed cav sqns.
1 Presidential Guard sqn.
10 indep inf coys.
3 arty gps, 1 AA arty bn.
2 engr bns.
30 M-3, 80 AMX-13 lt tks; 27 AML-60/-90 armd cars; M-113, AMX-VCI APC; 105mm, 6 Mk F3 155mm SP how; 40mm AA guns; 1 *Skyvan*, 6 *Arava*, 3 *Porter* tpts, 7 lt ac, 2 hel.
(VAB APC on order.)

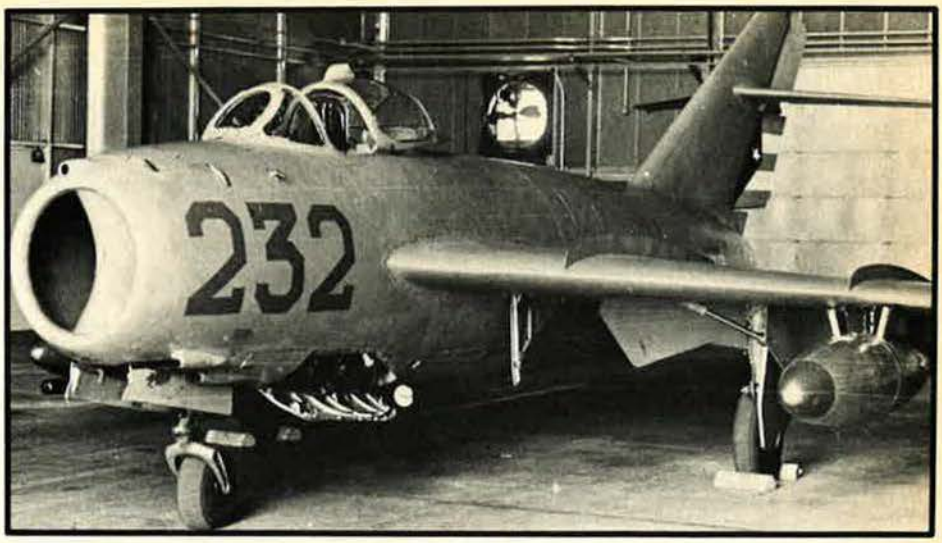
Navy: 3,800 (700 Marines).
1 Type 209 submarine.
3 frigates (1 ex-US fast transport, 2 ex-British *Hunt*-class).
2 coastal escorts (ex-US).
3 FPBG with *Exocet* SSM, 3 FPB.
2 large, 5 coastal patrol craft (5 under 100 tons).
2 LST, 2 LSM.
3 *Arava*, 2 T-37, 2 T-41, 1 Cessna 320, 1 Cessna 177 ac, 2 *Alouette* III hel.
(3 Type 209 submarines, 1 *Lupo*-class frigate, 4 corvettes on order.)

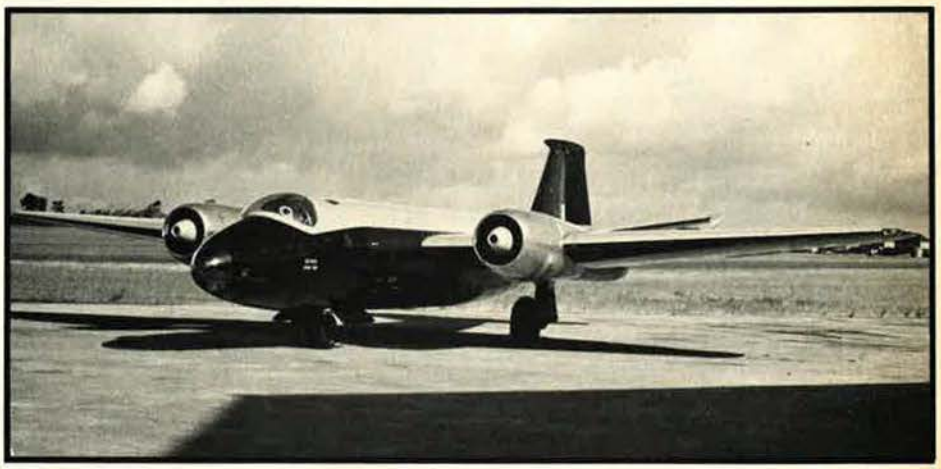
Air Force: 4,000; 46 combat aircraft.
1 lt bbr sqn with 5 *Canberra* B6.
1 FB sqn with 12 *Jaguar* A/B.
1 COIN sqn with 10 A-37B.
1 recce sqn with 6 *Meteor* FR9.
1 FGA/trg sqn with 12 BAC-167 *Strikemaster*.
1 PBY-5A *Catalina* MR aircraft.
Tpts incl 4 *Electra*, 2 C-130H, 4 DC-6B, 2 *Learjet*, 4 HS-748, 12 C-47, 5 C-45, 2 DHC-5, 3 DHC-6.
Hel incl 2 *Puma*, 4 *Alouette* III, 4 *Lama*, 3 Bell 47G.
Trainers incl 20 T-34C, 12 SF-260, 24 Cessna 150A.
R.550 *Magic* AAM.
(18 *Mirage* F1C fighters, 2 F1B trainers, 12 *Super Mystère* B2 FB, 2 DHC-5 tpts on order.)

Para-Military Forces: 5,800.

GUATEMALA

Population: 6,320,000.
Total armed forces: 14,270.
Estimated GNP 1977: $4.6 bn.
Defence expenditure 1978: 58.5m quetzal ($58.5m).
$1 = 1 quetzal.





Cuba's interceptor units are largely equipped with MiG-21s, but ground attack squadrons still fly the MiG-17 (top). Several Latin American countries have British-built Canberra bombers (below), among them Argentina, Ecuador, Peru, and Venezuela.

Army: 13,500.
3 bde HQ.
10 inf bns.
1 Presidential Guard bn.
1 para bn.
1 engr bn.
1 armd car coy.
9 arty btys.
8 AMX-13 lt tks; 8 M-8 armd cars; 6 M-3A1, 10 M-113, 10 RBY-1, 7 *Commando* APC; 12 75mm, 12 105mm how; 81mm, 12 4.2in mor, 10 40mm SP AA guns.

Navy: 400, incl 200 Marines.
11 small coastal patrol craft (under 100 tons).
1 med landing craft.

Air Force: 370; 11 combat aircraft.
1 FGA sqn with 11 A-37B.
1 tpt sqn with 1 DC-6, 9 C-47, 10 *Arava*.
1 comms sqn with 6 Cessna 172, 3 Cessna 180, 2 Cessna U-206C ac, 9 Bell UH-1D hel.
2 T-33A trainers.

Para-Military Forces: 3,000.

HONDURAS

Population: 3,400,000.
Military service: voluntary.
Total armed forces: 14,200.
Estimated GNP 1977: $1.3 bn.
Defence expenditure 1978: 62.8 m lempira ($31 m).
$1 = 2 lempira (1978), 2 lempira (1977).

Army: 13,000.
10 inf bns.
1 Presidential Guard bn.
3 arty btys.
1 engr, 1 sigs bn.
12 75mm pack, 8 105mm how; 81mm, 120mm mor; 57mm RCL.
(*Scorpion* lt tks on order.)

Air Force: 1,200; 18 combat aircraft.
1 FB sqn with 12 *Super Mystère* B2.
1 COIN sqn with 6 A-37B.
Tpts incl 1 C-54, C-45, 1 C-47, 3 *Arava*, 1 *Westwind*, 4 Cessna 180/185.
Trainers incl 6 T-6, 4 T-28E, 5 T-41A, 3 RT-33A.

Para-Military Forces: 3,000.

MEXICO

Population: 66,770,000.
Military service: voluntary, with part-time conscript militia.
Total armed forces: 97,000 regular, 250,000 part-time conscripts.
Estimated GNP 1977: $83.8 bn.
Defence expenditure 1978: 12.66 bn pesos ($557 m).
$1 = 22.7 pesos (1978), 22.6 pesos (1977).

Army: 72,000 regular, 250,000 conscripts.
1 mech bde gp (Presidential Guard).

1 inf bde gp.
1 para bde.
Zonal Garrisons incl:
23 indep cav regts, 64 indep inf bns, 1 arty regt. AA, engr, and support units.
M-3, M-5 lt tks; 100 M-3A1, M-8 armd cars; HWK-11 APC; 75mm, 105mm how (incl M-8 75mm, M-7 105mm SP).

Navy: 19,000 incl Naval Air Force and Marines.
2 destroyers (ex-US *Fletcher*-class).
1 frigate (ex-US *Edsall*-class trg ship).
18 ex-US *Auk*-class (coastguard) corvettes.
6 transports (4 ex-US).
16 ex-US fleet minesweepers.
22 *Azteca*-class patrol craft.
9 river, 6 coastal patrol boats (under 100 tons).
2 LST.
(9 *Azteca*-class patrol craft on order.)

Naval Air Force: 350.
10 HU-16 *Albatross* MR ac.
Other ac incl 1 *Learjet* 24D, 4 C-45, 3 DC-3, 1 Beech *Baron*, 3 *Bonanza*, 4 *Cessna* 150.
4 *Alouette* II, 3 Bell 47, 5 Hughes 269A hel.

Marines: 2,000; 19 security companies.

Air Force: 6,000; 80 combat aircraft.
1 COIN sqn with 15 AT-33A.
5 COIN/trg sqns with 20 T-6, 45 T-28A.
1 SAR sqn with 18 LASA-60 ac, 9 *Alouette* III, 1 Hiller 12E hel.
4 tpt sqns with 2 Boeing 727, 1 DC-7, 1 DC-6, 5 C-118, 5 C-54, 1 *JetStar*, 1 BAC-111, 20 C-47, 3 *Skyvan*, 12 *Islander*, 10 *Arava*, Aero *Commander*.
Hel incl 5 Bell 206B, 3 Bell 212, 10 Bell 205.
Trainers incl 20 T-6, 30 T-28, 20 Beech F33-19, 20 *Musketeer*.
1 para bn.
(12 PC-7 *Turbo-Trainer* on order.)

PARAGUAY

Population: 2,870,000.
Military service: 18 months.
Total armed forces: 17,000.
Estimated GNP 1977: $2.0 bn.
Defence expenditure 1978: 5.19 bn guaranies ($41 m).
$1 = 126 guaranies (1978), 126 guaranies (1977).

Army: 12,500.
1 cav 'div' (bde) with 2 mech cav regts, 1 inf bn, 1 arty bty.
6 inf 'divs' (bn gps).
2 indep horsed cav regts.
2 indep inf bns.
1 Presidential Guard bn.
1 arty regt.
5 engr, 1 sigs bns.
9 M-4 med, 6 M-3 lt tks; APC; 75mm pack, 105mm how; 2 Bell 47, 3 UH-12E hel.

Navy: 2,000 (500 Marines and Naval Air).
2 river defence vessels.
3 patrol boats (ex-Argentinian minesweepers).
8 coastal patrol craft (under 20 tons).
1 LSM, 2 landing craft, utility.
1 marine 'regt' (bn).
4 Cessna U206, 2 Cessna 150 ac, 2 Bell 47G hel.

Air Force: 2,500; 12 combat aircraft.
1 COIN sqn with 12 T-6 *Texan*.
Tpts incl 5 DC-6B, 2 C-54, 3 CV-240, 10 C-47, 1 DHC-6, 1 *Dove*, 1 DHC-3.
14 Bell UH-13A hel.
Trainers incl 8 Fokker S-11, 8 T-23 *Uirapuru*, 10 T-6, 1 MS-760, 5 Cessna 185.
1 para 'regt' (bn).
(10 AT-26 *Xavante* COIN, 10 EMB-110 tpts on order.)

Para-Military Forces: 4,000 security forces.

PERU

Population: 17,070,000.
Military service: 2 years, selective.
Total armed forces: 89,000 (49,000 conscripts).
Estimated GNP 1977: $13 bn. (Rapid inflation makes defence expenditure and GNP figures in local currency and dollars unreliable.)
Defence expenditure 1977: 30.04 bn soles ($406 m).
$1 = 74 soles (1977).

Army: 65,000 (49,000 conscripts).
2 armd 'divs' (bdes).
2 armd, 2 horsed regts (cav 'div').
8 inf and mech 'divs' (bdes).
1 para-cdo 'AB div' (bde).
1 jungle 'div' (bde).
3 armd recce sqns.
Arty and engr bns.
250 T-54/-55, 60 M-4 med, 110 AMX-13 lt tks; M-8 armd cars; 50 M-3A1 scout cars; 300 M-113, V-200 *Chaimite*, UR-416, Mowag APC; 105mm, 122mm, 130mm, 155mm how; 120mm mor; 28 40mm, 76mm towed, ZSU-23-4 SP AA guns; SA-3 SAM; 5 U-10B, 5 Cessna 185 lt ac; 42 Mi-8 (36 in store), 4 *Alouette* III, 5 *Lama* hel.
(200 T-55 tks, 122mm, 130mm guns, SA-3/-7 SAM, 2 *Nomad* lt tpt ac on order.)

Navy: 14,000 (incl Naval Air, 1,000 Marines).
8 submarines (2 ex-US *Guppy* I-, 4 ex-US *Mackerel*-class, 2 Type 209).
4 cruisers (2 ex-Dutch *De Ruyter*-, 2 ex-British *Ceylon*-class).
4 destroyers (2 ex-British *Daring*-class with *Exocet* SSM, 2 ex-US *Fletcher*-class).
3 frigates (1 *Lupo*-class, 2 ex-US *Cannon*-class).
6 river gunboats, 3 river patrol craft (under 100 tons).
4 landing ships/craft (2 LST, 2 med).
9 S-2A *Tracker* ASW, 6 C-47, 2 F-27, 1 *Aztec* tpt ac.
6 AB-212 ASW, 5 Bell 47G, 10 Bell 206, 6 UH-1D/H, 2 *Alouette* III hel.
8 T-34 trainers.
(2 Type 209 submarines, 3 *Lupo*-class frigates with *Otomat* SSM and *Albatros* SAM, 6 *Combattante*-class FPBG on order.)
1 marine bn.

Air Force: 10,000; 163 combat aircraft.
2 lt bbr sqns with 32 *Canberra* B2, B(I)8/56, 2 T4.
4 FB sqns: 2 with 35 *Mirage* VP, 2 with 32 Su-22, 4 Su-22UTI.
2 fighter sqns: 1 with 8 F-86F, 1 with 10 *Hunter* F52.
1 trg sqn with 12 MiG-21 (on loan from Cuba).
2 COIN sqns with 24 A-37B.
1 MR sqn with 4 HU-16B *Albatross*.
Tpts incl 3 L-100-20, 4 C-130E, 5 DC-6, 4 C-54, 2 *Learjet*, 16 An-26, 2 F-27, 4 F-28, 7 DHC-6, 16 DHC-5, 18 *Queen Air*, 3 *King Air*, 2 Beech 99, 12 *Turbo-Porter*, 5 Cessna 185.
Hel incl 12 *Alouette* III, 6 UH-1D, 20 Bell 47G, 14 Bell 212, 6 Mi-6, 6 Mi-8.
Trainers incl 15 T-6, 6 T-34, 8 T-33A, 19 T-41, 26 T-37B/C, 4 Cessna 150.
AS.30 ASM.

Para-Military Forces: 20,000 *Guardia Civil*.

URUGUAY

Population: 3,170,000.
Military service: voluntary.
Total armed forces: 27,000.
Estimated GNP 1977: $3.6 bn. (Rapid inflation makes defence expenditure and GNP figures in local currency and dollars unreliable.)
Defence expenditure 1977: 304 bn pesos ($72 m).
$1 = 4.22 pesos (1977).

Army: 20,000.
4 regional 'Armies' (divs) comprising: 3 armd regts, 13 inf bns, 6 cav regts, 4 arty 'bns' (btys), 1 AD bn, 5 engr bns.
17 M-24, 18 M-3A1 lt tks; 10 M-3A1 scout cars; 15 M-113 APC; 25 105mm how.

Navy: 4,000 (incl naval air, naval infantry, coastguard).
3 frigates (1 ex-US *Dealey*-, 2 *Cannon*-class).
2 escorts (ex-US minesweepers).
1 large and 6 coastal patrol craft (under 100 tons).
3 S-2A MR ac, 3 SNB-5 (C-45) tpts; 1 T-34B, 4 SNJ-4, 4 T-6 trainers, 2 Bell 47G, 2 SH-34J hel.
(2 Type 209 submarines on order.)

Air Force: 3,000; 30 combat aircraft.
1 fighter/trg sqn with 6 AT-33A.
1 COIN sqn with 8 A-37B.
1 recce/trg sqn with 10 T-6G, 6 U-17A.
Tpts incl 10 C-47, 2 F-27, 3 FH-227, 2 *Queen Air*, 5 EMB-110C.
Hel incl 6 Bell UH-1H, 2 Hiller UH-2.
2 Cessna 182, 2 Piper *Super Cub* liaison ac.
Trainers incl 6 T-41, 2 C-45.
(1 EMB-110B1 tpt on order.)

Para-Military Forces: 2,200.

VENEZUELA

Population: 13,090,000.
Military service: 2 years, selective.
Total armed forces: 44,000.
Estimated GNP 1977: $36.1 bn.
Defence expenditure 1978: 2.64 bn bolivares ($615 m).
$1 = 4.29 bolivares (1978), 4.29 bolivares (1977).

Army: 28,000.
2 med, 1 lt tk bns.
2 mech, 11 inf bns.
13 ranger bns.
1 horsed cav bn.
7 arty gps.
5 AA arty and engr bns.
142 AMX-30 med, 40 AMX-13 lt tks; 12 M-8 armd cars; AMX-VCI, 20 UR-416 APC; 75mm pack, 105mm how; 20 AMX 155mm SP guns; 81mm, 120mm mor; 35 M-18 76mm SP ATK guns; 106mm RCL; SS-11 ATGW; 40mm AA guns; some 20 *Alouette* III and Bell 47G hel.

Navy: 8,000, incl 4,000 Marines.
4 submarines (2 *Guppy* II, 2 Type 209).
4 destroyers (1 with *Seacat* SAM).
4 frigates.
3 FPBG with *Otomat* SSM, 3 FPB.
10 patrol craft (6 in reserve).
10 coastal patrol craft (11 on order).
6 landing ships (1 LST, 4 med, 1 tpt).
6 S-2E *Tracker*, 4 HU-16 SAR ac, 3 C-47 tpts, 2 Bell 47J hel.
(6 *Lupo*-class frigates with *Albatros* SAM, 6 AB-212 ASW hel, *Otomat* SSM on order.)

Marines: 3 bns.

Air Force: 8,000; 99 combat aircraft.
1 lt bbr sqn with 18 *Canberra* B2, 7 B(I)8, 2 PR3, 2 T4.
3 fighter sqns: 1 with 15 CF-5A, 4 CF-5B; 1 with 9 *Mirage* IIIEV, 4 VV, 2 VDV; 1 with 20 F-86K.
1 COIN sqn with 16 OV-10E.
2 tpt sqns with 5 C-130H, 1 Boeing 737, 1 DC-9, 20 C-47, 12 C-123B *Provider*, 3 HS-748, 1 Cessna *Citation*.
Hel incl 13 *Alouette* III, 12 UH-1D/H, 10 UH-19.
Trg ac incl 12 *Jet Provost* T52, 24 T-2D, 25 T-34, 2 Beech 95, 9 *Queen Air*, 12 Cessna 182.
R.530 AAM.
1 para bn.
(1 *Mirage* IIIEV fighter, 8 A-109 hel on order.)

Para-Military Forces: 10,000 National Guard.

THE THEATRE BALANCE BETWEEN NATO AND THE WARSAW PACT

The East–West Theatre Balance in Europe

Any assessment of the military balance between NATO and the Warsaw Pact involves comparison of the strengths of both men and equipment, consideration of qualitative characteristics, factors such as geographical advantages, deployment, training, and logistic support, and of differences in doctrine and philosophy. (For full coverage of the comparative methods used, see *The Military Balance 1977–78*, December '77 issue of AIR FORCE Magazine, pp. 118–126.) It must be set within the context of the strategic nuclear balance, of military forces world wide and of the relative strengths of the navies of the two sides. The last is discussed on pp. 117–121.

Certain elements in the equation are of special importance. Warsaw Pact equipment is relatively standardized, whereas that of NATO is not and is therefore subject to limitations on interoperability and thus flexibility. NATO has certain strengths, such as the striking power of its tactical air forces, but there is little depth in the NATO central sector, which presents problems in its defence. On the other hand, the Warsaw Pact has its own vulnerabilities, and there may be doubts about the reliability of some of its members and the value of their forces. It must be borne in mind that Soviet land and air forces in particular are designed for offensive operations; NATO forces are primarily designed for defence, and thus are designed to deter by creating a reasonable Soviet doubt about the possibility of the speedy success of a conventional attack and the nuclear consequences that might follow.

LAND AND AIR FORCES

Although divisions on both sides are often of different size and have different organizations, it is sometimes useful to compare numbers of divisions, but quite substantial numbers of combat manpower are not held on divisional establishments. When making a divisional comparison, it is most useful to compare the divisions available in two geographical regions: first, Northern and Central Europe (taken together); and, second, Southern Europe. For obvious reasons, it is not easy to distinguish between Warsaw Pact forces of the Central Region. The Southern Flank, on the other hand, is distinctly separate from the other regions, for both political and geographical reasons. There are three areas of deployment on this flank: eastern Turkey, Greek and Turkish Thrace, and north-east Italy. It would be difficult, if not impossible, for forces in any one of these areas to be moved to another. Table I has therefore been divided into two parts, with NATO listed as a whole (because US ground forces do not constitute a major part of the total) and the Warsaw Pact divided into two—the Pact as a whole and Soviet forces.

Table I: Ground Forces

Ground Forces Available in Peacetime (div equivalents)[c]	Northern and Central Europe[a]			Southern Europe[b]		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Armd	10	32	22	4	6	2
Mech	13	33	20	7	24	7
Inf and AB	4	5	3	26	3	2

[a] NATO figures are for AFCENT and AFNORTH combined. As neither of the commanders of these forces can be assured of the support of ground forces in Portugal or Britain, these are not included. French forces likewise are not included, although two divisions (being reorganized—see p. 80) are currently deployed in Germany. Forces in Berlin are included. Warsaw Pact forces include all divisions of East Germany, Czechoslovakia, and Poland, and Soviet divisions deployed in those countries in peacetime, together with those Category 1 and 2 divisions (see p. 69 for definitions) in the Western Military Districts of the Soviet Union which are presumed to be earmarked for employment on the Northern and Central Fronts.

[b] NATO forces include Italian, Greek, and Turkish land forces and, on the Warsaw Pact side, the land forces of Bulgaria, Hungary, and Romania, together with Category 1 and 2 Soviet divisions stationed in Hungary and south-western USSR which are assumed to be earmarked for operations on the Southern Fronts.

[c] Divisions, brigades, and similar formations aggregated on the basis of three brigades to a division.

MANPOWER

A comparison of front-line combat manpower deployed on the ground in normal peacetime circumstances (as distinct from total manpower, which is referred to later) fills out the picture further. The figures shown reflect the variations in divisional establishments mentioned above but also include combat troops in formations higher than divisions. They take some account of under-manning as well—many NATO and Warsaw Pact divisions are kept well below strength in peacetime. Figures calculated on this basis, which can only be very approximate, are shown in Table II. The figures do not include French forces; if those stationed in Germany are counted, the NATO figure for Northern and Central Europe might be increased by perhaps 40,000.

Table II: Manpower in Combat Units (thousands)

	Northern and Central Europe			Southern Europe		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Combat manpower in all types of formations	626	943	638	550	388	147

REINFORCEMENTS

Judgment on the rate at which reserve forces can be mobilized, moved to the theatre, and put into action is far from easy and involves many complex factors and qualifying assumptions. Some general points can be made:

—Warning time is only useful if there is the political will to mobilize. It depends crucially upon how early an attacker's preparations can be detected. This in turn will depend upon whether the attack is based upon reinforced forces or upon those in place.

—The success or failure of an unreinforced attack will largely depend upon the defender's ability to move rapidly from barracks into defensive positions.

—Reinforcement varies greatly from country to country. It should be rapid for Central European states. It should be quite rapid for the Soviet Union although her East–West transport systems are not particularly good (change-of-gauge stations will tend to delay rail movement). The United States faces great difficulties over reinforcement.

—Any Western reinforcement by sea will become much more uncertain if it has to take place after the outbreak of hostilities. Air reinforcement will also be contested. Transit facilities are likely to come under attack. By contrast, it may be less easy for the West to interfere with Soviet reinforcement, although here too there are some vulnerabilities.

—Many Warsaw Pact divisions are not at a high state of readiness, especially those listed as Category 3 (see definition of categories on p. 71). The size of the Soviet Union and her relative lack of good internal communications will make concentration of reserve manpower rather difficult.

—Most Western reinforcement does not involve the raising of complete formations but rather is intended to fill out the establishments of formations already deployed forward in peace.

Tables III and IV summarize the present position.

A fair summary of the initial reinforcement position might be that the Warsaw Pact is intrinsically capable of a much faster build-up of formations in the first two or three weeks, particularly if local

Table III: Warsaw Pact Reinforcing Formations

	Armd divs			Mech divs			Other divs		
	Category			Category			Category		
	1	2	3	1	2	3	1	2	3
Czechoslovakia	3	—	2	3	—	2	—	—	—
East Germany	2	—	—	4	—	—	—	—	—
Poland	5	—	—	3	2	3	—	2	—
Soviet divs									
In above area	14	—	—	13	—	—	—	—	—
Elsewhere[d]	4	11	11	6	13	46	8	—	—
Soviet totals	18	11	11	19	13	46	8	—	—

[d] Included here are four Category 1 divisions in Hungary and a number of divisions that might reinforce Southern Europe rather than the central sector. Soviet naval infantry are not included. It is assumed that Soviet divisions facing China (about 43 of all categories) would not be available to reinforce Warsaw Pact operations in Europe. There may be a number of 'equipment divisions' to provide a ready reserve, in addition to the divisions shown.

surprise is achieved, having a large pool of reserves on which to draw and the formations to absorb them; that NATO can only attempt to match such a build-up if it has, and takes advantage of, sufficient warning time; and that the subsequent rate of build-up of formations also favours the Warsaw

Table IV: Western Reinforcing Formations

	Divs			Bdes/regts			Marines
	Armd	Mech	Other	Armd	Mech	Other	Divs
Active Formations							
United States[e]	2	3	5	1	1	1	2
Britain	—	—	1	—	—	2	—
Canada	—	—	—	—	—	1	—
Germany	—	—	—	—	—	—	—
France	—	3	2	—	—	—	—
Totals	2	6	8	1	1	4	2
Reserve Formations[f]							
United States[e]	2	1	5	3	6	13	1
Belgium	—	—	—	—	1	1	—
Britain	—	—	—	—	—	—	—
Canada	—	—	—	—	—	—	—
Germany	—	—	—	—	—	6	—
Netherlands	—	1	—	—	—	1	—
Norway	—	—	—	—	—	11	—
Totals	2	2	5	3	7	32	1
Grand Totals	4	8	13	4	8	36	3

[e] Including light divisions (infantry and airborne) and armoured cavalry regiments.
[f] Some countries, particularly Britain, Canada, the Netherlands, and France, have plans to mobilize battalion-sized units in some numbers in addition to the formations shown here. France also has formations earmarked for territorial defence.

Pact. Only if the crisis develops slowly enough to permit full reinforcement could the West eventually reach a better position. Apart from having greater economic resources, alliance countries, including France, maintain rather more men under arms than the Warsaw Pact. For Army/Marines the figures (in thousands) are: NATO 2,845; Warsaw Pact 2,660. And the Soviet Union has a large number of her divisions and men on her border with China. Clearly, Soviet plans will put a premium on exploiting a fast build-up of forces, and NATO plans depend on having adequate standing forces to meet any attack and on augmenting them in good time.

EQUIPMENT

In a comparison of equipment one point stands out: the Warsaw Pact is armed almost completely with Soviet or Soviet-designed material and enjoys the flexibility, simplicity of training, and economy that standardization brings. NATO forces have a wider variety of everything from weapons systems to vehicles, with consequent duplication of supply systems and some difficulties of interoperability; they do, however, have some weapons qualitatively superior. As to numbers of weapons, there are some notable disparities, of which that in tanks is perhaps the most significant. The relative strengths are given below. Tanks in French formations are not included in these figures. If the two divisions stationed in Germany are taken into account, 325 tanks should be added to the NATO total; if the three divisions in eastern France are also counted, a further 485 should be added.

It will be seen that in Northern and Central Europe NATO has only a third as many operational tanks as the Warsaw Pact, though NATO tanks are generally superior (not, perhaps, to the T-64 and T-72 now being issued to the Soviet forces). This numerical weakness in tanks (and in other armoured fighting vehicles, where the Soviet forces are notably well-equipped both in numbers and quality) reflect NATO's essentially defensive role and has in the past been offset to some extent by a superiority in heavy anti-tank weapons, a field in which new air- and ground-launched missiles rapidly coming into service could increasingly strengthen the defence. NATO is introducing large numbers of such weapons, but so is the Warsaw Pact.

Table V: Main Battle Tank Comparison

	Northern and Central Europe			Southern Europe		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Main battle tanks in operational service[g]	7,000	21,100	13,650	4,300	6,800	2,500

[g] These are tanks with formations or earmarked for the use of dual-based or immediate reinforcing formations (some 600). They do not include those in reserve or small stocks held to replace tanks damaged or destroyed. In this latter category NATO has perhaps 2,500 tanks in Central Europe. There are tanks in reserve in the Warsaw Pact area, but the figures are difficult to establish. The total Pact tank holdings are, however, materially higher than the formation totals shown in the table.

The Warsaw Pact has also built up a marked advantage in conventional artillery in Northern and Central Europe: counting field, medium, and heavy guns, mortars and rocket launchers with formations, NATO has only some 2,700 against a Warsaw Pact total of more than 10,000. In Southern Europe the position is more nearly equal, NATO having 3,500 against some 4,000 in the Warsaw Pact, though about one-third of the NATO total is in Italy.

LOGISTICS

NATO has an inflexible logistic system, based almost entirely on national supply lines with little central co-ordination. It cannot now use French territory and has many lines of communication running north to south near the area of forward deployment. Certain NATO countries are, furthermore, short of supplies for sustained combat, but some Warsaw Pact countries may be no better off. The Soviet logistic support has been greatly augmented in recent years. The organization has been improved, and formations have been given more support. The former NATO superiority in forward-area logistics has probably now gone, though there is some inherent advantage in operating on home territory.

AIR POWER

If NATO ground formations are to be able to exploit the mobility they possess by day as well as by night, they must have a greater degree of air cover over the battlefield than they now have. Such cover is provided by a combination of rapid warning and communications systems, fighter aircraft and air defence weapons both for defence of key areas or in the hands of forward troops. In numbers of aircraft NATO is inferior but, although the margin is being reduced, may still have a higher proportion of multi-purpose aircraft of good performance over their full mission profiles, especially in range, payload, and all-weather capability; considerable power can be deployed in the ground-attack role in particular. Both sides are modernizing their inventories. The Soviet Union is producing multi-role fighters to replace the large numbers of aircraft at present used only in an air defence role, thus giving increased ground-attack capacity. In addition, fighters have for the first time been specifically designed for deep strike and interdiction. (The latest versions of the MiG-23/27 *Flogger*, Su-17/-20 *Fitter*, and Su-19 *Fencer* are reported to have substantially improved range, payload, avionics, and ECM capabilities. This may well be at the expense of overall numbers in future, since there has been an increase of some 1,300 tactical aircraft in the Warsaw Pact during the last seven years or so.) NATO is also bringing into service new fighter aircraft of many types, and the United States has recently substantially augmented her F-15 and F-111 squadrons in Europe. US aircraft in particular can now be assumed to have available very advanced air-delivered weapons, such as laser-guided air-to-surface missiles and other precision-guided munitions.

The air forces of the two sides have tended to have rather different roles; long range and payload have in the past had lower priority for the Warsaw Pact, while NATO has maintained a long-range deep-strike tactical aircraft capability. (The Soviet Union has chosen to build an MRBM force which could, under certain circumstances, perform analogous missions—though not in a conventional phase of any battle.) The introduction of more advanced, longer-range Soviet aircraft now presents a much greater air defence problem for NATO, and NATO strike aircraft must face the increased air defence capability that Soviet forces have built up. The Soviet Union has always placed heavy emphasis on air defence, evident not only from the large number of interceptor aircraft in Table VI but from the strength of her deployment of high-quality surface-to-air missiles and air defence artillery both in the Soviet Union and with units in the field. These defences would pose severe problems for NATO strike aircraft, drawing off much effort into defence suppression. NATO territory and forces are much less well provided with air defence, but heavy expenditure is now going into new systems of many sorts, both low- and high-level, missiles and artillery (and into electronic warfare equipment for aircraft).

Table VI: Tactical Aircraft

Tactical Aircraft in Operation Service	Northern and Central Europe[h]			Southern Europe[h]		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Light bombers	160	130	125	—	50	50
Fighter/ground-attack	1,400	1,350	925	628	375	125
Interceptors	435	2,025	900	220	1,000	425
Reconnaissance	380	550	350	90	220	150

[h] The area covered here is slightly wider than for ground troops as described in note a. Many aircraft have a long-range capability and in any case can be redeployed very quickly. Accordingly, the figures here include the appropriate British and American aircraft in Britain, American aircraft in Spain, and Soviet aircraft in the western USSR. They do not, however, include the American dual-based squadrons, which would add about 100 fighter-type aircraft to the NATO totals, nor French squadrons with perhaps another 450 fighters. Carrier-borne aircraft of the US Navy are excluded, but so are the medium bombers in the Soviet Air Force, which could operate in a tactical role.

The Warsaw Pact enjoys the advantage of interior lines of communication, which makes for ease of logistics. It has in the past had a relatively high capability for operating from dispersed natural airfields serviced by mobile systems, but the introduction of new high-performance fighters will reduce this. It does, however, have more airfields with protective shelters and the great advantage of standard ground-support equipment which stems from having only Soviet-designed aircraft. These factors make for greater flexibility than NATO has, with its wide variety of aircraft and support equipment. NATO suffers from having too few airfields, which are thus liable to be crowded, and has been slow to build shelters. It undoubtedly still has superiority in sophistication of equipment, but this technological edge is being eroded as the newer Soviet aircraft are brought in. The capability of NATO air crews (which in general have higher training standards and fly more hours) and the versatility of its aircraft, gives all-weather operational strength, and the quality of Western electronic technology is such that ground and airborne control equipment is almost certainly superior to that of the Warsaw Pact. The introduction of AWACS will give NATO an airborne control system that offers significant advantage. Since squadrons can be moved quickly, the NATO numerical inferiority shown above could rapidly be redressed regionally if enough airfields were available. While the total tactical aircraft inventories of the two sides are not dissimilar in size, the Soviet Union keeps about a third of her force of some 7,400 combat aircraft on the Chinese front.

CHANGES OVER TIME

The comparisons above begin to look rather different from those of a few years ago. The effect of small and slow changes can be marked, and the balance can alter. In 1962 the American land, sea, and air forces in Europe totalled 434,000; now the figure is around 300,000. There were 26 Soviet divisions in Eastern Europe in 1967; now there are 31, and they are larger in size (despite the increase of some 25 divisions on the Chinese front over the same period). The numerical pattern over the years so far has been a gradual shift in favour of the East, with NATO relying on offsetting this by a qualitative superiority in its weapons that is now being eroded as new Soviet equipment is introduced. While NATO has been modernizing its forces, the Warsaw Pact has been modernizing faster and expanding as well. In some areas (for example, SAM, certain armoured vehicles, and artillery) Soviet weapons are now superior, while in other fields (such as tactical aircraft) the gap in quality is being closed. The advent of new weapons systems, particularly precision-guided munitions and new anti-tank and air defence missiles, may again cut into the Warsaw Pact's advantage in tank and aircraft numbers, but in general the pattern is one of a military balance moving steadily against the West. As a result of this perception of a shifting balance, NATO set in train in 1977 a major review of defence policy.

It is too early to say whether this Long Term Defence Programme (LTDP), which was presented to NATO heads of State in Washington in May 1978, will in fact produce the greater readiness and savings through co-operation that are called for, but the objectives were relatively limited in scope, could be attained in practice for the small increases in budgetary outlays to which most Alliance members committed themselves in 1977 and 1978, and should serve to redress the worst of the imbalances. The ten 'task forces' addressed the following subjects:

1. Short-term readiness, including rapid outloading of ammunition and chemical protection.
2. Rapid reinforcement by US, UK, and Canadian Strategic Reserves, including the use of civil air and sea lifts and the addition of three sets of divisional equipment for US reinforcements in Europe (Pre-positioned Overseas Materiel Configured in Unit Sets, or POMCUS).
3. Increased reserves and improved mobilization techniques.
4. Co-operative measures (including command control and communications) at sea and national naval force increases, particularly in ASW, mine-warfare, and defence against air and surface attack.
5. Air defence integration and qualitative improvement.
6. Command Control and Communications (C3).
7. Electronic Warfare improvement on land, at sea, and in the air.
8. Logistics, including an improvement in war reserve stocks and greater alliance co-ordination of logistic support.
9. Rationalization of the research, development, and production of armaments in the direction of standardization and interoperability.
10. Theatre nuclear modernization.

Broadly speaking, these measures respond either to a specific and increasing Warsaw Pact threat—short-warning attack, increasing weight of air attack, or interdiction of sea routes—or to an awareness that NATO has for many years either been wasting a proportion of the resources allotted by the members of the Alliance to the common defence or, through failures in co-ordination, not using what there is available in the most efficient way. While some of this wastage is clearly endemic in an alliance of sovereign nations of widely different size, economic strength, and geographical disposition, it should be possible to make a more efficient use of resources. The only task force to be overtaken to some extent by events is the last; the moves to introduce the neutron warhead as a part of nuclear weapon modernization have, for the time being, been shelved. The political will to

press ahead with improvements and modernization in general may be difficult to sustain in the face of domestic and economic difficulties besetting the Alliance. Nevertheless, in terms of the arithmetic of the East–West balance, strong and well-equipped reserve forces capable of rapid mobilization and movement into battle positions could do much to offset imbalances. US plans to increase the number of divisional stockpiles in Europe, together with an extensive overhaul of air transport resources, should give US forces in Europe the capability of moving five divisions in ten days (together with 60 tactical air squadrons) as against a current figure of only one division in that time and 40 squadrons.

SUMMARY

It will be clear from the foregoing analysis that a balance between NATO and the Warsaw Pact based on comparison of manpower, combat units, or equipment is an extraordinarily complex one, acutely difficult to measure. In the first place, the Pact has superiority by some measures and NATO by others, and there is no fully satisfactory way to compare these asymmetrical advantages. Second, qualitative factors that cannot be reduced to numbers (such as training, morale, leadership, tactical initiative, and geographical positions) could prove dominant in warfare. However, three observations can be made by way of a summary:

First, the overall balance still appears to make military aggression seem unattractive. NATO defences are of such a size and quality that any attempt to breach them would require major attack. The consequences for an attacker would be incalculable, and the risks, including that of nuclear escalation, must impose caution. Nor can the theatre be seen in isolation: the central strategic balance and the maritime forces (not least because they are concerned to keep open sea lanes for reinforcements and supplies, and because of their obvious role in the North and the Mediterranean) play a vital part in the equation too.

Second, NATO has emphasized quality, particularly in equipment and training to offset numbers, but this is now being matched. New technology has strengthened the defence, but it is increasingly expensive. If defence budgets in the West are maintained no higher than their present level and manpower costs continue to rise, the Warsaw Pact may be able to buy more of the new systems than NATO. Soviet spending has been increasing steadily, in real terms, for many years. Furthermore, technology cannot be counted on to offset numerical advantages entirely.

Third, while an overall balance can be said to exist today, the Warsaw Pact appears more content with the relationship of forces than is NATO. It is NATO that seeks to achieve equal manpower strengths through 'balanced' force reductions while the Pact has sought in the past to maintain the existing correlation, although recent developments in the Mutual and Balanced Force Reductions (MBFR) negotiations may indicate a substantial alteration in Soviet attitudes towards a concept of parity in conventional strengths. Nevertheless, agreement on force data has still to be reached, and, until it is, 'parity' will remain an elusive goal.

Military Airlift Command C-141s and C-5s fly personnel of US dual-based units into Germany for a NATO exercise.

THE EAST-WEST BALANCE AT SEA

Setting aside the historical background to Soviet naval development, there is little doubt that Soviet naval forces now pose a threat to NATO which must be taken into account in making any judgment as to the state of the global balance between East and West. Quite specifically the role of NATO naval forces in controlling the sea for purposes of reinforcement and force projection, including sea-based deterrent forces, is being challenged by the Warsaw Pact. This essay establishes the criteria on which to base a judgment and then makes a comparison of naval forces which takes account of the many rather complex factors which affect naval force planning.

METHODS OF COMPARISON

There are three main ways of aggregating totals, all more or less imperfect. The first directly compares numbers of naval vessels by type; the second compares competing systems—but still on a numerical basis; the third examines the functions that each side must perform and the resources available for them.

Numerical Comparison. This is the least satisfactory method. Little can usefully be derived from numbers alone. The fact that such a comparison shows the United States with 13 aircraft carriers and the Soviet Union with none of anything like comparable performance only illuminates the way each country allocates resources but sheds little light on their relative overall naval strengths. Nor is it any more useful to compare total numbers of surface combatants, for that can conceal gross disparities in ship size and performance. It also ignores a very large number of qualitative and geographical factors, constraints which may inflate or degrade relative performance. Above all, it ignores the fact that the outcome of war at sea is no longer (if it ever was) calculable solely on the basis of individual ship performance. To an ever increasing extent, other systems—such as land-based aircraft and missiles, satellite reconnaissance, and world-wide command and control facilities using communication satellites—have their impact on the war at sea. Indices based upon measurement (size, tonnage, gun calibre) and numbers are rather unhelpful except in attempting to predict the outcome of the most limited of engagements. Technology has reached a point where it is no longer possible to single out vessels and compare like with like in isolation, because the range and adaptability of modern weapon systems allow almost all weapons platforms some offensive and defensive capability against all other platforms existing in an increasingly large air and sea space. The reach and destructive capability of land-based systems (aircraft and missiles) have now grown to the point where naval units may be under continuous threat in, for example, the Eastern Atlantic and the Mediterranean. Under these conditions, direct comparison of numbers of vessels tells us little or nothing about the likely outcome.

Competing Systems Comparison. This is more useful in that it at least avoids comparing like with like but tries to compare vessels which are trying to survive with vessels (or other systems) that are trying to destroy them; for example, numbers of aircraft carriers can be compared with numbers of general-purpose (GP) attack submarines (*i.e.*, all those which do not have a strategic missile capability), or ASW frigates with submarines. But this method too has drawbacks. It assumes that systems are competing directly and exclusively with each other, whereas the carrier faces a threat from surface-to-surface missiles (from land or sea) and from aircraft, as well as from systems delivered by submarine, while the submarine is threatened by mines and aircraft (fixed-wing and rotary-wing) and submarines, as well as by surface ASW vessels. The second major drawback concerns the context in which the ratio is applied. What may be useful in a relatively enclosed sea (such as the Mediterranean) will be meaningless in the Atlantic, the size of which may mean that only in a protracted war could all ASW units (say) actually compete directly with all submarines. Very many simplifying assumptions have to be made before this approach is particularly useful—except in comparisons over time. Here at least one can identify the rate of change of specific ratios in order to detect trends, but it would be misleading to expect an analyst to be able to say that there is a particular ratio which is comforting and another which is not.

Mission Comparison. This method will in most cases involve functional groupings of vessels under a single tactical command, rather than individual ships. Given that tactical groupings will be normal, one can begin to see whether there are enough escorts for carrier strike groups, convoys,

and fleet replenishment groups, for example. At the end of this essay is a balance drawn up using this methodology, but first it is appropriate to look at some of the qualitative factors which affect any balance based upon numbers, however they are put together, and to attempt some definition of missions.

MISSIONS

In general terms, NATO is much more dependent on the sea than the Warsaw Pact. Its strongest member is separated from all the others (except Canada) by the Atlantic, and although air transport can alleviate the difficulties inherent in carrying men across the 3,000 miles of sea (see below), it will never be able to make more than a small dent in the total tonnage of materiel to be ferried. The great bulk of replacement warlike stores to sustain European defence over a period must come by sea. The map of Europe shows clearly that the Northern and Southern flanks of NATO are difficult or impossible to reinforce by land. As with the transatlantic lift, air transport cannot by itself carry all the planned reinforcement to the flanks; sea transport will have to use the North Sea, the English Channel, and the Mediterranean.

NATO must also use the sea for the more classical role of force projection. First, tactical air reinforcement will rely upon forward air bases which, at least in the flank countries, are few and inadequate for the sustained operation of large numbers of modern aircraft. Carriers, provided they can be defended, could provide substantial air support without overloading local facilities. Second, Norway, because of her reluctance to have foreign troops stationed permanently on her soil in peacetime, is almost wholly reliant upon external reinforcement, and certain Atlantic islands (particularly Iceland) must have their negligible peace-time garrisons augmented in order to guard against a Soviet air or amphibious landing. Third, in a war of any duration, European dependence upon oil and other imported commodities will bring sharply into focus the need to provide safe passage for merchant shipping.

In marked contrast, the Soviet Union is a continental power able to move troops and materiel to almost all possible zones of conflict by land. Therefore the Warsaw Pact is mainly concerned with sea denial, whereas NATO must think much more in terms of sea control and the projection of force by sea. The exceptions to an unambiguous sea denial role for the Pact are the need to protect strategic submarines from attack by NATO forces and (more tentatively) to move forces eastwards in a war with China via the Indian Ocean. Part at least of Soviet naval forces will be needed to guard Soviet SSBN operating areas in order to keep out NATO hunter-killer submarines and ASW aircraft—particularly in the North Norwegian and Barents Seas.

The importance of the sea for NATO depends upon certain assumptions. In a short war, lasting only a few days, the control of the sea may matter little, except so far as the security of Western SSBN is concerned; but the longer the war continues, the more vital will sea control be to the Allied defence effort. As long as the Warsaw Pact can be denied its European objectives on land in the opening days of a major conflict, the sea and the air space above it will come to assume almost overwhelming importance as the channel for transatlantic reinforcement and, in the longer term, for the transport to Europe of essential commodities. It is also true that a prolonged period of tension before the outbreak of hostilities would permit reinforcement—given the political will—to take place safely (although not without protection against surprise attack) in which case at least part of the predicted naval warfighting role of NATO will be unnecessary. Nevertheless, NATO must plan for the following missions, though not necessarily in this order of priority:

- Protect sea and air routes, so as to ensure the safe passage of reinforcements both across the Atlantic and within the theatre.
- Protect merchant shipping carrying essential commodities.
- Protect the deployment of amphibious forces.
- Project air power ashore from carriers.
- Shadow and, if nuclear escalation takes place, be ready to destroy Soviet SSBN.

(Protection of Western SSBN is not included on the grounds that, at least for the time being, Western SSBN do not appear to be seriously threatened by Soviet ASW forces. However, that situation might change if Soviet ASW techniques improve; on the other hand, the introduction of American *Trident* missiles will greatly extend the—at present—rather restricted operating areas of US SSBN.)

QUALITATIVE FACTORS

Each of the missions listed above has become more difficult to perform in the face of growing Soviet power and naval reach. Also, technology seems to be favouring sea denial rather than sea control. Modern naval weapons, together with satellites for maritime reconnaissance, provide a greatly enhanced ability to acquire targets and to destroy them at long range, using stand-off systems such as air-to-surface missiles and submarine-launched cruise missiles. The coverage of Soviet naval land-based strike aircraft has increased continuously (especially since the introduction of *Backfire*). As a result of the emphasis on the nuclear propulsion for attack submarines, Soviet capacity to threaten submarines, surface units, and merchant shipping has also risen. Close to shore, small manoeuvrable missile-armed FPB, shore-based missiles, and aircraft will pose a major problem for anyone wishing to project power by the use of amphibious forces or carrier-borne aircraft, and, at least at the start of a conflict, the Warsaw Pact may be able to deny certain quite sub-

stantial areas of sea to NATO; the Eastern Mediterranean and the Baltic, Black, and Barents Seas will probably be very hostile environments, as may be the Sea of Japan..

Warsaw Pact naval forces suffer from considerable disadvantages. If unable to get into the high seas before the outbreak of hostilities, they must pass through choke points which are either under NATO control (Dardanelles, Straits of Gibraltar, Skagerrak) or which offer considerable advantages to an intercepting force (the Greenland–Iceland–UK Gap). Even if Warsaw Pact submarines are able to put to sea before war starts, their detection and tracking is less difficult for NATO, and the shadowing of surface units should present few difficulties. Warsaw Pact navies still lack assured fighter cover based at sea and, despite improved SAM cover, will be vulnerable to sustained attack by NATO maritime strike aircraft when beyond the range of shore-based fighter aircraft. This highlights the Soviet need for forward air bases. NATO, on the other hand, is well-placed, using in-flight refuelling, to extend fighter cover well into the Atlantic. Also, given the lack of facilities outside the Soviet Union and the real difficulties of returning to port for repair and replenishment (made more necessary by the fact that Soviet ASW vessels in particular tend to have less reload capacity) there are grounds for calling the Soviet navy a 'one-shot' force which would find it very difficult to sustain operations in distant waters over a period in wartime.

Recent technological trends and break-throughs can have a great impact on the war at sea. Electronic defences might be able to give a very large measure of protection against cruise missiles by jamming guidance systems. Given that cruise missiles form the major part of Soviet anti-shipping systems, ECM could disrupt terminal guidance and at once effectively degrade a key part of the Soviet naval arsenal. (However, advances in missile guidance could redress this.) There are also real possibilities of using effective point defence systems against incoming missiles. ECM and resistance to ECM will therefore play a very significant part in the survivability of naval forces. The possibility remains that one side or the other will achieve a substantial lead in ASW techniques—in detection, destruction, or both. On the whole, ASW advantages lie with the West at present, as much for geographical as for technical reasons.

The crucial period is that at the beginning of hostilities. The United States does not now feel entirely confident in her ability to carry out the reinforcing mission by sea in time. By turning to airlift and prepositioned stocks for a substantial part of her reinforcements, she is not only planning to speed reaction time but tacitly acknowledging the threat of interdiction of the sea routes for some time at least, even if the outcome were eventually favourable. By avoiding the need to sail (and therefore to protect) convoys in the early days of a war at sea, a considerable number of ASW units can be released to hunt Soviet submarines or to protect high-value units such as SSBN, carriers, or amphibious forces.

Non-Soviet forces make up only a very small part of the Warsaw Pact naval strength, and the multinational aspect of their fleet operations can be disregarded. For NATO, by contrast, there remain considerable problems in terms of interoperability and common operating procedures which must degrade the overall effectiveness of NATO sea power to some degree, despite limited joint exercising in peace and constant contact between Allied naval staffs. NATO navies tend to spend a much higher proportion of their lives at sea than those of the Warsaw Pact and have developed under-way replenishment to a much greater extent than the Soviet Union, despite the considerable advances made by the latter in recent years. It is known, for example, that many surface units in the Soviet Mediterranean Squadron spend considerable periods at rest in deep water anchorages and much replenishment takes place at anchor. It must also be noted that Soviet manpower is turned over at a faster rate than NATO's.

In the balance drawn below, certain assumptions must be made with regard to reserves and refit. It seems unwise to assume that any fleet reserve units can be made ready for a war lasting less than 30 days in time to affect the outcome in any significant way. It is also assumed that the proportion of ships undergoing refit at any one time is approximately the same for each class of ship on both sides, and a factor of a quarter has been deducted from paper totals to allow for those vessels which could not be made ready for war within ten days. FPB are not listed, although they can, as already noted, play an important sea-denial role close to shore. Aircraft totals assume 80 per cent availability on both sides, while helicopters have been excluded, although almost all surface ASW platforms deploy one or more.

FUNCTIONAL GROUPINGS

There are three distinct types of NATO surface ship formation: carrier strike groups; support groups; and escort groups. In addition, submarines, aircraft, MCM groups, and mines must be taken into account. *Carrier strike groups* consist of two strike carriers and about fourteen other surface warships performing a number of different protective tasks, including ASW and air defence. A normal complement for US carrier groups would, in addition to the two carriers, be one or two SAM cruisers, six to eight SAM destroyers, and several ASW frigates. This group would be able to use about half of its total number of aircraft in a conventional or nuclear strike role; the remainder (about 100) would be deployed on early warning, air defence, and ASW operations in connection with the protection of the group. Next is the *support group,* defined as an ASW force capable of independent operations in deep waters distant from enemy land-based air power or when the threat of land-based air power is limited by the presence of friendly fighters. This group would be built around an ASW cruiser or ASW carrier and would consist of one major unit together with eight mixed SAM and ASW destroyers and frigates. Third in the ranking of surface groups is the *escort group,* which would be capable of sustained escort operations where the threat of overwhelming air or submarine attack

is limited by the support, either close or distant, of other forces. An escort group would not have an ASW carrier or cruiser but would otherwise be similar in size and constitution to the support group—that is, some eight mixed SAM and ASW destroyers and frigates.

Turning to *submarines*, the most obvious distinction is between those which are nuclear propelled and those which are diesel powered. The former have a far greater operational capability, because of their high and sustained underwater speeds. The latter are more useful in limited areas of operation, like choke points, and are, of course, much cheaper to build. Both would normally operate as single vessels, although co-ordinated group operations may be practised against large surface forces, such as carrier groups. All submarines suffer to some extent from communications problems when submerged, so that relaying target data from reconnaissance aircraft or satellite and co-operation with ASW aircraft will not be easy. They are also noisy when travelling at speed and therefore much more likely to be detected by ASW systems. Nevertheless, submarines remain a most potent threat whether armed with homing torpedoes or cruise missiles (some of the latter have a relatively long-range capability).

It is likely that, on both sides, a large proportion of nuclear attack submarines will be deployed in an attempt to counter hostile and to protect friendly SSBN. Despite the fact that they are strategic systems, the number of SSBN is therefore relevant to the equation, so long as SLBM have not been launched. Submarines could also operate in conjunction with a surface group, and the Soviet Union may use surface groups to protect submarines, though this may confuse the groups' ASW operations and allow enemy submarines to get close. Generally, submarines are considered as individual fleet units.

Naval aircraft—whether land-based or sea-based—are normally organized into squadrons and wings but operate as individual aircraft. They are therefore listed singly and are divided into those which, like the P-3 *Orion* and the *Nimrod*, are land-based maritime reconnaissance (MR) and ASW aircraft and those land-based aircraft, like *Backfire* and *Tornado*, which may be armed with air-to-surface missiles (ASM) for use against surface units. The same division applies to carrier-based aircraft, so these are also listed separately.

The comparison of *MCM groups* and Soviet *mines* may conceal the fact that most older MCM vessels will be unable to sweep or neutralize modern Soviet mines. Each group is assumed to consist of six vessels.

Finally, a word about *amphibious forces* and replenishment groups. Each will require escorting, and the former will need a number of major surface units to establish and maintain sea control during a landing and so long as supporting craft remain offshore. Carrier-borne strike aircraft are likely to be in demand to support the assaulting forces until forward air bases can be established. Any amphibious assault—as opposed to a reinforcement operation at the invitation of any ally—will demand many scarce naval resources in a general war and could not be conducted into high-threat areas without considerable prior attrition of opposing naval and air forces.

DRAWING UP A BALANCE

Before comparing forces by mission, there is one final assumption: in a war of more than 30 days, all naval units of either side *could* be in competition with all the naval units of the other, depending upon deployment decisions at the time and upon other assumptions made about warning time and how that warning time is used to alter deployments. It is impossible to predict, for example, whether the carrier task group earmarked for the Mediterranean will be on station or will have been temporarily withdrawn for safety to the Atlantic. Clearly, non-US NATO forces are likely to remain in the Eastern Atlantic for the most part, but some deployment in the Indian Ocean is possible, and some French units are already there.

It is clearly possible to draw some tentative conclusions as to the overall balance of naval forces from the figures presented overleaf. As expected, NATO sea-control forces are considerably greater by any assessment than their Soviet counterparts, due to the inclusion of the US strike groups, but they face an impressive number of sea-denial systems. The mine warfare balance is obviously not a direct comparison, since only a proportion of mines might have to be cleared in the first instance, but it is clear that NATO's mines and mine-hunters are each fewer than the Warsaw Pact's. If, for example, the Soviet Union were to deploy one nuclear attack submarine to cover every NATO on-station SSBN, she is left with five for each carrier strike group. But even if she were to place even greater emphasis on 'strategic' ASW, she could not put two 'tails' on each SSBN. NATO can deploy three ASW aircraft for every Soviet submarine, though this is a rather inadequate number, given the inherent advantages of the submarine. The number of shore-based Soviet strike aircraft is impressive and the capability it represents is growing as *Backfire* is brought into service; this force is backed by 80 *Badger* tankers, which could extend its range across the North Atlantic. Nevertheless, if their target is to be the carrier groups themselves or vessels moving within the area covered by carrier aircraft, Soviet land-based strike aircraft may be opposed by about 186 carrier-borne fighter aircraft for air defence at sea (many of them the new F-14A with *Phoenix* long-range air-to-air missiles). They may also be intercepted en route to their targets by land-based fighters.

This is as far as such a general analysis can go before specific questions begin to arise about precisely how many carrier groups will be in the Atlantic, the Mediterranean, or the Pacific, and how many Soviet land-based aircraft will be deployed where at a precise moment. At this point, one moves from overall comparisons of naval capabilities into relative strengths in particular scenarios and these depend on fundamental operational assumptions that cannot be made here.

Comparison of Forces by Mission

NATO (incl France)			Warsaw Pact		
Category	US	Total NATO	Category	USSR	Total Pact
Sea-control forces			**Sea-denial forces**		
Strike groups	5	5	GP attack sub (nuc)	64	64
Support groups	3	7	GP attack sub (diesel)	119	125
Escort groups	10	30	Strike ac (shore-based)[a]	256	264
ASW/MR ac (shore-based)	173	325	Mines[d]	400,000	
ASW/MR ac (carrier-based)	88	114			
Air defence aircraft (carrier-based)	160	186			
MCM groups (all types)	½	40			
Sea-denial forces			**Sea-control forces**		
Attack sub (nuc)	68	77	Support groups	3	3
Attack sub (diesel)	10	134	Escort groups	13	13
Strike ac (shore-based)	—	77	ASW/MR ac (shore-based)[b]	164	164
Strike ac (carrier-based)	312	384	ASW/MR ac (carrier-based)[c]	19	19
Mines[d]	n.a. (probably under 100,000)		MCM groups (all types)	40	50
SSBN	31	37	**SSBN**	52	52

[a] *Tu-16* Badger, *Tu*-Backfire *B, and Il-28* Beagle.
[b] *Tu-95* Bear, *Il-38* May, *and Be-12* Mail.
[c] *Yak-36* Forger *provides a limited air defence capability.*
[d] *An approximate figure only.*

CONCLUSIONS

Given that Western assets will be spread across the globe—at least at the outset—there seems little doubt that Warsaw Pact assets could be concentrated to produce an impressive sea-denial capability in selected areas, but it is by no means clear that the Pact has a widespread sea-denial capability given the overall balance of systems. Should the West decide to concentrate its naval assets in those same areas, continuing sea control appears not infeasible. However, it is clear that NATO will be forced to disperse assets to protect much wider areas continuously against what will only be intermittent threats. In general, sea control assets have to be spread a great deal more thinly than sea-denial assets, which can be concentrated and switched rapidly from area to area. In that sense, the initiative as to the time and the place of competition rests with the Soviet Union and not with NATO. Only when NATO naval units turn to specific force-projection tasks and threaten some land objective of their own can the Soviet Union be challenged in an area selected by the West. The obvious exception to this is the Barents Sea, which the Soviet Union clearly considers to be home waters. Any NATO move into that area would be certain to provoke a massive reaction under optimum conditions for Soviet naval and maritime air forces.

Taking a long view (*i.e.*, assuming a war lasts more than 30 days) NATO should be able to organize its own assets better, at the same time as taking a heavy enough toll of Soviet assets to establish overall sea control. Such a war at sea seems likely to be a war of attrition in which geographical factors (primarily) would appear to favour NATO. NATO losses might be high in the early days of the struggle to establish control over areas deemed strategically important, but they should decline as Soviet sea-denial forces are destroyed.

Global force relations may only matter in a long war, and then only in a prediction of ultimate outcomes rather than in predicting the outcome of specific contests in particular areas. The results of these contests will depend—to state a most obvious truth—upon where the contest takes place and what resources each side is prepared to stake on the outcome. If NATO does not attempt all its maritime tasks at once, there should be adequate resources for a number to be successfully completed, though losses may be heavy.

Ten years ago NATO would almost certainly have attempted all its maritime tasks at once with a good expectation of success. That it cannot now expect to do so is a measure of the growth of Soviet sea-denial capability and the relative decline of the West's ability to use the sea for its own purposes.

How the balance will develop depends upon many factors, not least any overseas naval and air facilities acquired by the Soviet Union. Extended maritime operations, combined with qualitative improvements already discernible, would accelerate that detectable trend in favour of increased Soviet influence.

NOTE: A hard cover edition of "The Military Balance" is published in America by The Westview Press, 1898 Flatiron Court, Boulder, Colo. 80301.

TABLES OF COMPARATIVE STRENGTHS

1. Nuclear Delivery Vehicles: Comparative Strengths and Characteristics

(A) United States and Soviet Union

(i) *Missiles and Artillery*

United States						Soviet Union					
Category[a] and type	Number deployed (7/78)	First deployment	Max. range (mi)[b]	Throw-weight (000 lb)[c]	Warheads, max. yield[d] and notes	Category[a] and type[f]	Number deployed (7/78)	First deployment	Max. range (mi)[e]	Throw-weight (000 lb)[c]	Warheads, max. yield[d] and notes
Land-based						**Land-based**					
ICBM						*ICBM*					
Titan II	54	1962	7,000	7.5	1 × 5–10 MT	SS-9 *Scarp*	190	1965	7,500	12–15	Mod 1: 1 × 18 MT. Mod 2: 1 × 25 MT. Mod 4: 3 × 4–5 MT (MRV)
Minuteman II	450	1966	7,000	1–1.5	1 × 1–2 MT						
Minuteman III	550	1970	7,500	1.5–2	3 × 170 KT (MIRV)	SS-11 *Sego*	780	1966	6,500	1.5–2	Mod 1: 1 × 1–2 MT. Mod 3: 3 × 100–300 KT (MRV). Mod 3 has replaced some Mod 1
						SS-13 *Savage*	60	1968	5,000	1	1 × 1 MT. A solid-fuel successor, the SS-16, is ready for deployment; it has about twice the throw-weight and may also be deployed in a land-mobile mode
						SS-17	60	1975	6,500	6	Mod 1: 4 × 900 KT (MIRV). Mod 2: 1 × 5 MT operational. Has begun deployment in modified SS-11 silos
						SS-18	110	1975	6,300+	16–20	Mod 1: 1 × 18–25 MT. Mod 2: 8 × 2 MT (MIRV). Deployment has begun; reported accuracy 600 ft
						SS-19 Mod 1 / Mod 2	200	1975 / n.a.	7,000 / 6,300+	7	6 × 1–2 MT (MIRV) operational / 1 × 5 MT has been tested. Has begun deployment in modified SS-11 silos
MIRBM						*MIRBM*					
						SS-4 *Sandal*	500	1959	1,200	1	1 × 1 MT
						SS-5 *Skean*	90	1961	2,300	1	1 × 1 MT
						SS-20	100	1977	3–4,000	1.2	3 × 150 KT (MIRV). Tested at longer range with 1 lower-yield warhead
SRBM						*SRBM*					
Honest John	n.a.	1953	25	n.a.	Dual-capable. 1 × KT range	SS-1b *Scud* A		1957	50	n.a.	1 × KT range
Pershing	108[e]	1962	450	n.a.	Dual-capable. 1 × high KT range; conventional warheads under development	FROG 7		1965	10–45	n.a.	1 × KT range
						SS-1c *Scud* B	1,300	1965	185	n.a.	1 × KT range
						SS-12 *Scaleboard*		1969	500	n.a.	1 × MT range
Lance	36[e]	1972	70	n.a.	Dual-capable. 1 × low KT range; conventional warheads under development	SS-21		1978	65	n.a.	n.a.
LRCM						*LRCM*					
						SS-N-3 *Shaddock*	(100)	1962	450	n.a.	1 × KT range
Sea-launched						**Sea-launched**					
SLBM						*SLBM*					
Polaris A3	160	1964	2,880	1	3 × 200 KT (MIRV)	SS-N-4 *Sark*	27	1961	350	n.a.	1 × 1–2 MT
Poseidon C3	496	1971	2,880	2	10 × 50 KT (MIRV). Can carry up to 14 RV over reduced range	SS-N-5 *Serb*	54	1964	750	n.a.	1 × 1–2 MT
						SS-N-6 *Sawfly* Mods 1,2 / Mod 3	528	1969	1,750 / 2,000	1.5	1 × 1–2 MT, tested / 3 × KT range (MIRV)
						SS-N-8	370	1972	4,800	1.5	1 × 1–2 MT
						SS-NX-17	16	1977	3,000+	3	1 × MT; also tested with MIRV. Solid-fuel successor for SS-N-6
						SS-N-18	n.a.	1978	5,000+	5	3 × 1–2 MT (MIRV). Solid-fuel successor for SS-N-8
SLCM						*SLCM*					
						SS-N-3 *Shaddock*	324	1962	450	n.a.	1 × KT range.
Air-launched						**Air-launched**					
ALCM						*ALCM*					
Hound Dog	(400)	1961	600	n.a.	1 × KT range	AS-3 *Kangaroo*	n.a.	1961	400	n.a.	1 × MT range
						AS-4 *Kitchen*	(800)	1962	450	n.a.	1 × KT range
						AS-6 *Kingfish*	n.a.	1977	160	n.a.	1 × KT range
ALBM						*ALBM*					
SRAM	1,250	1972	150	n.a.	1 × KT range						
Artillery						**Artillery**					
M-110 203mm sp how	215	1962	10	—	Dual-capable. 1 × KT range	M-55 203mm towed gun/how	n.a.	1950s	18	—	Possibly dual-capable. If so, 1 × KT range
M-109 155mm sp how	300	1964	10	—	Dual-capable. 1 × 2 KT						

(ii) *Aircraft*

United States						Soviet Union					
Category[a] and type	Number deployed (7/78)	First deployment	Max. range (mi)[d]	Max. speed (Mach)	Weapons load (000 lb)	Category[a] and type[f]	Number deployed (7/78)	First deployment	Max. range (mi)[d]	Max. speed (Mach)	Weapons load (000 lb)
Bombers						**Bombers**					
Long-range						*Long-range*					
B-52D	366[f]	1956	10,000	0.95	60	Tu-95 *Bear*	100	1956	8,000	0.78	40
B-52G/H		1959	12,500	0.95	70	Mya-4 *Bison*	35[k]	1956	7,000	0.87	20
Medium-range						*Medium-range*					
FB-111A	66	1969	6,000	2.5	37.5	Tu-16 *Badger*	585[l]	1955	4,000	0.8	20
						Tu-? *Backfire* B[m]	80[l]	1974	5,500	2.5	17.5
Strike Aircraft						**Strike Aircraft**					
Land-based (incl short-range bombers)						*Land-based* (incl short-range bombers)					
F-4C/D/E	(556)[f]	1962	1,400	2.4	16	Il-28 *Beagle*		1950	1,400	0.8	4.85
F-111A/E		1967	2,925	2.2/2.5	28	Su-7 *Fitter* A		1959	900	1.7	5.5
						Tu-22 *Blinder*		1962	1,400	1.5	12
						MiG-21 *Fishbed* J/K/L	(1,000)	1970	1,150	2.2	2
						MiG-27 *Flogger* D		1971	900	1.7	7.5
						Su-17/-20 *Fitter* C		1974	1,100	1.6	11
						Su-19 *Fencer* A		1974	900	2.3	8
Carrier-based						*Carrier-based*					
F-4J/N	(100)[g]	1962	1,400	2.2	16						
A-6E		1963	2,000	0.9	18						
A-7E		1966	2,800	0.9	20						

(iii) *Historical Changes in Launcher Strength*

United States	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
ICBM	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054
SLBM	656	656	656	656	656	656	656	656	656	656	656
Long-range bombers	545	560	550	505	455	422	437	432	432	432	432

(iii) *Historical Changes in Launcher Strength*

Soviet Union	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
ICBM	858	1,028	1,299	1,513	1,527	1,527	1,575	1,618	1,527	1,477	1,400
SLBM	121	196	304	448	500	628	720	784	845	909	1,015
Long-range bombers	155	145	145	145	140	140	140	135	135	135	135

(B) Other NATO and WARSAW Pact Countries

(i) *Missiles and Artillery*

NATO (excluding USA)						Warsaw Pact (excluding USSR)					
Category[n] and type[n]	Number deployed (7/78)	First deployment	Max. range (mi)[b]	Warheads and max. yield[d]	Countries equipped	Category and type[f,n]	Number deployed (7/78)	First deployment	Max. range (mi)[b]	Warheads and max. yield[d]	Countries equipped
Land-based						**Land-based**					
IRBM						*IRBM*					
						SS-1b *Scud* A		1957	50	Dual-capable, 1 × KT range	All[q]
SRBM						*SRBM*	(132)				
SSBS S-2	18	1971	1,875	1 × 150 KT	France	SS-1c *Scud* B		1965	185	Dual-capable, 1 × KT range	All[q]
Honest John	(99)	1953	25	Dual-capable, 1 × KT range	Germany, Greece, Netherlands, Turkey[o]	FROG 3-7	(206)	1957–65	10-45	Dual-capable, 1 × KT range	All[q]
Pershing	72	1962	450	1 × KT range	Germany[o]						
Pluton	30	1974	75	1 × 15–25 KT	France						
Lance	(48)	1976	70	1 × KT range	Belgium, Britain, Germany, Italy						
Sea-launched						**Sea-launched**					
SLBM						*SLBM*					
Polaris A3	64	1967	2,880	3 × 200 KT (MRV)	Britain						
MSBS M-2	16	1974	1,900	1 × 500 KT	France						
MSBS M-20	48	1977	3,000	1 × 1 MT	France						
Artillery						**Artillery**					
M-110 203mm SP how	n.a.	1962	10	Dual-capable, 1 × KT range	Belgium, Britain, Denmark, Germany, Greece, Italy, Netherlands, Turkey[o]						
M-109 155mm SP how	n.a.	1964	10	Dual-capable, 1 × 2 KT	Belgium, Britain, Canada, Denmark, Germany, Greece, Italy, Netherlands, Norway, Turkey[o,p]						

(ii) *Aircraft*

NATO (excluding USA)							Warsaw Pact (excluding USSR)						
Category[a] and type[e]	Number deployed (7/78)	First deployment	Max. range (mi)[i]	Max. speed (Mach)	Weapons load (000 lb)	Countries equipped	Category and type[f,s]	Number deployed (7/78)	First deployment	Max. range (mi)[i]	Max. speed (Mach)	Weapons load (000 lb)	Countries equipped
Bombers							**Bombers**						
Medium-range							*Medium-range*						
Vulcan B2	48	1960	4,000	0.95	21	Britain							
Strike Aircraft							**Strike Aircraft**						
Land-based (incl short-range bombers)							*Land-based* (incl short-range bombers)						
F-104	n.a.[r]	1958	1,500	2.2	4	Belgium, Canada,[s] Germany, Italy, Netherlands, Norway, Turkey[o]	Il-28 *Beagle*[q]	6[t]	1950	1,400	0.81	4.85	Poland
F-4	n.a.[r]	1962	1,400	2.4	16	Germany, Greece, Turkey	Su-7 *Fitter* A[q]	110[t]	1959	900	1.7	5.5	Czechoslovakia, Poland
Buccaneer	64	1962	2,300	0.95	12	Britain	Su-20 *Fitter* C[q]	28	1974	1,100	1.6	4	Poland
Mirage IVA	37	1964	2,000	2.2	16	France							
Jaguar	177	1973	1,000	1.4	1	Britain, France							

Figures in parentheses are estimated.

[a] ICBM = range over 4,000 mi; IRBM = 1,500–4,000 mi; MRBM = 500–1,500 mi; SRBM = under 500 mi; LRCM = over 350 mi.

[b] Statute miles. Use of maximum payload may reduce operational range by up to 25 per cent of these figures.

[c] Throw-weight is the weight of post-boost vehicle (warheads, guidance systems, penetration aids) that can be delivered over a given range. At maximum range, throw-weight will be less than shown.

[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] Figures for systems in Europe only.

[f] 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.

[g] All the types listed are dual-capable, but some in the strike categories are not presently configured for the nuclear role.

[h] Long-range = over 6,000 mi; medium-range = 3,500–6,000 mi; bomber = aircraft primarily designed for bombing missions.

[i] Statute miles. Theoretical maximum range at optimum altitude and speed. Higher speeds, lower altitudes and full weapons loads reduce range, especially in the case of strike aircraft; for instance, an F-104 flying at operational height and speed and with typical weapons load has a combat *radius* of some 420 mi, compared with a maximum *range* of 1,500 mi.

[j] Excluding aircraft in storage or reserve.

[k] Excluding some 44 configured as tankers.

[l] Including Naval Air Force aircraft (some 280 Tu-16 *Badger* and 30 Tu- *Backfire* B) but excluding Tu-16 *Badger* tankers.

[m] Listed as a medium-range bomber on the basis of reported range characteristics.

[n] All NATO missiles are of American origin, except SSBS, *Pluton* and MSBS, which are French. All Warsaw Pact missiles are of Soviet origin.

[o] Nuclear warheads held in American custody. No nuclear warheads held on Danish or Norwegian soil.

[p] In few of these cases is the M-109 likely to have a nuclear role, and certainly not in the case of Canada.

[q] Nuclear warheads held in Soviet custody. It is not known how many are earmarked for a nuclear role.

[r] All aircraft listed are dual-capable, but many would be more likely to carry conventional than nuclear weapons. Certain other strike aircraft, such as the French *Mirage* III, may also be capable of carrying tactical nuclear weapons.

[s] *Vulcan* and *Buccaneer* are of British origin, F-104 and F-4 American, *Mirage* French and *Jaguar* Anglo-French. All Warsaw Pact aircraft are of Soviet origin.

[t] It is uncertain how many of these aircraft have a nuclear role. NATO (less US) deploys a total of about 500 F-104s and 150 F-4s in the FGA role.

[u] Canadian aircraft have no nuclear role.

2. Comparative Strengths of Armed Forces 1957-1978 (in thousands)

Year	USA	Japan	Germany	France	Britain[a]	USSR
1957	2,800	202	122	836	700	4,200
1958	2,637	214	175	797	615	4,000
1959	2,552	215	249	770	565	3,900
1960	2,514	206	270	781	520	3,623
1961	2,572	209	325	778	455	3,800
1962	2,827	216	389	742	445	3,600
1963	2,737	213	403	632	430	3,300
1964	2,687	216	435	555	425	3,300
1965	2,723	225	441	510	424	3,150
1966	3,123	227	455	500	418	3,165
1967	3,446	231	452	500	417	3,220
1968	3,547	235	440	505	405	3,220
1969	3,454	236	465	503	383	3,300
1970	3,066	259	466	506	373	3,305
1971	2,699	259	467	502	365	3,375
1972	2,391	260	467	501	363	3,375
1973	2,253	266	475	504	352	3,425
1974	2,174	233	490	503	345	3,525
1975	2,130	236	495	503	345	3,573
1976	2,087	235	495	513	335	3,650
1977	2,088	238	489	502	330	3,675
1978	2,069	240	490	503	313	3,638

[a] Excluding forces enlisted outside Britain.

3. 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	16,850	324	17,840	216	15,000	4,500	108	4,800	54	12–24
Soviet Union	11,000	325[a]	13,000	266[a]	7,000	1,300[b]	95[b]	2,300[b]	40[b]	10–14
China	10,000	270	12,000[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]	108[e]	5,000[e]	54[e]	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' is, however, often employed, particularly in West European countries, to describe a battalion-size unit, and it is so used in *The Military Balance*.)
[c] Infantry division.
[d] Britain has eliminated the brigade. Armoured division strength will rise to 11,500 on mobilization. New infantry formations of about brigade size, known as Field Forces, have been formed; their establishments vary according to role.
[e] Proposed new armoured brigades will have 3,026 men and 99 tanks, mechanized brigades 3,730 men and 66 tanks.

4. Indices of NATO Defense Expenditure, Current and *Constant* Prices[a]

(in local currency, 1970 = 100)

Country	1960	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977[b]	% Growth[c] 1960–70	% Growth[c] 1971–7
Belgium	53.9	81.1	87.1	90.4	100.0	105.8	117.7	130.5	153.0	186.5	218.8	243.6	6.4	14.90
	72.5	*89.8*	*93.9*	*94.0*	*100.0*	*101.3*	*107.0*	*110.9*	*115.4*	*124.7*	*134.1*	*139.4*	*3.3*	*5.46*
Britain	67.7	93.1	95.4	94.2	100.0	115.2	133.3	143.4	172.1	211.3	252.1	279.2	4.0	15.90
	100.6	*109.3*	*106.9*	*100.2*	*100.0*	*105.2*	*113.7*	*112.0*	*115.9*	*114.6*	*117.3*	*112.1*	*0*	*1.03*
Canada	80.3	95.3	93.5	92.1	100.0	103.4	108.6	116.7	138.9	151.7	174.1	200.5	2.2	11.67
	105.3	*107.2*	*101.1*	*95.2*	*100.0*	*100.6*	*100.8*	*100.6*	*108.0*	*106.6*	*113.6*	*121.2*	*−0.5*	*3.15*
Denmark	40.4	81.6	94.0	95.8	100.0	115.9	122.8	127.7	161.0	191.3	206.0	226.7	9.5	11.82
	71.4	*97.3*	*103.7*	*102.0*	*100.0*	*109.4*	*108.9*	*103.6*	*113.2*	*122.9*	*121.3*	*120.3*	*3.4*	*1.6*
France	57.7	87.1	91.0	95.5	100.0	105.4	110.8	121.2	147.4	171.3	195.6	219.9	5.6	13.03
	85.7	*102.3*	*102.3*	*101.1*	*100.0*	*99.8*	*99.2*	*101.1*	*108.1*	*112.5*	*117.2*	*120.7*	*1.6*	*3.22*
Germany	53.7	94.8	85.5	95.6	100.0	112.7	127.2	141.4	157.9	166.5	172.4	181.1	6.4	8.22
	70.2	*102.6*	*91.1*	*99.2*	*100.0*	*107.2*	*114.6*	*119.0*	*124.2*	*123.6*	*122.4*	*123.8*	*3.6*	*2.42*
Greece	36.0	66.1	77.4	89.8	100.0	109.0	121.1	139.8	169.8	309.1	291.9	418.8	10.8	25.15
	44.2	*70.0*	*81.7*	*92.6*	*100.0*	*105.8*	*112.6*	*112.9*	*108.1*	*172.6*	*144.1*	*184.2*	*8.5*	*9.68*
Italy	45.5	87.0	89.8	90.4	100.0	118.6	138.4	153.1	182.6	198.7	231.0	268.6	8.2	14.60
	67.0	*95.0*	*96.8*	*94.8*	*100.0*	*113.1*	*125.0*	*124.7*	*124.8*	*116.7*	*115.8*	*114.8*	*4.1*	*0.24*
Luxembourg	63.2	99.3	89.9	94.0	100.0	106.3	124.3	144.5	170.7	201.0	236.3	251.0	4.7	15.40
	81.5	*109.1*	*96.3*	*98.3*	*100.0*	*101.6*	*112.9*	*124.1*	*133.5*	*141.8*	*131.9*	*151.2*	*2.1*	*6.84*
Netherlands	43.5	80.6	82.7	92.8	100.0	112.6	125.4	137.7	161.9	182.6	197.0	216.4	8.7	11.50
	65.6	*93.1*	*92.0*	*96.1*	*100.0*	*104.7*	*108.2*	*110.0*	*117.9*	*120.7*	*119.7*	*123.3*	*4.3*	*2.76*
Norway	38.1	75.6	82.9	90.2	100.0	108.9	116.8	126.4	142.0	171.0	192.2	219.0	10.1	12.35
	59.2	*89.3*	*94.5*	*99.8*	*100.0*	*102.5*	*102.6*	*103.3*	*106.0*	*115.0*	*117.8*	*123.1*	*5.4*	*3.10*
Portugal	24.1	76.4	85.3	86.0	100.0	117.2	128.0	133.5	200.3	158.0	150.3	168.2	15.3	6.20
	37.3	*93.7*	*98.7*	*91.0*	*100.0*	*104.7*	*103.3*	*95.4*	*114.4*	*78.6*	*61.5*	*54.0*	*10.4*	*−11.66*
Turkey	38.6	73.7	82.7	86.5	100.0	136.1	159.7	195.5	253.8	271.4	427.3	764.8	10.0	32.91
	68.4	*87.7*	*93.0*	*92.6*	*100.0*	*114.3*	*123.6*	*131.1*	*147.0*	*131.9*	*177.3*	*249.1*	*3.9*	*13.87*
United States	58.3	96.9	103.7	104.6	100.0	96.2	99.7	100.8	110.3	116.8	116.9	133.9	5.5	5.66
	76.5	*112.7*	*115.7*	*110.8*	*100.0*	*92.3*	*92.6*	*88.1*	*86.9*	*84.3*	*79.7*	*85.8*	*2.7*	*−1.21*

[a] To produce constant price series (in italics) defence expenditures are deflated by consumer price indices. These reflect general rates of inflation, not rates in the defence sector.
[b] 1977 figures are provisional, those for Greece and Turkey being estimates; hence 1971–77 growth rates are approximate.
[c] Average annual compound growth rates over periods shown.

5. Comparisons of Defense Expenditures 1975-1978

Country	$ million				$ Per head				% Government spending[a]				% of GNP[b]			
	1975	1976	1977	1978	1975	1976	1977	1978	1975	1976	1977	1978	1974	1975	1976	1977
Warsaw Pact[c]																
Bulgaria	457	438	408	438	52	50	46	49	6.0	5.3	5.2	5.1	2.7	2.7	2.4	2.5
Czechoslovakia	1,706	1,805	1,823	1,818	116	121	122	121	7.3	7.0	7.0	7.1	3.8	3.8	3.9	3.8
Germany, East	2,550	2,729	2,900	n.a.	148	158	168	n.a.	7.9	7.8	7.8	n.a.	5.4	5.5	5.7	5.9
Hungary	506	551	590	658	48	52	56	62	3.5	3.6	3.6	3.7	2.4	2.4	2.5	2.6
Poland	2,011	2,252	2,455	2,545	59	66	71	73	7.0	7.4	8.5	8.6	3.0	3.1	3.0	3.0
Romania	707	759	824	923	33	35	38	43	3.7	4.0	4.0	3.8	1.7	1.7	1.7	1.7
Soviet Union[d]	124,000	127,000	133,000	n.a.	490	492	508	n.a.	n.a.	n.a.	n.a.	n.a.	11-13%		11-13%	
NATO[e]																
Belgium	1,971	2,013	2,476	n.a.	200	204	253	n.a.	10.0	10.2	10.4	n.a.	2.8	3.0	3.0	3.4
Britain	11,118	10,734	12,103	13,579	198	190	214	239	11.6	11.0	12.7	11.2	5.1	4.9	5.2	5.0
Canada	2,965	3,231	3,348	3,635	130	140	144	153	11.9	10.0	8.8	8.9	2.1	2.2	1.8	1 8
Denmark	939	861	1,085	1,320	185	168	213	259	7.3	7.4	6.7	6.5	2.2	2.2	2.5	2.5
France	13,984	12,857	13,666	17,518	264	241	254	325	20.2	20.6	19.2	20.3	3.6	3.9	3.7	3.6
Germany*	16,142	15,220	17,130	21,355	259	242	271	337	24.4	23.5	23.9	22.9	3.6	3.7	3.5	3.4
Greece	1,435	1,249	1,328	1,523	159	138	146	164	25.5	26.0	20.2	18.3	4.0	6.9	5.0	5.0
Italy	4,700	3,821	4,730	5,610	84	68	83	98	9.7	8.6	8.9	7.9	2.9	2.6	2.5	2.4
Luxembourg	22	23	29	37	65	68	80	100	3.0	2.9	2.8	2.9	0.9	1.1	1.0	1.1
Netherlands	2,978	2,825	3,716	4,208	218	205	266	301	11.0	9.8	10.9	9.5	3.4	3.6	3.3	3.6
Norway	929	902	1,130	1,291	232	223	241	316	8.2	7.6	9.3	9.6	3.1	3.1	3.2	3.1
Portugal	1,088	748	545	568	124	85	62	62	35.2	n.a.	13.3	10.6	6.6	6.0	4.0	3.3
Turkey	2,200	2,800	2,652	2,286	55	70	65	54	26.6	29.4	20.8	22.0	3.7	9.0	5.5	5.7
United States	88,983	91,000	104,250	113,000	417	423	480	517	23.8	23.8	22.7	23.0	6.1	5.9	5.4	6.0
Other Europe																
Austria	410	433	534	718	54	57	68	91	3.7	3.7	3.8	3.9	0.9	1.0	1.2	1.1
Eire	128	134	149	193	41	43	47	59	4.3	3.5	3.6	3.5	1.4	1.6	1.6	1.6
Finland	388	364	427	454	83	77	90	95	5.0	5.1	4.9	6.1	1.4	1.4	1.3	1.3
Spain	1,701	1,766	2,154	2,363	48	49	59	64	14.5	14.9	15.3	13.2	1.9	1.8	1.7	1.7
Sweden	2,483	2,418	2,833	2,946	303	294	343	355	10.5	12.5	11.6	11.7	3.4	3.4	3.4	3.4
Switzerland	1,047	1,221	1,153	1,547	160	184	172	240	19.3	18.8	18.3	18.0	1.8	1.8	2.0	1.9
Yugoslavia[c]	1,705	1,798	2,086	2,332	80	84	96	106	49.9	40.9	40.8	52.9	5.1[f]	5.6[f]	5.4	5.2
Middle East																
Algeria	285	312	397	456	17	18	23	25	4.7	n.a.	5.9	5.7	1.8[f]	2.2[f]	3.4	3.9
Egypt	6,103	4,859	n.a.	n.a.	163	128	112	n.a.	42.0	n.a.	n.a.	n.a.	22.8	n.a.	n.a.	n.a.
Iran	8,800	9,500	7,894	9,942	268	281	224	273	24.9	28.9	23.5	23.8	14.0[f]	17.4[f]	12.0	10.9
Iraq	1,191[g]	1,417	1,660	n.a.	107	123	141	n.a.	43.7	26.8	29.7	n.a.	18.7	n.a.	9.6	10.2
Israel	3,552	4,214	4,259	3,310	1,045	1,201	1,176	887	50.1	56.7	32.4	30.4	31.8	35.9	36.3	29.9
Jordan	155	155	201	304	57	55	70	103	22.0	19.4	20.1	25.6	12.1	12.2	12.9	15.5
Libya	203	229	338	448	83	90	130	162	13.7	n.a.	17.4	19.5	1.4	1.7	n.a.	1.8
Morocco	224	258	346	681	13	15	19	37	4.5	6.0	7.8	11.6	3.0	2.8	3.3	3.6
Saudi Arabia	6,771	9,038	7,539	13,170	1,153	1,506	1,005	1,704	20.0	29.0	24.0	35.1	7.3	18.0	17.7	13.6
Sudan	120	146	237	n.a.	7	8	12	n.a.	15.1	8.1	10.4	n.a.	4.3	n.a.	3.6	5.4
Syria	706	1,003	1,068	1,121	96	132	138	138	25.3	22.3	23.0	24.1	11.0[f]	15.1[f]	16.3	16.4
Africa																
Ethiopia	84	103.4	149	165	3	4	5	6	19.4	n.a.	21.1	21.6	3.3	2.9	3.6	n.a.
Nigeria	1,786	2,434	2,670	n.a.	28	38	40	n.a.	11.8	15.5	16.6	n.a.	2.9	n.a.	7.7	7.8
Rhodesia	102	130	159	242	16	21	24	35	12.3	14.1	16.5	17.1	2.6	3.0	5.2	7.7
South Africa	1,332	1,619	2,231	2,622	53	62	83	95	18.5	17.0	19.0	19.7	3.2	5.3	4.9	5.1
Asia																
Australia	2,492	2,803	2,678	n.a.	184	204	191	n.a.	8.6	9.4	9.1	n.a.	3.6	3.2	3.0	2.9
China[c]	n.a.	32,400	29,750	34,380	n.a.	35	32	36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	8.5
China (Taiwan)	1,007	1,597	1,672	n.a.	61	93	95	n.a.	n.a.	54.7	48.3	n.a.	7.2	n.a.	9.3	8.3
India	2,660	2,812	3,117	3,571	4	5	5	6	21.1	19.6	16.3	16.0	2.7	3.0	3.1	3.1
Indonesia	1,108	1,024	1,513	1,691	9	8	11	12	16.7	12.1	14.8	14.5	2.6	3.8	3.5	3.5
Japan	4,620	5,058	6,135	8,567	42	45	54	74	6.6	6.2	5.9	n.a.	0.9	0.9	0.9	0.9
Korea, North[c]	n.a.	n.a.	1,000	1,030	n.a.	n.a.	60	60	n.a.	16.7	15.4	n.a.	n.a.	n.a.	11.2	10.5
Korea, South	943	1,500	2,033	2,600	28	42	58	72	29.2	34.6	34.3	35.4	4.3	5.1	6.2	6.5
Malaysia	385	353	542	699	31	27	43	54	17.3	16.9	12.5	13.4	3.8	4.0	3.8	4.4
New Zealand	243	217	242	n.a.	79	69	76	n.a.	4.3	4.2	4.2	n.a.	1.8	1.8	1.7	1.8
Pakistan	725	807	808	938	10	11	11	12	12.3	17.2	39.4	42.7	8.4	7.2	5.5	4.6
Philippines	407	410	680	793	10	9	15	17	19.3	n.a.	18.3	17.2	2.1	2.6	3.0	3.4
Singapore	344	315	410	n.a.	152	138	175	n.a.	18.1	15.3	18.5	n.a.	5.1	5.3	5.4	6.3
Thailand	542	601	748	n.a.	13	14	17	n.a.	25.7	18.0	18.8	n.a.	3.2	3.7	3.7	4.1
Latin America																
Argentina	1,031	1,287	1,415	1,659	41	49	54	63	9.7	11.7	14.7	14.9	1.9	0.9	2.8	n.a.
Brazil	1,283	1,780	2,071	2,039	12	16	18	18	9.3	9.7	9.4	8.6	1.3	1.3	1.2	1.1
Colombia	106	133	140	173	n.a.	5	5	6	n.a.	9.2	8.3	7.6	0.8	0.8	1.1	1.1
Cuba[c]	n.a.	n.a.	n.a.	784	n.a.	n.a.	n.a.	80	n.a.	n.a.	n.a.	8.6	n.a.	n.a.	n.a.	n.a.
Mexico	586	591	544	557	10	9	8	8	2.4	4.4	3.9	2.9	0.7[f]	0.7[f]	0.8	0.6
Peru	383	n.a.	406	n.a.	24	n.a.	24	n.a.	15.3	n.a.	13.5	n.a.	2.4	3.1	2.4	3.1
Venezuela	494	423	512	615	41	34	40	47	5.4	5.5	6.1	5.9	1.6	1.7	1.4	1.4
* Incl aid to W. Berlin	19,540	18,758	21,263	26,731	313	299	337	422	29.2	28.9	29.6	28.7	4.3	4.4	4.3	4.2

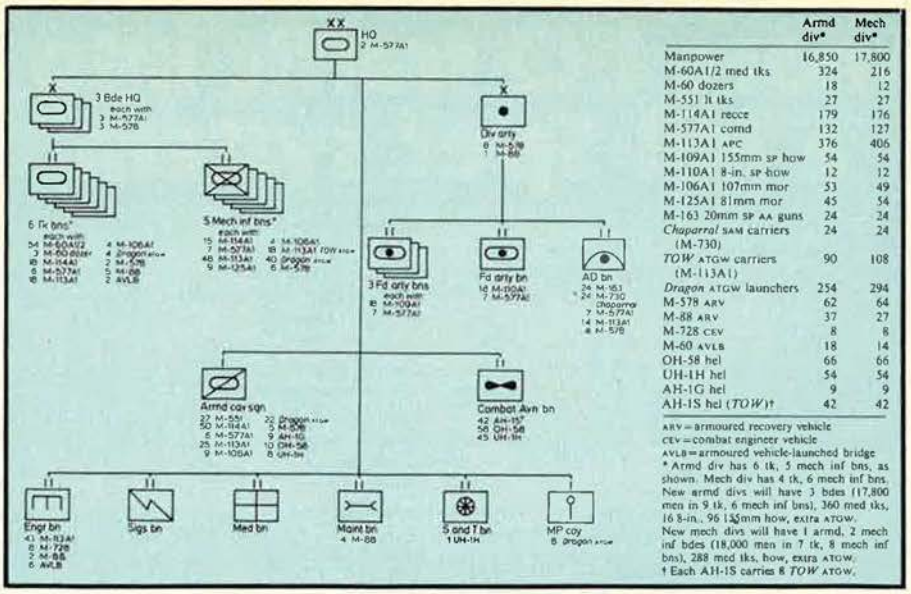
[a] This series is designed to show national trends only; differences in the scope of the government sector invalidate international comparisons.
[b] Based on local currency. GNP estimated where official figures unavailable.
[c] The difficulty of calculating suitable exchange rates makes conversion to dollars imprecise.
[d] See p. 11.
[e] Defence expenditures based on NATO definition, but some 1978 figures estimated from nationally-defined data. Figures from 1977 are provisional.
[f] Gross domestic product at market prices, not GNP, in 1974 and 1975.
[g] Nine-month figure only.

6. Comparisons of Military Manpower 1974-1978 (in thousands)

Country	1974–78					1978					
	Numbers in armed forces					Armed forces				Estimated reservists[a]	Para-military forces
	1974	1975	1976	1977	1978	Army	Navy	Air	% of men 18-45		
Warsaw Pact											
Bulgaria	152.0	152.0	164.5	148.5	150.0	115.0	10.0	25.0	8.4	235.0	189.0
Czechoslovakia	200.0	200.0	180.0	181.0	186.0	140.0	—	46.0	6.1	350.0	132.5
Germany, East	145.0	143.0	157.0	157.0	157.0	105.0	16.0	36.0	4.6	305.0	571.5
Hungary	103.0	105.0	100.0	103.0	114.0	91.0	—	23.0	5.2	143.0	75.0
Poland	303.0	293.0	290.0	307.0	306.5	222.0	22.5	62.0	4.0	605.0	445.0
Romania	171.0	171.0	181.0	180.0	180.5	140.0	10.5	30.0	4.1	345.5	737.0
Soviet Union	3,525.0	3,575.0	3,650.0	3,675.0	3,638.0	1,825.0[b]	433.0[b]	455.0[b]	6.7	6,800.0	450.0
NATO											
Belgium	89.7	87.0	88.3	85.7	87.1	63.4	4.3	19.4	4.5	54.4	16.5
Britain[c]	354.6	345.1	344.2	339.2	313.3	160.8	67.8	84.7	3.0	237.5	—
Canada	83.0	77.0	77.9	80.0	80.0	29.3	14.2	36.5	1.6	19.1	—
Denmark	37.1	34.4	34.7	34.7	34.0	21.0	6.1	6.9	3.3	154.9	—
France	502.5	502.5	512.9	502.1	502.8	324.4	68.2	100.8	4.7	350.0	83.3
Germany	490.0	495.0	495.0	489.0	489.9	336.2	36.5	106.2	3.9	760.1	20.0
Greece	161.2	161.2	199.5	200.0	190.1	150.0	17.5	22.6	11.0	290.0	129.0
Italy	421.0	421.0	352.0	330.0	362.0	251.0	42.0	69.0	3.3	693.8	195.5
Luxembourg	0.6	0.6	0.6	0.6	0.7	0.7	—	—	0.9	—	0.4
Netherlands	113.9	112.5	112.2	109.7	109.7	75.0	17.0	17.7	3.7	175.0	8.2
Norway	34.9	35.0	39.0	39.0	39.0	20.0	9.0	10.0	5.1	245.0	—
Portugal	217.0	217.0	59.8	58.8	63.5	40.0	14.0	9.5	3.9	—	29.4
Turkey	453.0	453.0	460.0	465.0	485.0	390.0	45.0	50.0	5.8	525.0	110.0
United States	2,174.0	2,130.0	2,086.7	2,088.0	2,068.8	774.2	723.8	570.8	4.7	819.7	—
Other European											
Austria	37.3	38.0	37.3	37.3	37.0	33.0	—	4.0	2.6	113.7	11.3
Eire	12.3	12.1	14.0	14.7	14.6	13.2	0.7	0.7	2.5	18.7	—
Finland	35.8	36.3	35.8	39.9	39.9	34.4	2.5	3.0	3.8	690.0	4.0
Spain	284.0	302.3	302.3	309.0	315.5	240.0	40.0	35.5	4.6	1,000.0	103.0
Sweden	72.2	69.8	65.4	68.6	65.7	40.6	11.8	13.3	4.1	684.0	—
Switzerland	18.5	18.5	18.5	18.5	18.5	18.5	—	—	1.4	606.5	
Yugoslavia	230.0	230.0	250.0	260.0	267.0	200.0	27.0	40.0	5.6	500.0	1,016.0
Middle East											
Algeria	63.0	63.0	69.3	75.8	78.8	70.0	3.8	5.0	2.6	100.0	10.0
Egypt	323.0	322.5	342.5	345.0	395.0	350.2	20.0	25.0	5.0	515.0	50.0
Iran	238.0	250.0	300.0	342.0	413.0	285.0	28.0	100.0	5.9	300.0	74.0
Iraq	112.5	135.0	158.0	188.0	212.0	180.0	4.0	28.0	10.1	250.0	79.8
Israel	145.5	156.0	158.5	164.0	164.0	138.0	5.0	21.0	23.3	460.0	9.5
Jordan	74.9	80.2	67.9	67.8	67.9	61.0	0.2	6.7	14.2	30.0	10.0
Libya	32.0	32.0	29.7	29.2	37.0	30.0	3.0	4.0	7.7	n.a.	n.a.
Morocco	56.0	61.0	73.0	84.7	89.0	81.0	2.0	6.0	2.6	n.a.	30.0
Saudi Arabia	43.0	47.0	51.5	61.5	58.5	45.0	1.5	12.0	n.a.	—	41.5
Sudan	43.6	48.6	52.6	52.1	52.1	50.0	0.6	1.5	n.a.	—	3.5
Syria	137.5	177.5	227.0	227.5	227.5	200.0	2.5	25.0	16.1	102.5	9.5
Africa											
Ethiopia	44.6	44.8	50.8	53.5	93.5	90.0	1.5	2.0	1.8	n.a.	129.0
Nigeria	210.0	208.0	230.0	230.5	231.5	221.0	4.5	6.0	n.a.	2.0	—
Rhodesia	4.7	5.7	9.2	9.6	10.8	9.5	—	1.3	0.8	55.0	44.0
South Africa	47.5	50.5	51.5	55.0	65.5	50.0	5.5	10.0	1.3	173.5	165.5
Asia											
Australia	68.9	69.1	69.4	69.7	70.1	32.1	16.3	21.7	2.4	24.3	—
China	3,000.0	3,250.0	3,525.0	3,950.0	4,325.0	3,625.0	300.0	400.0	2.4	n.a.	n.a.
China (Taiwan)	491.0	494.0	470.0	460.0	474.0	330.0	74.0	70.0	n.a.	1,170.0	100.0
India	956.0	956.0	1,055.5	1,096.0	1,096.0	950.0	46.0	100.0	0.8	240.0	300.0
Indonesia	270.0	266.0	246.0	247.0	247.0	180.0	39.0	28.0	1.0	n.a.	112.0
Japan	233.0	236.0	235.0	238.0	240.0	155.0	41.0	44.0	0.9	39.6	—
Korea, North	467.0	467.0	495.0	500.0	512.0	440.0	27.0	45.0	n.a.	n.a.	1,540.0
Korea, South	625.0	625.0	595.0	635.0	642.0	560.0	52.0	30.0	8.1	1,240.0	1,000.0
Malaysia	66.2	61.1	62.3	64.0	64.5	52.5	6.0	6.0	2.6	27.0	213.0
New Zealand	12.6	12.7	12.5	12.5	12.6	5.7	2.7	4.2	1.9	11.5	—
Pakistan	392.0	392.0	428.0	428.0	429.0	400.0	11.0	18.0	3.7	513.0	109.1
Philippines	55.0	67.0	78.0	99.0	99.0	63.0	20.0	16.0	1.1	45.0	65.0
Singapore	21.7	30.0	31.0	36.0	36.0	30.0	3.0	3.0	6.6	45.0	37.5
Thailand	195.0	204.0	210.0	211.0	212.0	141.0	28.0	43.0	2.6	500.0	66.0
Latin America											
Argentina	135.0	133.5	132.8	129.9	132.9	80.0	32.9	20.0	2.5	250.0	42.0
Brazil	208.0	254.5	257.2	271.8	273.8	182.0	49.0	42.8	1.2	n.a.	200.0
Colombia	63.2	64.3	54.3	56.5	75.5	60.0	9.0	6.5	1.6	425.0	50.0
Cuba	116.5	117.0	175.0	189.0	159.0	130.0	9.0	20.0	8.4	90.0	113.0
Mexico	82.0	82.5	89.5	95.5	97.0	72.0	19.0	6.0	1.0	250.0	n.a.
Peru	54.0	56.0	63.0	70.0	89.0	65.0	14.0	10.0	2.7	n.a.	20.0
Venezuela	39.5	44.0	42.0	44.0	44.0	28.0	8.0	8.0	1.8	n.a.	10.0

[a] Reservists with recent training. [b] Excludes *PVO-Strany* and Strategic Rocket Forces. [c] Includes men listed outside Britain.

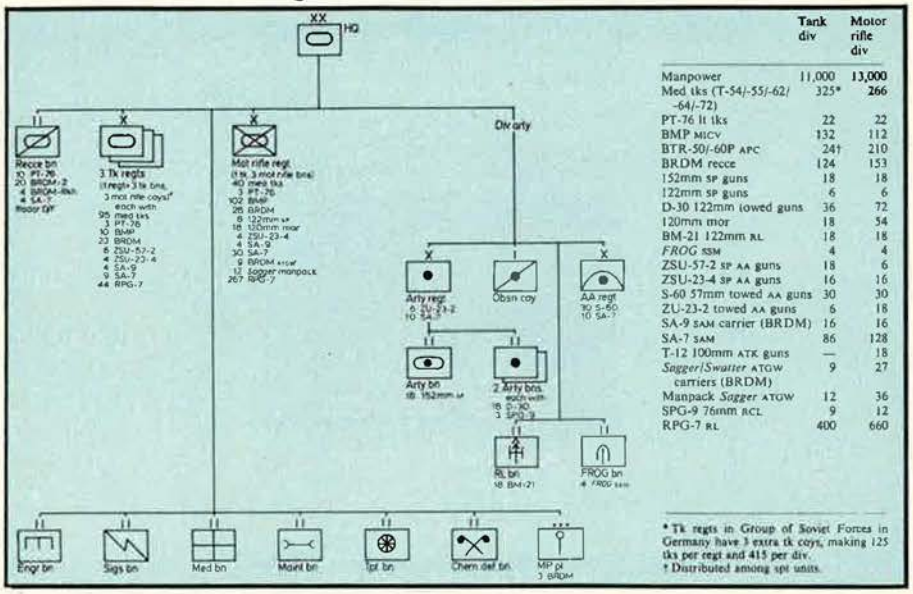
Organization of US Armoured/Mechanized Division



	Armd div*	Mech div*
Manpower	16,850	17,800
M-60A1/2 med tks	324	216
M-60 dozers	18	12
M-551 lt tks	27	27
M-114A1 recce	179	176
M-577A1 comd	132	127
M-113A1 APC	376	406
M-109A1 155mm SP how	54	54
M-110A1 8-in. SP how	12	12
M-106A1 107mm mor	53	49
M-125A1 81mm mor	45	54
M-163 20mm SP AA guns	24	24
Chaparral SAM carriers (M-730)	24	24
TOW ATGW carriers (M-113A1)	90	108
Dragon ATGW launchers	254	294
M-578 ARV	62	64
M-88 ARV	37	27
M-728 CEV	8	8
M-60 AVLB	18	14
OH-58 hel	66	66
UH-1H hel	54	54
AH-1G hel	9	9
AH-1S hel (*TOW*)†	42	42

ARV = armoured recovery vehicle
CEV = combat engineer vehicle
AVLB = armoured vehicle-launched bridge
* Armd div has 6 tk, 5 mech inf bns, as shown. Mech div has 4 tk, 6 mech inf bns. New armd divs will have 3 bdes (17,800 men in 9 tk, 6 mech inf bns), 360 med tks, 16 8-in., 96 155mm how, extra ATGW. New mech divs will have 1 armd, 2 mech inf bdes (18,000 men in 7 tk, 8 mech inf bns), 288 med tks, how, extra ATGW.
† Each AH-1S carries 8 *TOW* ATGW.

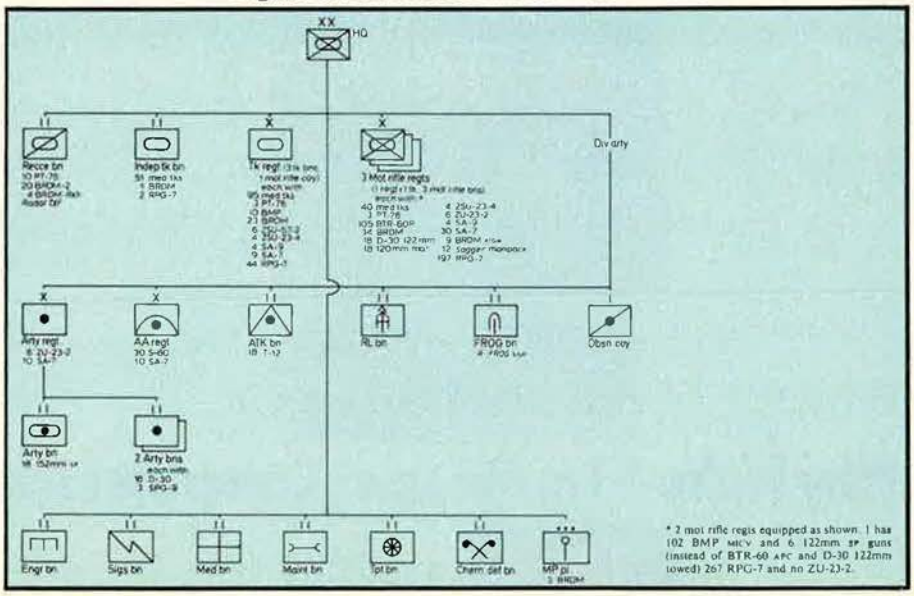
Organization of Soviet Tank Division



	Tank div	Motor rifle div
Manpower	11,000	13,000
Med tks (T-54/-55/-62/-64/-72)	325*	266
PT-76 lt tks	22	22
BMP MICV	132	112
BTR-50/-60P APC	24†	210
BRDM recce	124	153
152mm SP guns	18	18
122mm SP guns	6	6
D-30 122mm towed guns	36	72
120mm mor	18	54
BM-21 122mm RL	18	18
FROG SSM	4	4
ZSU-57-2 SP AA guns	18	6
ZSU-23-4 SP AA guns	16	16
S-60 57mm towed AA guns	30	30
ZU-23-2 towed AA guns	6	18
SA-9 SAM carrier (BRDM)	16	16
SA-7 SAM	86	128
T-12 100mm ATK guns	—	18
Sagger/*Swatter* ATGW carriers (BRDM)	9	27
Manpack *Sagger* ATGW	12	36
SPG-9 76mm RCL	9	12
RPG-7 RL	400	660

* Tk regts in Group of Soviet Forces in Germany have 3 extra tk coys, making 125 tks per regt and 415 per div.
† Distributed among spt units.

Organization of Soviet Motor Rifle Division



* 2 mot rifle regts equipped as shown. 1 has 102 BMP MICV and 6 122mm SP guns (instead of BTR-60 APC and D-30 122mm towed) 267 RPG-7 and no ZU-23-2.

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JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

Prototype of the McDonnell Douglas F-18 Hornet, rolled out on 13 September 1978

MCDONNELL DOUGLAS
MCDONNELL DOUGLAS CORPORATION; Head Office and Works: Box 516, St. Louis, Missouri 63166, USA

MCDONNELL DOUGLAS F/A-18 HORNET

In the Spring of 1974 the US Department of Defense accepted a proposal from the US Navy to study a low-cost lightweight multi-mission fighter, then identified as the VFAX. In June 1974 the USN approached the US aircraft industry to submit critiques and comments on such an aircraft. Six companies responded, including McDonnell Aircraft Company; but in August of that year Congress terminated the VFAX concept, directing instead that the Navy should investigate versions of the General Dynamics YF-16 and Northrop YF-17 lightweight fighter prototypes then under evaluation for the USAF.

McDonnell Douglas made a study of the configuration of these two aircraft and concluded that Northrop's contender not only met most nearly the Navy's requirements, but would also prove the easier to convert to a combat fighter suitable for operation from aircraft carriers.

As a result of this review, McDonnell Douglas teamed with Northrop to propose a derivative of the YF-17 to meet the Navy's requirement, with McDonnell Douglas as the prime contractor. Identified as the Navy Air Combat Fighter (NACF), this received the designation F-18 Hornet when selected for further development. The initial short-term contracts, announced on 2 May 1975, allocated $4.4 million to McDonnell Douglas/Northrop and $2 million to General Electric, for continued engineering studies and refinement of the projected airframe and power plant.

On 22 January 1976 it was announced that full-scale development had been initiated by the US Navy, with initial funding of $16 million. Total cost of the development programme is expected to be about $1.4 billion, including the production of 11 F-18s for the flight test programme.

The first Hornet was rolled out at the McDonnell Douglas plant at St. Louis on 13 September 1978, and was scheduled to make its first flight later in that year, and to become operational in 1982. The Navy plans to procure a total of 811 Hornets, with production at a rate of up to 11 aircraft per month by 1985.

The Hornet derives from development work carried out by Northrop during recent years to evolve an advanced tactical fighter, and stems from the P-530 Cobra concept of 1968–73, which formed the basis of the company's YF-17 prototype. The Hornet airframe differs from that of the latter aircraft by having increased wing area, a wider and longer fuselage to pro-

vide greater internal fuel capacity, an enlarged nose to accommodate the 0.71 m (28 in) radar dish, to meet the Navy's search range requirement of over 30 nm (56 km; 35 miles), and strengthening of the airframe structure to cater for the increased loads caused by catapult launches and arrested landings. Approximately 2,000 kg (4,400 lb) of additional fuel will be carried to meet Navy mission range requirements.

A team of Northrop engineers is established at the St. Louis headquarters of McDonnell Douglas, responsible for some 30% of the development engineering. Northrop's share of the production will be about 40%, with responsibility for developing and building the centre and aft fuselage. McDonnell Douglas will build the rest of the airframe, carry out final assembly, and will have marketing responsibility for all naval aircraft. An international land-based version, the **F-18L**, is to be built for export to friendly nations, and Northrop will be responsible for sales of this version: construction will be divided 60% to Northrop and 40% to McDonnell Douglas.

Ease of maintenance has been given most careful consideration in formulation of the design. Servicing points are disposed so that essential maintenance personnel can work simultaneously without getting in each other's way. An engine change can be effected within approximately 20 minutes, and radar equipment is track-mounted so that it can be rolled out for maintenance. Electronics equipment is housed behind quick-release doors at chest height, and the windscreen is hinged to permit easy access behind the instrument panel. A built-in test panel, mounted within the nosewheel well, will pinpoint system failures, and when the indicated access door is opened the assembly which has failed will 'flag' confirmation that it needs repair or replacement. Ground crew will have access to a 'go, no go' panel for rapid pre-flight check, and this will confirm levels of essential liquids, such as engine oil, hydraulic fluid, radar coolant, APU oil, and oxygen. Safety features include self-sealing fuel tanks and fuel lines, fire suppressant foam within the fuel tanks, built-in fire extinguishers, filler foam in the fuselage for fire suppression, and a system which detects hydraulic fluid leaks and then isolates the relative section.

Conventional instrumentation has almost disappeared from the cockpit, replaced by three cathode ray tubes and an information control panel directly in front of the pilot. All essential flight and target information is projected on to the eye-level head-up display so that, without taking his eyes from the target, the pilot is kept constantly aware of the changing situation. So that he will not be distracted by having to move his hands to different controls, every critical switch for air-to-air and air-to-surface engagements is either in the throttle in his left hand, or on the control stick in his right hand. During air-to-air combat the Hughes AN/APG-65 radar can track multiple targets, displaying up to eight target tracks while retaining up to ten in its memory. A raid assessment mode enables the pilot to discriminate between closely spaced targets. The radar information is displayed on a clutter-free scope in either lookup or lookdown attitude. It provides also range-while-search capability, long-range search and track, and several modes for close-in combat.

Artist's impression of Hornets armed for air combat (upper aircraft), and ground attack with laser-guided missiles

The **F-18** Hornet is intended to replace both USN and US Marine Corps F-4 Phantoms for the primary missions of fighter escort and interdiction. There will be a proportion of two-seat trainers. Additionally, an attack version of the Hornet is being developed to replace the Navy's A-7 Corsair II aircraft in the mid-1980s, under the designation **A-18**. This will be identical with the F-18 except for having one different cockpit display, and certain specialised auxiliary equipment, such as a FLIR and a laser tracker, which is being developed as part of the Hornet programme.

TYPE: Single-seat carrier-based naval strike fighter.

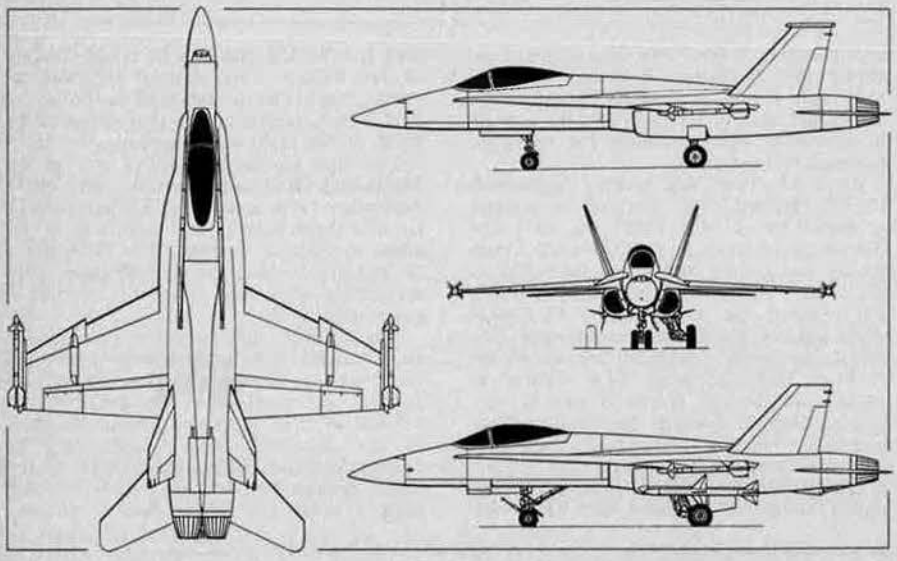
WINGS: Cantilever mid-wing monoplane. Moderate-sweep multi-spar structure, primarily of light alloy and graphite/epoxy. Boundary layer control achieved by wing root slots. Leading-edge manoeuvring flaps have a maximum extension angle of 35°. Trailing-edge flaps, actuated by Bertea hydraulic cylinders, deploy to a maximum of 45°. Ailerons, with Hydraulic Research actuators, can be drooped to 45°, providing the advantages of full-span flaps for low approach speeds. Notched sections on outer wing leading-edges to enhance aileron effectiveness. Wings fold, by means of AiResearch mechanical drive, at the inboard end of each aileron.

FUSELAGE: Semi-monocoque basic structure, primarily of light alloy, with graphite/epoxy used for access doors/panels. Airbrake in upper surface of fuselage between tail fins. Pressurised cockpit section of fail-safe construction.

TAIL UNIT: Cantilever structure with swept vertical and horizontal surfaces. Twin outward-canted fins and rudders, mounted forward of all-moving tailplane, which is actuated by National Water Lift Co servo-cylinder hydraulic units.

LANDING GEAR: Retractable tricycle type, manufactured by Cleveland, with twin-wheel nose and single-wheel main units. Nose unit retracts forward, main wheels

The McDonnell Douglas F-18 Hornet, with additional side view (top) of the proposed land-based Northrop F-18L (Pilot Press)



The F-18 Hornet is intended to replace US Navy and USMC F-4 Phantoms and the USN's A-7 Corsair IIs in the mid-1980s

aft, turning 90° to stow horizontally inside the lower surface of the engine air ducts. Bendix wheels and brakes. Ozone nosewheel steering unit.

POWER PLANT: Two General Electric F404-GE-400 low bypass turbojet engines, each producing approx 71.2 kN (16,000 lb) thrust and developed from the YJ101 turbojets that power the YF-17. Internal fuel load approx 4,990 kg (11,000 lb); provision for up to three external tanks, increasing total fuel capacity to approx 7,257 kg (16,000 lb). Simmonds fuel gauging system.

ACCOMMODATION: Pilot only, on Martin-Baker Mk 10 ejection seat in pressurised, heated, and air-conditioned cockpit. Upward-opening two-part canopy, both sections hinged individually.

SYSTEMS: Fly-by-wire flight control system, with mechanical backup. Garrett AiResearch air-conditioning system. GEC electrical power system. Hydraulic system with leak detection and isolation capability. Oxygen system.

ELECTRONICS AND EQUIPMENT: Will include an Automatic Carrier Landing System (ACLS) for all-weather carrier operations; a Hughes AN/APG-65 multi-mode air-to-air and air-to-ground tracking radar; Itek ALR-67 radar warning receiver; General Electric quadruple-redundant flight control system with two AYK-14 digital computers; Litton inertial navigation system; Kaiser multi-purpose cockpit display, including head-up display; Conrac communications system control; Normalair-Garrett digital data recorder for Bendix maintenance recording system; and Smiths standby altimeter. Garrett AiResearch APU for engine starting and ground pneumatic, electric and hydraulic power, and fuel pressure or cooling.

ARMAMENT: Nine external weapon stations with a combined capacity of 6,214 kg (13,700 lb) of mixed ordnance at high *g*, or greater capacity at limited *g*. These comprise two wingtip stations for AIM-9 Sidewinder air-to-air missiles; two outboard wing stations for an assortment of air-to-ground or air-to-air weapons, including AIM-7 Sparrow radar-guided missiles; two inboard wing stations for air-to-ground ordnance, or external fuel tanks; two nacelle fuselage stations for Sparrow missiles or sensor pods; and a centreline fuselage station for weapons or external fuel. An M61 20 mm six-barrel gun is mounted in the nose. Pod-mounted forward-looking infra-red (FLIR) and laser tracker to be developed for A-18.

DIMENSIONS, EXTERNAL:

Wing span	11.43 m (37 ft 6 in)
Wing span over missiles	12.41 m (40 ft 8½ in)
Width, wings folded	7.62 m (25 ft 0 in)
Length overall	17.07 m (56 ft 0 in)
Height overall	4.66 m (15 ft 3½ in)
Tailplane span	6.92 m (22 ft 8½ in)
Wheel track	3.11 m (10 ft 2½ in)
Wheelbase	5.25 m (17 ft 2½ in)

AREA:

Wings, gross	37.16 m² (400 sq ft)

WEIGHTS:

Fighter mission T-O weight	15,234 kg (33,585 lb)
Fighter escort mission T-O weight	15,876 kg (35,000 lb)
Max T-O weight	more than 19,960 kg (44,000 lb)

PERFORMANCE (estimated):

Max level speed	more than Mach 1.8
Max speed, intermediate power	more than Mach 1.0
Approach speed	130 knots (240 km/h; 150 mph)
Combat ceiling	approx 15,240 m (50,000 ft)
T-O run	less than 305 m (1,000 ft)
Combat radius (internal fuel)	more than 400 nm (740 km; 460 miles)
Ferry range, unrefuelled	more than 2,000 nm (3,706 km; 2,303 miles)

ILYUSHIN

ILYUSHIN DESIGN BUREAU; Headquarters: Moscow Central Airport, Khodinka, Moscow, USSR

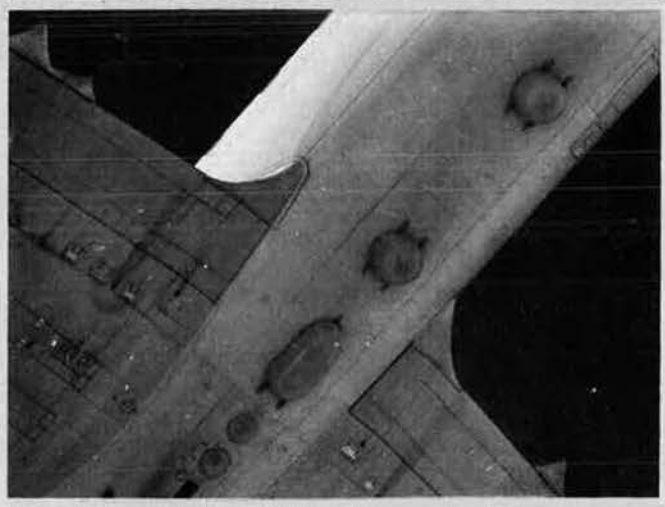
ILYUSHIN Il-18 ELINT VERSION
NATO reporting name: Coot-A

First photographs have now become available of a new ECM or electronic intelligence version of the familiar Il-18 turboprop airliner, first seen in 1978 and given the NATO reporting name of 'Coot-A'. The airframe appears to be basically unchanged by comparison with the transport, suggesting that 'Coot-A' may represent the latest example of the Soviet practice of converting surplus aircraft for military support duties.

It carries under its fuselage a container about 10.25 m long and 1.15 m deep (33 ft 7½ in x 3 ft 9 in), which is assumed to house side-looking radar. There is a further container, about 4.4 m long and 0.88 m deep (14 ft 5 in x 2 ft 10½ in) on each side of the forward fuselage, containing a door over a camera or other sensor. Numerous other antennae and blisters can be seen, about eight of them on the undersurface of the centre and rear fuselage, with two large plates projecting above the forward fuselage.

Construction, basic dimensions, and general weight and performance data of 'Coot-A'

The new electronic intelligence version of the Ilyushin Il-18 known to NATO as 'Coot-A' (Royal Air Force)



Some of the new fairings and elint equipment under the centre-fuselage of 'Coot-A' (Royal Air Force)

should not vary greatly by comparison with the officially-released details of the Il-18 passenger transport which follow:

WINGS: Cantilever low-wing monoplane. Mean thickness/chord ratio 14%. All-metal structure. Three spars in centre-section, two in outer wings. All-metal ailerons are mass-balanced and aerodynamically-compensated, and fitted with spring tabs. Manually-operated flying controls. Electrically-actuated double-slotted flaps. Electro-thermal de-icing.

FUSELAGE: Circular-section all-metal monocoque structure. The structure is of the fail-safe type, and appears to employ rip stop doublers around window cutouts, door frames, and the more-heavily loaded skin panels.

TAIL UNIT: Cantilever all-metal structure. Trim tabs in rudder and elevators. Additional spring tab in rudder. Manually-operated flying controls. Electro-thermal de-icing.

LANDING GEAR: Retractable tricycle type. Hydraulic actuation. Four-wheel bogie main units, with 930 mm x 305 mm tyres and hydraulic brakes. Steerable (45° each way) twin nosewheel unit, with 700 mm x 250 mm tyres. Tyre pressures: main 7.86 bars (114 lb/sq in), nose 5.86 bars (85 lb/sq in). Hydraulic brakes and nosewheel steering. Pneumatic emergency braking.

POWER PLANT: Four Ivchenko AI-20 turboprops, driving AV-681 four-blade reversible-pitch propellers. Ten flexible bag-type fuel tanks in inboard panel of each wing and integral tank in outboard panel, with a total capacity of 23,700 litres (5,213 Imp gallons). The Il-18D has additional bag tanks in centre-section, giving a total capacity of 30,000 litres (6,600 Imp gallons). Pressure fuelling through four international standard connections in inner nacelles. Provision for overwing fuelling. Oil capacity 58.5 litres (12.85 Imp gallons) per engine.

DIMENSIONS, EXTERNAL:

Wing span	37.4 m (122 ft 8½ in)
Wing chord at root	5.61 m (18 ft 5 in)
Wing chord at tip	1.87 m (6 ft 2 in)
Wing aspect ratio	10
Length overall	35.9 m (117 ft 9 in)
Height overall	10.17 m (33 ft 4 in)
Tailplane span	11.8 m (38 ft 8½ in)
Wheel track	9.0 m (29 ft 6 in)
Wheelbase	12.78 m (41 ft 10 in)
Propeller diameter	4.50 m (14 ft 9 in)

DIMENSIONS, INTERNAL:

Flight deck:	
Volume	9.36 m³ (330 cu ft)
Cabin, excl flight deck:	
Length	approx 24.0 m (79 ft 0 in)
Max width	3.23 m (10 ft 7 in)
Max height	2.00 m (6 ft 6 in)
Volume	238 m³ (8,405 cu ft)

AREAS:

Wings, gross	140 m² (1,507 sq ft)
Ailerons (total)	9.11 m² (98.05 sq ft)
Trailing-edge flaps (total)	27.15 m² (292.2 sq ft)
Vertical tail surfaces (total)	17.93 m² (193.0 sq ft)
Rudder	6.83 m² (73.52 sq ft)
Horizontal tail surfaces (total)	27.79 m² (299.13 sq ft)
Elevators (total)	11.80 m² (127.0 sq ft)

WEIGHTS AND LOADINGS:

Weight empty, equipped:	
Il-18E	34,630 kg (76,350 lb)
Il-18D	35,000 kg (77,160 lb)
Max payload	13,500 kg (29,750 lb)
Max T-O weight:	
Il-18V, E	61,200 kg (134,925 lb)
Il-18D	64,000 kg (141,100 lb)
Max wing loading (Il-18D)	457 kg/m² (93.6 lb/sq ft)
Max power loading (Il-18D)	5.05 kg/kW (8.30 lb/ehp)

PERFORMANCE (at max T-O weight):

Max cruising speed:	
Il-18V	351 knots (650 km/h; 404 mph)
Il-18E, D	364 knots (675 km/h; 419 mph)
Econ cruising speed:	
Il-18V	324 knots (600 km/h; 373 mph)
Il-18E, D	337 knots (625 km/h; 388 mph)
Operating height:	
Il-18D	8,000–10,000 m (26,250–32,800 ft)
T-O run:	
Il-18E	1,100 m (3,610 ft)
Il-18D	1,300 m (4,265 ft)
Landing run:	
Il-18E, D	850 m (2,790 ft)
Range with max fuel, 1-hour reserves:	
Il-18E	2,805 nm (5,200 km; 3,230 miles)
Il-18D	3,508 nm (6,500 km; 4,040 miles)

AÉROSPATIALE

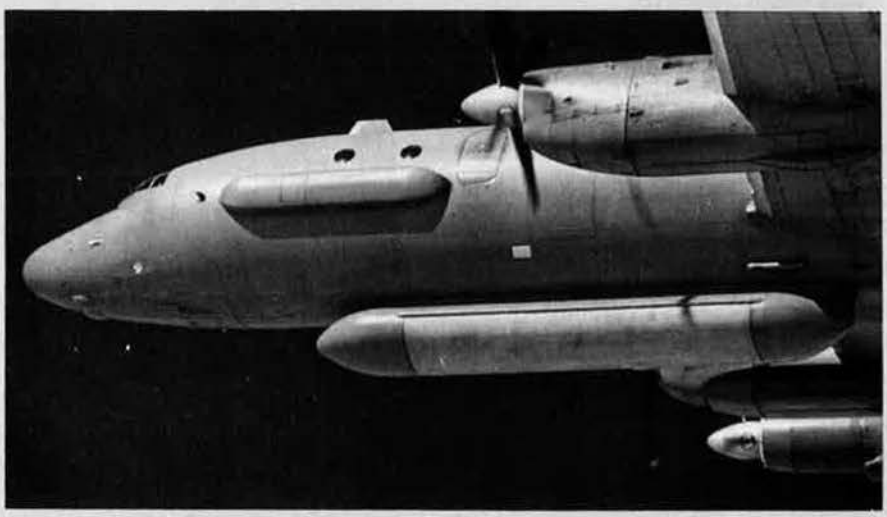
SOCIÉTÉ NATIONALE INDUSTRIELLE AÉROSPATIALE; Head Office: 37 boulevard de Montmorency, 75781 Paris Cédex 16, France

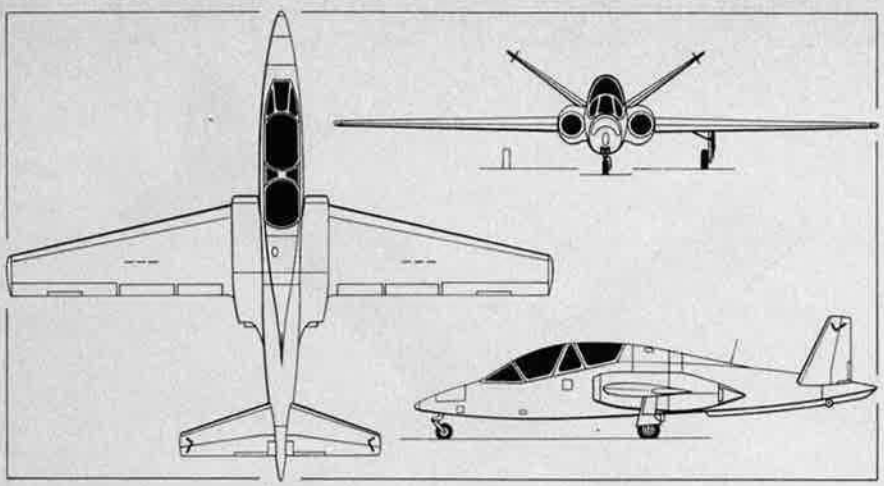
Aérospatiale demonstrated the prototype of its new Fouga 90 jet basic trainer for the first time at the recent Farnborough Air Show, in England. It also announced first details of a new piston-engined primary trainer.

AÉROSPATIALE FOUGA 90

The Fouga 90 is a modernised version of the CM 170 Magister trainer, of which 929 were built between 1953 and 1969. Of these, about 650 are believed to continue in service

Close-up of the side-looking radar pod and other elint features of 'Coot-A' (Royal Air Force)





Aérospatiale Fouga 90 (two Turboméca Astafan IIG turbofan engines) (Pilot Press)

in 16 countries, and accumulated flying time on the type totals several million hours.

When designing the Fouga 90, Aérospatiale retained the aerodynamics of the wing and tail unit of the Magister. The centre-fuselage has been redesigned and deepened, to accommodate pilot and instructor in the now-preferred stepped positions, to give the occupant of the rear seat an optimum forward view. More modern electronics and systems are installed; and the original Marboré turbojets are replaced by turbofans, offering much reduced specific fuel consumption and noise characteristics. Limiting load factors are +7*g* and −3*g*, permitting all standard aerobatic manoeuvres. Like the Magister, the Fouga 90 is suitable for weapon training and light attack roles.

A prototype Fouga 90 flew for the first time on 20 August 1978.

TYPE: Light twin-turbofan transition trainer.

WINGS: Cantilever mid-wing monoplane. NACA 64 series wing section. Thickness/chord ratio varies from 19% at root to 12% at tip. No dihedral. Incidence 2°. Leading-edge sweepback 13°. Single-spar aluminium alloy stressed-skin structure. Servo-control ailerons. Hydraulically-operated all-metal slotted flaps. Retractable airbrakes in upper and lower surfaces.

FUSELAGE: All-metal semi-monocoque stressed-skin structure.

TAIL UNIT: All-metal single-spar V structure, with included angle of 110°. Statically and aerodynamically balanced elevators. Long narrow-chord ventral fin, enclosing small tail bumper.

LANDING GEAR: Retractable tricycle type. Hydraulic actuation. Goodyear main wheels, diameter 254 mm (10 in), with hydraulic brakes. Nosewheel diameter 102 mm (4 in), fitted with anti-shimmy device.

POWER PLANT: Two Turboméca Astafan IIG turbofan engines, each rated at 6.76 kN (1,520 lb st). Main fuel in two fuselage tanks, with total capacity of 710 litres (156 Imp gallons). Optional wingtip tanks, containing a total of 250 litres (55 Imp gallons).

ACCOMMODATION: Two seats in tandem, under large individual rearward-hinged canopies. Martin-Baker F10KX zero-zero ejection seats in prototype. Rear seat raised to give instructor clear view forward over head of pupil. Forward field of view 10° up and 15° down from front seat, 13° up and 5° down from rear seat.

SYSTEMS: Modernised by comparison with CM 170 Magister. Cockpits pressurised and air-conditioned. Individual oxygen supply with regulator in each cockpit.

ARMAMENT (optional): Four underwing attachments for external stores: each inboard station has capacity of 250 kg (551 lb), each outboard station has capacity of 150 kg (331 lb). Weapon loads can include four 125 kg or 50 kg bombs; two 50 kg bombs and two pods each containing eighteen 68 mm rockets; or two AS.11 or AS.12 air-to-surface missiles and two 30 mm gun pods.

DIMENSIONS, EXTERNAL:

Wing span, with tip-tanks	12.15 m (39 ft 10¼ in)
Wing span, without tip-tanks	11.96 m (39 ft 3 in)
Wing aspect ratio	7.6
Length overall	10.38 m (34 ft 0½ in)
Height overall	3.078 m (10 ft 1¼ in)
Tailplane span	4.38 m (14 ft 4½ in)
Wheel track	4.35 m (14 ft 3 in)

AREAS:

Wings, gross	18.38 m² (197.8 sq ft)
Ailerons (total)	1.10 m² (11.84 sq ft)
Trailing-edge flaps (total)	2.10 m² (22.60 sq ft)
Horizontal tail area (projected)	3.71 m² (39.93 sq ft)
Vertical tail area (projected)	2.60 m² (28.00 sq ft)

WEIGHTS AND LOADINGS:

Weight empty, equipped	2,600 kg (5,732 lb)
Normal T-O weight, 'clean'	3,500 kg (7,716 lb)
Max T-O weight, with armament	4,200 kg (9,259 lb)
Normal wing loading	190.4 kg/m² (39.00 lb/sq ft)
Normal power loading	258.9 kg/kN (2.54 lb/lb st)

PERFORMANCE (estimated, at normal T-O weight):

Max level speed at 4,600 m (15,000 ft)	345 knots (640 km/h; 398 mph)
Rate of climb at S/L	1,158 m (3,800 ft)/min
Service ceiling	12,195 m (40,000 ft)
T-O to 23 m (75 ft)	610 m (2,000 ft)
Landing from 15 m (50 ft)	670 m (2,200 ft)
Range with max fuel	1,000 nm (1,850 km; 1,150 miles)

Aérospatiale Fouga 90, developed from the widely-used CM 170 Magister basic trainer

AÉROSPATIALE/SOCATA TB-30

At the Farnborough Air Show, in September 1978, Aérospatiale released first details of this tandem two-seat primary trainer which it has defined over a period of several years in collaboration with the French Air Force. Intended to reduce the cost of military training, by comparison with an all-through jet sequence, the TB-30 will meet the requirements of FAR Pt 23 (Aerobatic Category) and will cover the full primary flight curriculum of basic training, aerobatics, blind and night flying, close formation and combat manoeuvres, and VFR/IFR navigation for students in both fighter and transport streams.

Further applications, such as liaison and light tactical support duties, are envisaged, and the cockpit layout resembles closely those of contemporary combat aircraft. Power plant is a 224 kW (300 hp) Lycoming IO-540-K flat-six engine, driving a constant-speed propeller.

No structural data have yet been made available, but the emphasis has been placed on safety and strength for a useful airframe life of 10,000 h. Research and wind tunnel testing have advanced far enough to permit planned prototype roll-out in mid-1979. Development has been undertaken by the Aérospatiale Aircraft Division. Manufacture will be entrusted to its Socata subsidiary, at Tarbes.

DIMENSIONS, EXTERNAL:

Wing span	7.40 m (24 ft 3¼ in)
Wing area	9.00 m² (96.88 sq ft)
Length overall	7.40 m (24 ft 3¼ in)
Height overall	2.70 m (8 ft 10¼ in)

WEIGHTS AND LOADINGS:

Max T-O weight	1,200 kg (2,645 lb)
Max landing weight	1,140 kg (2,513 lb)
Max wing loading	133.3 kg/m² (27.3 lb/sq ft)
Max power loading	5.36 kg/kW (8.82 lb/hp)

PERFORMANCE (estimated, at max T-O weight):

Never-exceed speed	250 knots (463 km/h; 287 mph)
Max cruising speed at S/L	190 knots (352 km/h; 218 mph)
Approach speed	80 knots (148 km/h; 92 mph)
Stalling speed, flaps down, idle power	62 knots (115 km/h; 72 mph)

Max rate of climb at S/L
457 m (1,500 ft)/min
Service ceiling 4,600 m (15,100 ft)
Max cross-wind for T-O, landing, and taxying 20 knots (37 km/h; 23 mph)
Max endurance at 1,500 m (5,000 ft) 3 h
Range with max fuel
650 nm (1,200 km; 750 miles)
g limits +7; −3.5

GENERAL AVIA

COSTRUZIONI AERONAUTICHE GENERAL AVIA; Address: Via Trieste 24, 20096 Pioltello, Milan, Italy

GENERAL AVIA F.600 CANGURO (KANGAROO)

Designed by Dott Ing Stelio Frati, Technical Director of General Avia, the F.600 Canguro is a low-cost, economical to operate general-purpose transport, capable of using unprepared airstrips. Potential applications include ambulance, photographic, geophysical research, parachutist dropping, cargo transport, coastguard, rescue, agricultural, and passenger transport duties. The Canguro can also be equipped as an executive transport, and has various possible military applications.

A prototype was nearing completion in the late Summer of 1978, and was expected to make its first flight during the last quarter of the year. Development of the Canguro is being supported by SIAI-Marchetti, which will undertake any series production after completion of the flight test and certification programme.

TYPE: Twin-engined freight, ambulance, and general utility transport.

WINGS: Cantilever high-wing monoplane. Constant-chord non-swept wings, of GAW-1 section and 17% thickness/chord ratio. Dihedral 2°. Incidence (constant) 1° 30′. All-metal riveted structure of light alloy, with stressed skin. Centre-section has main spar and two auxiliary spars; outboard of engines, wings have two spars. All-metal ailerons and electrically-operated double-slotted flaps. No tabs.

FUSELAGE: All-metal semi-monocoque structure, of basically rectangular cross-section, with stressed skin.

TAIL UNIT: Cantilever all-metal stressed-skin structure, with sweptback fin and rudder and non-swept horizontal surfaces of constant chord. Small dorsal fin. Balanced rudder and elevators; trim tab in rudder and starboard elevator.

LANDING GEAR: Non-retractable tricycle type, with oleo-pneumatic or rubber-in-compression shock-absorbers. Single castoring nosewheel. Twin-wheel main units, attached to small sponsons at fuselage baseline and fitted with disc brakes.

POWER PLANT: Two 231 kW (310 hp) Lycoming TIO-540-A2C flat-six engines, each driving a Hartzell fully-feathering constant-speed propeller. Fuel in four equal-sized wing tanks, with cross-feed capability, total capacity 900 litres (198 Imp gallons).

ACCOMMODATION: Crew of one or two on flight deck, with dual controls standard. Cabin accommodates up to 10 passengers (one beside pilot, two facing pairs in forward part of cabin, with two rearward-facing seats and three-person bench seat aft of central toilet and baggage compartments). Alternative accommodation for 10 parachutists, or four stretcher patients and two medical attendants, or 907 kg (2,000 lb) of freight. Passenger seats removable, permitting quick change from passenger to cargo configuration in approx 10 minutes. Cabin floor, equipped with cargo rails and anchor points, is capable of supporting a specific load equivalent to 400 kg/m² (82 lb/sq ft). Single forward door on each side for crew/passenger access. Double door at rear on starboard side, for freight loading, is capable of admitting pallets and cases of standard 1.43 m (4 ft 8¼ in) width. All accommodation heated and ventilated.

SYSTEMS: Duplicated hydraulic system for main-wheel brakes only. Electrical power (24V DC), for main and emergency operation, from two 50A alternators.

ELECTRONICS: HF com, autopilot, and basic flight instrumentation standard. Other electronics, to customer's requirements, can include nav/com with VOR/ILS or VOR/LOC coupling, ADF, DME, and ATC transponder.

DIMENSIONS, EXTERNAL:

Wing span	13.34 m (43 ft 9¼ in)
Wing chord (constant)	1.60 m (5 ft 3 in)
Wing aspect ratio	8.5
Length overall	11.80 m (38 ft 8½ in)
Height overall	3.65 m (11 ft 11¾ in)
Tailplane span	5.06 m (16 ft 7¼ in)
Double door (rear, stbd):	
Width	1.43 m (4 ft 8¼ in)
Height	1.14 m (3 ft 9 in)

DIMENSIONS, INTERNAL:

Cabin, excl flight deck:	
Length	4.30 m (14 ft 1¼ in)
Width	1.23 m (4 ft 0½ in)
Height	1.27 m (4 ft 2 in)
Volume (cargo)	7.1 m³ (250.7 cu ft)

AREAS:

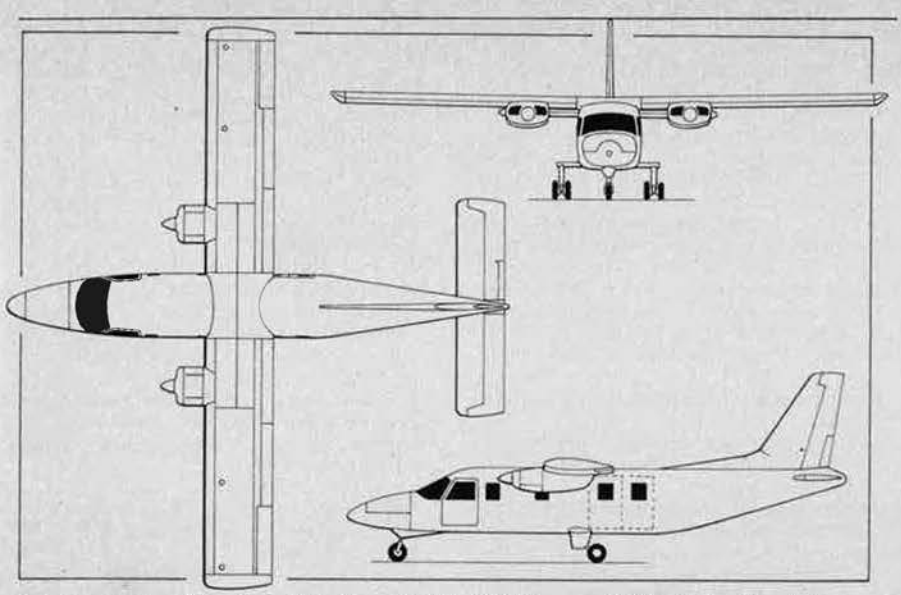
Wings, gross	21.50 m² (231.42 sq ft)
Ailerons (total)	1.28 m² (13.78 sq ft)
Trailing-edge flaps (total)	2.32 m² (24.97 sq ft)
Fin	1.46 m² (15.72 sq ft)
Rudder, incl tab	0.90 m² (9.69 sq ft)
Tailplane	3.06 m² (32.94 sq ft)
Elevators (total, incl tab)	2.50 m² (26.91 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	1,800 kg (3,968 lb)
Max standard fuel	610 kg (1,345 lb)
Max cargo payload	900 kg (1,984 lb)
Max T-O weight	3,000 kg (6,613 lb)
Max wing loading	139.5 kg/m² (28.6 lb/sq ft)
Max power loading	6.49 kg/kW (10.67 lb/hp)

Artist's impression of the TB-30 primary trainer, under current development by Aérospatiale

General Avia F.600 Canguro prototype, nearing completion in Milan



Latest, revised configuration of the General Avia F.600 Canguro (Michael A. Badrocke)

PERFORMANCE (estimated, at max T-O weight except where indicated):
Max level speed at 4,570 m (15,000 ft)
167 knots (310 km/h; 193 mph)
Max cruising speed (75% power) at 3,660 m (12,000 ft)
146 knots (270 km/h; 168 mph)
Econ cruising speed (60% power) at 3,660 m (12,000 ft)
129 knots (240 km/h; 149 mph)
Stalling speed, flaps down
57 knots (105 km/h; 65.5 mph)
Max rate of climb at S/L
402 m (1,320 ft)/min
Service ceiling 7,400 m (24,275 ft)
Service ceiling, one engine out
3,200 m (10,500 ft)
T-O run 275 m (902 ft)
Landing run 220 m (720 ft)
Range at max cruising speed, AUW of 2,950 kg (6,503 lb):
max fuel and 465 kg (1,025 lb) cargo
944 nm (1,750 km; 1,087 miles)
max payload 313 nm (580 km; 360 miles)
Range at econ cruising speed, AUW of 2,950 kg (6,503 lb):
max fuel and 465 kg (1,025 lb) cargo
1,100 nm (2,040 km; 1,267 miles)
max payload 367 nm (680 km; 422 miles)
Range at max cruising speed, AUW of 2,900 kg (6,393 lb):
nine passengers, no baggage
540 nm (1,000 km; 621 miles)
five passengers and 40 kg (88 lb) baggage
944 nm (1,750 km; 1,087 miles)
Range at econ cruising speed, AUW of 2,900 kg (6,393 lb):
nine passengers, no baggage
620 nm (1,150 km; 714 miles)
five passengers and 40 kg (88 lb) baggage
1,100 nm (2,040 km; 1,267 miles)
Max endurance, 45 min reserves 8 h

BOEING VERTOL

BOEING VERTOL COMPANY; Address: Boeing Center, PO Box 16858, Philadelphia, Pennsylvania 19142, USA

BOEING VERTOL MODELS 114 and 234

At the Farnborough International Air Show in September 1978, Boeing Vertol released further details of the two latest military variants of the Chinook medium transport helicopter. These are:

YCH-47D Chinook. Modernisation of three Chinooks (one each of the CH-47A, B, and C models) under a US Army R&D programme. If the development programme of these prototypes is successful, it could lead to a contract for the modernisation of up to 361 of the US Army's inventory of Chinook aircraft. Prototypes are being fitted with Lycoming T55-L-712 engines, a T-62T-28 APU, and an advanced flight control system, among other features. Production CH-47Ds are expected to have glassfibre/carbon fibre resin rotor blades, trials of which began on a CH-47C testbed on 22 May 1978. First YCH-47D scheduled to fly in May 1979. Depending on timing of go-ahead, re-delivery of CH-47Ds to US Army could begin in 1980.

WEIGHTS AND PERFORMANCE (YCH-47D. A: guaranteed; B: estimated, based on whirl test results):
Internal payload over 100 nm (185 km; 115 miles) at 1,220 m (4,000 ft), hovering OGE at T-O:
A 5,896 kg (13,000 lb)
B 6,496 kg (14,322 lb)
External payload over 30 nm (55.5 km; 34.5 miles) at 1,220 m (4,000 ft), 61 m (200 ft)/min vertical climb at T-O, 35°C:
A 6,803 kg (15,000 lb)
B 7,155 kg (15,775 lb)
Gross weight, hovering OGE at S/L, ISA:
A 22,680 kg (50,000 lb)
B 24,267 kg (53,500 lb)
Max level speed at S/L, ISA, at AUW of 14,968 kg (33,000 lb):
A 155 knots (287 km/h; 178 mph)
B 161 knots (298 km/h; 185 mph)
OEI service ceiling at 14,968 kg (33,000 lb) AUW, ISA:
A 3,050 m (10,000 ft)
B 4,270 m (14,000 ft)

Chinook HC. Mk 1. Version for Royal Air Force, which has ordered 33 for delivery between August 1980 and the end of 1981. Generally similar to Canadian CH-147 (Model 234), with Lycoming T55-L-11C turboshaft engines, but will have provision for glassfibre/carbon fibre rotor blades and three external cargo hooks (capacity 12,700 kg; 28,000 lb on centre hook, or 9,072 kg; 20,000 lb total on forward and rear hooks); accommodation for up to 44 troops or 24 standard NATO stretchers; engine and windscreen de-icing; provision for two self-ferry fuel tanks in cabin; and amphibious capability in sea states of up to 3. Intended for use on logistic support, tactical troop lift, casualty evacuation, air mobility, and external load-carrying duties. Extensive range of British electronics and equipment, including Decca tactical navigation system and Lucas 40kVA generators, under offset arrangements still under negotiation ($15 million worth of tenders had been made to 63 UK companies by September 1978, covering a 10-year programme not confined to the RAF order).

As of September 1978 the order/delivery position for military Chinooks was as follows:

Operator	Model	Ordered	Delivered
US Army	CH-47A/B/C	721	721
Argentinian AF	CH-47C	3	due 1979
Royal Australian AF	CH-47C	12	12
Canadian Armed Forces	CH-147	9	9
*Imperial Iranian AF	CH-47C	95	50
*Italian AF	CH-47C	26	26
*Libyan Arab AF	CH-47C	20	10
*Royal Moroccan AF	CH-47C	6	due 1978–79
Spanish AF	CH-47C	10	10
Royal Thai AF	CH-47A	4	4
Royal Air Force	Modified CH-147	33	due 1980–81
		939	842

*Built in Italy by Agusta group

BOEING VERTOL MODEL 234LR COMMERCIAL CHINOOK

Announced in the late Summer of 1978, this development of the CH-47 Chinook has been evolved for commercial transport use and for offshore oilfield support. Based on the Model 234 standard military Chinook, the Model 234LR will have many new features, includ-

Now offered in commercial form, the Chinook 234LR is intended to carry 44 passengers about 545 nm (1,010 km; 627 miles)

ing Avco Lycoming AL 5512 turboshaft engines; glassfibre/carbon fibre rotor blades; transmission equipped with redundant lubrication systems and jam-proof flight control actuators, for improved safety; an advanced flight control system to reduce pilot workload and provide easier IFR operation; a new crashworthy fuel system, with pressure refuelling (one point each side of fuselage); and reduced cabin vibration and noise. The passenger cabin will be fitted with Boeing 727-type windows, and will provide four-abreast economy class seating for up to 44 passengers (11 pairs of seats each side of centre aisle) on 500 nm (926 km; 575 mile) stage lengths, in seats with 84 cm (33 in) pitch. Two cabin attendants will be carried, and galley, lavatory, and overhead baggage lockers will be standard.

Alternatively, the Commercial Chinook can be configured for utility/cargo transport operation, with the passenger seats removed, or for a passenger/cargo mix. In all-cargo configuration, sling loads of up to 12,700 kg (28,000 lb) can be carried, and provision will be retained for two self-ferry fuel tanks in the forward part of the cabin.

DIMENSIONS, EXTERNAL:
- Rotor diameter (each) 18.29 m (60 ft 0 in)
- Length overall, rotors turning 30.175 m (99 ft 0 in)
- Length of fuselage 16.08 m (52 ft 9 in)
- Height overall (to top of rear rotor hub) 5.68 m (18 ft 7.8 in)

DIMENSIONS, INTERNAL:
- Cabin, excl flight deck:
  - Length 9.19 m (30 ft 2 in)
  - Max width 2.51 m (8 ft 3 in)
  - Max height 1.98 m (6 ft 6 in)

WEIGHTS (estimated):
- Weight empty:
  - Utility, external cargo load 9,144 kg (20,160 lb)
  - Utility, internal cargo load 9,338 kg (20,588 lb)
  - Long range, cargo interior 9,962 kg (21,964 lb)
  - Long range, passenger interior 11,008 kg (24,270 lb)
- Fuel load:
  - Utility configuration 1,826 kg (4,026 lb)
  - Long range configuration 6,361 kg (14,024 lb)
- Max payload (Utility, 30 min reserves) 13,290 kg (29,300 lb)
- Max T-O weight:
  - Internal load 21,318 kg (47,000 lb)
  - External load 23,133 kg (51,000 lb)

PERFORMANCE (estimated, long range configuration):
- Max cruising speed 150 knots (278 km/h; 173 mph)
- Econ cruising speed 135 knots (250 km/h; 155 mph)
- Range with 44 passengers, 45 min IFR reserves 545 nm (1,010 km; 627 miles)
- Max range, 45 min IFR reserves 740 nm (1,371 km; 852 miles)

SIAI-MARCHETTI

SIAI-MARCHETTI SOCIETA PER AZIONI; Head Office: Via Indipendenza 2, 21018 Sesto Calende (Varese), Italy

SIAI-MARCHETTI S.211

Intended as a lightweight, low-cost basic trainer and light attack aircraft, the S.211 was first revealed in the form of a model at the Paris Air Show in May/June 1977. It is of tandem two-seat configuration, and is powered by a non-afterburning turbofan engine.

A prototype of the S.211 is under construction, and is expected to make its first flight in 1979.

TYPE: Turbofan-engined basic trainer and light attack aircraft.

WINGS: Cantilever shoulder-wing monoplane, with supercritical section evolved by computer with the assistance of the US universities of New York and Kansas. Thickness/chord ratio 15% at root, 13% at tip. Anhedral 2° from roots. Sweepback 15° 30′ at quarter-chord. Two-spar metal torsion box structure, forming integral fuel tank; attached to fuselage by four bolts. Upper and lower skins each formed by two one-piece panels joined along centreline and to the spars. Ailerons and large-area Fowler-type flaps on trailing-edges. No tabs.

FUSELAGE: Conventional metal semi-monocoque structure. Hydraulically actuated airbrake under centre-fuselage. Equipment bay in nose.

TAIL UNIT: Cantilever metal structure. Swept-back fin and rudder; tapered leading-edge on tailplane. No tabs.

LANDING GEAR: Hydraulically-retractable tricycle type. All units retract forward into fuselage (main units into undersides of engine air intake trunks). Designed for sink rate of 4 m (13 ft)/s. Provision for emergency free-fall extension.

POWER PLANT: One 9.8 kN (2,200 lb st) Pratt & Whitney Aircraft of Canada JT15D-1 non-afterburning turbofan engine mounted in rear of fuselage; lateral intake each side of fuselage. Fuel in integral wing tank and fuselage main tank, total usable capacity 750 litres (165 Imp gallons). Single-point gravity refuelling. Provision for two 350 litre (77 Imp gallon) drop-tanks on inboard underwing stores points.

ACCOMMODATION: Seats for two persons in tandem in pressurised and air-conditioned cockpit under sideways-opening canopy: pupil in front, instructor in elevated rear seat. Ejection seats for both occupants, capable of operation at all altitudes and at speeds between 60–400 knots (111–741 km/h; 69–461 mph), including ejection through canopy.

SYSTEMS: Environmental control system for cockpit pressurisation and air-conditioning, using engine bleed air. Max pressure differential 0.27 bars (4.0 lb/sq in). Hydraulic system, pressure 103.5 bars (1,500 lb/sq in), for landing gear and airbrake actuation. Demand-type main oxygen system, sufficient to supply two occupants for 4 hours, plus emergency oxygen supply.

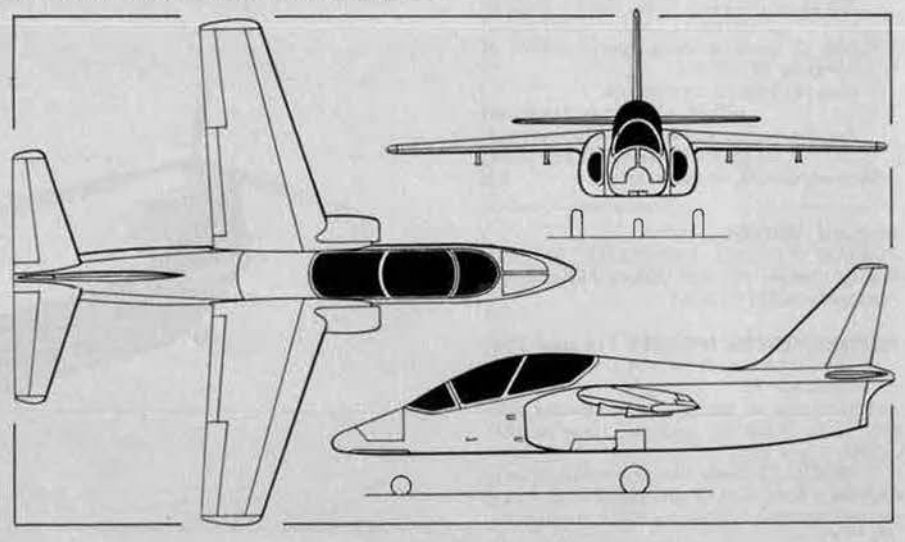
ARMAMENT: Four underwing hardpoints, stressed for loads of up to 300 kg (660 lb) inboard, 150 kg (330 lb) outboard; max external load 600 kg (1,320 lb). Typical loads can include four SUU-11B 7.62 mm Minigun pods, four 12.7 mm gun pods, or (inboard only) two 20 mm gun pods; four AL 18-50 (18 x 50 mm), Matra F2 (6 x 68 mm), LAU-32 (7 x 2.75 in), or AL 6-80 (6 x 81 mm) rocket launchers, or (inboard only) two Matra 155 (18 x 68 mm) or SNORA RWK-020 (12 x 81 mm) launchers; two Sidewinder or Magic air-to-air, or two Maverick air-to-surface, missiles on the inboard points; four bombs or practice bombs of up to 150 kg size, or (inboard only) two bombs or napalm containers of up to 300 kg; four cartridge throwers; or (inboard only) two photo-reconnaissance pods each with four cameras and infra-red linescan, or two 350 litre (77 Imp gallon) auxiliary fuel tanks.

DIMENSIONS, EXTERNAL:
- Wing span 8.00 m (26 ft 3 in)
- Wing area, gross 12.60 m² (135.63 sq ft)
- Wing aspect ratio 5.08
- Length overall 9.28 m (30 ft 5½ in)
- Height overall 3.73 m (12 ft 2¾ in)
- Tailplane span 3.96 m (13 ft 0 in)
- Wheel track 2.00 m (6 ft 6¾ in)

WEIGHTS:
- Weight empty, equipped 1,420 kg (3,130 lb)
- Max T-O weight:
  - trainer, 'clean' 2,200 kg (4,850 lb)
  - armed version 2,800 kg (6,173 lb)

PERFORMANCE (estimated):
- Never-exceed speed Mach 0.80 (400 knots; 741 km/h; 461 mph EAS)
- Max level speed at 7,620 m (25,000 ft) 360 knots (667 km/h; 414 mph)
- Max cruising speed at 7,620 m (25,000 ft) 345 knots (639 km/h; 397 mph)
- Stalling speed, flaps down 68 knots (125 km/h; 78 mph)
- Max rate of climb at S/L 1,188 m (3,900 ft)/min
- Service ceiling 12,200 m (40,000 ft)
- Min air turning radius at S/L less than 305 m (1,000 ft)
- T-O and landing run approx 305 m (1,000 ft)
- T-O to 15 m (50 ft) 440 m (1,445 ft)
- Landing from 15 m (50 ft) 536 m (1,760 ft)
- Range at 9,145 m (30,000 ft) with max fuel, 30 min reserves 1,080 nm (2,000 km; 1,245 miles)
- Sustained *g* limit at 4,575 m (15,000 ft) 2.55
- Design *g* limits +6; −3

The S.211 lightweight basic trainer and attack aircraft being developed by SIAI-Marchetti (Pilot Press)



Can lessons learned in the World War II bomber offensive against Germany be applied to modern tactical air warfare?

A Close Look at Close Air Support

By Gen. T. R. Milton, USAF (Ret.)

EVERY now and then the Air Force Academy hosts a Military History Symposium. The eighth such affair was held a few weeks ago, and the theme this time was airpower and warfare. In addition to several hundred historians, academics of other persuasions, cadets, and just plain interested citizens, the symposium also drew a few makers of military history, among them Gens. Curtis LeMay, Ira Eaker, and O. P. Weyland. In those three names alone there is enough history to keep any gathering occupied, but they were there to participate, not as monuments.

The business of fighting in the air has attracted its share of theorists, from Giulio Douhet to the modern Pentagon theologians who carry on the daily doctrinal struggle, but a look back over the history of air warfare shows that theories often have been altered or abandoned when the fighting began. The invincibility of the daylight manned bomber was a concept painfully unlearned. Our discovery of the P-51 in 1943 as the bombers' saviour, and the best fighter in World War II, was almost a happy accident.

The P-51 had been around since 1940 when Dutch Kindelberger, president of North American Aviation, offered to design a new airplane for the beleaguered RAF. Four months later, North American, unhindered in those uncomplicated times by systems-analysis and other modern bureaucratic achievements, came up with the P-51, or Mustang, as the British promptly named it. We were still pursuing the thesis of bombers fighting their way in, and so long-range fighters got little attention.

The P-47 also was available and eminently capable of escort duty given long-range drop tanks. The problem was that the drop tanks were well down the priority list. We even tried out a sort of battleship version of the B-17, the YB-40, as an escort device. The YB-40s, bristling with turrets and overloaded with ammunition, had a short and disastrous war. Thus, almost by default, the concept of long-range fighter escort for bombers came into vogue, and the daylight bombing theory was rescued for the rest of the war in Europe.

Airpower concepts, however, tend to be short-lived things. Each war sees some significant change in weaponry or the nature of the enemy, changes that invalidate previous concepts, however dearly held.

Listening to the historians recount how it was in days gone by, how the Japanese Air Force rose and fell, the failings of Luftwaffe leadership, the limited conceptual approach of the Soviets toward airpower in World War II, it is easy to start musing on the days ahead. What will we learn next time out, assuming our enemy is a well-armed modern power?

In these times of small aircraft inventories and battlefield antiaircraft missiles there would seem to be, as a starter, some reason to worry about the subject of close air support, especially in the European theater. It is a subject that in the past has brought Army and Air Force doctrinaires, and leaders for that matter, into conflict. More recently, the disputes seem, if not entirely resolved, at least papered over. The Air Force is buying A-10s with the close-support mission in mind, and the policy of positioning our fighter wings right up there behind the troops is further assurance the Air Force is in direct support of the Army. Still, as we absorb the lessons of past airpower history, we are entitled to wonder a bit.

The Luftwaffe was absent at Normandy, a fact that contributed immensely to the success of that campaign. It was absent because our side had won both the air battle and the interdiction campaign. These would once again seem to be first priorities, if history means anything. Thus, the question: Is close air support in a modern—which is to say lethal—environment a priority mission for an air force which will have to contest control of the air, for the first time since Bataan and North Africa, from a numerically inferior standpoint?

Maybe it is, but there are some discouraging statistics left over from the Yom Kippur War of 1973 that suggest that an air force, even one as good as the Israeli Air Force, can expect a terrible pounding from modern battlefield air defenses.

There is no dodging the fact that we will never even approach having the kind of airplane inventories we had in World War II. Airplanes that cost twenty or more times as much as a World War II airplane must somehow do, if not twenty times more, at least considerably more nowadays. And if the first few days of any war are not to see the end of our tactical air through attrition, the losses must somehow be held down.

In the bleak autumn of 1943, the bombers longed for close support. We wanted to see our little friends close at hand, the closer the better. As time went on, it became apparent to the Eighth Air Force planners, if not to the bomber crews, that the best bomber support was not visible close support. And, so, while the bombers saw fewer friendlies as our fighters ranged on a wide search for the Luftwaffe, they saw fewer hostiles as well.

Admittedly, applying that theory to the problem of Army support might prove a pretty hard sell. Close support has come to mean something the troops can see, and the Army and Air Force have come a long way toward resolving their doctrinal differences. Still, limited numbers of airplanes are one of the facts of life, now and forevermore. Close support in the environment of a modern battlefield does not seem to be a likely way to conserve that inventory. ■

Airman's Bookshelf

A Military View of Vietnam

Strategy for Defeat, by Adm. U. S. G. Sharp, USN (Ret.), Presidio Press, San Rafael, Calif., 1978. 311 pages. $12.95.

In his chapter entitled, "Was It Peace with Honor?" Admiral Sharp answers by describing the fall of Saigon: "It was obvious the enemy was gearing up for a major offensive. On the other hand, we had reneged on our commitment and were not even supplying the South Vietnamese with the one-for-one replacements for armaments lost."

Using his experience first as commander of the Pacific Fleet and later as head of the Pacific Command, Admiral Sharp recounts the US role in Vietnam, and examines the effectiveness of airpower in modern warfare. His conclusion: The US used its airpower unwisely in the classic military sense of too little, too late.

As he describes it, the US role in Vietnam was an ignoble one: "At the peak of the fighting we had 550,000 American troops in South Vietnam; in the aggregate we lost 55,000 of our fighting men and spent about $150 billion. We disengaged in 1973 with a single objective won —the release of our POWs."

It is hard to deny the conclusion Admiral Sharp draws: "For the first time in United States history we had become engaged in a conflict in which we failed to gain a satisfactory settlement."

But the author takes the position held by most US military men that the blunders were made not on the battlefield but back in Washington, by civilian policymakers.

It is saddening to read and be reminded of the repeated overruling of sound military advice, often without explanation. In Admiral Sharp's view, vital military decisions were made more with an eye to Hanoi, Peking, and Moscow, than to their effect on the war.

If there is a villain in such a book as this, it is former Defense Secretary Robert S. McNamara, now president of the World Bank. Repeatedly he is shown watering down recommendations of military commanders anxious to use the full conventional force they commanded to bring the war to a successful conclusion.

Telling of a Honolulu conference Mr. McNamara held in 1965 with top military commanders, Admiral Sharp writes: "At this meeting it became clear that Secretary McNamara intended to downgrade the air war against North Vietnam and to emphasize the air and ground war in South Vietnam. He insisted that the requirement for airpower in South Vietnam must get the first call on our air assets."

Admiral Sharp says of the meeting that Mr. McNamara's reports summarizing the meeting were a "distortion" of the Admiral's actual views: "However, as with most conferences that Secretary McNamara attended, the published results somehow tended to reflect his own views, not necessarily a consensus."

Of Secretary McNamara's policy of restraining the use of airpower, the Admiral writes: "This fateful decision contributed to our ultimate loss of South Vietnam as much as any other single action we took during our involvement. And underlying it all was an almost frantic diplomatic activity directed at getting negotiations started. Hanoi would analyze such activity as an indication that we were lacking the will to fight."

As an example of the orders the McNamara Pentagon passed down to pilots, he cited a strike approved in September 1965: "We were allowed for the first time to hit two bridges northeast of Hanoi, but these targets had to be struck simultaneously and only once."

There is little disagreement among military men, however, that the policies of Secretary NcNamara were a *Strategy for Defeat.*

The unfettered use of airpower on North Vietnam, where the war was being fueled, was tried finally in December 1972, and resulted in a peace agreement the following month.

Admiral Sharp writes: "Unfortunately, we failed to press home our advantage of the moment," and as a result got little from the bargaining table. He concludes: "Most wars have in common the fact that they were won by one side or the other. This war is the exception. For the real tragedy of Vietnam is that this war was not won by the other side, by Hanoi or Moscow or Peiping. It was lost in Washington, D. C. There and there alone lies the answer to our final question—will it happen again?"

—Reviewed by Bonner Day, Senior Editor.

Reviewing British Airpower

Portal of Hungerford: The Life of Marshal of the Royal Air Force Viscount Portal of Hungerford KG, GCB, OM, DSO, MC, by Denis Richards. Heinemann, London, 1977. 436 pages, with index, photographs. $24.

This first biography of C. F. A. (Peter) Portal—the Royal Air Force counterpart to Hap Arnold—is a welcome addition to the now nearly complete shelf of portraits of the key WW II Allied leaders. Portal had been a squadron commander and war hero in World War I, a brilliant staff officer and commander of successively larger units during the interwar period, and leader of Bomber Command for the first year of the war. When Winston Churchill chose him to be Chief of Staff in 1940, he did so because he recognized Portal to be the "accepted star of the Air Force." Portal's wartime leadership bore out Churchill's judgment. Dwight Eisenhower wrote that Peter Portal "was the greatest of all the British war leaders—greater even than Churchill," and George Marshall said that Portal had the "best mind" of the Combined Chiefs of Staff.

With similar judgments sprinkled

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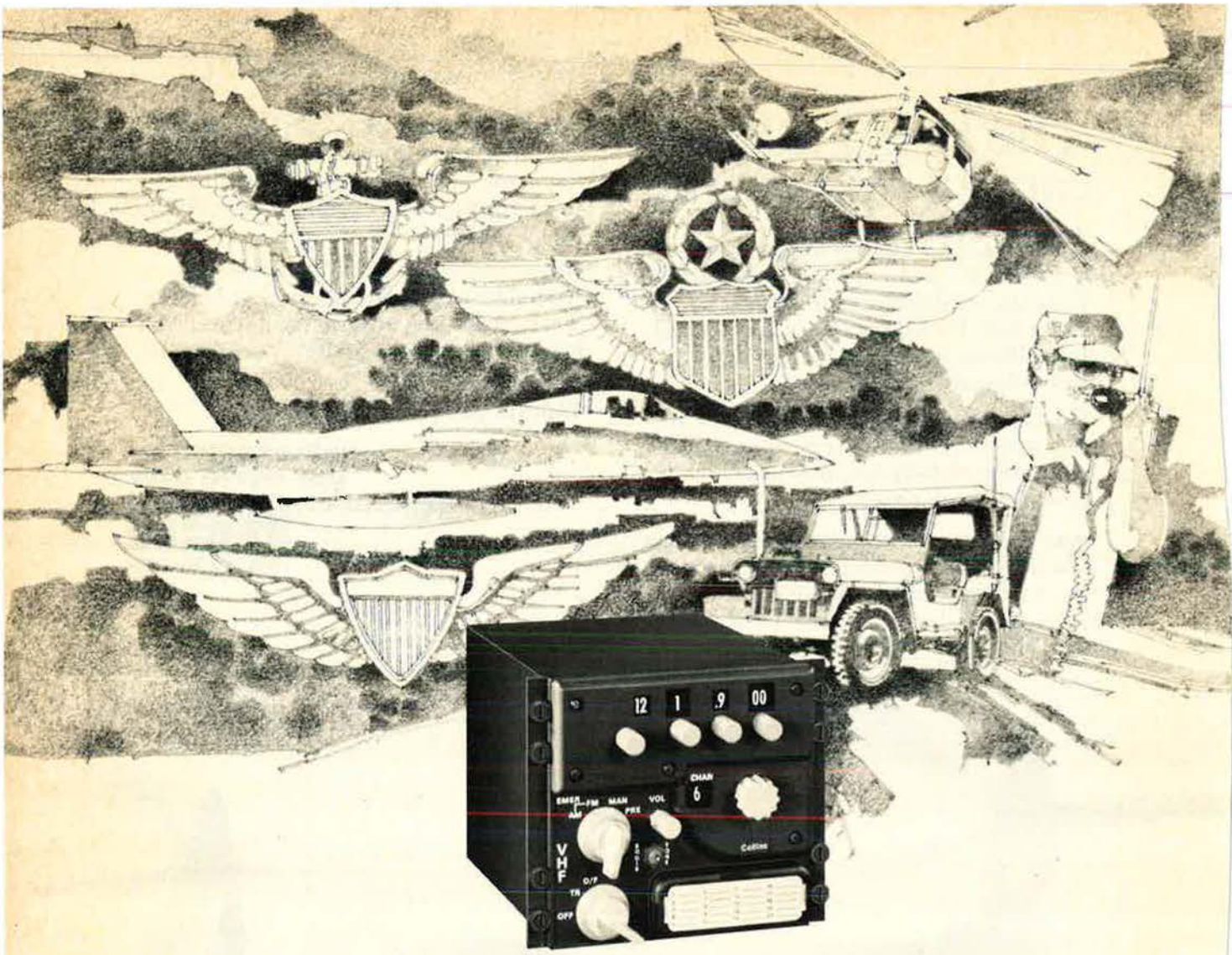

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Airman's Bookshelf

throughout the volume, one wishes that the author had put more emphasis on World War II. Yet in that thirty-five percent or so of the book, the doctrinal issues are explored and Portal's dealings with Churchill are examined in the process of demonstrating Peter Portal's contribution to the Allied victory.

Portal's approach to strategic bombing was nondoctrinaire and might be contrasted with some in the American air leadership who were determined to prove the success of precision bombing come what may. If one were to seek an American analogy, Portal seems to be in the Arnold or George Kenney mold. Portal had strong views on how to use airpower, but in the face of crippling losses while implementing RAF doctrine, he backed off and found other ways to strike the enemy. A long-time believer in precision bombing, when losses in daylight became prohibitive, he switched to the night, area-bombing formula in an attempt to remain active and to strike the enemy with all that he was able to muster while preserving and building his force for more telling blows later.

Much of the strategic bombing story is told through a review of the interesting correspondence between Portal and "Bert" Harris of Bomber Command. There is no analogue to this in American World War II experience. There appears to have been a great deal more give-and-take amongst the British—both within the military command structure and with the politicians—than found in the American war effort. Portal had to threaten resignation numerous times to force Churchill to back down on issues or to make the Prime Minister accept a path he had arbitrarily refused.

Although there are momentary lapses of professional objectivity by the author and the lengthy account of Portal's pre-World War II professional and family life is too long, this generally readable biography is valuable for the insights it brings to a different style of leadership and a different approach to strategic bombardment.

—Reviewed by Lt. Col. Alan Gropman, Directorate of Plans, Hq. USAF.

New Books in Brief

Tactical Nuclear Weapons: An Examination of the Issues, by William R. Van Cleave and S. T. Cohen. Recognizing substantial changes in the NATO-Warsaw Pact nuclear balance since the "flexible response" doctrine of the 1960s, the authors reexamine policy issues concerning tactical nuclear weapons and warfare in Europe. Under three headings (political, military, and technical), they compare NATO and Warsaw Pact approaches and analyze conceptual problems, suggesting ways for improving the ability of the US and NATO to cope with the threat of theater or tactical nuclear warfare. Index. Crane, Russak & Co., Inc., New York, N. Y., 1978. 128 pages. $10.50.

Veteran and Vintage Aircraft, compiled by Leslie Hunt. This fourth

Airman's Bookshelf

edition, expanded and updated, shows where some 9,000 of the world's oldest, rarest, and most fascinating aircraft and other flying machines are flown or preserved. More than 2,000 types, illustrated by some 900 photos, are listed for ninety countries. Index. Charles Scribner's Sons, New York, N. Y., 1978. 336 pages. $12.50.

Warning and Response, by Julian Critchley. A conservative member of the British Parliament says NATO cannot rely upon warning of an impending attack. Citing examples of successful surprise attacks in this century (Pearl Harbor, Nazi blitzkrieg, the Yom Kippur War, and Korea) he says that warning signs are invariably misinterpreted, disbelieved, and filtered by the preconceptions of politicians. Deciphering an enemy's code is no guarantee of intentions. NATO's defense must be credible without relying on warning, the author says, and concludes that NATO must restore tactical nuclear deterrence in Europe and demonstrate an ability to fight and win with its forces in being. Crane, Russak & Co., Inc., New York, N. Y., 1978. 144 pages. $14.

Washington Information Directory, 1978–79, Congressional Quarterly. A well-blazed trail through the bureaucratic jungle of Washington is provided in this reference. Whether your questions involve national security, foreign affairs, individual assistance programs, or equal rights (to name a few areas), you'll know which way to turn by looking in this book. For each subject, the book includes key agencies, House and Senate Committees, private organizations, and lobbying groups involved in the issue. For each listing, there are names, addresses, and telephone numbers, as well as a complete description of the organization's involvement. Indexed by subject and by organization. Congressional Quarterly, 1414 22d St. N. W., Washington, D. C. 20037. 902 pages. $19.50.

World War II Airplanes, Volumes 1 and 2, by Enzo Angelucci and Paolo Matricardi. Together the volumes provide an overview of aircraft development between 1939 and 1945 in Great Britain, Germany, Italy, France, Czechoslovakia, Netherlands, Poland, Sweden, Yugoslavia, Romania, Belgium, Finland, Norway, Denmark, Greece, and Hungary (Vol. 1); Japan, United States, the Soviet Union, Australia, New Zealand, South Africa, China, and Brazil (Vol. 2). Includes in chronological order every plane in each nation's air force, with text, three-view drawings, and color illustrations. Rand McNally & Co., P. O. Box 7600, Chicago, Ill. 60680. 320 pages with index. $6.95.

—Reviewed by Robin Whittle

Recent and of Interest

The Secret Betrayal, by Nikolai Tolstoy, Charles Scribner's Sons, $14.95. The handing over to the Soviet Union of 2,000,000 Russians in the West.

Deadly Magic, by Edward Van Der Rhoer, Charles Scribner's Sons, $9.95. The Allied breaking of Japanese codes in World War II.

U.S. Occupation in Europe After World War II, edited by Hans A. Schmitt, The Regents Press of Kansas, $6.95.

The All-Volunteer Force and American Society, edited by John B. Keeley, University Press of Virginia, $8.95.

Problems of Sea Power As We Approach the Twenty-First Century, edited by James L. George, American Enterprise Institute, $5.75.

Airfields of the Eighth, Then and Now, by Roger A. Freeman, Battle of Britain Prints International, Ltd., $23.50.

F-111, by Bill Gunston, Charles Scribner's Sons, $9.95.

F-14 Tomcat, by Arthur Reed, Charles Scribner's Sons, $9.95.

Airborne at War, Napier Crookenden, Charles Scribner's Sons, $14.95.

P-38 Lightning at War, by Joe Christy and Jeff Ethell, Charles Scribner's Sons, $14.95.

Panzers at War, by A. J. Barker, Charles Scribner's Sons, $14.95.

Invasion: North Africa 1942, by S. W. C. Pack, Charles Scribner's Sons, $12.95.

Private Pilot Examination Review, by James W. Morrison, Arco Publishing Co., $9.95. ■

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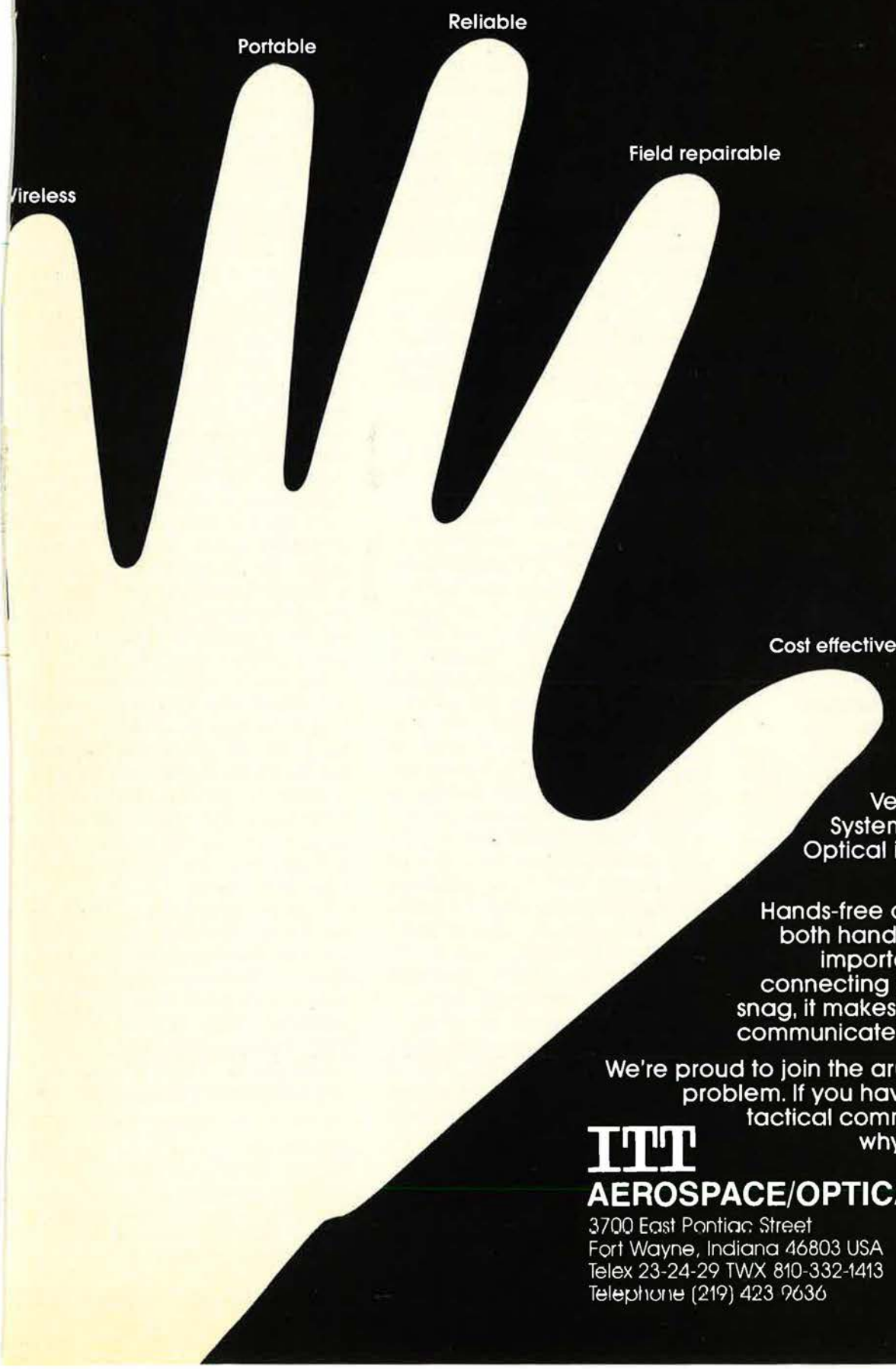

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Nearly half of the 1,074 members of World War II's Women's Airforce Service Pilots met at Colorado Springs in September to celebrate . . .

The Year of the WASP

BY JAMES R. PATTERSON
Photos By Bill Madsen

THEIR own V-Day, long fought for by the Women's Airforce Service Pilots (WASPs), was celebrated in late September by 457 members of the organization that flew 60,000,000 miles, most of it ferrying combat aircraft, during World War II. At a five-day national convention at the Antlers Hotel in Colorado Springs, the WASPs hailed President Carter's signing of a bill on November 25, 1977, that was strongly supported by the Air Force Association and that cleared the way for them to attain the status of veterans.

For their tenth and largest meeting, the WASPs swarmed in from throughout the United States and several foreign countries. They were joined by husbands, many of whom were former Air Force pilots, associate members, and such staunch friends as Sen. Barry Goldwater and retired Air Force Col. Bruce Arnold, son of the AAF's World War II leader, Gen. H. H. (Hap) Arnold. Both the Air Force Academy and NORAD supported the convention, providing speakers and entertainment as well as tours of their facilities.

That almost half of the 1,074 women who wore WASP wings between 1942 and 1944 should return for the reunion was acclaimed by Mrs. Bernice F. Haydu, who was retiring after three years as president of the organization. Mrs. Haydu credited the membership committee's work in locating "lost" WASPs, and the interest in possible veterans' benefits with swelling convention attendance.

Mrs. Haydu pointed out, however, that the Secretary of the Air Force still has to establish a civilian/military service review board before a WASP can apply for an honorable discharge.

"I think any veterans' benefits we are likely to receive will be meager," she said, "but it is the recognition we have sought for thirty-four years."

The high-spirited gathering was similar to many Air Force Association conventions and unit reunions. In the meeting rooms and class parties there was much of the hangar flying along with there-I-was stories that characterize any conclave of pilots. Many of the WASPs appeared in uniform and, if they had gained a pound or two and added a few gray hairs, they still exhibited much of the same vitality and dedication that got them through flight training at Avenger Field in Sweetwater, Tex.

Mrs. Leotta (Dedie) Deaton, trim and pert in her dark blue uniform, still teaches Red Cross swimming classes in her home town of Wichita Falls, Tex. She was administrative assistant to Jacqueline Cochran, the director of the WASPs, personally knows every WASP, and serves as unofficial historian for the group.

"Our girls were the cream of the crop," she recalls proudly. "Out of almost 25,000 who applied for flight training, our girls were the ones who succeeded."

Mrs. Deaton added that her former boss had very much wanted to attend the convention but was unable to because of ill health.

Many of the women are still flying, and several arrived piloting aircraft. Among them was Mrs. Betty Jo Reed, cochairwoman of the convention committee and chief pilot for the 4080 Corporation, who flew in at the controls of a twin-jet.

The other cochairwoman, Mrs. Mary Helen Chappell, no longer is flying, but vividly remembers when she was copilot for Gen. Frank Armstrong. Later, as one of only two WASPs assigned to the Manhattan Project, she sometimes occupied the right seat while working with Col. Paul Tibbets, pilot of the *Enola Gay,* which dropped the atomic bomb at Hiroshima.

Among the highlights of the convention, which boasted the slogan "The Year of the WASP," was the talk by Bruce Arnold, who recounted the long battle to win veteran's eligibility for the wartime women pilots. Colonel Arnold, who had been a leader in the effort, warmly praised the group for its courage and persistence in winning through to victory against substantial opposition.

Another feature of the meeting was the luncheon at the Air Force Academy's Mitchell Hall for a delegation of WASPs and a group of women cadets. The luncheon was arranged to provide an exchange of views and experiences between the veteran pilots and the young women who hope to pursue military flying careers.

The climax of the convention came on the final night with an address by Senator Goldwater, who had introduced the bill to provide veterans' benefits for the WASPs. The banquet at which he spoke on national defense issues drew the largest attendance of any of the sessions, with 620 persons overflowing the hotel's main dining room.

In an election of officers, Mrs. Lillian Connor Roberts of Gainesville, Va., was chosen president; Mrs. Elizabeth P. Nicholas of Indianapolis, Ind., vice president, and Mrs. Edna Modisette Davis of Los Angeles, Calif., secretary-treasurer.

Orlando, Fla., will be the site of the next national convention in 1980. ■

James R. Patterson, a retired Air Force Reserve colonel and former public relations executive of United Aircraft Corp., now lives in Colorado Springs. He has been a frequent contributor to AIR FORCE Magazine.

Three WASP leaders check program of the recent five-day convention that drew 457 of World War II's women pilots. From left to right, Mrs. Leotta Deaton, of Wichita Falls, Tex., member of the board of directors; Mrs. Bernice F. Haydu, of Riviera Beach, Fla., president; and Mrs. Betty Jo Reed, of Denver, Colo., cochairwoman of the convention.

How it was then—in the dark days of World War II—is discussed by an Air Force Academy cadet, an Air Force captain, and a member of the WASPs at a special Academy luncheon attended by a delegation of the veteran women pilots and young women interested in flying careers.

Sen. Barry Goldwater—a principal backer of legislation that extends veterans' benefits to the WASPs—addresses the convention audience in Colorado Springs.

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Legislative Pluses, Minuses Cited

On the plus side of the "people" bill ledger, Congress during its adjournment rush raised the limit of CHAMPUS payments from the 75th to the 80th percentile, but not to the 90th as the services wanted. The lawmakers blocked another attempt to phase out commissary store funding and threw out the ill-advised commissary bagger-replacement scheme and the threatened two percent "users fee."

They extended for two years the authority to pay reenlistment bonuses and the various doctor-dental incentive pays. They okayed lump-sum reenlistment payments for active-duty people and a small enlistment-reenlistment bonus and educational assistance program for the Reserve components. Permission to continue commissioning physician assistants was also granted.

By far the juiciest plum, of course, was approval of junior enlisted travel benefits (*see separate item below*).

On the negative side people-wise, the legislators banned government funds for abortions at military hospitals and under CHAMPUS, except where the life of the mother would be endangered, and in a few other situations. They also directed a fifteen percent cut in inputs to all graduate degree programs and tightened the "double-dipping" rules.

The latter action limits future military retirees (Regulars and non-Regulars alike) to a combined Civil Service salary and military retirement pay of $47,500, the so-called "Executive Level V Ceiling." In addition, Regular officer retirees must still forfeit half of all their retired pay above $4,532.

Down the home stretch Congress also decided that Air Force could fire twice-passed-over officers and continue officer and airmen early release programs, the latter for one more year. Then they must be reduced.

Among other people actions, Congress continued the requirement that most Defense civilian employees must use available and adequate government quarters on TDY. Many employees have complained bitterly about this policy. In separate moves, the lawmakers okayed a specially struck gold medal for Lt. Gen. Ira C. Eaker, USAF (Ret.), and authorized the Defense Secretary to "provide transportation" for the Girl Scouts on two foreign trips.

All of the above-cited actions have become law.

Air Force emerged from the final legislative flurry with authorized military personnel strength ceilings of 53,075 for the Air Force Reserve, 92,150 for the Air Guard, and 566,400 for the Regular force.

Jr. EM Travel $ Victory Hailed

When the services early this year pinned their "number-one priority" tag on junior EM travel entitlements legislation, the odds for success didn't look favorable. After all, a lot of money was involved, and some key lawmakers opposed the idea. Like Senate Armed Services Committee Chairman John Stennis (D-Miss.), who said too many military dependents were abroad already.

But Pentagon officials, far from turning their backs on the fight as many uniformed personnel have asserted they did on benefits generally, plugged persistently for approval. They underscored the young marrieds' financial problems. Air Force leaders stressed the urgency of the travel entitlements in speeches, congressional hearings, and at every opportunity.

It was iffy for months, but in mid-October Congress finally approved and the President signed the Defense Department appropriations bill, complete with $85 million in junior EM travel benefits for this fiscal year. Officials hailed the action. "It's a monumental victory for young enlisted families and the services," one declared. AFA, long a supporter of the move, echoed these feelings.

The measure gives E-1s, E-2s, and E-3s, and E-4s with less than two years' service, going overseas, returning from overseas, or transferring from one foreign post to another, the following:

(1) Government-paid relocation of dependents and 1,500 pounds of household goods (to either an accompanied foreign base or a designated Stateside location); (2) shipment of a car; (3) dislocation allowance (equal to a month's quarters allowance); (4) temporary lodging allowance overseas; and (5) in some cases a trailer allowance. Members without dependents are also authorized shipment of their cars, and they now rate 500 pounds of hold baggage, compared to 225 pounds heretofore.

Hq. USAF fired off its implementing message, prepared in advance, when the Chief Executive signed the legislation. The message ordered CBPOs to immediately contact all junior enlisteds on overseas orders or expecting them and explain the new entitlements and their options.

Junior airmen now abroad with their dependents must extend their tours and serve the full accompanied-by-dependents tour to accrue all the new entitlements. However, if they decline to extend, Uncle Sam will ship back their cars and 500 pounds of household goods. They are also authorized dependent travel from the CONUS port to the new duty station and shipment of 1,500 pounds of household goods from a location in the CONUS to the duty base.

In a concession to Senator Stennis, Congress said the travel entitlements would not be paid (to any service members) if the total number of military dependents overseas climbs above 350,000. This could cause problems. A Defense spokesman said there are about 300,000 "command-sponsored" dependents abroad, but it was not clear how many others—"individually-sponsored"—are overseas.

Authorities said the new entitlements should definitely help recruit-

ing and retention. They hope to expand the full travel package next year to junior enlisteds who transfer within the states.

Pentagon officials, meantime, are maneuvering for another new benefit for enlisteds: per diem equality with officers. One plan under study in the Pentagon carries a $66 million annual price tag. The authorities hope to get a legislative proposal to Capitol Hill next year.

Reservists' SBP Launched

The Air Reserve Personnel Center has set in motion the newly approved Survivor Benefits Program (SBP) for Reservists, notifying members eligible for retirement and providing them instructions, forms, and actuarial tables. The Reservists' SBP coverage was included in a bill, recently signed into law, which improves the program for several categories of widows (*see last month's "Bulletin Board"*).

The new measure authorizes annuities for widows of Reservists eligible to retire but who have not reached age sixty. Eligibles can choose an annuity of up to fifty-five percent of their retired pay (1) payable to the beneficiary on the date he would have been sixty (if he dies before then), or (2) starting from the day of his death (before or after age sixty). Those not choosing either course must wait until age sixty to elect coverage, the same as now.

Eligibles have ninety days from the date notified of their eligibility to make an election. ARPC has a toll-free number, (800) 525-1391, for persons needing assistance.

Banner Session for Veterans

Congress in the final days of the recent session voted improvements in veterans' disability compensation, survivor payments, home loans, pensions, cemetery and other benefits. Not since the first GI Bill in 1944 did veterans do so well, according to Rep. Ray Roberts (D-Tex.), chairman of the House Veterans Affairs Committee.

Most of the improvements were effective October 1. They:

- Provide a 7.3 percent increase in (1) disability compensation drawn by 2,200,000 veterans with service-connected disabilities; (2) disability indemnity compensation (DIC) received by 324,000 survivors of deceased service-connected vets; and (3) the clothing allowance that is paid certain seriously disabled veterans.
- Extend allowances to the dependents of 400,000 vets with service-connected disabilities rated thirty and forty percent. This pleasant surprise is in addition to the 7.3 percent compensation raise.
- Increase compensation for various groups of seriously disabled vets, such as those requiring special care. For example, certain ones needing a skilled health care attendant will get $900 a month for that purpose.
- Increase from $3,300 to $3,800 the allowance paid those veterans eligible to buy a car, and establish a new "housebound" rate of $45 a month for certain surviving spouses receiving DIC.
- Provide DIC payments to survivors of vets who die of nonservice-connected causes, provided they were totally disabled for service-connected ailments at time of death and had been so rated for ten years. Heretofore, such survivors did not receive DIC.
- Increase burial allowances from $800 to $1,100 when death is service-connected, and from $250 to $300 in nonservice-connected cases. The lawmakers also authorized the Veterans Administration to pay the average cost of a headstone or grave marker bought by a veteran's survivors, and set up a grant-in-aid plan to improve state veterans cemeteries.
- Boost from $17,500 to $25,000 the maximum guaranty on VA home and condominium loans. The measure also removes price ceilings on mobile homes and reduces from 181 to ninety days the required service for getting VA housing loans. The changes aim to get more veterans back into the housing market.
- Increase from $100 to $200 the monthly pension paid the 286 living Medal of Honor winners. It's effective January 1.

Air Guardsmen from many states flank the new monument honoring the late Maj. Gen. I. G. Brown during dedication ceremonies at McGhee-Tyson AB, Tenn., recently. The event also marked the tenth anniversary of the ANG's Professional Military Education Center, also at McGhee-Tyson, which General Brown established when he was ANG Director.

The Bulletin Board

The President approved all the items listed above. In signing the Civil Service Reform Act, he also eliminated veterans' preference in federal job hiring for nondisabled officers retiring after October 1, 1980, in grades above O-3. Congress rejected Mr. Carter's bid to eliminate hiring preference for all nondisabled veterans.

The legislators also voted increases in veterans' pensions and sweeping changes in the pension program. At press time, the President had not signed this bill into law, although he was expected to do so.

The pension measure raises maximum pension rates from $2,368 to $3,550 for a single veteran, from $2,544 to $4,651 for a veteran with one dependent, and provides $600 for each additional child. Also included are increases for survivors and for vets with special "aid-and-attendance" needs.

These pensions are paid to more than 2,000,000 needy veterans and survivors, not on the basis of any service-connected disability, but because they served faithfully and Uncle Sam feels a responsibility since they are in poor health and financial difficulty.

The new pension measure requires that nearly all the veteran's family income must be deducted, reducing the maximum allowable pension dollar for dollar. Heretofore, several kinds of income had been excluded. The measure, reported in detail in the August 1978 AIR FORCE Magazine, also provides automatic pension raises to keep pace with the cost of living and ensures that VA pensions will not be reduced because of Social Security increases.

In a separate action, Congress approved a resolution establishing the week of May 28–June 3, 1979, as "Vietnam Veterans Week." The resolution is sponsored by Vietnam veterans serving in Congress. Supporters in both the House and Senate recently began plugging legislation they say is the "first comprehensive bill ever introduced to address the problems of the Vietnam veterans." It would help them get jobs, provide federal funds for health and psychological care, extend the GI Bill delimiting date, and raise GI Bill payments at high-cost schools and colleges. Backers say they will push the bill hard at the upcoming session of Congress.

Pay Not Eroded, GAO Holds

Military pay and benefits are not being eroded, according to a fifty-five page report recently issued by Comptroller General Elmer B. Staats. He heads the General Accounting Office, an arm of Congress that acts as the watchdog on federal spending.

Mr. Staats cited different studies in an attempt to show that the average service member is "slightly better off" than in 1972. He referred to a Rand Corp. study which states that enlisted careerists enjoy a "total compensation which falls in the top fourth of income of comparably aged and educated, fully employed, white high school graduates."

The report says the Defense Department should "better inform" military personnel of pay proposals and changes, thus helping them understand that their pay and benefits are not being cut.

Ed Gates . . . Speaking of People

The Demise of OER Controls

Four years ago, when the Air Force adopted its "controlled" officer effectiveness report (OER) program, officials thought they might well have picked a winner. They sorely needed one, for inflation in ratings had plagued the service for years and irked rank-and-file officers no little. The OER had drawn a steady chorus of boos.

Authorities figured they had probed the controlled OER idea from A to Z. Their examinations included six years of staff studies, workshops, surveys, and senior leadership reviews. Even mock promotion boards, using different controls, were conducted. It was an intensive research and development effort, and there seemed reason in late 1974 to believe the officer corps might accept a controlled system with teeth. Certainly the then-existing "9–4" system lacked teeth, for under it ninety-two percent of the then 100,000-plus USAF officers were receiving "nines," the top rating.

Picking the best qualified people for promotion became tough indeed, and the forecast was for still greater difficulty because of upcoming reduced promotion quotas. The squawks from the troops and commanders intensified.

But the replacement control device, launched in November 1974 after considerable fanfare, ran into early trouble. The program's sharp teeth immediately began to bite, and individuals started to bark. They didn't like those "third-box" ratings that began to appear.

Under the new controls, just twenty-two percent of the officers could receive a 1, or "top-box," rating. In addition, only fifty percent of the force could receive either a top box or a 2, the "second-box" rating. This left the entire other half of the force the recipients of a 3 rating (or lower), the dreaded "third box."

In the early going, officials insisted that a third box "is a good rating and will be competitive for all promotions through lieutenant colonel." But it proved to be otherwise.

So the complaints mounted, not just from third-box ratees but also from raters and reviewers. The latter were the high-level officials with a most unpleasant job: fit all the ratings rendered by raters under their jurisdiction into the inflexible 22-28-50 ratio pattern. Particularly upset were third-box assignees at Hq. USAF, who contended that they would be top box if they were assigned elsewhere.

Hoping to squelch the static, Air Force in September 1976 brought the command vice commanders together in hopes they could find ways to brighten the image of the controlled operation. A year later, officialdom lifted the controls on second-box ratings, a move that reportedly resulted in a flock of uncontrolled second boxes for those officers who had previously garnered third boxes.

But these moves failed to curb the growing dissatisfaction. Accordingly, earlier this year USAF leaders, like Fagin in the musical comedy "Oliver," began "reviewing the situation." In earnest. The service surveyed thousands of officers of all ranks, ratees and reviewers alike. The poll confirmed that better than three of every four took a negative view of the controlled OER system; they said that it damaged morale and contributed to the growing retention problem of young officers.

Meanwhile, at the Pentagon, authorities continued to mull over pay changes advanced by the President's Commission on Military Compensation. Target dates for getting firm legislative proposals through the Administration and to Congress early next year slipped further, as disagreements between service and DoD officials persisted. The biggest stumbling block appeared to be the retirement pay area; five separate retirement proposals were under study at one point.

Short Bursts

The Pentagon is stirring up a legislative proposal to give **military children overseas one round-trip a year** to a Stateside school or school outside their foreign location, *on a space-required basis* (emphasis supplied). Such trips have long been authorized just on a space-available basis, a situation military parents have deplored. Deputy Assistant Defense Secretary Maj. Gen. Stanley M. Umstead, Jr., also indicated Defense would try to get the students' baggage limit, now just sixy-six pounds, increased.

Hq. USAF recently picked 518 non-Regular lieutenant colonels and below **to serve two years beyond the twenty** they normally serve. The selectees, not surprisingly, are mostly S&E and rated officers. **Another "selective continuation board"** is scheduled for next year for non-Regulars with separation dates in FY '81 and FY '82. However, there are no plans to allow non-Regular officers to serve routinely beyond twenty years.

The commissary at Yokota AB, Japan, has been named **the best store in the Air Force,** with Offutt AFB, Neb., second.

The Defense Department recently turned loose **suggestion program participation** and savings figures. They show uniformed **USAFers completely dominate the program.** One example: in FY '77 more than 250,000 USAF military suggestions were adopted, compared to Army's 52,000 and Navy's 10,000.

Air Force is looking for **retired members willing to participate** in the **Retiree Involvement Program** (RIP) being set up at each base. Volunteers will man the local retirement offices, answer questions for other retirees, dependents, and surviving spouses, etc.

Senior Staff Changes

CHANGES: M/G James R. Brickel, from Asst. DCS/P&A, Hq. USAF, Washington, D. C., to Asst. DCS/RD&A, Hq. USAF, Washington, D. C. . . . **M/G William J. Kelly,** from DCS/Proc. & Prod., Hq. AFLC, Wright-Patterson AFB, Ohio, to C/S, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing retiring M/G Carl G. Schneider . . . **B/G David M. Mullaney,** from Dep. ACS/Intel., Hq. USAF, Washington, D. C., to Dep. Asst. to Sec. Def. (Atomic Energy), Washington, D. C. . . . **B/G Earl T. O'Loughlin,** from V/C, Oklahoma City ALC, AFLC, Tinker AFB, Okla., to DCS/Proc. & Prod., Hq. AFLC, Wright-Patterson AFB, Ohio, replacing M/G William J. Kelly . . . **B/G James C. Pfautz,** from Def. Attaché, Cairo, Egypt, to Dep. ACS/Intel., Hq. USAF, Washington, D. C., replacing B/G David M. Mullaney.

RETIREMENT: M/G Carl G. **Schneider.**

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. James Binnicker, from 12th AF, Bergstrom AFB, Tex., to Senior Enlisted Advisor, Hq. PACAF, Hickam AFB, Hawaii, replacing **CMSgt. Charles Reynolds,** now with 7th Bomb Wing, SAC, Carswell AFB, Tex. ■

The survey was followed by a conclave of four-star officers and major commanders. Their recommendation, though not unanimous, was to remove rating controls entirely. Chief of Staff Gen. Lew Allen agreed, and the decision went into operation in mid-October. Although generally welcomed, the announcement touched off a stir at bases around the world.

"How will it affect me?" "How will the next promotion board regard a noncontrolled top box beside a controlled second or third box?" "What, exactly, will a noncontrolled second box mean?" "How can a board determine the true value of a noncontrolled top box?" These are the types of skullbusters officers promptly began posing, but, of course, no answers are yet available.

General Allen, in announcing the decontrol move, said it "will give rating officials added responsibility and flexibility in assigning ratings. The responsibility for fair, objective evaluations that accurately reflect performances and potential must still fall squarely on the shoulders of all rating officials." While the actual reaction to the Allen statement remains to be seen, officials are braced for a return of rating inflation. How much is a big question.

The Chief also said that while the controlled system had triggered "expressions of concern by individual officers, supervisors, and commanders," it also accomplished many of the goals it was intended to meet. He cited checking inflation and giving commanders a means of identifying top-notch performers. Air staffers added that it pinpointed officers who probably "weren't going to make it. . . ." In more official language, the system enabled the service to meet several of its "basic evaluation system objectives" such as to "provide perspective on career prospects" and give management a "consistent differentiation of quality."

But its big drawback, one informed source told AIR FORCE Magazine, is that it failed to "minimize negative aspects of evaluation anxiety and demoralization." Another Hq. USAF personnel expert laid the system's demise to its "disregard for the human element" because it focused overwhelming attention on the "worst rating." Those who received the dreaded third boxes felt stunned and humiliated, more so than if they had received "sevens or eights" under the previous nine-point system, he said.

Some authorities, meanwhile, say they aren't worried about a return to inflation in ratings. They believe other indicators —*e.g.*, a person's assignments, his academic and PME records, and raters' narrative comments—provide clues and some guidance for promotion boards. At least, this group holds, inflation is a lesser evil than a system that generates deep bitterness among various groups of officers.

Despite the problems, the controlled system might still be around if other pressing officer concerns had not intensified. These included unhappiness over pay and benefits erosion and slumping young officer retention. "They all gained steam about the same time," one source noted, adding that the "needs of management and those of individual officers" clashed. The decision to shelve controls permanently, therefore, marked a concession to the needs of individuals.

With the end of controls, the rules governing administration of the OER program have been changed. One directs that most officers on selection lists for a year be given immediate noncontrolled ratings (heretofore officers on hike rosters were not rated until after their promotions). Another alteration shakes up the reviewing process, as the reviewer no longer plays a key role; in fact, he's now called the "indorser." Dozens of other administrative changes have gone into effect and AFR 36-10 has been amended accordingly.

So what's ahead? Will the service ever come up with a winner on the OER front? Certainly officials will keep trying, though they say there are no major changes in store for the immediate future. They promised to take "a very long look at the decontrolled system." ■

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BENEFIT INCREASES

Now . . . The Sixth Major Benefit Increase for

$85,000 STANDARD PLAN

Other Important Benefits

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

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CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year-end dividends (16.67% for 1977) to insured members in thirteen of the past sixteen years, and has now increased basic coverage on six separate occassions.

Additional Information

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are: **Group Life Insurance:** Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

Eligibility

All active duty personnel of the Armed Forces of the United States and members of the Ready Reserve* and National Guard* (under age 60), Armed Forces Academy cadets*, and college or university ROTC cadets* are eligible to apply for this coverage provided they are now, or become, members of the Air Force Association.

*Because of restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from cadets or Reserve or Guard personnel residing in Florida, New York, Ohio or Texas. Members in these states may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

CURRENT BENEFIT TABLES

AFA STANDARD PLAN

PREMIUM: $10 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-29	$85,000	$12,500	$97,500
30-34	65,000	12,500	77,500
35-39	50,000	12,500	62,500
40-44	35,000	12,500	47,500
45-49	20,000	12,500	32,500
50-54	12,500	12,500	25,000
55-59	10,000	12,500	22,500
60-64	7,500	12,500	20,000
65-69	4,000	12,500	16,500
70-74	2,500	12,500	15,000

Aviation Death Benefit:*

Non-war related	$25,000
War related	$15,000

AFA HIGH OPTION PLAN

PREMIUM: $15 per month

Insured's Attained Age	Basic Benefit*	Extra Accidental Death Benefit*	Total Benefit
20-29	$127,500	$12,500	$140,000
30-34	97,500	12,500	110,000
35-39	75,000	12,500	87,500
40-44	52,500	12,500	65,000
45-49	30,000	12,500	42,500
50-54	18,750	12,500	31,250
55-59	15,000	12,500	27,500
60-64	11,250	12,500	23,750
65-69	6,000	12,500	18,500
70-74	3,750	12,500	16,250

Aviation Death Benefit:*

Non-war related	$37,500
War related	$22,500

*The Extra Accidental Death Benefit is payable in the event an accidental death occurs within 13 weeks of the accident, except as noted under **Aviation Death Benefit** (below).

***AVIATION DEATH BENEFIT:** The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore the non-war related benefit will be paid in all cases where the death does not result from war or an act of war, whether declared or undeclared.

OPTIONAL FAMILY COVERAGE

(may be added to either Standard or High Option Plan)
PREMIUM: $2.50 per month

Insured's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each Child*
20-39	$10,000	$2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-74	750	2,000

*Between the ages of six months and 21 years, each child is provided $2,000 coverage. Children under 6 months are provided with $250 coverage once they are 15 days old and discharged from hospital.

ce Association Military Group life Insurance

$127,500 HIGH OPTION PLAN

APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life 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 Mo. Day Yr.	Height Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force Academy
- ☐ ROTC Cadet _____ Name of college or university
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ _____ Academy

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN		Mode of Payment	STANDARD PLAN	
Members Only	Members and Dependents		Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ___ _____
Member's Signature

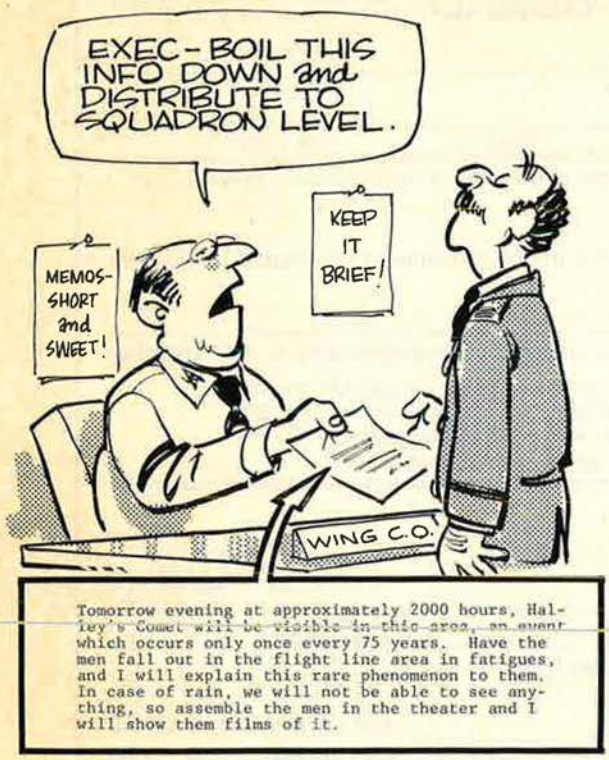
12/78
Form 3676GL App

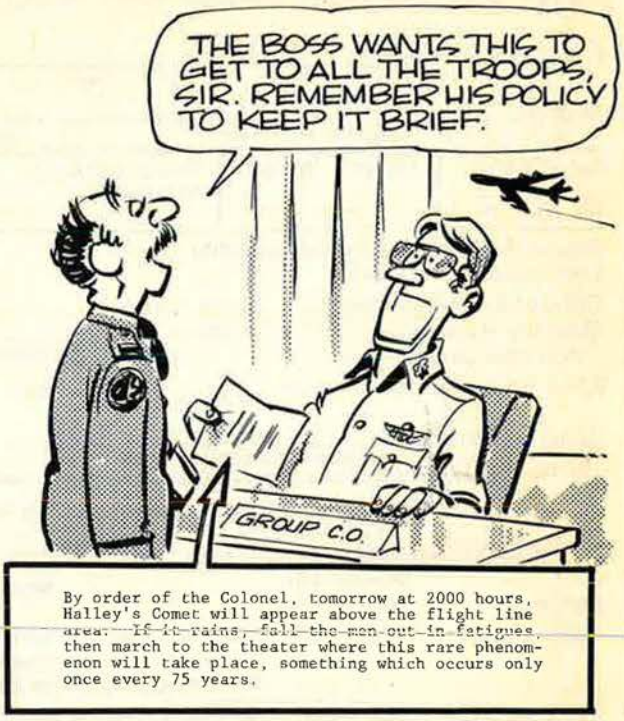
Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

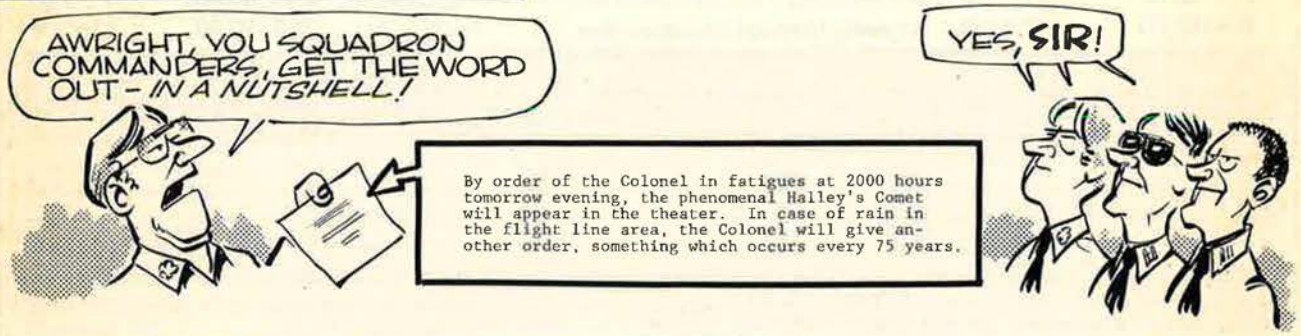
Bob Stevens'

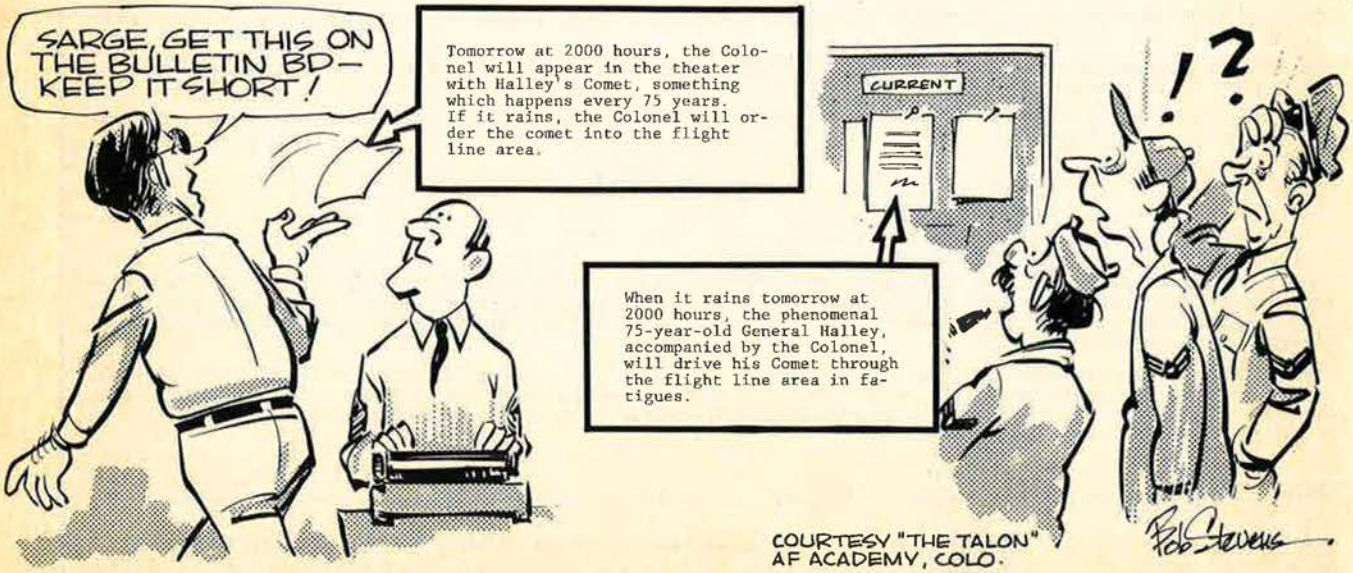
"There I was..."

COMMUNICATIONS IS NEVER HAVING TO SAY..."HUH?" COMMUNICATIONS-OR THE LACK THEREOF-IS ALSO THE BASIS FOR MOST AVIATION HUMOR TODAY...AND YESTERDAY, FOR THAT MATTER.









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KC-10A

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