

DECEMBER 1979/\$3

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

# MAGAZINE



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## The Military Balance 1979/80

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# Air Force Power



TF34-POWERED A-10 CLOSE AIR SUPPORT AIRCRAFT



CF6-50-POWERED KC-10A ADVANCED TANKER/CARGO AIRCRAFT



CF6-50-POWERED E-4A ADVANCED AIRBORNE COMMAND POST

## GE engines: The superior performance and reliability needed, whatever the mission

General Electric high bypass turbofans are continuing to prove their performance capabilities in key USAF missions

Twin TF34 engines help provide Fairchild's A-10 with the short-field performance, maneuverability and extended loiter time needed for its close air support mission.

Two other advanced aircraft are powered by thoroughly proven CF6-50 engines. For the McDonnell Douglas KC-10A Advanced Tanker/Cargo Aircraft, they help provide excellent mission range and payload capabilities. And for Boeing's E-4 Advanced Airborne Command Post, CF6-50 engines offer the reliability and low fuel consumption necessary to meet varied and complex mission objectives.

GENERAL  ELECTRIC

MILITARY  
AIRCRAFT

COMMERCIAL  
AIRCRAFT

UNMANNED  
AIRCRAFT

## At Lear Siegler Astronics is Flight Control

When you're looking for experience  
and technology in flight control...  
the Astronics Division has the answers in:

### MILITARY AIRCRAFT

As early as 1949, the Astronics Division achieved notable success in flight control with the receipt of the Collier Trophy for development of the first high-volume production autopilot for jet aircraft. The airplane was the **B-47**... the autopilot was one of more than 10,000 produced by LSI for the USAF.

The tradition continued with technology innovation—in 1953 the first fighter autopilot coupled to an ILS receiver for the **F-86D**; in 1954 the first transport autopilot for the **KC-135**; the first solid state 3-axis damper for the **F-104** in 1955.

More recently, the Astronics Division's AFCS for the **LTV A-7** initiated two breakthroughs—control augmentation with control stick feathering and a two-channel fail safe AFCS. This system was later modified and put into production for the Lockheed **P-3C** to insure absolute reliability and safety.

The latest addition to the Astronics Division of automatic flight control is the first production fly-by-wire flight control computer and sidestick controller for the General Dynamics **F-16**.

### UNMANNED AIRCRAFT

The Astronics Division's success with Automatic Flight Controls for piloted aircraft led to the development of control systems for pilotless aircraft.

LSI's versatile drone autopilot was designed for use in many drone aircraft. By merely changing circuit cards and sensors, each drone can be programmed to fly a variety of missions. It has flown thousands of missions in the USAF/USN series of **BQM-34** targets.

The LSI TACAN Guidance Augmentation System was the first Astronics drone autopilot with homing capability, enabling the Drone to simulate a variety of incoming anti-ship missile threats.

In 20 years, LSI produced more than 4,000 drone autopilots.

Because of this broad experience, the U.S. Air Force selected the Astronics Division for the design and development of an integrated system of modular avionics to interface with new and existing remotely piloted vehicles.

The resulting "CORE" Avionics system was later selected for the USAF **BGM-34C** program and successfully completed a 30 flight test program.

### COMMERCIAL AIRCRAFT

In 1956 the Astronics Division brought innovation to the commercial jet transport world with the first Category 3A automatic landing system for the **SUD Caravelle**.

This technology was later carried forward to the design of the avionic flight control system for the **Lockheed L-1011**. This system, with its autoland technology provides complete "hands-off" operation from take-off through a Cat IIIA landing and automatic rollout.

**FOR MILITARY MANNED, UNMANNED  
AND COMMERCIAL AIRCRAFT  
...FLIGHT CONTROL  
IS THE ASTRONICS DIVISION.**

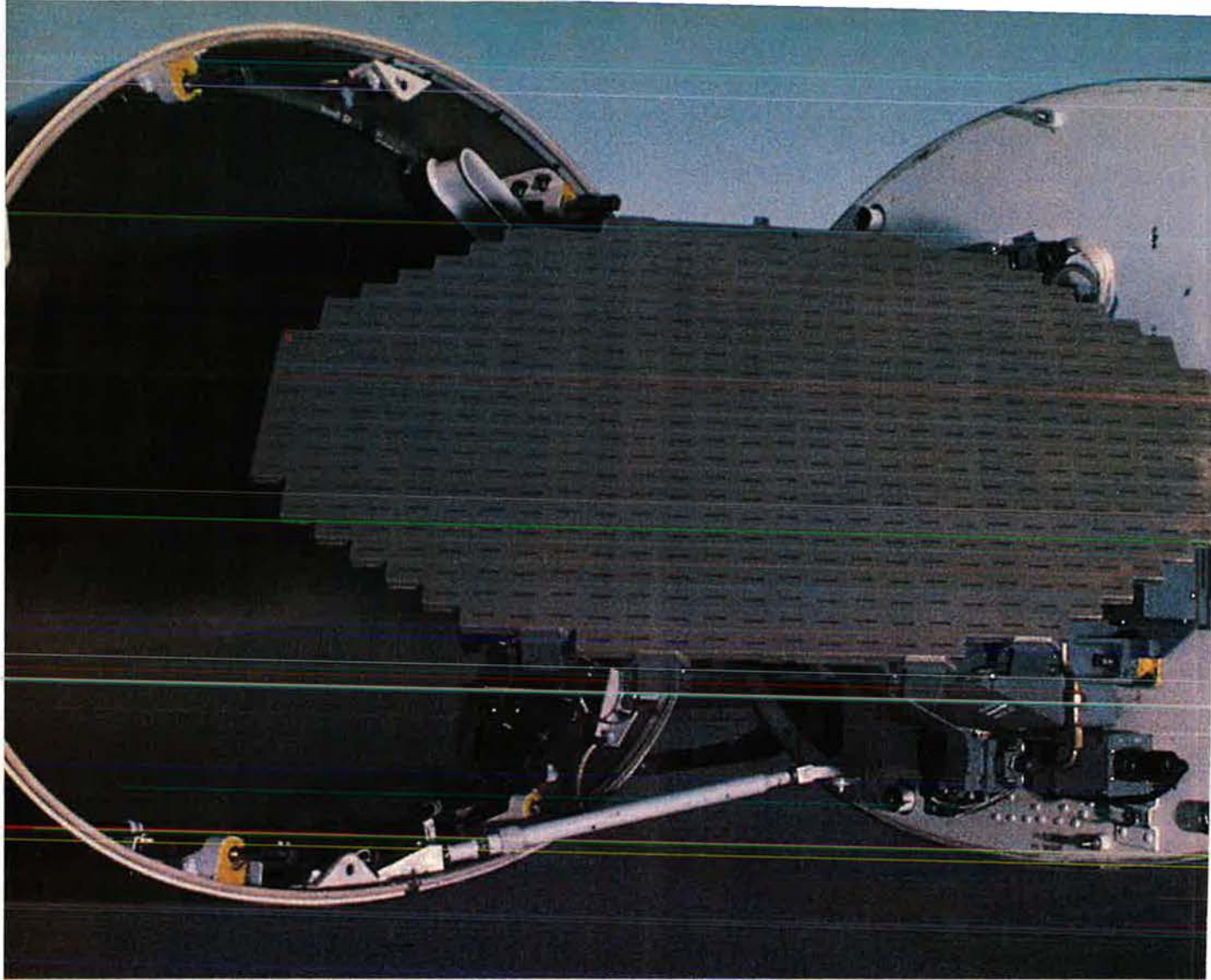


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# The F-16 Radar. Never has so much radar a space, in so short a time

The challenge: design a radar for the multirole F-16 fighter. Give it a fighting advantage for different missions. Produce it at an extraordinarily low cost. And do it fast!

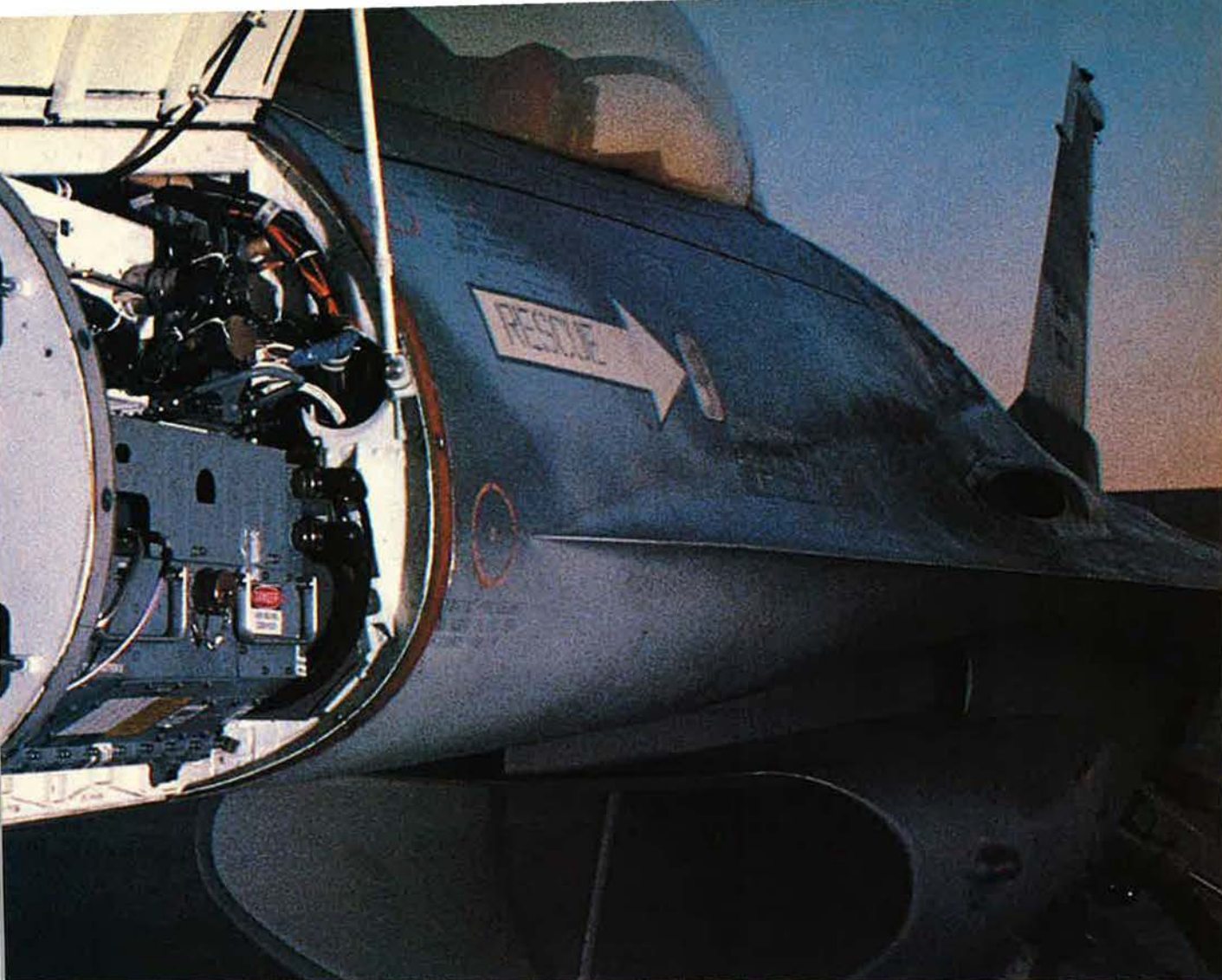
That's just what we did. The digital, Pulse Doppler F-16 radar operates in 10 different modes for air combat, ground attack and sea-lane defense. It changes modes and acquires targets automatically, freeing the pilot to fly the aircraft.

Westinghouse delivered the first production F-16 radar only 16 months after go-ahead (compared to an average of 24 months). This figure is even more impressive considering the system is co-

produced simultaneously in the United States and four other NATO countries. This multinational team now delivers over 20 F-16 radars every month.

How well does it work? Despite an extremely challenging development schedule and testing environment, including operational evaluation in Europe, the radar is now demonstrating required performance.

In fact, Westinghouse has so much confidence in the F-16 radar that we have a Reliability Improvement Warranty with the USAF and NATO. For a fixed price, we repair all radar failures for four years or 300,000 flight hours whichever comes first.



# been put in so small or so little money.

and those repairs can be done quickly because the F-16 radar is self-testing (fault detection and isolation) to line replaceable unit level which permits flightline changes within minutes. This high supportability translates into maximum system availability.

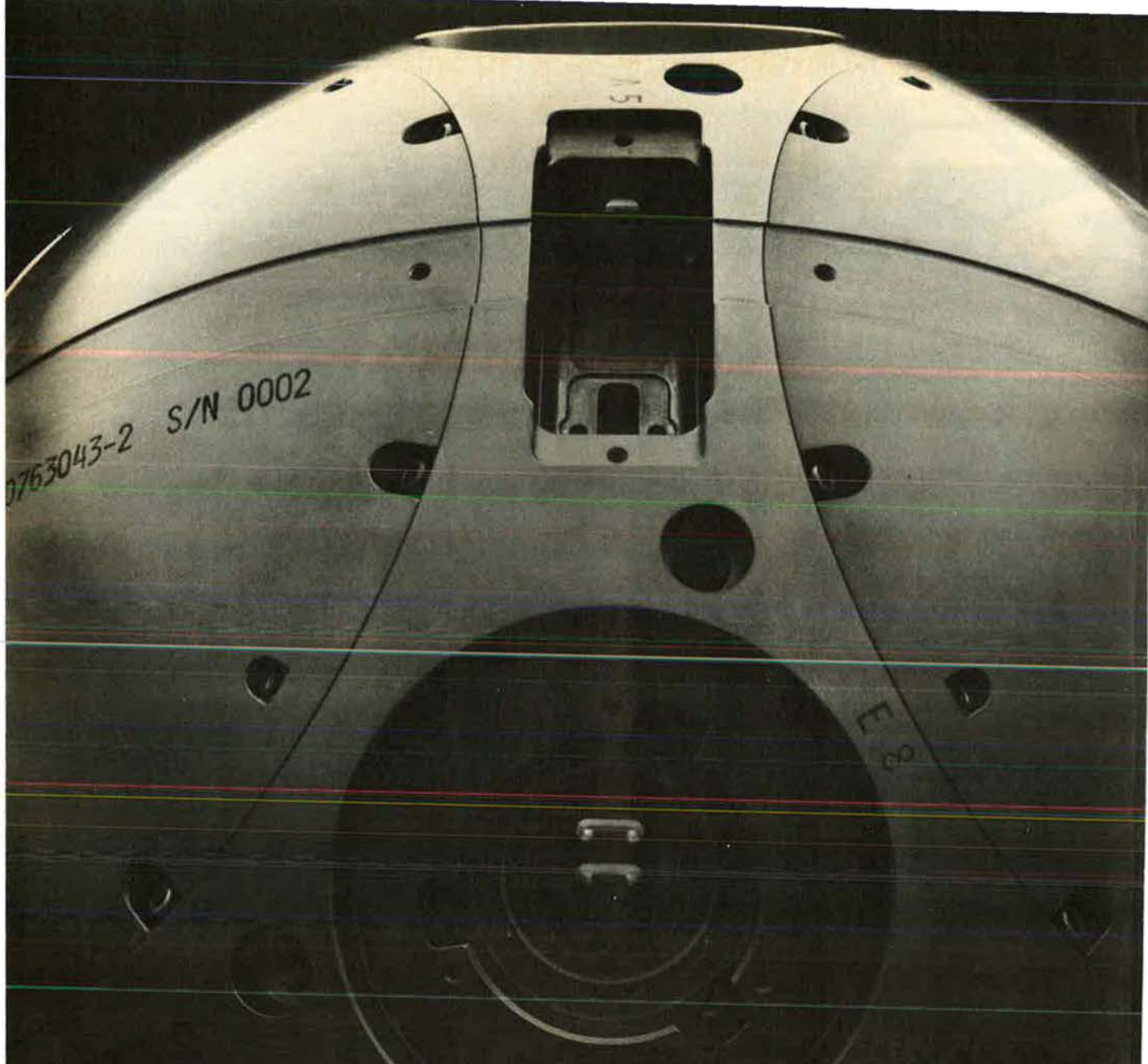
To address future requirements, Westinghouse is now designing radar modifications to give the F-16 fighter longer detection range for more

effective air-to-air missile employment. Also coming is a programmable signal processor for multiple target capability and additional ECM resistance. These new developments can be added to the system within the existing radar volume, requiring no airframe modification.

The F-16 radar. It's one great reason Westinghouse can say, "Bring us the tough jobs."

**We design it. We produce it. We support it.**

 **Westinghouse Defense**



# MX/AIRS

Northrop's Advanced Inertial Reference Sphere (AIRS) for U.S. Air Force MX intercontinental ballistic missile. Most precise guidance system of its kind.

AIRS represents most advanced expression of "floated ball" inertial guidance technology. Concept originated by Charles Stark Draper Laboratory. Developed by Northrop.

Northrop's Third Generation Gyro, which provides unparalleled accuracy, and other inertial instruments fit into precisely machined beryllium sphere. Stabilized inner sphere system senses orientation and position changes and alerts missile computer for necessary action.

Total isolation of inner sphere preserves accuracy by minimizing adverse effects of magnetic, vibration, temperature variations.

Northrop Corporation, Electronics Division, 2301 West 120th Street, Hawthorne, California 90250.

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Making advanced technology work

## This Month

- The Legacy of the '70s** / Editorial  
**Congressional SALT Hearings—Round Two** / By Edgar Ulsamer  
**Armament: The Business End of the Air Force** / By Edgar Ulsamer  
**TAC: Ready to Fly and Fight** / By F. Clifton Berry, Jr.  
**The US Stake in Southeast Asia** / By Gen. T. R. Milton, USAF (Ret.)

### The Military Balance 1979/80

A Publication of The International Institute for Strategic Studies, London

- 61 **Foreword** / By the Editors of AIR FORCE Magazine  
 62 **Abbreviations**  
 63 **Index to Countries and Principal Pacts**  
 64 **The United States and the Soviet Union**  
 70 **Soviet Defence Expenditure**  
 71 **The Warsaw Pact**  
 74 **The North Atlantic Treaty**  
 89 **Other European Countries**  
 92 **The Middle East and the Mediterranean**  
 99 **Sub-Saharan Africa**  
 104 **China**  
 106 **Other Asian Countries and Australasia**  
 113 **Latin America**  
 120 **The East-West Theatre Balance in Europe**  
 125 **The Balance of Theatre Nuclear Forces in Europe**  
 130 **Tables of Comparative Strengths**

### Jane's All the World's Aircraft Supplement

Compiled by John W. R. Taylor

### Judicial Review for VA Decisions? / By Ed Gates

### ABOUT THE COVER



For the ninth 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 is by Art Director Bill Ford.

### Departments

- 12 **Airmail**  
 17 **Unit Reunions**  
 20 **In Focus . . .**  
 26 **Airman's Bookshelf**  
 28 **Aerospace World**  
 37 **Index to Advertisers**  
 146 **The Bulletin Board**  
 147 **AFA Believes . . .**  
 148 **Speaking of People**  
 152 **AFA News**  
 156 **AFA State Contacts**  
 160 **There I Was . . .**

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# Proven power for tomorrow's new

It's not yet certain what the next generation of military trainers will look like. However, some things are certain.

Tomorrow's trainers will be rugged and efficient, based on the most cost effective design concepts.

And they'll be powered by proven engines. Like the arsenal of Garrett engines shown below.

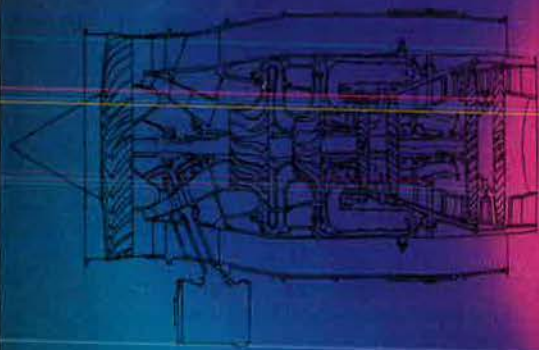
Each engine has a proven record of design maturity that eliminates the high risks associated

with the development of a brand new engine.

Each offers low ownership costs and easy-to-service modular construction.

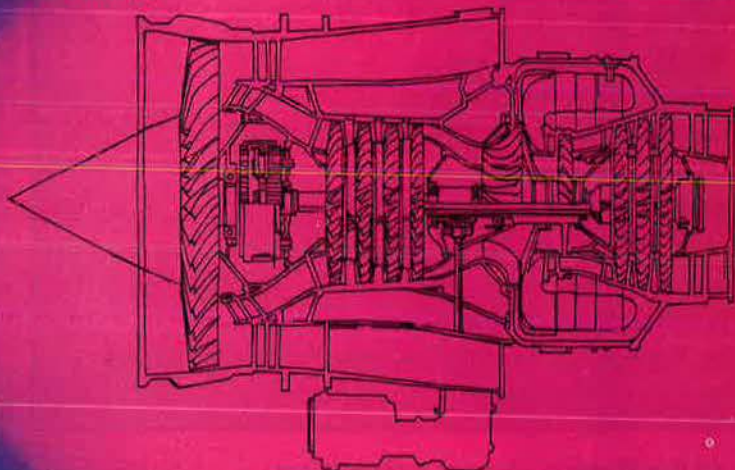
And, each is ready to bring the next generation of trainers a step closer to operational reality.

As the world's largest manufacturer of small gas turbines, Garrett isn't a stranger to the military. Over 1,000 of our engines are now flying in the invento



## TFE76 1,500 lbs. thrust class

- Medium bypass turbofan.
- Based on the core section of Garrett's phenomenally successful T76 and TPE 331 turboprop engine.
- Core proven by over 16 million flight hours in over 50 different military and civilian aircraft.
- Turboprop combat experience in the Rockwell OV-10 Bronco and the Fairchild Peacemaker.



## TFE731 3,500 lbs. thrust class

- High efficiency, medium bypass turbofan for increased thrust.
- A fully matured design, proven by more than 1.5 million hours in 1,800 engines in 14 of today's leading business jets.
- Now flying in the Spanish Air Force CASA 101 military trainer.
- Can be de-rated to 3,000 lbs. thrust class to provide long life with low operating costs, to meet a variety of aircraft and mission requirements.



# Trainers.

What's more, we are doing more Armed Services contract work on small gas turbine research than any other manufacturer.

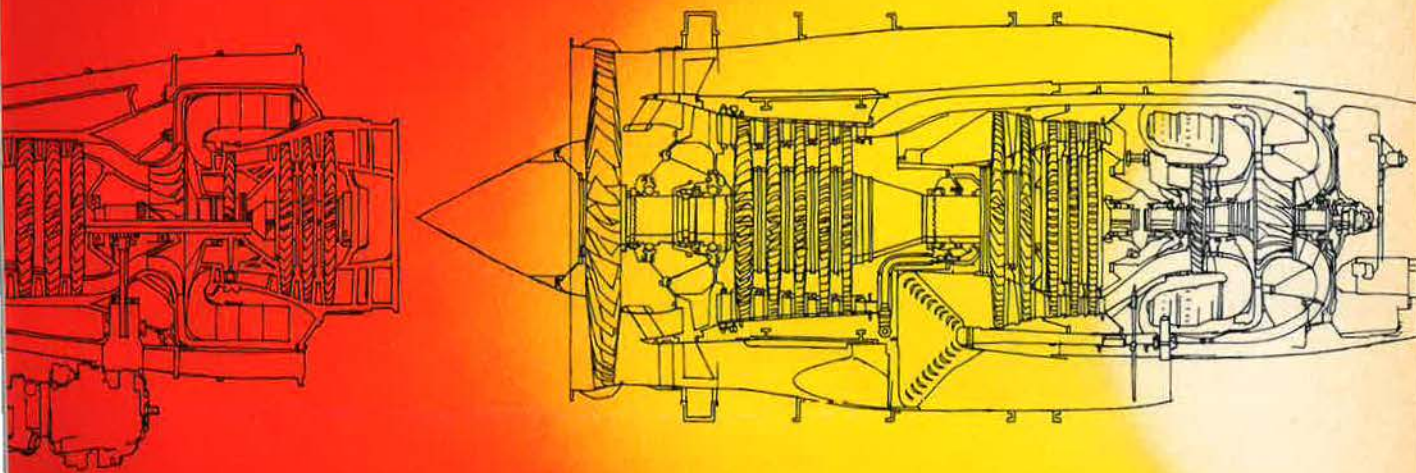
We also back up the reliable performance of our engines with an extensive worldwide military support network.

The point being, no matter what the final shape of tomorrow's trainers — single engine or twin, swept

wing or straight — Garrett is ready now with proven engine configurations that can save you time and taxpayer money.

For more information, write: Propulsion Engine Sales, AiResearch Manufacturing Company of Arizona, P.O. Box 5217, Phoenix, Arizona 85010.

Or call (602) 267-3011.



## **TF1042 4,500 lbs. thrust class    ATF3 5,500 lbs. thrust class**

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• Militarized version of the commercial TFE 731, under development with Volvo Flygmotor.  
• Operation available at 3,600 lbs. thrust to meet a variety of altitude and mission requirements, and provide longer life with lower operating costs.  
• Development is now underway at Volvo Flygmotor.

- Medium bypass with extremely low IR and noise signatures.
- Selected for the Mystere 20 Gardian, the Falcon 20H business jet and used on U.S. Coast Guard HU-25A surveillance aircraft.
- The only turbofan engine in its class that has been flight-tested above 55,000 feet.
- Early version set turbofan altitude and endurance records on USAF/Ryan "Compass Cope" RPV.

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## The light at the end of the tunnel is only five feet above ground.

That's one of the reasons the C-5 is such a great airlifter. Its cargo deck is low to the ground—an essential feature for fast loading, an imperative feature when minutes count during unloading. In a crisis situation, 200,000 pounds of critical cargo has been unloaded from the C-5 in under 30 minutes.

That kind of performance is far beyond the reach of any other airlifter in the world.

In the picture above, you're looking down 145 feet of cargo compartment and out through a cargo opening that's 19 feet wide. That cavernous compartment can accommodate two main battle tanks—the drive on, they drive off. It can handle gear Chinook helicopters. Or bridge launchers. Just about anything the Army needs carry anywhere.



There's a lot more to the C-5's unique lifting capability. It can be refueled in flight to give it globe girdling range. It can operate in remote areas of the world because of its advanced navigational systems. Its high-flotation landing gear enables it to use unimproved runways as short as 3,500 feet. And, of course, once it lands it can unload and get out fast.

The C-5. Built on the only airlifter production line in the U.S. by the people who know more about designing and building airlifters than anyone else. When it comes to airlifters, Lockheed knows how.

**Lockheed**  
Lockheed-Georgia Company

# Airmail

## Comment on SALT II

Your excellent report (October, p. 37) on the SALT II Senate testimony of Strategic Air Commander in Chief Gen. Richard H. Ellis somehow omitted his primary comment on the merits of the treaty:

"It is our assessment that during the period of the Treaty, SAC will have less difficulty executing its deterrent and emergency war missions with a SALT Treaty than we would without a Treaty. We have based this assessment on a thorough and continuing analysis of all available intelligence on Soviet strategic capability and an in-depth understanding of our own capabilities and weaknesses."

Robert Sherman  
Military Affairs Assistant  
to Rep. Bob Carr  
Washington, D. C.

## Safety for Tomorrow's Air Traffic

Your October cover story ["NAFEC: Today's R&D for Tomorrow's Air Safety"] does an excellent job of capturing both the essence of what FAA's National Aviation Facilities Experimental Center (NAFEC) is all about, and the vital R&D work that underlies the entire Federal Aviation Administration commitment to a safer and better air transportation system.

I realize how difficult a job it was to put all of NAFEC's different elements together into a cohesive, well-written story. Assistant Managing Editor Bill Schlitz did a first-rate job.

Joseph M. Del Balzo  
Director  
NAFEC, FAA  
Atlantic City, N. J.

## "I Knew Him When . . ."

Your editorial memorializing Lord Louis Mountbatten and Col. Philip G. Cochran (October 1979) was fitting and proper but, from one who knew and loved Phil Cochran, it was far too short and inadequate. I must, for the sake of accuracy, correct at least one reference you made.

It is quite true that Milt Caniff patterned "Flip Corkin" after Phil—looks, mannerisms, speech, and indomitable courage and defiant self-reliance. However, Flip was introduced to the comic strips in the summer of 1942—long before the North

African invasion or the Burma campaign—not after his heroic exploits in the overseas world. I have a series of "Terry and the Pirates," dated August 1942, which show Flip Corkin, and those of us who were associated with Phil Cochran that summer affectionately called him Flip.

I can truthfully say that, if it weren't for Phil Cochran, I would not have flown during the war—and, for that, I am eternally grateful. As a brand-new second lieutenant, fresh from flying school in May 1942, I was assigned to Phil's squadron (65th Fighter Squadron, "Fighting Cocks"). On my third flight in a P-40, I cracked up while attempting a short-field takeoff and totally demolished the aircraft.

Phil was in the ambulance when it arrived at the scene of the accident and was the first to get to me. I was apparently uninjured, but Phil accompanied me to the hospital in the ambulance, where the flight surgeon examined me. Phil never left my side. When, after about half an hour, the flight surgeon pronounced me all right, Phil immediately took me out to the flight line and personally shoved me into another P-40 and said, in his distinct manner, "Get it in the air, sport!" I was back flying within one hour of the accident.

Phil knew that if I started to think about the accident, I would probably develop fear of flying and, if he had not propelled me into the air before the full effects of the accident were realized, I'm quite sure I never would have flown again.

Everyone who was touched by Phil Cochran has a story to tell about him for he was one of a kind, and it is with deep reverence that I join the privileged few in saying, "I knew Phil Cochran."

Lt. Col. Charles Jaslow,  
USAF (Ret.)  
Ann Arbor, Mich.

## Air Force Doctrine

I found Maj. Gene E. Townsend's article on the evolving characteristics of Air Force doctrine ["The Dynamic Role of Air Force Doctrine," October '79] most interesting. It has been a growing belief of mine that the Air Force's role in our nation's defense

will become more important over the next decade. As a new subscriber to AIR FORCE Magazine, I hope you will continue to publish such excellent articles.

Beyond those sentiments, however, I would like to know: (1) whether it is possible for me to purchase a copy of the most current edition of Air Force Manual 1-1, and (2) if it is possible to purchase a copy, where and how I might do so?

Jerry Eagan  
Fairborn, Ohio

• *Active-duty Air Force personnel—military and civilian—may obtain copies of Air Force Manual 1-1, "Functions and Basic Doctrine of the US Air Force," through their local publications distribution office. Others may obtain copies by writing to the Superintendent of Documents, US Government Printing Office, Washington, D. C. 20401. Price \$3.50 per copy. Stock No. 008-7000442-9 must be included in your order. Comments on Air Force doctrine may be forwarded to Hq. USAF A/XOXL, Washington, D. C. 20330.*  
THE EDITORS.

## Don't Keep Them Apart

Jim McDonnell bull's-eyed in his August "AFA Believes" column. His point on our commitment as perceived by our allied host nation needs as much emphasis as possible. Here the government of Japan building and funding additions to our base to make life more comfortable for us and our families. To penalize us, our families, and the American public by mandating arbitrary reduction of dependents overseas would be counterproductive in all the ways Jim mentioned.

As a personnel officer, I see, daily, the impact and cost of family separation, and the advantages of family unity, even in an unfamiliar locale and society. We need more support on this issue. The Air Force and the American public can't afford the cost of rotating our people overseas every twelve to eighteen months.

Capt. Robert P. Smith, US,  
APO San Francisco

## Angels a National Asset

Let me congratulate you on the fine job of reporting [October '79] on the most recent Arnold Air Society/Angel Flight National Conclave held in St. Louis. As you must realize, Air Force ROTC cadets comprise a sizable portion of your readership, and they were well represented by this article. . .

# SCIENCE/SCOPE

Better ways to help pilots visualize the performance characteristics of their weapons, particularly during the stress of combat, should reduce the chance of missiles being fired in such instances as when the aircraft is in the wrong attitude or the target too far away. Hughes, under U.S. Air Force sponsorship, is evaluating new display techniques and algorithms (data processing formulas) for fire control systems. After these concepts have been analyzed in ground simulations, the best will be demonstrated in flight tests in an F-15 fighter.

A new laser designator will enable F-5F fighter crews to pinpoint ground targets for laser-homing weapons. The compact device, designed to fit the narrow space between the back seat and left side of the fuselage, is part of a Laser Target Designator System (LTDS) being manufactured for foreign military sales. To operate the unit a crewman sights a target through an optical telescope and fires the laser designator. The beam passes through the aircraft canopy to the target and is reflected like a beacon. Laser-homing weapons sense the reflected laser light and guide themselves to the target. Hughes is producing the designator for Northrop Corporation, prime contractor for the LTDS (AN/AVQ-27).

A unique "picture-taking" system comprising five separate sensors will help the U.S. Air Force evaluate which imaging methods may be most useful for advanced airborne applications. The Hughes-developed system consists of one sensor that sees only visible light, another that measures thermal radiation (heat), two active laser systems that detect the amount of reflected light, and a millimeter-wave radar. Variations in the gray tones of panoramas made by the sensors, particularly in those made at night and during inclement weather, reveal the advantages and disadvantages of each.

How a fighter aircraft's radar performs during exercises can be determined from data gathered by a new recording system. Hughes devised the equipment for use with its AWG-9 weapon control system on the U.S. Navy's F-14 Tomcat. The recorder stores up to an hour of data, pilot and voice communications, and a time base. The information is sufficient to analyze the radar's performance from search and detection through missile launch. In the past, only highly modified test aircraft could provide this data because tactical aircraft have little or no room for additional electronics. Space was found on the F-14 by removing an electronic countermeasures unit that goes unused on training missions.

Two laser-guided artillery shells have scored direct hits on moving tanks that were pinpointed by a Ground Laser Locator Designator (GLLD). The recent demonstration of the U.S. Army's Copperhead weapon system, attended by representatives of seven foreign nations, was held at Ft. Carson, Colorado. GLLD, now in production at Hughes for use with the Copperhead, can also designate targets for all laser-homing weapons now in operation or under development.

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CULVER CITY, CALIFORNIA 90230

# The New Shape of Air Power



In each generation, one combat aircraft incorporates the full technology of the time and is known as the "fighter pilot's fighter." The Spitfire. The Mustang. The Sabre. The Phantom. Each delivered spectacular performance and each dominated the skies of its era.

Today, that fighter pilot's fighter is the F-16, with its unparalleled maneuverability, advanced avionics and multiple weapons payloads . . . a true multirole fighter with unmatched capability in air-to-air and air-to-ground missions.

The F-16 is operational with the Belgian and United States Air Forces, and is scheduled to join the Air Forces of Denmark, The Netherlands, Norway and Israel. Like the pace-setting fighters of other generations, the F-16 will set the standard of multirole combat performance for years to come.

**GENERAL DYNAMICS**

Fort Worth Division, Fort Worth, Texas 76101



I'm sure that AFROTC faculty members join me in appreciation of your emphasis on this little-known and little-understood area of AFROTC activity. The Angels represent a true national asset for the Air Force, and deserve every bit of support they can get.

Lt. Col. Pete Henderson  
Det. 5, AFROTC  
Auburn University  
Auburn, Ala.

## Early Christmas Gift

September's AIR FORCE you published a letter from my wife who was seeking a WW II sextant as a Christmas present to me. Before our copy of the magazine arrived she already had received two answers and now there must have been a dozen, but one letter just to inquire if I had been the writer's instructor at Elington in 1945. (I had been.) Most people asked for an offer, but two offered them free! My wife was so overwhelmed that she had to let me in on the secret.

I graduated in Class 42-15 at Mather AFB, was in the school there as an instructor (and flight commander). I was in the first airplane to arrive at Elington AFB to move the navigation school there. I went to China in '45 on the Flying Tiger and was one of the first navigators to report back to Mather when the school was moved back in the States. I loved navigation and my wife knew how much I'd appreciate a sextant. My thanks to all our great Air Force friends.

Capt. Robert E. Brandon,  
AFRES (Ret.)  
Spokane, Wash.

## More on the Holten B-17 Crash

In the April issue of AIR FORCE magazine, you published a letter from M. J. G. Hols of Holten, the Netherlands, concerning a B-17 that had crashed in Holten in 1943.

I have contacted Mr. Hols direct, as I think I know about this B-17. It was in the 385th Bomb Group, Great Ashfield, Suffolk. (My home, Bacton, is identically, is the next village to Great Ashfield.) B-17F #42-3539 crashed in Holland Sunday, October 11, 1943, at approximately 3:20 p.m., after bombing Muenster, Germany.

The pilot, Lt. William Whitlow, escaped with SSgt. John T. Ashcraft (Ashcroft?), aided by the Dutch Resistance, via Holland, France, Belgium, and Spain, arriving back at Great Ashfield January 6, 1944. Two other members of the crew escaped, 2d Lt. Lloyd Stanford, the bombardier, and 2d Lt. Jim F. Burch, the copilot, who tragically drowned while swimming the last river to freedom near Irún, Spain. When he escaped by bailing out of his plane, Lieutenant Burch injured his leg.

I've been researching the Muenster raid of October 10, 1943, for a year for a book I'm writing. I have been in touch with Mr. Whitlow, now an attorney at law in America, since March 5, in connection with my book. He has been unable to trace John T. Ashcraft since the war.

I would be very grateful if readers would assist me in my research in trying to contact the following crewmen who escaped: John T. Ashcraft; Lloyd Stanford, 385th Bomb Group, Great Ashfield; Paul C. Horning, navigator, 91st Bomb Group, Bassingbourne, Cambridgeshire; Thomas E. Combs, 100th Bomb Group, Thorpe Abbots, Norfolk; and Walter L. House, 384th Bomb Group, Grafton Underwood.

Two others, James L. Lohrmann, engineer (?), and Richard Jackson, parachuted into Holland. . . .

Ian L. Hawkins  
29, Birch Ave.  
Bacton Stowmarket,  
Suffolk, IP14 4NT, England

## Mach 1 and the P-47

My old friend Lowery Brabham, former Chief Test Pilot for Republic Aircraft Corp., who made the first flight on the P-47 Thunderbolt fighter, recently denied, in the last issue of the P-47 Thunderbolt Pilots Association's *Jug Newsletter*, an "old wives' tale" that some combat pilots in WW II insist they flew a "Jug" P-47 at the speed of sound.

Over the years some of these same warriors have tried to convince this old Curtiss engineering test pilot veteran that they reached Mach 1 or otherwise in the vicinity of the speed of sound.

As a former Engineering Test Pilot with Curtiss-Wright Corp., and having personally conducted some high-Mach-number dive tests on P-40s, P-39s, and P-47s at Buffalo, and P-51s as well as P-38s at Wright Field, I am quite familiar with the dive limitations of those aircraft. The writer also conducted 150 dives in a Thunderbolt evaluating a series of Curtiss tran-

sonic and supersonic experimental-type propellers into the region of Mach .82 at Curtiss, Caldwell, N. J.

Brabham is correct as hell, in our opinion, that, aerodynamically, no WW II propeller-driven aircraft even came close to reaching Mach 1 in a dive due to the astronomical drag rise of the aircraft and propeller shortly after exceeding approximately Mach .83, plus a pilot's inability to have positive control of the aircraft thereafter.

This was discussed at length, at the annual P-47 Thunderbolt reunion in Colorado Springs several years ago, with several P-47 pilots who swear they dove their aircraft in the vicinity of 700 miles per hour and returned to their base. These comments were made in the company of Alexander Kartveli, Chief Engineer of Republic Aircraft Co., who designed the P-47 Thunderbolt, and Dr. Don R. Berlin, Director of Engineering for the Airplane Division of Curtiss-Wright Corp., the designer of the P-36, P-40, and P-75 fighters. They both confirmed that, due to the aerodynamic constrictions and limitations and the state of the art of aircraft and propeller design existing at that time, attaining the speed of sound on any WW II propeller is just a figment of someone's imagination.

I hope all WW II fighter pilots will put this fantasy to bed once and for all, since several pilots tried to reach the speed of sound and, unfortunately, are now a statistic.

In past discussions with my old and dear friend Tony La Vier, former Chief Test Pilot for Lockheed Aircraft, he said, "Anyone who ever reached Mach 1 in a WW II propeller aircraft ain't here to tell about it."

Dr. Herbert O. Fisher  
Kinnelon, N. J.

## Last of the B-17s?

I am very interested in Phillip Huston's letter in the "Airmail" column for September (p. 16) regarding the last B-17G airplanes still flying in the United States and England.

He may know that most of the flying examples were built right at the end of the war and did not see combat, as did *Shoo Shoo Baby* with the 91st Bomb Group. However, he may not know that there is a real beautiful B-17G still doing excellent work for the French National Geographic Institute (IGN) and is based at Creil just north of Paris.

This airplane, F-BGSP, should certainly be preserved by someone when it ends its days with the IGN, because

# Airmail

as 44-8846 it served with the Eighth Air Force in England from the early part of 1945. It was with the 351st Bomb Group at Polebrook until May of that year, then transferred to the 305th at Chelveston, where it served with the 365th Bomb Squadron with the code-letters XK-M. The airplane served with that group on occupational duties in Europe at St. Trond in Belgium before the outfit moved on to Lechfeld, Germany.

In later years, 846 was sold by the USAF to the IGN and entered the French civil register on December 9, 1954, where it has remained to this day. . . .

Harry Holmes  
Middleton, Manchester, England

Without a doubt the B 17G as well as the Es and Fs are by now practically extinct. One lonesome and unsung G, however, still sits proudly on a concrete slab at Tulare, Calif. This, plus *Shoo Shoo Baby* (AIR FORCE Magazine, April '79), should make at least two of these models still alive. I fear for the Es and Fs though. God only knows how many are left. They were all great airplanes and we loved them all.

My own E model, #3474, lies smashed, burned, and dismembered on a wooded, jungle slope, about thirty miles south of the erstwhile Japanese stronghold of Rabaul, New Britain. She went down about 2:00 a.m. on June 26, 1943, after being hit by ground fire over Vunakanau Air-drome and then finished off by night fighters while trying to limp home. But she is not forgotten. I will be visiting her resting place next summer. I will be alone because I was her only survivor.

I feel ashamed not to have done this before, but after being liberated from the POW camp at Rabaul in September of 1945, I was kept busy flying in the various successors to the B-17: the B-29, B-50, B-47, and B-52. AIR FORCE Magazine (December 1955) carried a story on some of my activities. But, no matter how much more sophisticated have been the post-WW II successors, the B-17 will always be my great "love" and that of many of my contemporaries.

Lt. Col. José L. Holguin,  
USAF (Ret.)  
Los Angeles, Calif.

## 317th TAG Flag

The 317th Tactical Airlift Group has been reactivated at Pope AFB, N. C. Its last operating base was Celle RAF Station, Germany (January-September 1949). If anyone knows the whereabouts of the original group flag, I would like to hear from you.

Col. James N. Hockney  
317th TAG/CC

Pope AFB, N. C. 28308

Phone: (919) 394-4848 or  
AUTOVON 486-4848

## F-104C in SEA

As a contributor to the French aviation magazine *Air Fan*, I am trying to compile a story of the F-104C service in Vietnam. As this aircraft had only a limited service life in SEA, it is very difficult to find facts of any kind on this subject. Therefore I would appreciate the help of readers.

I am looking for any details of its service in SEA like pictures, combat reports, and anecdotes by anyone who has flown the type or worked on it, or who may have some details which might be of interest in compiling a comprehensive story on this subject. All material will be returned, and a copy of the story will be forwarded to anyone who helps.

Jean Pierre Hoehn  
92, avenue Jean Jaurès  
67100 Strasbourg, France

## Essex-Based Groups

I am endeavoring to compile a book on aviation in the County of Essex during the Second World War, and am seeking contact with former members of the 344th, 394th, and 409th Bomb Groups of the Ninth Air Force.

I would be most grateful if former members of these and of any other Essex-based groups would contact me.

Ian C. Mactaggart  
Craig-y-Llyn  
Braintree Rd.  
Gosfield, Halstead  
Essex C09 1PR, England

## MiG Kill Aircraft

Thud crew chiefs would like to hear from anyone that could tell them the tail numbers of the F-105s and USAF F-4 aircraft that are credited with MiG kills.

I have the list of the F-4, F-105, and two B-52 MiG kills, but it is neither complete nor accurate. All the dates are listed and pilot(s) names are given, but when it gets to the serial numbers, the list is incomplete, inaccurate, and possible typing errors ap-

pear. Dates run from the first MiG kill (July 10, 1965) and end with the last kill (January 8, 1973). More than half of the tail numbers for the F-4s (Phantom) are missing and none of the F-105s (Thud) were even recorded.

I would like to update the list to include all tail numbers of these aircraft. In order to do this I will need the help of the Air Force men and women who were there at the time the aircraft received their MiG kills. I know a lot of these people probably have separated from the Air Force and have gone into civilian jobs, so I will need the help of the civilian sector, Air National Guard, Air Force Reserves, and active-duty employees. You can call for a true Total Force Effort. Come on, you old crew chiefs, let's get the record straight once and for all!

TSgt. Larry A. Goodale  
507th TFGP (AFRES)  
L-13/MAO "B" Flight  
Tinker AFB, Okla. 7314

## Book About the '47s

I am in need of some further assistance from the readers of AIR FORCE Magazine. I have almost finished my new book for Squadron/Signal Publications on gunship activity in the SE war but am sadly lacking in AC-47 material. Ol' Spooky was the best known of all the dragonships but the one I have the least on. Also, it had been decided to add the activities of the EC-47s to this new book. Anyone with information and/or photos/slides of AC-47 gunships or EC-47 psywar birds, please contact:

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

## Ninth AF Squadrons

I am attempting to locate members of the 40th Mobile Communications Squadron and the 21st Weather Squadron, Ninth Air Force, during World War II, to collect information about these units for a history.

Also, is there in existence a Ninth Air Force Historical Society that might help me in this endeavor?

Irvin J. Kirch  
34 Hoss Rd.  
Indianapolis, Ind. 462

## Air Force Flight Gear

I am currently collecting USAF flight gear from 1940 to the present day. The gear is to be used for display at shows and for those who are just curious about what our pilots wore and wear today. I'm looking for helmets, flight suits, oxygen masks,

oves, goggles, chutes, etc. I will purchase gear, or donations will be listed on display.

Frank MacSorley  
1119 Wynbrook Rd.  
Glen Burnie, Md. 21061

Phone: (301) 760-5460

#### Slides and Photos

I am a collector of aircraft slides and photographs. I have taken more than 1,000 slides and 1,000 photographs. At the present time, I am seeking slides and photographs of aircraft during the period of 1950s to mid-1960s—both military and airliner type aircraft and United States and foreign manufacture.

I am willing to trade, buy, or exchange slides and pictures.

Steve Robbins  
4115 E. Grove St.  
Phoenix, Ariz. 85040

I would very much appreciate any assistance from readers who could help me start a slide collection of Air Force and Navy aircraft, past or present. If the reader wishes, the slides will be returned after being duplicated. I will also trade from my collection with anyone who would like to. The slides will not end up in books or magazines, only in my collection. Any assistance will be appreciated.

Wayne Whited  
3187 Kennesaw View Dr.  
Marietta, Ga. 30064

#### Aviation Paintings

I would like to purchase original aviation paintings. If any AFA member has these for sale, could they please contact me.

Samuel S. Kloda  
5817 Eldridge Ave.  
Montreal, P. Q.  
Canada H4W 2E3

#### Host Bases

I am an AFROTC cadet and would like to collect old base guides to Air Force installations now deactivated. I am especially interested in old ADCOM bases such as Otis, Truax, Suffolk County, Richards-Gebaur, etc.

Jeff Alfier  
Apt. 626  
5309 Riverdale Rd.  
Riverdale, Md. 20840

#### Needed:

Information relative to AC-47, -119, F-100, F-105, F-106, F-107, F-108, F-117, F-119, F-120 aircraft, such as slides, photos, films, mission tapes, etc. Will be duplicated promptly and returned. I am also looking for a USAF issue of the F-4 OD helmet (size 7 1/4). Lastly, I

would like to hear from persons attached to the 4413th CCTS and 71st SOS/AFRES.

K. T. Wilhite, Jr.  
4620 Georgetown Ct., #1  
Indianapolis, Ind. 26222

### UNIT REUNIONS

#### Lawyer-Pilots Bar Association

February 6-10, 1980, Marco Island, Fla.  
**Contact:** Arthur Alan Wolk, 1712 Locust St., Philadelphia, Pa. 19103. Phone: (215) 545-4220.

#### Philippines Personnel

All ex-Air Force personnel stationed in Philippines and those who were POWs, and their families, 35th anniversary reunion to be held in Manila, April 1980, Manila Hotel. Bataan Day will be celebrated April 9, 1980, with special unveiling of bronze tablet in memory of the nurses captured on Bataan and Corregidor. **Contact:** Brig. Gen. William Hipps, USAF (Ret.), P. O. Box 13505, Orlando, Fla. 32859.

#### River Rats

Annual Red River Valley Association, April 25-27, 1980, Sahara Hotel, Las Vegas, Nev.  
**Contact:** Lt. Col. Al Krisch, phone: (702) 643-2245, or Lt. Col. Chuck Fenton, PSC Box 1672, Nellis AFB, Nev. 89191. Phone: (702) 643-4020.

#### Stalag Luft III

Ex-POWs, April 18-19, 1980, Cincinnati, Ohio. **Contact:** David Pollak, P. O. Box 46566, Cincinnati, Ohio 45246.

#### 20th Air Force Association

Three special tours in 1980. All vets and families eligible at greatly reduced land and air fares. February 7, depart New York, Miami, Houston, and Los Angeles, 21-day tour visiting Brazil, Paraguay, Argentina, Bolivia, Peru, and Ecuador. June 12, depart New York for 1-week tour of Sweden and Denmark, followed by a 2-week cruise of Norwegian Coast to the North Cape. Early August, for 11th consecutive year, depart West Coast for 3-week tour to Mariana Islands (Guam, Saipan, Tinian), Hong Kong, Manila and Corregidor, Bali, Australia, New Zealand, and Tahiti. Reservations limited on all tours. **Contact:** 20th Air Force Association, P. O. Box 5534, Washington, D. C. 20016.

#### Class of 1960

Johnson AB, Japan, High School Class of '60 students and faculty—possibility of 20-year reunion during summer of 1980. Would also welcome response from other 1959-60 students and faculty. **Contact:** Thomas M. Slone, 601A Bueno Court, Dayton, Ohio 45431.

#### 73d Bomb Wing Association

Superfort Groups 497, 498, 499, and 500, plus assigned and attached units on Saipan, May 15-18, 1980, Dayton, Ohio. **Contact:** 73d Bomb Wing Association, 105 Circle Dr., Universal City, Tex. 78148.

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## 1980

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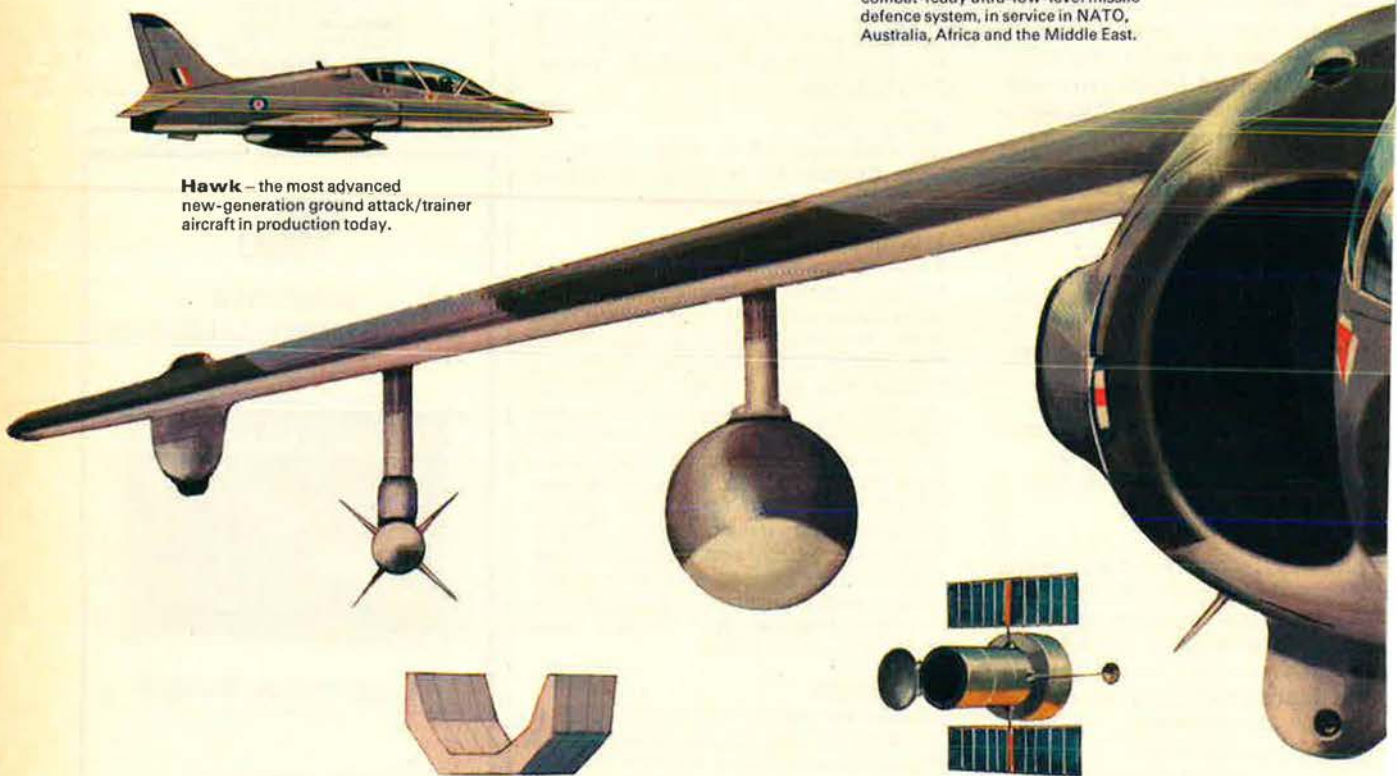
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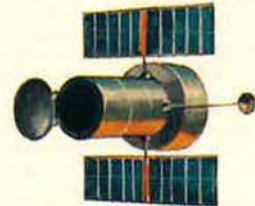
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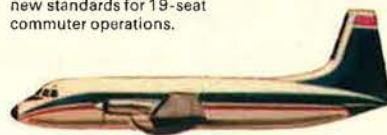
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# InFocus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., Nov. 7

## Congressional SALT Hearings—Round Two

The Senate Armed Services Committee's second round of hearings on the proposed SALT II agreement, held in October, provided few clues to whether or not the full Senate eventually will approve the accord and in what form. Neither did parallel hearings by the Senate Foreign Relations Committee and by a special panel of the House Armed Services Committee prove conclusive in this regard.

The Administration's witnesses, in the second go-around, seemingly were fatigued by the need to recycle arguments that they made earlier and exhaustively and piqued by their own side's brouhaha over Soviet troops in Cuba. Their performance, thus, seemed less brilliant than before, yet the pro-treaty forces suffered no significant setbacks.

The SALT critics, likewise, scored few triumphs, but solidified their positions and probably are justified in their optimism that some changes to improve the accord eventually will be made.

Among the witnesses, former Defense Secretary Donald H. Rumsfeld—well remembered by the committee members for his intellectual toughness—made a strong impact on Capitol Hill as well as on the news media. While reasserting his philosophical commitment to arms control, he rejected SALT II in its present form as a "bad bargain . . . by more than a trivial margin." Pointing out that the US could have signed SALT II in 1976—a temptation resisted by the previous Administration as not being in the national interest—he cautioned that "given the weight and momentum of the Soviet buildup and the American self-denial . . . in strategic capabilities over the recent past, such an agreement is even less acceptable today."

Reciting a series of changes that have soured the bargain since the framework for SALT II was formulated at the 1974 Vladivostok summit, Mr. Rumsfeld charged the Carter Administration with negotiating SALT II from the blindered logic of "minimum

deterrence" and acceptance of the "unsound and dangerous" notion of strategic "overkill."

The former Defense Secretary flayed the Carter Administration's orientation toward a "launch on warning" or "launch under attack" (LUA) posture as "a crutch of no valid use other than in trying to justify US weakness." He urged the Senate to reaffirm the concept of "extended" deterrence, meaning a range of options, to provide the US with "more precise, moderate, and hence appropriate responses" in crisis situations.

A supporter of the treaty—although with reservation—SAC's Commander in Chief Gen. Richard H. Ellis also expressed strong opposition to the doctrine of launch on warning or launch under attack for two reasons. LUA, he pointed out, does not correct the throw-weight advantage of the Soviet Strategic Rocket Forces (SRF).

Substituting a LUA strategy for the survivably based MX ICBM is flawed seriously also because "successful LUA response requires adequate warning, accurate attack assessment, a correct decision by the NCA [National Command Authorities], and survivable communications to our nuclear forces," General Ellis testified. But there are deficiencies, he acknowledged.

"The North American Air Defense Command [NORAD] missile warning system should reliably warn us of an impending missile attack. Whether the warning time is adequate depends upon circumstances not entirely under NORAD control," General Ellis testified. He added that the proximity of Soviet submarines to Washington and key military installations influences the adequacy of warning time.

Time is equally crucial for attack assessment of incoming ICBMs and SLBMs. Yet the existing system, General Ellis said "will not accurately assess an ICBM/SLBM attack under all conditions because time is inadequate."

The combined effect of too little warning and inaccurate attack assessment creates a "high probability that the NCA could not make a correct

decision," General Ellis warned.

Lastly, once a decision to launch is reached, it must be transmitted quickly to the strategic forces. But the Minuteman ICBMs, General Ellis explained, must receive the order prior to impact of the Soviet ICBMs, or risk being destroyed: "Whether communications can be maintained through this transattack period is problematical. We know how to restore communications after the transattack period, but this takes time. Minuteman survivability depends upon communications in the transattack period; MX does not."

In his testimony, General Ellis seemed to support the Senate's non-binding vote to increase the Defense budget by five percent in real terms in 1981 and 1982. This increase is being studied by the Administration. Such an increase, he told the committee, would accommodate three strategic initiatives recommended by SAC and permits modest improvements of the general purpose forces and better O&M funding.

The strategic initiatives include the acquisition of 155 FB-111B/Cs whose combined effectiveness would "offset approximately half of the entire Soviet SS-18 ICBM arsenal. (SALT II accords the Soviet Union the unilateral right to some 300 moderate large ballistic missiles of the SS-11 type, each of which has about twice the throw-weight of the proposed MX.)

SAC, incidentally, takes exception to some statements contained in an assessment of the FB-111B/C that appeared in this space last month. The modified aircraft, senior SAC spokesmen stress, would have the same range and payload as the B-52 if both aircraft are refueled once. Also, in a practical sense, the vulnerability of strategic bombers at tankers while on the ground or during fly-out is the same. The reason is that SAC often alternates the takeoff tankers and bombers to assure that the former are around to support the latter. Hence, under such a scenario the bomber's ability to flush more rapidly becomes academic.

Lastly, SAC remains confident that between NORAD's warning system and the Navy's ASW assets as well as the command's ability to disperse its bomber/tanker force or to place it on airborne alert, its survivability is adequate to withstand existing SLE threats.

Another strategic program recommended by General Ellis during testimony is the "urgent requirement

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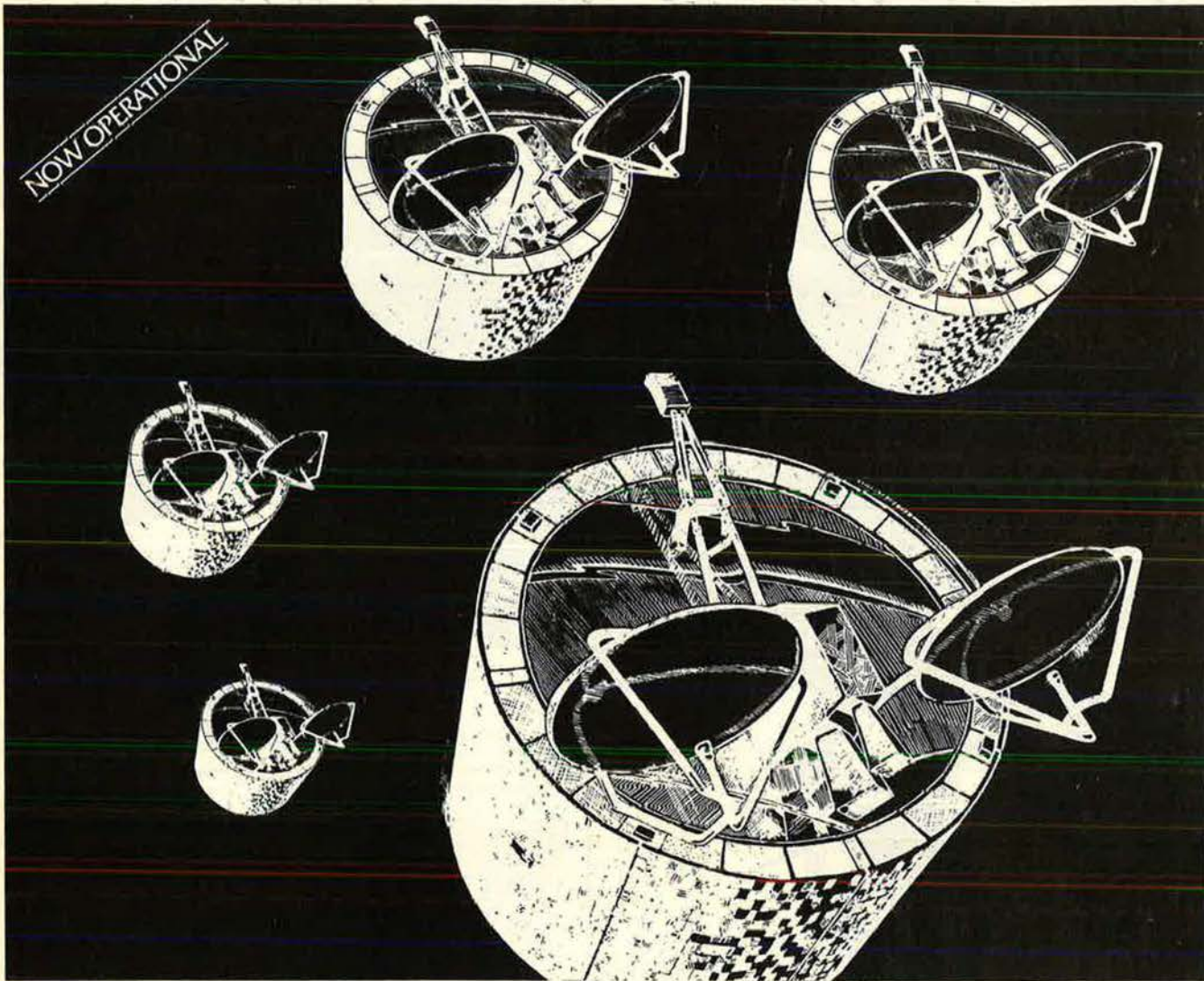
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DSCS II has greatly increased the nation's capacity for keeping our worldwide forces in touch with strategic commanders throughout the Department of Defense. The spacecraft are being built by TRW for the

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# nFocus...

reengine the KC-135 [fleet, which] could be equivalent to adding almost 100 tankers to the inventory. This additional capability is particularly important because of the increasing requirements for SAC tankers to support rapid, worldwide deployment and employment, and to meet the increasing fuel requirement of cruise-missile-carrying B-52s."

The third initiative urged by SAC centers on "redundant and assured two-way force connectivity between our NCA and the strategic forces," according to General Ellis. Key here, he said, are expansion and acceleration of the E-4 airborne command post procurement program and related equipment in order to improve force management and escalation control during the transattack and postattack period.

## More Soviet Duplicity

The Soviet Union appears to be circumventing the provisions of the 1975 Helsinki European security accord that requires NATO and the Warsaw Pact to notify each other in advance of large-scale military maneuvers (involving more than 25,000 troops) and to permit the other side to have observers at such events, according to Gen. Donn R. Starry, commander of the US Army's Training and Doctrine (TRADOC) Command.

He told this writer that there is basis for the assumption that the Soviets frequently conduct several maneuvers simultaneously in a manner that, tactically at least, justifies the contention that they are separate, individual exercises, and do not reach the numerical levels that would bring these maneuvers under the Helsinki accord's purview. In effect, General Starry suspects, a whole Soviet Army may be engaged in such a field exercise, yet because of the technical ploy of separating individual elements—and keeping them below the 25,000-troop threshold—such maneuvers need not be reported to NATO, nor is NATO in a position to insist on the presence of its observers. A senior West German defense expert told this column that the condition outlined by General Starry is "commonplace."

In assessing the markedly different tactical and strategic doctrines of the Warsaw Pact and NATO, General Starry characterized the East's con-

cepts as "essentially maneuver-based force disruption" approaches. The Soviet/Warsaw Pact tactics center on a troika of mass, momentum, and continuous land battle keyed to deep penetration of the NATO forces and disruption of the latter's defensive and counteroffensive operations. At the same time, the Soviets plan to bring enormous firepower to bear in order to make possible and support the desired maneuvering operations.

The countervailing US/NATO tactic must start with "the numbers" confronting the alliance. With the Pact tank forces outnumbering NATO two- or threefold across the board—and capable of driving up that ratio to six, seven, or even eight to one in their favor by massing forces in given areas—maneuvering operations by the NATO forces probably would be neither feasible nor tactically sound. Massive "force destruction," brought into play as rapidly as possible, therefore, is needed "just to even things out" somewhat, the TRADOC Commander believes.

The second imperative, General Starry suggests, is to inflict massive casualties as quickly as possible "to get their attention. They are very well trained and well motivated. They are operating under very strict rules and under rigid control by the commissar system. [NATO] will have to make them realize that" they won't have a free ride to the coast.

Once NATO's firepower has evened out the balance, the next step must be to prevent the Soviet rear-echelons from joining up with the first echelon and thus to slow the sustaining momentum of the Soviet attack. This needs to be done whether the Soviet attack involves a centralized massive thrust or the diffuse tactic known as the "daring thrust." The latter tactic has been espoused by and debated in Soviet military literature for about forty years—and is not a new concept as erroneously assumed by some Western analysts. The daring thrust, General Starry suggests, is meant to counter NATO's ability to set up anti-tank missile belts capable of inflicting crippling losses on the Warsaw Pact's advancing armor. Its objective is to substitute surprise for mass by attacking with as little warning over as broad a front as possible.

Brunt of the daring thrust operation would be borne by new highly mobile regiments that the USSR is adding to its standard motorized rifle divisions. These highly maneuverable units are meant to penetrate deep and fast enough to keep NATO's antitank de-

fenses from setting up organized resistance, according to the TRADOC commander.

The Soviets, he explains, are very good at surprise and spend considerable time and effort to perfect this trait. From NATO's point of view, coping with Soviet surprise attacks is "probably our most difficult problem. The reason is that we will be looking for signals [that portend attack] in an already high noise level of activity, [such as training exercises and full-fledged maneuvers]." The challenge, therefore, will be what types of signals NATO intelligence should look for and how to find them. Additionally, the Soviets probably would launch their attack in the wake of protracted "cat-and-mouse games," designed to generate false alerts on the part of the NATO forces and to dull the West's intelligence and response capabilities, in the view of General Starry. He added that, although there probably will be telltale signals presaging a Warsaw Pact attack involving massive force, the question is whether or not the US and its allies "will be able to read them" in time.

Key to preventing or impeding link-up between the first and follow-on echelons must be a combination of air and ground systems backed up by teamwork between the Army and the Air Force in managing the air-land battle. The first need, General Starry said, is to find the second echelon quickly and deep enough on the battlefield to provide the time and terrain to operate on those forces before they can join the first echelon fight.

Three prerequisites for engaging the Warsaw Pact's rear echelon are advanced reconnaissance, surveillance, and target-acquisition systems. "I think I can say for [General W. L.] Creech [Commander of the Tactical Air Command] and myself that neither of us believes that we have enough of those systems," General Starry asserted.

To correct present deficiencies in these three mission areas, TRADOC and TAC are coordinating closely plans and programs to acquire new systems by the two services in order to prevent excessive overlaps as well as gaps. The goal is to "have the right kind of overlap, but not too much" in aerial platforms, radars, ground surveillance platforms, and what the maneuver forces themselves need to "see," he explained.

Obviously, once the rear-echelon targets are acquired, they must be attacked with a variety of weapons and

# InFocus...

delivery systems consonant with the tactics formulated by the battlefield commander. There are two schools of thought about how to cope with the rear echelon. Some US and NATO analysts contend that killing tanks is "the only game in town" and that all weapons and delivery systems should be dedicated to that purpose. But there is also the tenet that because of the high cost of massive tank-killing capabilities, the better tactic is to merely slow down the tanks, disrupt the enemy's formations, and destroy the "soft" systems in the rear echelons, such as command and control, logistics, and transportation.

The result, in General Starry's view, could be the same as painstakingly destroying the bulk of the second echelon's armor. TRADOC, he explained, is working closely with TAC to assure that the Air Force develops the capabilities beyond the reach and domain of the Army and that those Air Force capabilities include command and control countermeasures, the ability to break up Soviet formations and paralyze the enemy's logistics and mobility, as well as provide the option to kill tanks wholesale.

## Washington Observations

★ Chairman of the House Armed Services Committee Melvin Price (D-Ill.), in a recent letter to Energy Secretary Charles W. Duncan, Jr., called attention to the potential danger to national security of inadequate production of the special fissile materials needed for nuclear weapons. Pointing out that insufficient funding in FY '80 and FY '81 have placed in limbo the fate of a key facility in the production of special nuclear materials, the Purex plant at Richland, Wash., Chairman Price warned that "it would be ironic indeed if we were to commit billions of dollars to strategic and tactical delivery vehicles only to find that sufficient materials are not available for warhead production" for such weapons as MX, ALCM, Trident, and theater nuclear missiles.

★ Senior Defense officials are chastised because of continued "lobbying" against MX and in behalf of more sea-based strategic deterrent by CIA Director Adm. Stansfield Turner.

★ One of the ironies of the SALT II treaty's definition of new ICBMs that

are prohibited under the accord is the absence of a valid or enforceable base line. The treaty prohibits either side from developing and deploying more than one new ICBM type that is more than five percent larger or smaller than any existing type. Not only have the Soviets refused to confirm or deny US intelligence estimates of the sizes and throw-weights of Soviet ICBMs now in the inventory, but, as this column learned authoritatively, the US has never seen the fourth generation of Soviet intercontinental ballistic missiles other than in canisters or on transporters. In the case of the SS-16 and SS-20—the latter is essentially an SS-16 without its third stage and therefore is outside the purview of SALT II—the difference in canister length is about three feet. Best US intelligence estimates are that the Soviets could transport SS-16s in canisters that to this nation's reconnaissance satellites look like SS-20 canisters, and the other way around.

★ Site selection for USAF's Consolidated Space Operations Center that will control all military space operations, including Shuttle flights, is turning into a hot potato politically. Key contestants are a site near Peterson AFB, Colo. (that could be tied to NORAD's Cheyenne Mountain complex); Malmstrom AFB, Mont.; and Kirtland AFB, N. M. Interest on the part of congressional representatives from the involved states is keen.

★ Sen. Sam Nunn (D-Ga.), speaking before a Konrad Adenauer Stiftung-sponsored meeting in Washington, D. C., recently, explained that since the mid-1970s the Soviets have expanded and modernized their theater nuclear forces to the point where "they may now be regarded as superior to NATO's in crucial categories of survivability, mobility, and range. The Soviets have doubled the number of their nuclear warheads designated for targets in Europe.

"They introduced at least two new calibers of nuclear artillery. They are replacing their older surface-to-surface missiles with far more mobile and highly accurate systems. They have fielded a host of new nuclear-capable deep-strike tactical aircraft. And with the deployment of the SS-20 and the Backfire bomber, [and] the SS-21, the SS-22, and the SS-23 [new nuclear-armed theater ballistic missiles] . . . the Soviets have eliminated the territorial sanctuaries that NATO once would have enjoyed in a

tactical nuclear exchange. Moreover unlike NATO, the Soviets have designed, equipped, and trained their conventional forces to survive and exploit nuclear and chemical combat."

Pointing out that two-thirds of NATO's 7,000 nuclear warheads are launched by short-range delivery systems—such as artillery—and thus are confined to strikes on targets in NATO territory, he said, NATO's TNFs therefore, "are hardly likely to terrify or deter the Soviet Union."

★ US space experts believe that the Soviet Union is on the verge of testing a reusable space booster, akin to but less sophisticated than that of NASA's Space Shuttle. The expectation is that the first flight will take place during 1980. Development of such a Soviet system would remove the basis of Moscow's past contention that the US Space Shuttle interferes with a proposed ban on antisatellite (ASAT) spacecraft since it is in effect such a system.

★ Noteworthy insights into White House, especially National Security Council (NSC), thinking on US space goals and policy were provided in a recent speech by Brig. Gen. Robert Rosenberg, the NSC's space policy and intelligence expert. The US space policy, General Rosenberg pointed out, "calls for a program of assured, enforceable access to space. It corrects pursuit of survivability and endurance of space systems commensurate with their planned need in crisis and war. While we seek a comprehensive arms-control agreement, we are vigorously pursuing development of our own capabilities. Our space defense policy calls for a capability to . . . detect and react to threats to all US space systems."

In what could be interpreted as implied criticism of inadequate intergovernmental coordination of the Space Shuttle program, the NSC official asserted that "it must be a basic tenet that the Shuttle is not an end unto itself. To the extent that [the Shuttle] imposes bureaucratic inefficiencies and impedes the effective management of our space program, the nation would be denied a tremendous opportunity."

Referring to the as yet embryonic operational structure of the Shuttle program, General Rosenberg warned that the "national attitude toward manned spaceflight must mature the same way that it has for aviation—adventure must give way to business."

# "Vought Research & Development is surprising, because we're at work in so many unexpected areas."



**Dr. Felix Fenter**  
Vice President,  
Vought Corporation

"In evaluating any aerospace product, there are always three basic factors to consider: performance, quality, and economy. As aspects of a single product, these factors share a closed universe in which the expansion of one factor squeezes the other two.

"When this expansion has reached its limit, technological breakthroughs are required for overall product improvement to continue. And it's the fundamental task of Research & Development to provide such breakthroughs — in performance, quality, or economy — wherever the pressure is greatest.

**Vought manages R&D to maximize output in coincidence with corporate objectives based on market demands."**

"We like to think of ourselves as pragmatic visionaries with one foot in the laboratory and one in the marketplace. Vought R&D functions to help fill a strategic business plan based on what that marketplace needs.

"One major objective of the plan is to maintain and enhance Vought's position as a major supplier of tactical missile systems.

"To compete, we've looked beyond our traditional missile strengths and laid a solid foundation in guidance and control. Here the factor of performance is paramount.

"Currently, we're working with solid state physics, with the new phenomena of electro-optic phase change materials, for example. We're developing laser radars, laser hardening techniques, optical data processing systems, communications devices, and more, all geared to superior guidance and control performance.

**Missile guidance and control is just one area where the demands of the marketplace have led us into entirely new fields of R&D."**

"In responding to needs for improved product quality, we've made important gains in the field of materials. Reinforced Carbon Carbon (RCC) is a Vought-developed material of incredible strength and heat resistance used for the Space Shuttle.

"A second generation of RCC has been developed, and we're now working on the third. We're also dealing with advanced laminated metal structures with superior fracture resistance

while developing new methods of super plastic forming and diffusion bonding. In addition, we're working with other families of composites suitable for the high rates of production associated with many missile programs.

"Advanced materials like these impact upon the economy factor as well. They are durable, so maintenance and replacement costs are reduced for products in which they are used. And they can often be produced less expensively than more conventional materials.



A laser scanner utilizing thermochromic VO<sub>2</sub>.

**"We're not concerned with fine tuning efforts. We're interested in major technological strides forward."**

"Some R&D programs tend simply to refine technology; to make minute improvements in the state of some art. But at Vought, we must do more. That's why we're in everything from composite fasteners to quantum counters to infrared simulators to low-drag underwater technology. It's also why we have a sense of excitement and urgency about what we do.

"Many of our most interesting and important projects are proprietary and/or classified. But one thing can be assured openly: they aren't 'ivory tower' or merely speculative. Like everything else we do at Vought R&D, they're guided by strategic business plans dedicated to making aerospace products whose performance, quality, and economy are second-to-none."

**VOUGHT** an LTV company  
**Applying management to technology**

# Airman's Bookshelf

## Linebacker II—A Comprehensive Appraisal

*Linebacker II: A View From the Rock*, by Brig. Gen. James R. McCarthy and Lt. Col. George B. Allison (edited by Col. Robert E. Rayfield). Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402, 1979. 208 pages with appendix, glossary, and notes. \$4.50.

This book, eighth of the USAF Southeast Asia Monograph Series published under auspices of the Air War College, was written by two men who were participants in Linebacker II, the December 1972 campaign against targets in the Hanoi-Haiphong area. General McCarthy flew 1,200 combat missions in Southeast Asia and was Airborne Mission Commander for the largest raid of Linebacker II. Colonel Allison is a master navigator who flew seventy-six B-52 missions, including twenty against targets in the North and two in Linebacker II.

As the title indicates, the book deals primarily—but not exclusively—with B-52 operations from Andersen AFB, Guam (The Rock). It is a day-by-day account of the eleven-day campaign that brought about the January 1973 cease-fire. It includes a considerable amount of exciting combat narrative, a generous sprinkling of maps, and many supplemental photographs.

The first two chapters, which cover the prelude to Linebacker II, are worth the price of the book. They provide an unexampled insight into the complexity of Strategic Air Command operations and should be read by everyone on Capitol Hill who has to deal with military affairs.

Although it is not the purpose of the book, the authors convincingly refute recurring charges of SAC's tactical rigidity during Linebacker II. That campaign was the first time (and may

be the only time) that large numbers of strategic bombers—designed for individual delivery of nuclear weapons but there used in cells, armed with conventional bombs—were sent against targets in a restricted area defended by the heaviest concentration of surface-to-air missiles in the history of air warfare. Considering the novelty of the situation and the high level at which Linebacker II was controlled, the wonder is that tactics could have been changed drastically in five days.

This is one book that does not slight the heroic dedication of the ground elements that maintained and armed the B-52s and fed and housed 12,000 people on a tropical base designed for one-fourth that number. To take but one example, a bomb wing engine shop normally overhauls five jet engines a month, but at Guam, "the requirement was 120 jet engine overhauls a month." Equally notable "was the ability of the flight crews to be able to fly these complex [rapidly changing] tactics in combat, in mass formation, without benefit of practice."

The book is a tribute to the professionalism of Strategic Air Command, and through it the ability of all American airmen to rise to a challenge when the chips are down. It is a book that should be in the library of every airman and every civilian who has responsibility for maintaining this country's aerospace power.

—Reviewed by John Frisbee, Editor.

## American Eagles

*The Eagle Squadrons—Yanks in the RAF 1940–1942*, by Vern Haugland. Ziff-Davis Flying Books, New York, N. Y., 1979. 187 pages with index and photographs. \$12.95.

Hitler had overrun Europe, Britain was under siege, and America would

soon be drawn into the conflict. Everyone with a grain of sense knew it.

From all around the US, young men hankering for adventure—often motivated by a sense of duty—streamed north to Canada and trans-ported to England.

The US was officially neutral, but many in high places approved. Army Air Corps Gen. Hap Arnold told a recruiter for the RAF: "According to the rules I'm working under, if a flying cadet gets fractious, goes in for love, stunt flying, gets drunk even once . . . we've got to wash him out. If I were fighting a war, they're the kind I would want to keep. I wouldn't be surprised if a lot of our washouts look you up." They did.

Many Americans were already in the British Isles, eager to join up. (Likewise, Bill Dunn, whose accounts of combat in the RAF have appeared in these pages.) Initially, the early American arrivals were formed into the RAF's 7 Squadron and eventually 121 and 13 Squadrons—the Eagle Squadrons.

And, while at first greeted by some quarters with skepticism, the Eagle Squadrons soon ranked with the best. They paid their dues—of the 24 Americans who served with the RA about a third were killed. (Appalling, though, was the number who died in aerial accidents.)

This book recounts the story of the famous Eagles—their recruitment, training, aerial combat, and ultimate absorption into the US air force when America got into the war in a meaningful way in Europe. The book is based on extensive interviews with surviving Eagle Squadron pilots and after-action reports written during the war. (The chapter describing the Eagles' air combat over Malta appears as an article in the September issue of this magazine.)

A number of the Eagles were youngsters still in their teens, but the reality of combat and accident death quickly matured them. They became acquainted with the ritual of an RAF funeral—a slow march to the cemetery, a quick march back to the station.

Eagle pilot George Sperry later observed: "We saw so many of our friends die that we developed a defense against any betrayal of emotion and refused to sentimentalize friendship and parting and death. To mark therefore, we seemed to be without loyalty or deep feeling." But the Eagles also gained a reputation for high jinks and high-spiritedness.

Also related in the book are t

ories of Americans who fought in AF fighter squadrons in the East as the Japanese war machine rolled relentlessly through Southeast Asia.

Vern Haugland was an Associated Press correspondent in World War II and the first civilian to be awarded a Silver Star. He also served as AP's aviation editor for twenty-one years. He is—a rare privilege—an honorary member of the Eagle Squadron Association. He writes:

"During the Eagles' 1976 reunion in London, people on the street embraced them; autograph seekers trailed them in hotel lobbies. Taxi drivers provided free service, brushing tips aside with the comment, 'You've already paid.'"

—Reviewed by William P. Schlitz, Assistant Managing Editor.

### New Books in Brief

*Chariots for Apollo: A History of Manned Lunar Spacecraft*, by Courtney G. Brooks, James M. Grimwood, and Loyd S. Swenson, Jr. Part of the NASA history series, this book begins with NASA's creation and with the definition of a manned spaceflight program to follow the Mercury series. It concludes with the Apollo-11 lunar landing. Filled with facts and figures about complex machines, facilities, and intricate maneuvers, the book's fourteen chapters cover three phases of spacecraft evolution. Appendices, illustrations, and index. US Government Printing Office, Washington, D. C., 1979. 538 pages. \$9.

*Child Yank Over the Rainbow: The Military Exploits of Lt. Joseph E. Boudwin and Yanks of the 42nd Rainbow Division*, by Warren J. Brown. Here is World War I through the eyes of pilot Joseph E. Boudwin and two other WW I veterans who were involved in the ground war while serving in the 42d Rainbow Division. Photos. Available from Aero-Medical Consultants, Inc., 10912 Hamlin Blvd., Largo, Fla., 1979. 287 pages. \$4.95.

*Conquest of the Skies: A History of Commercial Aviation in America*, by Carl Solberg. A look at the evolution of the US airline industry, from the days when pilots flew converted World War I planes to deliver the mail through the jet age. The author interviews people involved in the air transport business to tell the story of commercial aviation. Photos, bibliography, index. Little, Brown & Co., Boston, 1979. 441 pages. \$14.95.

*Does Defense Beggar Welfare?*, by Dr. James L. Clayton. The author examines the current "welfare vs. warfare" debate that has occupied congressional and public attention. Dr. Clayton explains the liberal and radical attacks on defense spending and documents that defense and welfare spending operate independently of one another. The author suggests that instead of bickering, defense and welfare proponents should cooperate to ensure that the economic system supports our commitments. National Strategy Information Center, Inc., 111 East 58th St., New York, N. Y., 1979. 71 pages. \$3.95.

*Energy in America's Future: The Choices Before Us*, a study of the technical, economic, institutional, environmental, health, and safety aspects of alternative energy futures, prepared by the staff of the Resources for the Future National Energy Strategies Project. Sam H. Schurr, Project Director, is the principal author along with Joel Darnstadter, William Ramsay, Harry Perry, and Milton Russell. The book is optimistic about the nation's ability to meet the goals of adequate energy supply, conservation, and environmental integrity within the next few decades. Indices, figures, and tables. The John Hopkins University Press, Baltimore, Md., and London, 1979. 555 pages. \$10.95.

*Fighter Aces of the U.S.A.*, by Raymond F. Toliver and Trevor J. Constable. The authors cover the full range of Americans who fought for the sky in fighters, spanning the expatriates who flew with the British and French before US entry into World War I to the jet pilots who flew in Southeast Asia. A number of aces render first-person accounts of aerial combat. Almost 700 photographs, many published for the first time. Ace lists and index. Aero Publishers, Inc., 329 West Aviation Road, Fallbrook, Calif., 1979. 400 pages. \$24.95.

*Flying Bomb: The Story of Hitler's V-Weapons in World War II*, by Peter G. Cooksley. In mid-June 1944, Nazi Germany opened a new offensive against the British using their flying bomb—the V-1—and later the first ballistic missile, the V-2. The author describes the development and use of the V-weapons and how the British counteracted the threat. Photos, maps, index, appendix. Charles Scribner's Sons, New York, N. Y., 1979. 208 pages. \$12.50.

*Jane's World Railways and Rapid Transit Systems, 1979-80*, edited by Paul Goldsack. A large-size encyclopedic reference of railroads and rapid transit systems. In the *Jane's* tradition, the book is painstakingly thorough with photos, line drawings, specifications, and text. Franklin Watts, Inc., Jane's USA, New York, N. Y., 1979. 538 pages. \$84.50.

*Military Aircraft of the World*, by John W. R. Taylor and Gordon Swanborough. First published in 1971 and updated annually, the book is a reference to the world's military aircraft. Photos, silhouettes, index. Charles Scribner's Sons, New York, N. Y., 1979. 224 pages. \$12.95.

*How Wars Begin*, by A. J. P. Taylor. The author, a British historian, delivered these lectures over BBC television in 1977. As always, he presents some surprising and controversial opinions: World War II did not become a "world war" until 1942; in fact, Europe was "at peace" for a year after Hitler overran the continent in 1940. The US actually forced the Japanese to bomb Pearl Harbor when it imposed an impossible embargo. And, in 1948, it was "the Russians who really conducted the Berlin airlift," since they were running the control towers. Much of the book is devoted to illustrations. Photos, index. Atheneum Publishers, New York, N. Y., 1979. 180 pages. \$10.95.

*The U.S. Air Service in World War I, Vol. 4*, edited by Dr. Maurer Maurer. Subtitled *Postwar Review*, this reference contains two major sections: lessons learned from the conduct of the air war during World War I, and a survey of bombing damage. Material is based on remarks by commanders, pilots, observers, and other officers of Air Service units who were asked for their opinions immediately following the war. US Government Printing Office, Washington, D. C. 20402, 1979. 617 pages. \$9.50.

*Used Aircraft Guide*, by Jeffrey Ethell. The first guide ever published on buying major used aircraft, this book details what to look for in a used airplane, how to inspect it, and how to buy it. There is a description and specifications for major aircraft types, highlighting their particular problems and average net worth. Charles Scribner's Sons, 597 Fifth Ave., New York, N. Y., 1979. 158 pages. \$14.95.

—Reviewed by Robin Whittle

# Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., Nov. 6  
★ USAF has under development a weapon guidance system that would use radio signals from satellites orbiting 11,000 miles (17,703 km) in space to guide tactical missiles to land- and sea-based targets with extreme accuracy.

The system aboard the missile would determine the weapon's precise latitude, longitude, and altitude in flight by processing within billionths of a second signals received from satellites. This data would then automatically correct the missile's inertial navigation.

The first series of flight tests of a prototype version of this Global Positioning System (GPS), built by Hughes Aircraft Co., recently was concluded at the Air Force Armament Laboratory, Eglin AFB, Fla. The guidance equipment was carried in a modified fuel-tank pod aboard an F-4 Phantom during the test flights.

Key to GPS guidance is the Navstar Global Positioning System (NGPS)

under development for the Air Force—a network of twenty-four satellites that should all be in place by 1987. Providing around-the-clock worldwide navigational data, these would allow a GPS-guided tactical missile to be launched anytime, anywhere, in any type of weather, and over any distance within the weapon's range.

Other types of guidance systems are hampered by reliance on terrain features to which they are keyed, thus limiting use over water or desert areas.

The Navstar network will be capable of servicing an unlimited number of users simultaneously, and because GPS is dependent only on the satellite signals once it is launched, it is suited for standoff launch-and-leave tactics.

Being passive, the GPS-guidance system would not broadcast a missile's arrival as would one using radar. GPS can also make possible high-altitude, supersonic delivery; other correlation navigation systems

lose accuracy as altitude increases. As now visualized, however, GPS would be used to take a missile to within a short distance of a particular target, where some other technique would be employed for terminal guidance.

★ Full-scale engineering development of the Airborne Self-Protection Jammer (ASPJ), an electronic countermeasures set destined for Navy and Air Force tactical aircraft, is being sponsored under competitive contracts awarded by the Naval Air Systems Command.

Joint-venture teams composed of ITT Avionics/Westinghouse Aerospace and Sanders Associates/Northrop will each submit designs, which will provide the basis for selection of one of the teams to build the prototype hardware.

Equipping aircraft with ASPJ is to begin in the 1980s and continue into the 1990s, officials said. Candidates include the Navy F/A-18, F-14, A-6, EA-6, and AV-8, and the Air Force F-16 and F-111. The system is being designed to protect aircraft from existing radar-guided weapons and those that can be foreseen through the year 2000. Full-scale development is expected to cost \$100 million or more with production ranging to \$1 billion, officials said.

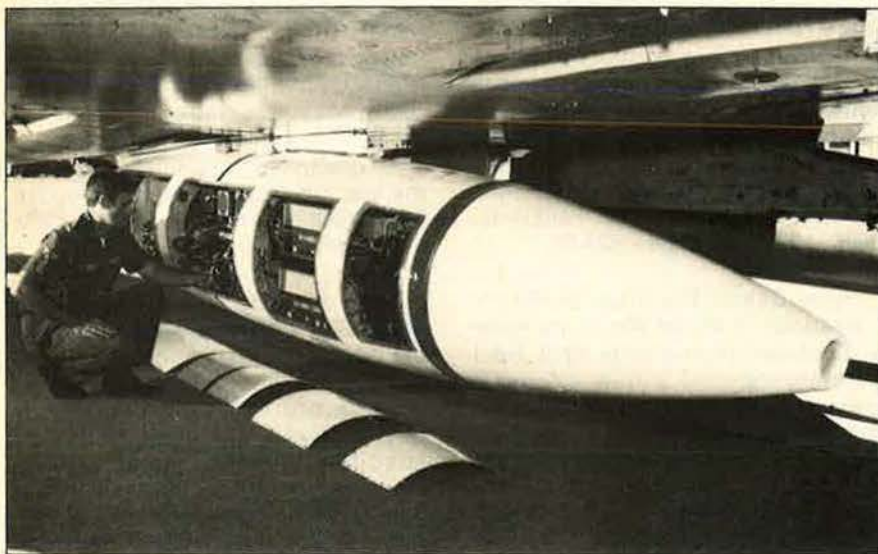
★ In a project that borders on the unique if not the fantastic, USAF is studying ways of dropping munition stores from the upper surfaces of aircraft.

The Air Force Armament Laboratory, Eglin AFB, Fla., calls the concept the Low-Level Weapons Delivery (LLWD) system. It stems from a requirement for a capability to attack targets in heavily defended areas at very low altitudes.

Under LLWD, an aircraft would penetrate the target area at from fifty to 100 feet (15.2 to forty m) altitude and release lifting bodies in which the weapons (bombs, cluster munition, what-have-you) are stored. The lifting body would climb to the best attack altitude for the weapon it enclosed. Meanwhile, the aircraft would have departed the blast area.

An aeronautical engineer at the lab's Munitions Interface Branch, 1st Lt. Kenneth Edwards, initiated studies of and built an LLWD system that has caught official interest.

"This method of delivering a weapon could solve some major survivability problems," Lieutenant Edwards said. "By flying low and hav-



A technician checks a modified fuel-tank pod that houses equipment being test-flown to demonstrate the feasibility of using signals from orbiting satellites to guide tactical missiles to their targets. See item above for details.

the weapon execute the pop-up maneuver, the aircraft's vulnerability decreases significantly. In addition, the relatively undisturbed airflow over the top of the aircraft would enable safer weapons separations." (Conventional downward ejections are affected by "downwash" from the aircraft wing.)

Under contract, Grumman Aerospace Co., Bethpage, N. Y., is to conduct a feasibility study to examine various launch and ejection methods. A practical, a flight test demonstration will follow, officials said.

(For a rundown on LLWD and other exotic munitions and delivery systems under development, see story beginning on p. 40.)

In testimony before a US House subcommittee on aviation, Sikorsky Aircraft President Gerald J. Tobias called on the government for "equal recognition" of the role that helicopters play in the nation's transportation system.

The executive's appearance before the subcommittee was in conjunction with hearings being conducted to name airport and airway improvement legislation.

Tobias asked Congress to "specifi-

cally recognize that civil helicopters do exist, that they are a valid complement to our national aviation system, and that they have unique needs." The Sikorsky President called for congressional recognition that heliports differ from airports and helicopter airways have different requirements from fixed-wing airways.

According to Mr. Tobias, highly efficient and energy-conserving helicopters offer the potential for attracting a substantial portion of hub airport traffic to facilities that are much closer to the actual destination of most air travelers. "Yet, the further growth of the helicopter in passenger service is being inhibited by a lack of specific recognition and encouragement by the federal government. The unique advantages of the helicopter are lost when we force it to fit a procedural box that was designed exclusively for fixed-wing aircraft.

"The helicopter industry has been growing at the rate of about seven percent per year in real terms," Mr. Tobias said, "and now delivers forty percent of its production to civil customers." (US military procurement of helicopters has declined from more than ninety percent in 1969 to less than sixty percent now.)

"In fact," the executive said, "sales of civil helicopters in 1979 are five times greater than ten years ago" and that upward trend is expected to continue.

★ Five men whose contributions have become part of the world's aviation and space heritage were enshrined in the International Aerospace Hall of Fame, San Diego, Calif., in October.

The five:

• **Gen. Curtis E. LeMay, USAF (Ret.)**, World War II commander of an Eighth Air Force Division and of the US's B-29 force in the Pacific who, following the war, led SAC into the jet age and later served as USAF Chief of Staff.

• **Professor Willi Messerschmitt**, German military aircraft designer whose Me-109 was built in greater numbers than any other fighter on either side in WW II and whose Me-262 was the first operational jet fighter. After the war, he helped organize and direct the highly successful Messerschmitt-Bölkow-Blohm. He died in 1978 at the age of eighty-nine.

• **Dr. William H. Pickering**, US space scientist who played a vital role in developing the technology that



—Wide World Photos

A recent symposium at the National Air and Space Museum to mark the fortieth anniversary of jet flight: from left, John E. Steiner, "father of the Boeing 727"; Hans J. P. von Ohain, developer of the engine for the first operational jet fighter, the Me-262; Anselm Franz, developer of the first axial-flow turbojet; Brig. Gen. Charles Yeager, USAF (Ret.), first to fly faster than sound; Air Commodore Sir Frank Whittle, RAF (Ret.), inventor of the first aircraft jet engine; and former FAA Administrator Najeeb E. Halaby.

# Aerospace World

made the lunar landings possible. As Director of Caltech's Jet Propulsion Laboratory, Pasadena, Calif., he also guided the nation's programs to send space probes to Mars, Venus, and Jupiter. Retired from JPL, Dr. Pickering has remained active as an instructor at Caltech.

• **Sir Thomas O. M. Sopwith**, the British aircraft designer whose company built more than 16,000 planes of seventeen types for the Allies during WW I and whose Sopwith Camel became a legend. An aviation pioneer, Sopwith began building aircraft at Kingston upon Thames in 1912. His Sopwith Aviation Co. was forerunner to the Hawker Siddeley Group, which he headed from 1935 to 1963. Today, at ninety-two, Sir Thomas is Founder President for Life.

• **Lawrence B. Sperry**, US aviation pioneer and engineer who devised and personally tested such early innovations as the silk parachute, the autopilot, and many other basic flying instruments. Sperry died, still a young man, in 1923 when his plane crashed in the English Channel.

★ Two test pilots—USAF Lt. Col. Robert C. Ettinger and General Dynamics Corp.'s Philip F. Oestricher—have been presented the Iven C. Kincheloe Award, sponsored by the Society of Experimental Test Pilots. The two earned the top award in their field for "successfully managing and flying the high angle of attack program on the F-16 fighter."

And recently retired Lt. Gen. Thomas P. Stafford, former astronaut and Hq. USAF DCS/RD&A, was presented the J. H. Doolittle Award, another top prize sponsored by the Society. General Stafford was cited for "excellence in the technical management of aerospace technology."

★ Robert Hill, a civilian electrician at Little Rock AFB, Ark., who was blinded in the South Pacific during World War II, has been chosen as one of ten co-winners of the Outstanding Handicapped Federal Employee of the Year Award.

Mr. Hill, who has worked at the air base for the last fifteen years, had to overcome prejudice against the hand-

## New Senior Editor, F. Clifton Berry, Jr.

F. Clifton "Clif" Berry, Jr., has joined the staff of AIR FORCE Magazine as a Senior Editor. Prior to this, he was Contributing Editor of *Armed Forces Journal* and wrote feature articles for foreign and US magazines, including the *Smithsonian Magazine*. From 1975-78, he was coeditor of *Armed Forces Journal* following early retirement from the Army as a lieutenant colonel.

A native of Neponset, Ill., Colonel Berry graduated from high school in 1948 and enlisted in the Air Force in time to serve in the Berlin Airlift. Appointed to West Point in 1950, he resigned after his third year to marry. Enlisting in the Army, he was awarded a direct Regular commission while serving as a paratrooper in the 82d Airborne Division in 1955. An expert in airlift, airdrop, and close air support, he taught these subjects at the Infantry School, wrote about them at staff college and in magazines, and applied them in combat in Vietnam. Colonel Berry also served in Latin America, including operating helicopter resupply of victims of the Managua earthquake in 1972. In 1973-74, he commanded an infantry battalion in Korea.

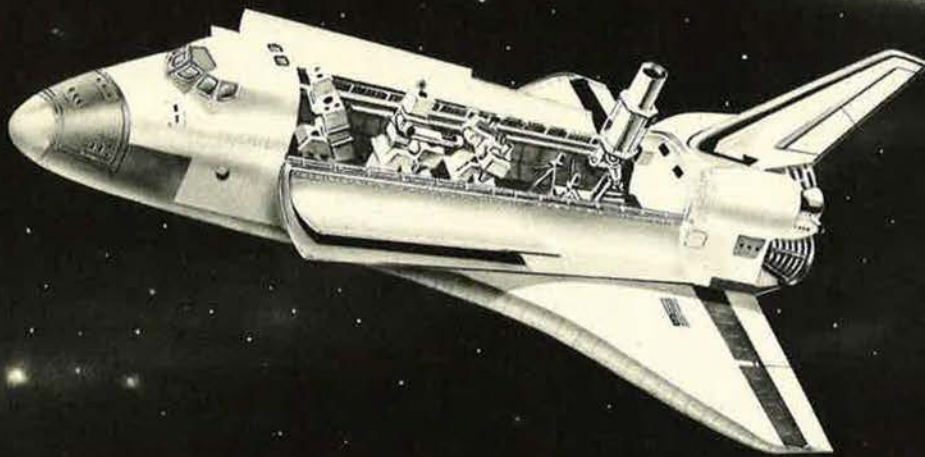
After several years' service in

Washington on the Army staff, in the office of the Secretary of Defense, and with the Arms Control and Disarmament Agency, he was selected for the colonels' list and attendance at the Army War College, but decided on early retirement in favor of journalism. A Master Parachutist and holder of the Combat Infantryman Badge, he has a bachelor's degree in mathematics from George Washington University and a master's in communication from Stanford. He and his wife, Irene, live in Herndon, Va.



One of the Outstanding Handicapped Federal Employees of the Year is Robert Hill, of Little Rock AFB, Ark. See item.





# Need Shuttle payload control? Sperry listens...and responds

The third generation of Shuttle-qualified communication/data handling systems is available now from Sperry Flight Systems for control of your Orbiter bay payloads.

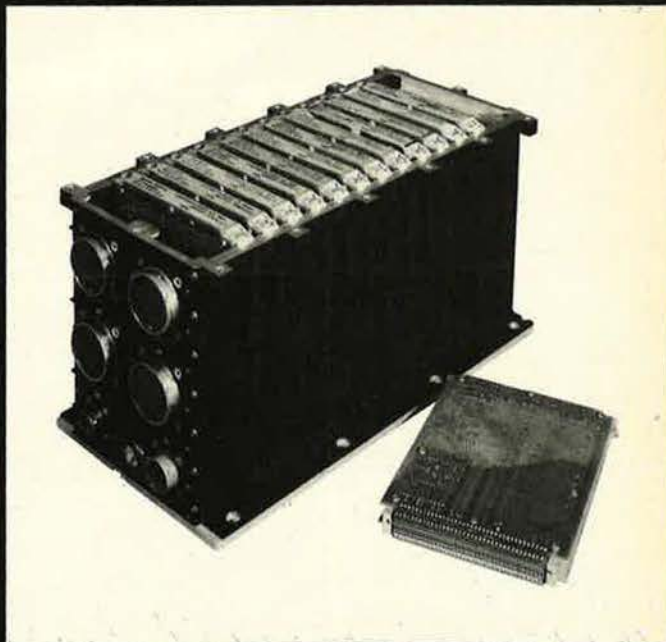
Sperry multiplexer-demultiplexer (MDM) systems for the Orbiter itself and the solid rocket boosters will be on all Orbiter flights. We know our way around the Shuttle. That's why we can help you build a C&DH and microprocessor control sub-system tailored to *your* payload, based on our off-the-shelf, Flexible MDM system now in production.

Sperry will customize a payload-Flexible MDM combination to simply and reliably integrate your experiment as a Shuttle payload. You'll be free to concentrate on your experiment and its results.

Johnson, Marshall and Goddard Space Flight Centers have accepted Flexible MDMs for pallet experiment support. Systems have been ordered for the Multi-Mission Spacecraft flight support system and TRW's Process Control and Data Acquisition System.

With this background we offer much more than hardware. Our software integration system and our engineers can help you take the lowest cost approach to your Orbiter payload needs.

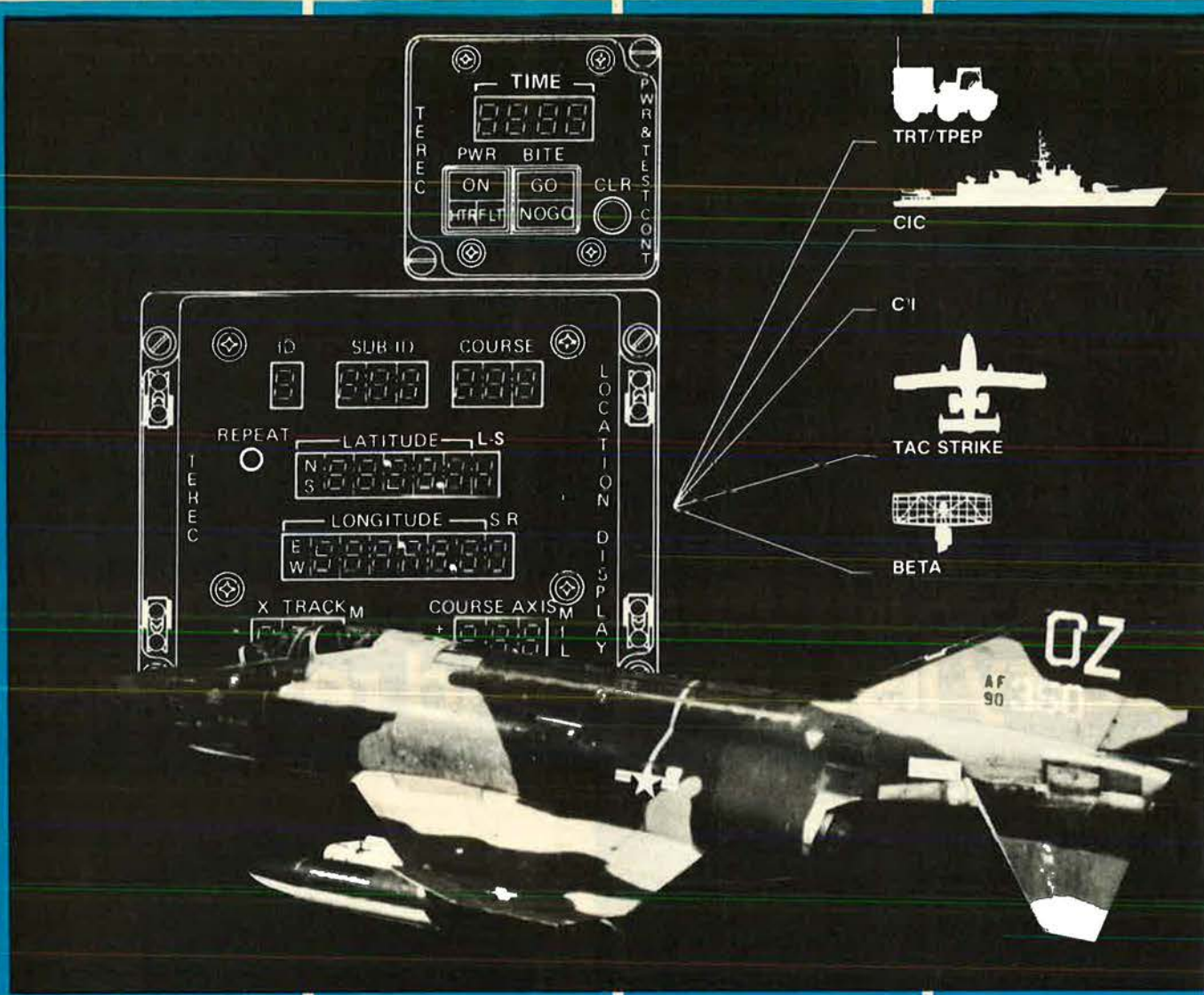
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**AMECO**

...capped in his job. Many were opposed to a blind man working with multicolored electrical wiring in high-risk areas.

A trainer of apprentice repairmen in addition to his regular job, Mr. Hill has been awarded six outstanding performance ratings and three sustained superior performance awards.

During Pentagon ceremonies in October, Mr. Hill and the other co-winners were presented plaques by Lt. Gen. Andrew P. Iosue, DCS/Manpower and Personnel.

**NEWS NOTES—**Johnnie Boyd, a methods engineer employed by the Air Force at Tinker AFB, Okla., has been elected the new **National Commander of the Civil Air Patrol**. A CAP member since 1943, Mr. Boyd previously was Vice Commander of USAF's civilian auxiliary; he'll receive an automatic promotion to CAP brigadier general. Mr. Boyd spent three years in the Marine Corps and Reserve and also has served as an Air Force Reservist.

**Vandenberg AFB, Calif.**, has been chosen by USAF as this year's winner of the **General Thomas D. White En-**

**vironmental Quality Award and John L. Haygood, base forester at Barksdale AFB, La., the Personal Award for Natural Resources Conservation;** it was the second such award for each.

**The People's Republic of China by**

year's end is expected to receive the last of **eight Bell Model 212 twin-turbine helicopters**, the first such transaction between a US helicopter manufacturer and a PRC agency. The Civil Aviation Authority of China will operate the helicopters in offshore

## First "Blind Flight" Reenacted on Fiftieth Anniversary

One of the milestones in the evolution of modern aviation—the first "blind flight"—was reenacted on September 24, 1979, fifty years to the day after the original flight took place.

Present for the occasion was Lt. Gen. James H. Doolittle, USAF (Ret.), pilot during the blind flight; its safety pilot, Brig. Gen. Benjamin S. Kelsey, USAF (Ret.); and other aviation pioneers of the era.

The reenactment was a joint project of three companies whose instrumentation helped make the 1929 flight possible; Aircraft Radio & Control, now a division of Cessna Aircraft Co., whose homing radio was used; Kollsman Instrument Co., a division of Sun Chemical Corp., whose founder invented the "sensitive" barometric altimeter used; and Sperry Corp.'s Flight Systems division, which developed the artificial horizon instruments that led to all-weather flying.

Jimmy Doolittle's exploits during World War II and his racing and aerobatic feats in the 1930s have overshadowed his earlier contributions to aviation safety

and progress, biographers point out.

The original flight took place at Mitchel Field, N. Y., while Jimmy was on leave from the military and marked the beginnings of aviation as a true science. It was conducted in a Consolidated NY-2 military trainer with the rear cockpit sealed to keep out all light. Lasting fifteen minutes, the flight marked the first time that an aircraft took off, flew a set course, and landed by instruments alone.

The reenactment employed a Consolidated "Fledgling" flown by Cole Palen of the Old Rhinebeck (N. Y.) Aerodrome, a museum of still-flying antique planes, and took place at Aircraft Radio & Control's private airfield near Boonton, N. J., which best approximated the grass runway and rural settings of 1920s' airfields.

Following the reenactment, General Doolittle was presented an etched-metal full-size reproduction of the New York Times front page that carried the story of the historic flight. Others who contributed to the flight received smaller reproductions as mementoes.



...a Martian but a security policeman at ...ano AB, Italy, during NATO "Display ...ermination 79" exercise that involved ...nations of the Mediterranean-wide ...ed Forces Southern Europe. ...ticipating in the exercise were ...OUTH air, ground, and sea units.



Back then, in 1929, Jimmy Doolittle prepares for the first blind flight, a milestone in aviation progress. Note hood built especially to enclose the cockpit and confine visibility to the instrument panel.

petroleum, forestry, and geophysical work.

As early as June 1917, American civilians with engineering experience were being signed up for duty in Europe to prepare for the arrival of US forces. These **Engineer Field Clerks**

have been declared by DoD to have served on active military duty and thus entitled to veterans' benefits under 1977's GI Bill Improvement Act. DoD's action follows recent similar decisions concerning World War II's Women's Airforce Service Pilots and World War I's Signal Corps Female Telephone Operators.

In conjunction with initial deliveries of McDonnell Douglas F-15Js, Japan's **Air Self-Defense Force** has dispatched **test pilots and ground crew members** to the US to work with the aircraft. Personnel to train as instructor pilots will follow.

And the **first operational F-15 Eagles** to be permanently assigned to the Pacific area recently arrived at Kadena AB, Okinawa, Japan. There, USAF's **18th Tactical Fighter Group** consisting of the 67th TFS, the 12th TFS, and the 44th TFS will be equipped with the Eagle, replacing F-4C and Ds.

**Col. Thomas E. Buford**, the first navigator assigned as an AFRES wing commander, recently **assumed command of the 446th MAW (ASociate)**, McChord AFB, Wash.

Publication of the **Air Force Journal of Logistics** will begin early next

## B-47 No. 53-2104 to Pueblo Museum

Once, more than 1,500 were operational as this nation's front-line strategic bomber. But now the Boeing B-47 Stratojet is just a memory for the SAC pilots who flew her during the cold war years of the '50s and early '60s.

That memory is being preserved in tangible form by the Pueblo Air Museum in Pueblo, Colo. The Museum contracted Desert Air Parts, Inc., of Tucson, Ariz., to restore to flying condition B-47 No. 53-2104, the only completely assembled Stratojet left in the Military Aircraft Storage and Disposition Center (MASDC) at Davis-Monthan AFB, Ariz. Desert Air Parts spent 500 man-hours preparing the B-47 for the hour and forty-minute flight to Pueblo, where the Museum will refurbish it with fresh paint and original markings for display as a historic relic of Air Force history.

The B-47 was phased out of the active inventory in 1966, though some served as reconnaissance, weather, and ECM aircraft for a short period thereafter. Powered by six General Electric J47 engines, the first B-47 flew in 1947. When the production run ended in 1957, more than 2,000 of the Air Force's first sweptwing bomber had been built, serving as a vital component of the US's aerial arsenal.

Desert Air Parts recruited two old B-47 hands, Col. George Nakis, USAF (Ret.), and Lt. Col. Bob Fawver, USAF (Ret.), for the final flight of 53-2104. Colonels Nakis and Fawver went over B-47 technical data and checklists to refresh their memories of the thousands of hours they had spent in the bomber's cockpit. "It all came back," Colonel Nakis said, "when I again sat in this bird's cockpit. I pulled out my checklist and started going down it, looking for switches, knobs, and gauges. I was surprised how quickly it all came back to me."

The final flight from Davis-Monthan was made on July 12, 1979. For the flight, all military markings were removed, and the FAA certified the aircraft for a one-time ferry flight under civilian registration. A large crowd lined the runway as Colonel Nakis started the number-four engine, and then the other five in sequence. With shouts of encouragement from the spectators, the B-47 sped down the runway and into the air. "She performed perfectly on takeoff," Colonel Nakis said. "No problems whatsoever. We grossed 117,000 pounds, and the acceleration was exactly as advertised."

When the Stratojet touched down in Pueblo, city and Museum officials were waiting to take possession of the plane. Colonel Nakis later said of the flight: "I guess, in summary, it was a totally enjoyable experience. The flight brought back some of my past, and I'm grateful for having

had the opportunity to fly the B-47 one last time."

Though the B-47 probably will never fly again, thanks to the efforts of those who work to preserve military aviation history, she will not be forgotten. —BY HUGH WINKLER



Top photo, Col. George Nakis, left, and Lt. Col. Bob Fawver review B-47 technical data prior to their one-time flight. Above, six jet engines kick up dust as B-47 No. 53-2104 taxis to the flight line.

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# Aerospace World

ear. The professional journal will feature articles on USAF logistics-related research, analysis, conceptual thinking, and improvement efforts.

**Lockheed Missiles & Space Co.** has received an Air Force contract for High Voltage, High Power Solar Power Systems Study that could lead to modules generating "practically unlimited electricity" for future satel-

From left, California ANG's SSgts. Gail Ball and Rita Poli, A1C Diane Francis, SrA. Vicky Rutherford, and A1C Kathy Wright of the 222d Combat Communications Squadron, Costa Mesa ANG, during their annual two-week training stint.



## Index to Advertisers

Aerospace Historian	155
Air Research Mfg. Co., Garrett Corp.	6 and 7
Air Force Museum Foundation	17
Beech Aircraft Corp.	83
Bell & Howell, Datatape Div.	84
Bell Helicopter Textron	36
British Aerospace, Inc.	18 and 19
Cubic Corp.	115
MS Inc.	17
-Systems, Inc.	Cover III
airchild Industries, Inc.	80 and 81
airchild Space & Electronics Co.	53
General Dynamics Corp.	14
General Electric, Aircraft Engine Group	Cover II
Hommet Turbine Components Corp.	8
Hughes Aircraft Co.	13
House Jones Box Corp.	155
Har Siegler, Inc.	1
Ion Industries, Aero Products Div.	35
Ion Industries, AMECOM Div.	32
Ion Industries, Guidance & Control Systems Div.	21
Lockheed Corp., The	10 and 11
Mas Aerospace Ltd.	136
Donnell Douglas Corp.	Cover IV
Motorola Inc., Government Electronics Div.	57
National Car Rental System	150
Northrop Corp.	4
Orkin-Elmer Data Systems	116
Raytheon Co.	38 and 39
Rockwell International, Collins Telecommunications Products	54
Im Corp.	78
Sperry Rand Corp., Sperry Flight Systems Div.	31
Teager Co., Kearfott Products Div.	60
W Systems Group	22, 77, and 145
United Technologies Corp., Pratt & Whitney Aircraft Div.	58 and 59
United Light Corp.	25
Westinghouse Electric Corp., Aerospace Div.	2 and 3
W A Insurance	157, 158, and 159

lites and Space Shuttles in low earth orbit and on synchronous missions.

**Northrop Corp.** has been contracted to develop and test a system based on **Forward Looking Infrared (FLIR) technology** that would enable Coast Guard helicopter crews to locate shipwreck survivors and downed aircraft in the water and at night regardless of weather. Also able to detect oil spills and other forms of ocean pollution, the system will be tested aboard the HH-52A helicopter currently in USCG service. ■



A 67th ARRS HH-53 from RAF Woodbridge, UK, using a special cable designed for Apollo space capsule recoveries, demonstrates airlift capabilities in retrieving a disabled Royal Navy Wessex helicopter.

At Otis AFB in Massachusetts, this phased array radar—as tall as a ten-story building—looks out 3,000 miles over the Atlantic Ocean. A second, identical radar will soon be operational at Beale AFB in California. Together, they comprise the Pave Paws early warning system.

Designed and constructed by Raytheon for the U.S. Air Force's Electronic Systems Division, Pave Paws will provide rapid detection and characterization of a submarine-launched ballistic missile attack on the U.S. mainland. The two dual-faced radars—employing the most advanced solid-state, phased array technology—also monitor satellites in orbit.

On Shemya Island in the Aleutians, another

large phased array radar, Cobra Dane, collects data on Soviet missile development flights. Cobra Dane, also designed and constructed by Raytheon for the Electronic Systems Division, performs early warning and satellite tracking as well.

In Puerto Rico, the Raytheon-developed Wide Area Active Surveillance radar (WAAS) will handle mission control, event reconstruction, and range safety at the Atlantic Fleet Weapons Training Facility. And, as shown in the smaller photograph, Raytheon is designing a multiple target instrumentation radar (MIR) for test, evaluation, and training. Capable of tracking up to 16 targets simultaneously, MIR will provide

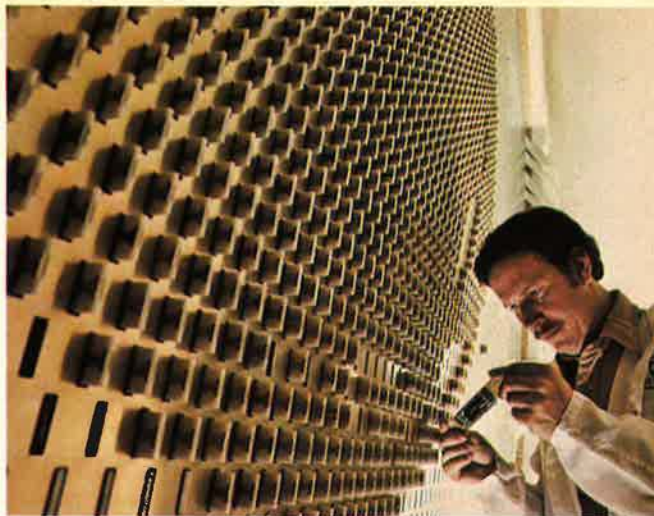
## Pave Paws: a new long-range lookout for early





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RAYTHEON

The mission of the Air Force is to fly and fight and its ultimate function, by extension, is to deliver the armament that wins dual engagements and the war. USAF engineers and technicians at AFSC's Armament Division are developing an array of munition systems that will maintain US leadership in . . .

# ARMAMENT: The Business End of the Air Force



An F-111 is testing the stores compatibility of the MK-20 "Rockeye" unguided cluster munition.

ON OCTOBER 1, 1979, Air Force Systems Command's Armament Development and Test Center at Eglin AFB, Fla., was redesignated the Armament Division (AD). Elevation of the organization—which has a staff of almost 8,000 and an annual budget of about \$1.2 billion—to the division level signifies recognition by the Air Force and the Defense Department of the growing importance of the weapons, munitions, submunitions, sensors, and other electronics that combined are known as "armament." As the new Division's Commander, Maj. Gen. R. M. Bond, puts it: "Without armament, you might say, the Air Force would be just another unscheduled airline."

The revolution in armament that started with the first "smart bombs" of the Vietnam War pivots on two fundamental factors: the transition from unguided to guided and in other ways "smart" weapons and munitions, and the parallel ability to use guided armament from platforms that stand off from the target, rather than having to penetrate to it. Primal catalyst of the radical change that has taken place in the armament field is the cornucopia of new electronic sensors and devices that filter, process, and compute information on the spot, are increasingly compact, and keep coming down in price and size while multiplying capability and capacity.

The payoff from this abundance of advanced technology is a revolution in operational capabilities manifested in multiple kills per pass, the ability of one aircraft to engage a number of hostile aircraft at the same time, and the capacity of "smart" armament to function autonomously under night and adverse weather conditions. The latter trait includes the weapon's capability to be released or launched before it or the weapons controller has selected any specific target as well as its ability to identify a target using infrared, millimeter wave, or other signatures.

Ancillary benefits range from midcourse guidance—that can make up for intrinsic limits of sensors by coupling them to an on-board minicomputer—to increased resistance to electronic countermeasures. The latter results from the autonomy of these new weapons, which reduces or eliminates the need to communicate with them as they perform their missions. The less the need to communicate, the less their susceptibility to electronic countermeasures.

The recent, prolific growth of technologies associated with armament, however, has not been universally beneficial. It often takes, the AD Commander told AIR FORCE Magazine, an "inordinately long" time from the point "when we begin to fully understand the technology until we get the weapon into the inventory," especially in cases involving design modifications—impelled by technological or threat changes—in midstream: "We tend to forget that such changes cost time and money." The men and women of AFSC's newest product development division, therefore, "feel a sense of urgency, an impatience with ourselves, to get new weapons with improved capability into the hands of the operators," General Bond avowed.

## The AMRAAM Program

After a fifteen-year hiatus, the Air Force is back in the business of developing an air-to-air missile. The missile, known as the Advanced Medium-Range Air-to-Air

Missile (AMRAAM), General Bond makes clear, is a top priority of the Division. This joint Air Force/Navy program is being managed by USAF. AMRAAM is an advanced, beyond-visual-range missile that AD is developing for use by USAF, the Navy, and possibly NATO. It is a follow-on system—beginning around 1985—to replace the AIM-7 Sparrow. Among AMRAAM's principal advances over the latter are increased missile speed and range, improved low-level attack performance, and the optional ability to launch up to six missiles against several targets at the same time. While the precise range of the new missile is classified, it extends roughly from the upper limits of the visual-range AIM-9 to the sixty-mile-plus range of the AIM-54C Phoenix of the Navy's F-14. As the next generation tactical air-to-air missile, AMRAAM will be compatible with USAF's F-15 and F-16 and the Navy's F-14 and F-18.

Development of AMRAAM, according to recent testimony before Congress by Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, "may become a cooperative NATO program." A Memorandum of Understanding between the United States, Germany, Britain, and France concerning systems characteristics and coproduction or dual production is being drafted. Candidate European aircraft on which AMRAAM might be used include Tornado, the Mirage 2000, and the Swedish Viggen.

The new missile weighs about 300 pounds—or roughly half as much as the AIM-7 Sparrow—and uses an inertial reference unit and minicomputer to calculate target coordinates obtained from the launching aircraft's radar system. Once the missile closes with the target, an active on-board radar seeker guides it to the target. During the first leg of a long-range flight, the launching aircraft's fire-control system can transmit update information to a receiver on the back of the missile. When the missile is within active homing range, AMRAAM can operate autonomously, thus enabling the pilot to break away and engage other targets. If the missile is launched when the target is already within active acquisition range, of course, AMRAAM can operate in a launch-and-leave mode.

One of the key features of AMRAAM is that the track-while-scan radar in the launching aircraft is not required for the weapon system's multiple target capability, although it enhances such operations. Modifications of the launching aircraft required to provide AMRAAM with a multiple firing feature are not extensive. The F-14's AWG-9 fire-control system, tailored to the AIM-54 Phoenix missile system, already includes this feature. The F-18 will use a similar system. The Air Force plans to upgrade the F-15's fire-control system to the level of the AWG-9. At present, there are no plans to add track-while-scanning to the F-16. Nevertheless, equipping the F-16 with AMRAAM, of itself, will provide that aircraft with a midrange, air-to-air capability that it now lacks and provide it with a multiple target capability.

The Air Force, in February of this year, awarded two thirty-three-month demonstration/validation contracts—one to Raytheon Co. and the other to Hughes Aircraft Co.—under which each will produce sixteen guided test vehicles scheduled to be flight-tested in 1980 and 1981. By the end of 1981, the AMRAAM Systems



AD's Self-Protection Weapon (SPW) could provide all strike aircraft with a limited defense-suppression capability against GCI and SAM sites without interfering with the aircraft's primary mission.

Program Office (SPO) plans to award a forty-month, full-scale development contract. Delivery of the first operational missile is expected late in 1985. Development and procurement is likely to involve a "leader-follower" arrangement to provide a second industrial source for this crucial weapon.

The cost of taking AMRAAM through its RDT&E phase is estimated at about \$450 million. Overall, the program is expected to reach a level of several billion dollars, especially if NATO joins in the effort.

NATO's participation in the US AMRAAM program is linked on a *quid pro quo* basis to this country's participation in NATO's Advanced Short-Range Air-to-Air Missile (ASRAAM). Dr. Perry told Congress: "We have agreed in principle with Germany, France, and the United Kingdom that the US will develop AMRAAM and our European allies will develop ASRAAM." Because of this policy, known as the "family-of-weapons" concept under which duplicative efforts within NATO are to be avoided, the US is holding back on ASRAAM development except for some joint USAF/Navy work on specialized seekers.

No significant risk appears to attend this delay since the currently used AIM-9 Sidewinder will remain adequate for some time to come. Improved versions of this short-range missile (that like the AIM-7 is being developed and bought by the Navy) include the AIM-9L, which incorporates improved solid-state guidance and control components to permit all-aspect launch, increase operational capability, and boost reliability. The "L" version's improved fuze and warhead enhance its effectiveness further. A yet-more-advanced model, the proposed AIM-9M, would incorporate additional improvements, including an active optical target detector, a rocket motor that produces less smoke, and a closed-cycle cooler for the IR seeker.

To bridge the period until AMRAAM becomes available, improved models of the AIM-7, designated the "F" and "M" versions, also are being developed and procured. The AIM-7M, currently undergoing test, incorporates an advanced monopulse radar seeker that increases clutter rejection and look-down capability compared to the "F" model. The AIM-7F/M models are of vital im-

portance to the F-15 since without missiles of this level of sophistication the aircraft cannot attain its full combat potential.

The Armament Division is working with the Navy on the joint-service High-Speed Anti-Radiation Missile (HARM). This air-to-surface rocket-propelled weapon can suppress or destroy the radars of hostile surface-to-air missile systems and air defense artillery. HARM will be able to attack radars that are beyond the capability of either the Shrike or Standard Anti-Radiation Missiles currently in use. HARM will be carried by the F-4G Wild Weasel, the A-7, and the F/A-18. It also might be used by SAC's B-52s. Assuming a successful production milestone decision in the fall of 1981, AD plans to procure an initial production run of 150 HARMs in FY '81.

Another missile program concerned with suppression of air defenses on the ground is AD's Self-Protection Weapon (SPW), a small, short-range quick-reaction missile to be carried by tactical aircraft of all types. This program is still in a conceptual stage involving studies by five contractors. SPW is not intended for dedicated defense suppression missions like HARM. Rather, the underlying goal is to graft on all strike aircraft a limited defense-suppression capability—with no more than three or four SPWs to be carried on a given sortie—against GCI and SAM sites without impairing the planes' ability to carry out their primary mission. SPW candidates include modified Falcon, Sidewinder, Hellfire, and Roland missiles as well as new-from-the-ground-up designs.

### The Submunitions Revolution

Almost any NATO/Warsaw Pact scenario is dominated by two fundamental conditions: A "target-rich" environment—in the main, the Pact's concentrated armor—and an unprecedented massing of air defenses designed to thwart NATO's airpower.

The Wide Area Antiarmor Munitions (WAAM) program is designed to take both conditions into account.



The Wasp minimissile is a "smart" munition that automatically recognizes tanks and incorporates an autonomous lock-on/hit-to-kill capability. Twenty-four of these submunitions can be carried by an F-16.

WAAM is a family of antiarmor weapons that can be delivered from very low altitudes and from standoff positions in all weather conditions. These traits should improve significantly the survivability of tactical air forces in the dense defensive environment of Central Europe. Because of their lethality and multiple kill capability, the various WAAM weapons will cut the number of sorties and passes that have to be flown and thus reduce aircraft attrition.

According to USAF analyses, the WAAM weapons can be expected to increase present armor kills per sortie significantly. Ancillary gains include more kills per unit of flying time—which is doubly beneficial because of the constrained airspace over Central Europe—greater operational economy, and more flexible strike capabilities.

WAAM also is a central element of the Defense Department's terminally guided submunitions program and, by extension, linked closely to the Assault Breaker program being carried out under the auspices of the Defense Advanced Research Projects Agency (DARPA). The latter program represents a broad, multifaceted system to find and track second-echelon targets. Assault Breaker's key elements are sophisticated target acquisition and guidance radars for standoff-launched area weapons to be used against distant fixed and moving targets.

WAAM consists of three weapons concepts—either in or approaching concept validation. The Antiarmor Cluster Munition (ACM) is neither guided nor cued and is, among the three concepts, the near-term solution to the antiarmor challenge. The ACM program's validation phase involves two contractors—Martin Marietta and Honeywell—whose competing designs differ in some details. The Martin design envisions releasing fifty-six and the Honeywell proposal forty-eight submunition devices from a standard tactical munitions dispenser (SUU-65). Aircraft expected to launch this weapon include the F-16, A-10, and F-111.

Following release, the dispenser's retracted fins extend to spin it. When the dispenser opens—generally at an altitude of about 200 feet—the submunitions are spun out with enough angular acceleration to cover a relatively wide area in an even pattern. The rotational rate can be preset to provide for flexibility in the size and density of coverage.

The submunitions are equipped with stabilization and orientation devices. The Honeywell design has a cross ribbon parachute while Martin relies on a ballute—a cross between a balloon and a parachute. A protruding impact sensing probe detonates the ACM weapon about three feet above the ground and fires multiple slugs in a horizontal direction. The Martin design fires two slugs—or warhead fragments—at 180 degrees to each other while the Honeywell ACM fires three fragments with 120 degrees horizontal dispersion and a fourth slug straight down in case the weapon lands atop an enemy tank.

Both designs use a new, sophisticated warhead technology optimized for the antiarmor mission. Called self-forging fragments, these devices are in effect directed high-energy slugs that, unlike shaped charge penetrators, don't require physical contact with the target for detonation and are effective over greater distances. The self-forging fragments warhead technology is a

spinoff from the sophisticated computer analyses required to probe the kinetic and other processes that go on inside a detonating nuclear warhead. AD's munitions experts proudly refer to the self-forging technology as "twenty-first century wizardry." In oversimplified form, the exploding ACM warhead releases concentrated energy in a precise, precalculated manner. This process, in turn, causes the warhead's copper liner—a concave disk—to forge itself at great velocity into solid slugs. These slugs attain speeds faster than a high-velocity rifle bullet which, combined with their mass, is sufficient to tear through armor. ACM's self-forging fragments can destroy tanks over extended ranges.

The Defense Department's decision to move the ACM program into full-scale engineering could come as early as next spring.

### **The Wasp Minimisile**

A major technological advance from the unguided ACM is the Wasp multiple minimissile system. This program, anticipated to reach a \$1.5 billion level, is expected to enter concept validation in the near future. Hughes Aircraft Co. and Boeing Aerospace Co. are the competing contractors. The Wasp guided minimissile is equipped with automatic target recognition and incorporates an autonomous lock-on/hit-to-kill capability. The weapon can be launched from rails or pods by the carrier aircraft.

If carried in a 2,000-pound-class pod, twelve minimissiles—each weighing about 100 pounds—would fan out over the target area upon release, search for armor with either millimeter wave (MMW) or infrared (IR) guidance and lock on to kill the target. Wasp uses a shaped-charge warhead. The F-16 could carry two Wasp pods, for a total of twenty-four minimissiles.

Current plans call for selection of either the millimeter wave or infrared seeker about sixteen months into the Wasp program's validation phase. Air Force armament experts don't hide their preference for MMW guidance—if it can be made to work reliably and economically—since this technology can do everything that IR can "plus a great deal more." For instance, millimeter wave guidance works in fog, whereas IR doesn't.

### **The Extended Range Antiarmor Munition**

Perhaps the most ingenious and flexible long-term approach of the WAAM program for coping with the Warsaw Pact's numerically superior armored forces is a weapon with the improbable name of Extended Range Antiarmor Munition, or ERAM for short. ERAM is a cluster weapon that uses the same dispenser and self-forging fragmentation warhead technology as ACM. But that is where the similarity ends, for ERAM incorporates enough computational and sensor refinements to qualify for the appellation of a truly smart submunition. The weapon is a target-activated, cued system that includes both a direct attack feature as well as a capability to delay the advancing enemy forces. ERAM entered a thirty-three-month concept-validation phase in June of this year, with Honeywell and AVCO Corp. serving as the two competing contractors.

ERAM will be deployed ahead of the enemy's advancing armor. Two differing designs are under consideration, one packing sixteen and the other twelve ERAM

weapons into a tactical munitions dispenser. Deployment of the submunitions would be similar to that of ACM. But ERAM weapons don't detonate when they land. Rather they set up an ambush as their integral seismic and acoustic sensors sit and listen. Once one picks up and identifies an approaching target, ERAM orients itself in that direction and then attacks in a uniquely lethal manner by launching a self-forging warhead equipped with an IR or MMW sensor over the target. As the weapon overflies the target, the sensor aims and fires a self-forging fragment at the top of the tank. In addition to its antiarmor feature, ERAM also incorporates a "covering fire" or delay feature that hinders the enemy's mine-clearing operations enough to stack up the advancing armor.

A fourth WAAM, a sensor-warhead combination called Cyclops using a scanning sensor while descending on a chute, recently was discontinued by the Air Force because of funding constraints. The cost of taking the three WAAM programs through full-scale engineering is pegged at about \$450 million.

A number of schemes to deliver WAAM in concert with evolving, sophisticated standoff systems, such as the Precision Location Strike System (PLSS—an all-weather and night tactical strike system)—Assault Breaker, Radiometric Area Correlation (RAC) guidance, and the All-Weather Tactical Strike (AWTS) system, are under consideration.

The Electronic Systems Division's Pave Mover program, a core element of Assault Breaker, might provide the means for standoff delivery of WAAM and similar armament. Pave Mover is an airborne synthetic aperture radar and moving target indicator (MTI) that can track targets over distances of up to 200 miles with enough accuracy to direct effective strikes by manned aircraft and unmanned weapons against them.

The Armament Division's Combined Effects Bomblet program will augment WAAM since these cluster weapons can be used in antiarmor as well as anti-materiel/personnel missions. Equipped with a shaped-charge warhead, the bomblet can penetrate most armor. The weapon is also suitable for attacks on troops and light vehicles.

### **Hard Structure Munitions**

Among the most demanding challenges confronting USAF's armament designers is to come up with nonnuclear warheads of reasonable size and weight that can destroy such hard structures as submarine pens. The Armament Division's Hard Structure Munitions (HSM) program, especially the laser-guided GBU-17/B, shows great promise of meeting this elusive goal. The principle behind the HSM technology is a combination of energy coupling and high velocity. Energy coupling is achieved by using a primary shaped charge in phase with a so-called "follow-through" charge. Fuzing arrangements to set off the two charges at optimized intervals are difficult and failure-prone. The first feasibility demonstration of the laser-guided HSM this summer was successful. Flown against a submarine pen with an outer liner of four-foot-thick reinforced concrete and a four-foot-thick inner liner, the weapon worked as predicted. Yet in a subsequent test against a similar structure that also had a dirt overburden, the primary charge of the weapon deto-



Currently under study, the Advanced Conventional Standoff Missile (ACSM) is meant to go after high-value defended targets in the second and third echelon, using advanced guidance systems of high accuracy.

nated, but the follow-through charge failed to go off.

In other, earlier HSM tests by AD's Armament Laboratory, special "boosting" techniques were used to accelerate the weapon to increase the energy coupling effects. Up to fifteen feet of concrete was destroyed by HSM under these circumstances.

The objective of the GBU-17 program is integration of laser-guided bomb kits in the inventory with HSM warhead and fuzing systems for subsonic and supersonic delivery by F-4 aircraft.

Another sophisticated nonnuclear armament program is AD's Advanced Conventional Standoff Missile (ACSM), now under study by a number of contractors. A number of missile technologies—including air-breathing cruise and supersonic integrated rocket ramjet propulsion—are under consideration. Tailored for use against high-value, and thus presumably highly defended, targets in the second or third echelons—such as airfields—this weapon could be either air- or ground-launched. ACSM's objective is to hit high-value targets from standoff with high accuracies and thereby spare manned aircraft from exposure to a dense air defense environment.

Three operating modes are being considered. Subsonic cruise is the least demanding in terms of technical risks and cost, but also entails relatively high vulnerabil-

ity. The second approach relies on technologies being developed for the Advanced Strategic Air-Launched Missile (ASALM), a hybrid rocket and supersonic ramjet design.

The third technology involves a semiballistic boost-glide design. Such a weapon, boosted by a thirty-second rocket burn, would be launched on a semiballistic trajectory. But the trajectory would be shallow enough to cause the weapon to perform "aerodynamic skips" off the atmosphere. By literally bouncing between space and the stratosphere, the missile would gain greater range than a comparable purely ballistic weapon.

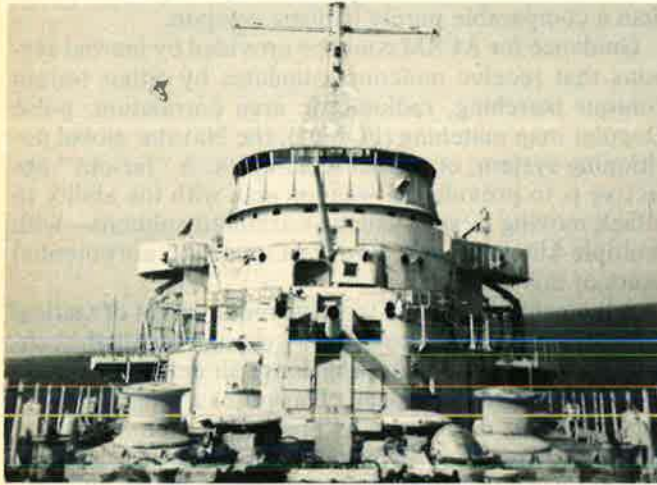
Guidance for ACSM could be provided by inertial systems that receive midcourse updates by either terrain contour matching, radiometric area correlation, pulse Doppler map matching (PDMM), the Navstar global positioning system, or similar techniques. A "far-out" objective is to provide the weapon also with the ability to attack moving targets—such as armored columns—with multiple-kill munitions. Both TAC and SAC are potential users of this weapon.

A long-standing, hard-to-solve requirement of tactical air forces is the ability to deliver weapons with high accuracy from aircraft penetrating dense air defense zones at low altitude and high speed. This poses a tough problem for armament designers. At present, weapons release, especially in cases involving dispensers for submunitions, generally is held to medium and high altitudes and the subsonic regime. TAC, for good and valid reasons, insists on the capability to release submunitions and other armament at altitudes of about 100 feet. The Strategic Air Command—in connection with its "bomber-enhancement" program—also is interested in munitions dispensers and bombs that regardless of the carrier aircraft's speed can be released at altitudes of less than 100 feet and then use kinetic energy to climb up to between 500 and 600 feet before descending on the target. Off-axis weapons delivery is another goal sought by both TAC and SAC. So is the ability to deliver munitions "backward" from the dispenser. The Armament Division is working on a number of techniques that show limited promise of meeting these requirements.

The Low-Level Weapons Delivery System, under study by AD's Armament Laboratory, envisions launching weapons from the top of aircraft. The idea is to use lifting bodies carried on and released from the top of the rear fuselage while penetrating high-threat zones at fifty to 100 feet altitude. On release from the aircraft, the lifting body would climb to its best attack altitude to deploy either cluster munitions or single bombs against the target. Aircraft vulnerability could be reduced sharply by low-altitude penetration coupled with pop-up weapon release. A fringe benefit is that the relatively smooth airflow over the top of the aircraft, undisturbed by the downwash from the aircraft's wing, makes for a more reliable and predictable separation. Grumman Aerospace Co. is exploring various weapon launch and ejection techniques involving lifting bodies that could lead to follow-on flight-test demonstrations.

A related effort, also in concept definition, deals with techniques for low-level delivery of laser-guided bombs. AD's only "quantity production" item is the laser-guided bomb, which comes with a standard guidance kit but in different sizes. A clear plus of this family of weapons is

the economy of scale that comes from buying in quantity: about \$4,000 per laser guidance kit and about a dollar per pound of bomb weight. But this weapon, developed during the Southeast Asian war, has drawbacks, including deficiencies in accuracy because of limited maneuverability at low altitude. The weapon works on a so-called "bang-dead-bang" principle, meaning that its guidance system orders course corrections only by full deflection of the aerodynamic control surfaces when the bomb



*A GBU-15 Cruciform Wing Weapon streaks toward the out-of-commission USS Ozark following release from an F-111 flying at 980 miles per hour. The GBU-15 scored a direct hit in this test flight in summer of 1979.*

wanders off course. The result is overcorrection comparable to steering a car only when it is about to run off the road. The low-level laser-guided bomb is to use more advanced guidance technologies and will be able to maneuver at low altitude. Guidance systems under consideration for the low-level laser-guided bomb include the homing seekers of the Hellfire modular missile used by the Army's Advanced Attack Helicopter, and the Army's Copperhead laser-guided artillery projectile.

### Specialized Munitions

The Low-altitude Airfield Attack System (LAAS), also known as the JP-233 system, is a joint UK/US program currently in full-scale engineering development. Development responsibility has been assigned to the British, with the US paying half of the development cost, or about \$200 million. (The financial arrangement has proved difficult because of the British inflation rate—about eighteen percent annually—and the marked drop in the exchange rate of the dollar.) The JP-233 system includes specialized dispensers and submunitions capable of being delivered against Warsaw Pact airfields from high-speed aircraft flying at low altitudes. The weapon makes it possible to sweep across an airfield and close it down by tearing up the runways. Two types of submunitions are used: runway penetrators and harassment mines.

For a number of reasons, including Soviet demonstrations at the United Nations, general reservations by the White House, and funding constraints, the joint Navy/Air Force Fuel Air Explosive II (FAE) program is now a low-level effort. The basic principle underlying

Fuel Air Munitions is to create around the target a cloud of fuel mixed with air, which is detonated rather than burned. The result is similar to a propane tank truck explosion. Whole city blocks are leveled. The effectiveness of these weapons stems from the fact that they can look around corners, something that fragmentation weapons can't do, and that they don't require an oxidizer. While most of the initial technical problems have been solved, no production decision has been made by the White House.

The "Bigeye" (BLU-80/B) joint service program involves development and acquisition of a freefall binary chemical dispenser in the 500-pound class. "Bigeye" creates and dispenses a highly toxic nerve agent. The agent is created by combining two relatively harmless chemicals just prior to weapon release. The Navy is the program's lead service while USAF's Armament Division's role is limited to integrating the dispenser with the delivery aircraft.

As yet in a tentative, exploratory state is the Armament Laboratory concept of using submunition, self-forging fragmentation warheads on air-to-air missiles to increase their lethal range. The notion is to develop a missile carrying six warheads, each firing several self-forging slugs.

### Near-Term Programs

One of the Air Force's most delay-prone weapons programs is the GBU-15 modular-guided glide weapon system. The GBU-15 is, in fact, a family of guidance/control, airframe, and 2,000-pound warhead modules that can be configured for various attack conditions against a range of targets. It has not fared well in Congress. There are two basically different models—a cruciform and a planar wing design. The cruciform model was cleared for production by the Defense System Acquisition Review Council (DSARC) a year ago, but the program had to be held up when Sen. Thomas F. Eagleton (D-Mo.) charged that the test program was inadequate. Most of the tests requested by Senator Eagleton have been completed since then, with the weapon scoring direct hits in all instances. Launched from F-111s at about 200-foot altitude, the weapon furnishes a "modest" standoff capability. Information about the precise range is classified. The F-111's weapon system officer controls the weapon with a hand control device. The weapon goes wherever he directs it.

The planar wing model, whose folded wings open upon deployment, is optimized for long-range standoff. This weapon is still under development and is not expected to be ready for production for another two years. Both weapon types use the same warhead, guidance section, and data-link pod, but the planar weapon uses a sophisticated digital weapon control computer while the cruciform model gets by with a simpler analog autopilot. A technological challenge affecting both designs is the vulnerability of the data link to jamming. Another factor is its high cost.

The GBU-15, according to General Bond, is an example of the slow approach that has plagued the development of armament in the past. General Bond makes clear that the spirit of impatience and urgency that motivates the men and women of the new Armament Division will remove the word "slow" from their vocabulary. ■



SAC's tankers are always on time."  
An F-16A from Hill AFB drinks fuel  
from a Utah Air Guard KC-135.



Its return to decentralized maintenance organizations and insistence on realistic training create improved readiness in the fighting squadrons of Tactical Air Command. The improved productivity makes . . .

**M** IDWAY in its thirty-fourth year as an Air Force major command, Tactical Air Command turns the corner from 1979 to 1980 as an outfit in transition. It is absorbing five new types of aircraft (733 A-10s, thirty-four E-3As, 115 F-4Gs, 729 F-15s, and 1,388 F-16s) and has just assumed management responsibility for the six active Air Force interceptor squadrons and associated ground-based air defense radars and control centers formerly assigned to the Aerospace Defense Command.

At the same time, TAC's 113,000 people must keep flying more than 2,000 aircraft, many of them ten to more than twenty years old, while simultaneously remaining ready to rapidly deploy combat and support forces anywhere in the world.

Even with its new aircraft, TAC has only limited night and all-weather ground attack capabilities, yet is expected to win the air/ground battle.

Like all other commands, TAC

must compete for good people to accomplish its tasks within limited resources. It then must find ways to train them realistically and to keep them in the Air Force.

Under Gen. Robert J. Dixon, TAC Commander from October 1973 through April 1978, the command began to cope with the transitions that lay ahead and to devise realistic air combat training exercises like Red Flag and its offshoots. (Today, only seven years after the end of USAF participation in the Vietnam War, less than a third of TAC's operationally assigned pilots have combat experience.) Realistic training also has borne fruit in closer cooperation with the Army and allied forces in developing common doctrine and procedures, and in highlighting frankly both resource and organizational shortcomings.

This report on TAC in transition includes extracts from interviews with the TAC Commander, Gen. W. L. Creech, interspersed with AIR FORCE Magazine's observations at

# TAC: Ready to Fly and Fight

BY F. CLIFTON BERRY, JR.  
SENIOR EDITOR



Gen. W. L. Creech (left), Commander, Tactical Air Command, talks with pilots and crew chiefs after a flight in the F-16B at Hill AFB, Utah. In center is Lt. Col. Larry Boese, Commander, 16th Tactical Fighter Training Squadron, responsible for training US and allied F-16 instructor pilots.

TAC units. General Creech's words are in italics.

### A Return to Basics

A visitor to TAC units finds that, although the command is absorbing several new weapon systems, the methods of integrating them and giving them fighting life are quite often a return to the old basics. Seeing several TAC bases with a variety of different missions creates the unmistakable impression that a re-orientation is taking place in a system that once overstressed statistics and "management," sometimes at the expense of preparing to fly and fight. The statistics are still there, and even more refined; so are frequent evidences of modern management techniques. But the difference today is that they appear to serve operational missions rather than driving them; that is, their purpose is to make best use of limited resources to fly and fight.

*That's why we are here. To fly and fight—and win—wherever and whenever we are needed.*

The obstacles to attaining combat-ready status are familiar: funding squeezes, parts shortages, glitches in new aircraft systems, and losses of trained people are just a few. The present-day solutions are also familiar. They boil down to re-

lentless emphasis on realistic training and maintenance, supported by making TAC's needs and capabilities known both inside and outside the command.

We asked General Creech what TAC had done in 1979 to maintain and improve its readiness. He said that of the hundreds of possible goals, he selected a "basic five":

- *Improve our ability to deploy rapidly and fight immediately;*
- *Improve aircrew training—in quantity and quality;*
- *Emphasize the welfare of the maintenance troops;*
- *Pay additional attention to professional appearance: bases, facilities, and people;*
- *Further develop and improve our people programs.*

He said that TAC has worked out ways to reconstitute its Replacement Training Unit (RTU) squadrons much faster. They are operational squadrons that double as training units, and must be reconstituted to deploy as combat outfits. Also cited: TAC's stress on rapid force generation and equipment mobilization, so its units can move out in a hurry.

An example of force generation is provided by the 354th Tactical Fighter Wing's "Thunderhog I" exercise held in late September.

From its home at Myrtle Beach AFB, S. C., the 354th's A-10s compressed a full month's flying activity into seven days. Besides flying 798 close-support sorties with forty-two A-10s (in 1,095 flying hours), the wing processed 874 persons and more than a million pounds of cargo into and out of Military Airlift Command C-141s in both day and night loading. Other TAC fighter and recce wings conduct similar force generations year-round at home stations, involving the entire wing and base.

These exercises supplement and reinforce the actual deployment of TAC units abroad. Regarding deployments, General Creech said:

*We have an entirely new program called Checkered Flag. Its basic notion is to acquaint every squadron in TAC with specific wartime operating areas and bases overseas. This allows them to concentrate on their most likely wartime surroundings, and do their homework in advance. By so doing, they will arrive ready to fight immediately—and knowledgeably. It's a new program; we didn't do that in as specific a way before. It is keyed to periodic overseas visits by unit commanders to "scout the terrain," to squadron-sized deployments, and to a large diet of study at home base. In short, Checkered Flag gives us a "by-squadron" game plan and preparation program for major trouble spots. We retain, of course, the overall flexibility to send any squadron anywhere in the world.*

In Fiscal 1979, TAC units executed fourteen short-term tactical deployments to reinforce US Air Forces in Europe and Pacific Air Forces. It also carried out seven other major overseas deployments. They included the highly visible dispatch of twelve F-15s and two E-3A aircraft to Saudi Arabia by the Carter Administration to "show the flag" in the Middle East, and eight F-4Es to the Panama Canal Zone for the same purpose.

In November, President Carter ordered two E-3As to South Korea following the assassination of President Park. The aircraft and crews left Tinker AFB, Okla., five hours after Saturday-morning notification, arriving at Osan AB, Korea,

seventeen hours later, after a nonstop 7,000-mile flight.

On the day AIR FORCE Magazine visited TAC headquarters, three deployments were in progress: eighteen F-15s en route to Kadena AB, Okinawa; twelve A-10s headed for the 81st Tactical Fighter Wing at Bentwaters, England; and twenty-four F-4s returning home from an exercise at Ramstein, Germany.

*The troops carry those out magnificently. They leave with twenty-four airplanes, and they get there with twenty-four. They go transoceanic with eight aerial refuelings, and SAC's tankers are there on time, always.*

In the jump seat of an E-3A flight deck over the North Atlantic headed for a sunset aerial refueling, we asked the flight crew if the tankers are ever late. "No, they are always on time," said one crew member. "If the tankers were late," another one said, "a lot of fighter pilots would be logging raft time instead of flight time."

Just then the navigator made voice and radar contact with the KC-135 tanker. It was seventy miles out, turning toward the E-3A for an on-time linkup. Soon TSgt. Jim Brewer, the flight engineer instructor, spotted the speck at eleven o'clock high. The visual approach began. Six minutes later, the two 125-ton aircraft were flying together as one at 310 knots and 26,000 feet, linked by the slender length of a boom surging jet fuel from KC-135 tanker to E-3A AWACS.

The precision flying required for aerial refueling is carried out scores of times every day by SAC tankers and TAC aircraft, in training as well as overwater deployments. The aircraft at both ends of the refueling booms include Air Force Reserve and Air National Guard planes as well as those from active-duty wings. In fact, of the fourteen short-term tactical deployments executed in FY '79, five were by AFRES or ANG units flying F-105D, RF-4C, and A-7D aircraft.

### **Training and Organizing for Combat**

Flinging forces across the oceans ready for immediate combat depends on realistic training before-



Maintenance men of Langley AFB's 1st Tactical Fighter Wing check their F-15 fighters during preflight inspection at Cold Lake Canadian Forces Base. The aircraft were participating in Maple Flag, a joint US-Canadian training exercise. In left background are TAC A-7Ds from Davis-Monthan AFB, Ariz.

hand; enough training in the right skills so that TAC forces, if required, can fight outnumbered and win. "Quantity" of training is important if enough people are to be trained. For instance, the experienced E-3A aircraft commander practicing refueling hookups described above had done eleven refuelings on the wing's simulator at Tinker AFB, Okla., before this live practice.

*The "quantity" improvement in training has been remarkable. Since mid-1978, we have increased our sortie output by the equivalent of four full work days of productivity per month. That was done without additional resources, and without any increase in the number of working days. As in any such increase, the main ingredient was some very hard work by the troops.*

At the 354th TFW during "Thunderhog I," for example, the munitions people uploaded and downloaded 30-mm rounds for the wing's A-10 GAU-8A guns at a rate of twelve minutes per load of 588 rounds. This feat meant faster turnaround and more sorties per plane per day. At the 1st Tactical Fighter Wing at Langley, new F-15 pilots

are flying an average of three training sorties per week, up significantly from two years ago, "aging" faster and acquiring winning combat skills earlier.

Out at the 388th Tactical Fighter Wing (Hill AFB, Utah), F-16 maintenance men and women improve productivity by doing ninety to ninety-five percent of their training in practical work on the wing's aircraft. This is done in small groups, and by affiliation between the maintenance people and aircrews.

*We reorganized maintenance; we decentralized it. We took the large organizational maintenance squadrons that were part of the centralized concept, and broke them up into squadron-sized packages tied to the fighter squadrons. They wear the fighter squadron patch and do their own scheduling. We also went to dedicated crew chiefs, where we assign responsibility for each tail-numbered aircraft to a specific individual.*

These initiatives trade on successful practices of the past—updated to meet today's needs. This decentralization greatly helped to increase sortie output and will be of

even greater importance in wartime.

Some might call these "Giant Steps Backward," as one officer suggests, but they are among the commonsense steps that result in improved sortie productivity. In effect, by returning to the basics, more sorties are created without buying additional aircraft. (Dr. Robert Moore, the Deputy Under Secretary of Defense for Tactical Warfare Programs, told the House Budget Committee in May that improving operational readiness of aircraft on hand is one-tenth as expensive as buying new airplanes.)

At every squadron visited, these practices were evident. Crew chiefs' names were on their airplanes (on fighters, stenciled on the fuselage; on the E-3A, displayed on a plaque inside the main door). Not all aircraft had nicknames yet, but many did, including an F-16 called *Juicy Lucy* in the 388th Tactical Fighter Wing. (The only traditional element missing on the aircraft: World War II vintage "nose art.") Maintenance men and women wore the patches of their affiliated fighter squadrons. In addition, the Aircraft Maintenance Unit (AMU) people vied with each other to exceed sortie goals, fewest aborts, and other criteria.

*We also set sortie goals by individual squadrons, so the troops on the line can relate to them. If sortie goals are aggregated on a wing-wide basis, they can't relate to it. But when a goal is identified as their airplane's performance, or that of their individual squadron, they can and do relate to it. If they meet their sortie goals, we give them some extra time off. If they are not meeting their goals, they work longer. They understand that. It's straightforward, and it works.*

Every one of TAC's twenty-four wings met its allocated flying hour program in FY '79 for the first time in more than ten years. And at far higher sortie and flying-hour rates to boot. So it seems clear that the establishment of unambiguous goals and our major maintenance reorganization have had their desired effect. For 1980, our sortie goals are higher still.

The results of the decentraliza-

tion and hard work show in the FY '79 aircraft utilization rates. Before that, from 1969 to 1977, there was a fifty percent decline TAC-wide in fighter aircraft utilization; from an average of twenty-three sorties per plane per month down to twelve. Flying hours also declined, from thirty-two hours per plane per month in 1969 to nineteen hours in 1977. With the maintenance changes and emphasis, the trend was reversed. Thus in FY '79, TAC's fighters flew an average of 15.7 sorties and twenty-two hours per plane per month. For FY '80, the goal is 16.6 sorties and twenty-three hours.

The question is whether the higher rates planned for 1980 and beyond can be achieved without additional people and money. General Creech believes that the 1980 goal represents the upper limit of productivity with current resources. He believes that more people, parts, and funds are needed to fly above those levels.

*That is understood in Washington, and additional resources are being provided for in the five-year budget process. Our ultimate goal is to get back near the rates we were flying in 1969. But the main point is this: With our own determined effort, we not only stopped a seriously declining trend; we reversed it. Naturally we're proud of that, and the credit goes to the maintenance crews.*

The numbers read well, but what do the maintenance people think about the changes?

What feedback has General Creech received?

*Most of them like the decentralized system. Most have seen that it works, and appreciate that it is not only an issue of peacetime productivity. An even bigger need is to be structured in peacetime as we will fight in wartime. Under the centralized system, as single squadrons deployed, the maintenance people had to be reorganized. I think it is a very bad principle to reorganize as you are going to war. The reason it's so bad is that you don't want to discover just after the war starts that something is lacking or the unit is deficient in some other way. That*

*is the worst possible time to find out about it. So we have put ourselves into an organization that mirrors the way we will actually deploy and fight.*

Aircrews and maintenance people both expressed the same conclusion when asked about the changes. If an individual is responsible for a specific airplane, it gets better care. If the people of a maintenance outfit are directly responsible for a small number of aircraft whose crews they know, the aircraft fly more sorties. The anonymous, centralized maintenance complexes broke the old bonds between aircrew and ground crew. Aircraft maintenance was more of a clock-punching job than a sharing of mission accomplishment. That is being reversed today in TAC, just as realistic training is coming to the fore.

#### **Instrumented Ranges**

TAC has been a leader in performing realistic training. Its Red Flag exercise at Nellis AFB, Nev., for example, provides tactical aircrews with a realistic enemy threat in a training environment, including air defense weapons and two squadrons of camouflaged F-5E fighters whose pilots fly the latest in Soviet-bloc air-to-air tactics. Red Flag participation has been expanded to include Army, Navy, and Marine Corps units and representatives from several allied nations, as well as Air National Guard and Air Force Reserve aircrews.

*We have also increased the amount and quality of our other forms of realistic training. For example, dissimilar air combat training—which involves dogfighting with aircraft of different types and different services—has more than doubled in the past year. Also, the number of low-level missions flown below 200 feet has more than tripled in FY '79 over FY '78.*

*We are also expanding and improving a home-base training approach we call Composite Force Training (CFT). It is mini-Red Flag training. We encourage wings to do it during periodic "battle weeks," when they practice going to war, work around the clock, and fly wartime surge rates. Today they don't*

Trained air officer of the US Customs Service operates a multipurpose console aboard an E-3A AWACS airplane of Tactical Air Command. Five Customs air officers are stationed with TAC's 552d AWAC Wing, regularly flying missions aboard the E-3A. Its "look-down" radar is useful in detecting low-flying aircraft penetrating US airspace with cargoes of drugs, and vectoring Customs aircraft to interceptions.



*just practice internally as they did in the past, but put on mini-Red Flag exercises of their own. For instance, the 1st Tactical Fighter Wing (F-15) here at Langley just finished such a CFT exercise in which they had eight outside units, including Navy and Marines, flying with them. So we are striving for more realism across the board.*

The flying units relish the hard, realistic training. Lt. Col. Ralph F. Wetterhahn, Commander of the 71st Tactical Fighter Squadron at Langley, says if resources were unlimited, he'd like to have all his F-15 pilots fly two sorties per day, and all against dissimilar aircraft. What he actually is able to get for his thirty-three pilots is ten sorties per month for experienced pilots, and fifteen per month for the newer men. Either he or his Ops Officer, Lt. Col. Jim Hardenbrook, flies with each new man. Then he "ages" the new pilots by flying them more often, and by always having them fight outnumbered.

At the 71st's briefing room, we found missions planned against Navy F-14 and A-4 and Marine F-4 fighters. The air combat is arranged through wing headquarters direct to the Navy and Marines's controlling headquarters. Direct telephone hookups between the squadrons' ready rooms simplifies final coordination, both preflight and post-flight.

The learning value of dissimilar air combat is enhanced by use of

one of the four instrumented Air Combat Maneuvering Ranges/Instrumentations around the country. (The Navy's first-generation systems are called "Ranges"; USAF's second-generation complexes are dubbed "Instrumentation." They perform the same role.) A typical ACMR/I complex covers more than 700 square miles. It contains a network of unmanned, solar-powered tracking stations on the range, which feed data to control and display stations during a battle. Pods attached to each aircraft provide three-dimensional location, aircraft attitude, and weapons data to the tracking station.

The ACMR used by the Langley F-15s in their simulated air battles is an overwater area off Cape Hatteras, which permits supersonic combat. Its two identical display and debriefing systems are at the 1st TFW area and at Naval Air Station Oceana. The Navy owns the system, but USAF uses and pays for twenty-five percent of it. For the 1st Tactical Fighter Wing that translates to three missions per day, each of which can involve several aircraft. Another ACMR is at Marine Corps Air Station, Yuma, Ariz. The Air Force's two ACMIs are at Nellis AFB, Nev., and Tyndall AFB, Fla.

In the same week that 1st TFW F-15s were battling off the East Coast, the 388th TFW's F-16s were slicing through the skies over Utah and Nevada, bringing the multinational fighter into the operational inventory. A visitor to the 388th's

home at Hill AFB, Utah, on a typical day saw Navy F-14s, A-4s, and F-5s on the ramp next to the wing's F-16s. (The F-5s were from the Navy's "Top Gun" unit, its own "Aggressor" squadron flying Soviet-type tactics.)

Lt. Col. Larry Boese commands the 16th Tactical Fighter Training Squadron of the 388th TFW. He is responsible for training the instructor pilots from USAF and the foreign nations equipping with the F-16. He believes dissimilar air combat training is the best way to build combat-ready skills; flying against your own type of airplane does very little for combat proficiency. He says the Air Force and Navy pilots don't keep score of their dogfights, or claim that either side "wins" an aerial battle. Instead, they concentrate on "What did we learn today?"

### **Bonuses From the E-3A**

TAC's big airplane, the E-3A Sentry Airborne Warning and Control System (AWACS), flies regularly in support of TAC-wide training. For example, the Langley F-15s were receiving night intercept training from a TAC E-3A when AIR FORCE Magazine visited. For four nights running, the E-3A took off from Langley just before sunset, refueled over the North Atlantic, then spent several hours controlling F-15s from its lofty perch. At the same time, the E-3A's flight crew and mission crew members were themselves undergoing training.

Normal E-3A crew complement is seventeen to nineteen; four flight crew members moving the airplane about the sky, and thirteen to fifteen mission crew members operating the surveillance and command and control systems aft of the flight deck. On the fourth day of training with the 1st TFW, however, E-3A 75-0557 carried thirty-five persons. All of them were giving instruction or receiving it, either on the flight deck or on the multipurpose consoles, the radar systems, the computers, or the radio systems. The realism of the training included three hookups for live aerial refuelings by the flight crew, plus console practice and in-flight maintenance activities for the mission crew. Two crew chiefs also worked during the flight, extending ground mainte-

nance to the air. (The "Students" on the E-3A flight deck are not fresh out of basic; flight crew members have from 750 to several thousand jet multiengine hours. Mission crew students are typically about half new and half experienced in control and surveillance functions.)

An unexpected result of the E-3A's extensive realistic training has been discovery of new and unusual ways to use the airplane's systems. Controlling the air battle is an obvious—and planned—use, but the students and instructors working the systems have added others. Some examples: exchanging information with ground forces via IFF transponders, passing enemy data to Army HAWK air defense systems so they can keep their radars off the air longer, and working effectively with the US Customs Service to combat aerial drug smuggling. (The E-3A was covered in the June '79 AIR FORCE Magazine article "AWACS in Operation.")

### Solving Some People Problems

Realistic training in maintenance is epitomized by the F-16 program at the 388th Tactical Fighter Wing.

There, SMSgt. Stanley Swallow told how he and his thirty-one instructor colleagues receive students from the Air Training Command field training detachment, and give them the follow-on training to qualify them to work on F-16s. It is "structured on-the-job" training, with ninety to ninety-five percent of the work being performed on wing aircraft needing maintenance. Class sizes are small; usually four or five men and women from USAF and allied air forces. Each class member is self-paced. The criterion for passing each step is demonstrating actual ability to perform required tasks on the airplane. (Both the 388th and the ATC detachment make extensive use of simulators to teach maintenance procedures for catastrophic, disabling, or infrequently seen failures that couldn't be demonstrated safely on a functioning airplane.)

Practicality of the crew chief training includes their visiting General Dynamics at Fort Worth to watch the last two weeks' assembly of their own airplanes. The crew chiefs like that. They see their plane before it is sealed up for delivery, and get a chance to talk with people

who put it together. Senior maintenance people consider the practice a good motivator, both for the Air Force and for GD's assembly workers. (Imagine the results if US auto buyers could see their cars assembled at Detroit, and the assembly line workers knew they were watching.)

Supporting realistic training in the air and on the ground is TAC's emphasis on upgrading the conditions under which maintenance is performed.

*I strongly believe our maintenance troops have been short-changed on facilities for years, and have not had all the support they need. To get at that perennial problem, I launched a command-wide effort we call Project New Look. It involves increases in the size of the flight-line maintenance facilities, making them more adequate, providing adequate heating and cooling—and the like. Nothing fancy, no frills. It enables and encourages the maintenance men and women to do their job better, and improves sortie productivity as well as the quality of our maintenance.*

### Doctrinal Cooperation

In executing its doctrinal development responsibilities, TAC works closely with its counterparts in the US Army and in allied forces. The strongest recent push for closer cooperation came in the mid-1970s under Gen. Robert J. Dixon at TAC and Gen. W. E. DePuy at the Army's Training and Doctrine Command (TRADOC). Their successors, Gens. W. L. Creech and Donn A. Starry, have continued to expand the foundations they built.

TAC and TRADOC each established an Air-Land Programs Office (ALPO) to be the focal point for joint actions. A totally separate agency called the Air-Land Forces Agency (ALFA) is staffed by Air Force and Army people and located at Langley AFB, but is free of ties to either staff. ALFA is considered the "honest broker" of ideas and information and is expected to work on joint concepts, analyses, and procedures of the air-land battle.

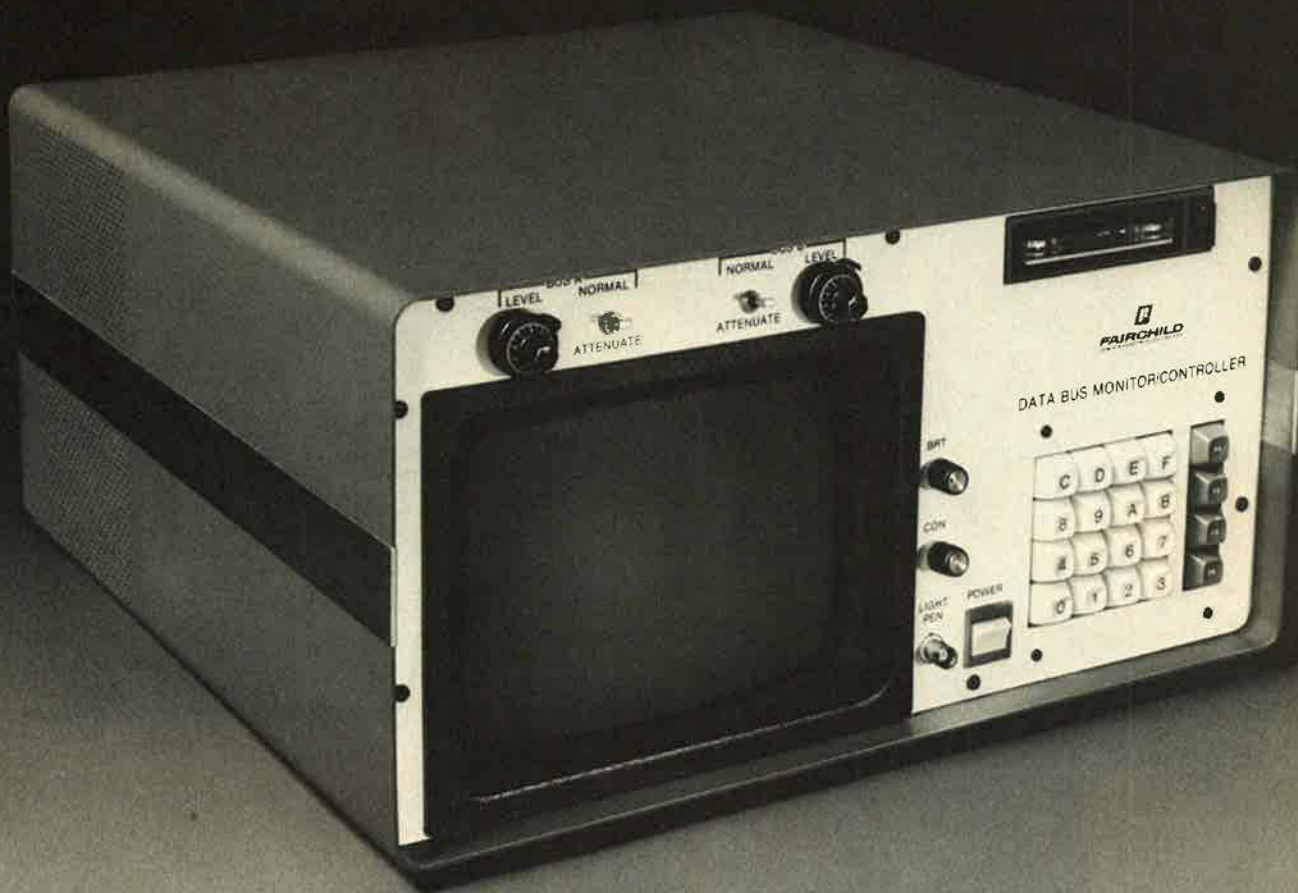
Recent operational products of the TAC-TRADOC cooperation include Joint Air Attack Team Tactics (JAATT) and Joint Countering Against Attack Helicopters (J-CATCH). JAATT techniques allow close cooperation between USAF attack aircraft and Army scout and attack helicopters against enemy ground forces; J-CATCH techniques pit Air Force attack aircraft and Army helicopter teams against enemy attack helicopters.

In doctrine development, TAC and TRADOC are producing a joint service Air-Land Operations Manual, which is consistent with—and coordinated with—NATO doctrine. In addition, they are working together to develop operational doctrine and procedures for meshing close air support, battlefield air interdiction, and second echelon interdiction. The purpose: to ensure that the air-land battle is fought as an integrated, orchestrated whole, instead of disjointed Army-Air Force actions separated by artificial vertical and horizontal boundaries. This is an unusually fruitful area for progress, especially as the working troops free themselves of parochial, single-service "roles and missions" shackles.

A TAC officer provided an example of what General Creech was talking about. He said that at a TAC base in the Southeast, the people in the Aircraft Maintenance Unit (the package married to a fighter squadron) were working day in and day out in places with no air conditioning, while everyone else on the base had air conditioning. He called that the "short end of the stick." That has changed under New Look.

At Tinker AFB, the 552d AWAC Wing's maintenance crews created a "ready room" with their own labors, the materials coming through New Look. A visitor dropping in with CMSgt. RJ Morris, the Wing's Maintenance Superintendent, found a clean, comfortable, well-lighted place with pool and Ping-Pong tables, sturdy sofas, and an attractive coffee and snack bar—all built, maintained, and operated by the crews.

In the area of "people programs," TAC leaders are charged with meeting and talking with their people to find out the problems that concern them and to work on solutions in a visible way. TAC lead-



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ers are encouraged to speak out on the problems, and to let the troops know they are trying to do something about them. According to General Creech, that is to counteract the perceived erosion of benefits. He was asked if there has been a mass exodus of maintenance experts in TAC as a result of erosion of benefits and their long-term perceived "short-change" status.

*There has not been a mass exodus. There has been a trend in*

*the maintenance career field—and others—of a steady decline in retention. It appears to directly reflect their assessment of the erosion of benefits. Quite frankly, I find among them a high—and growing—level of mistrust as regards the future on pay and benefits. They have reached that frame of mind based on a series of events over the past seven years, and each new pay cap or benefit withdrawal makes it worse. Even abortive attempts in the Congress to make cuts feed the*

*mistrust. In career reenlistments, all services, including the Air Force, are down. Within that overall career group, trends in second-term retention are particularly important. Those people have put in two terms, have a considerable investment in retirement equity, and when they decide to leave it is a very serious decision. The Air Force is down to only sixty-one percent retention of second-termers. As recently as two years ago, it was some seventy percent. Therefore, although it is not yet a mass exodus, and the Air Force remains somewhat better off than the other services, the trends are very worrisome—things are steadily getting worse instead of better. The surrounding issues—including the key one of erosion of compensation—must be faced squarely.*

Facing the issues squarely is a central theme in TAC units these days. It applies to people matters, to maintenance, and to realistic training so that TAC can be ready to fight a "come-as-you-are" war. It recognizes that realism and productivity can be improved within existing resources. But it also acknowledges that there are upper limits on how far people and organizations can be stretched without outside support before they wear out or leave. That is why Gen. Bill Creech wonders at assertions in the press that if the Defense Department were to get more money, it wouldn't know where to spend it.

*I wish anyone who really believes that would come down to Langley and spend a day with me. I would show him where we badly need funding—just to do the things we're supposed to do now. So it's plain wrong and far removed from reality to say we could not productively use additional defense dollars. We are busy getting ready, and staying ready, and are getting the most we can out of our resources—those we have and those we will get. That's our job, and I believe we are doing it well.*

The test is in the doing, of course, and TAC's performance is measured every time US conventional airpower is exercised anywhere in the world. ■

### Night, All-Weather Capabilities Lagging

TAC considers its major modernization programs—A-10, E-3A, F-4G, F-15, and F-16—to be going well. Initial problems and corrective actions have been reported extensively. Each of the aircraft is performing well the missions it was designed for. But General Creech says:

*We are concerned about the things they cannot do well. At the head of that list is our air-to-ground attack capability at night and in weather. We need improvements there. At the least, we need to develop on an expedited basis a night, under-weather capability with conventional munitions. Also, the technology is here—or just around the corner—to do the same thing in weather. We have programs under way in those areas, but they are not coming along as swiftly as we would like, primarily due to funding limitations. Air Force Systems Command's Aeronautical Systems Division (ASD) has the lead on those improvements and is doing an aggressive job.*

In late summer, ASD went to industry for a rapid response to the requirement for a night attack capability for the A-10 and F-16. The technical approach is expected to include a wide field of view video head-up display with an autonomous day and night pod. A Request for Proposal has been released. Contract award for this quick-reaction competitive program is expected around late February 1980.

That is a temporary fix for the night requirement. Something more extensive is needed for the true night, all-weather capability. General Creech:

*The next big barrier we need to break through for fighters involves not speed, not altitude, not maneuverability. It is the barrier posed by night and weather. We have done well on speed, altitude, and lethality. We have not done well in improving our ability to fight at night and in weather.*

Why not?

*Because of the technical challenges of providing the needed avionics at affordable costs. As you know, the F-111 has a good capability at night and in weather, against fixed targets especially. But we stopped that line of development with the F-111 and switched back to buying only clear air mass fighters—not altogether by Air Force choice. Now, however, the challenges appear surmountable. We need to adapt our newest aircraft—the A-10 and F-16—to fight in all conditions. We can't stop and wait for better conditions, because the enemy won't.*

Late in November, TAC delivered to the Air Staff a study of the ways to achieve the night, all-weather capabilities now lacking. Among other issues, the study addressed the technologies required (and whether they are available or should be developed), plus such fundamental questions as whether single-seat or two-place aircraft are better for the missions envisioned. Its recommendations probably will not be translated into funded programs for the FY '81 budget, but they do provide a rational framework for FY '82 program starts.

Twenty years ago, US military planners couldn't have visualized the depths of the tragedy that would befall so much of the Indochinese peninsula. Nor could they foresee the coming importance of . . .

# The US Stake in Southeast Asia

By Gen. T. R. Milton, USAF (Ret.)

**H**OWEVER easy it may be, here at home, to turn a blind eye on events in Southeast Asia, a visitor to the Far East these days becomes acutely aware of them. More than 200,000, or one of every six of the refugee boat people, have perished at sea, according to the estimate of Adm. Maurice Weisner in his farewell remarks as Commander in Chief, Pacific. What the eventual toll will be is anybody's guess. As to the casualty lists in Cambodia, where slaughter and starvation are everyday routine, there is a real danger that more than a million will die if massive help does not reach there soon, and there is no reason to think that is going to happen, whatever the United Nations decides to do. The political and bureaucratic obstacles to large-scale relief in Cambodia appear just too formidable.

In the dim and faraway past of the fifties and sixties, Cambodia was a comic-opera land, a country ruled by the eccentric playboy Prince Sihanouk, whose erratic behavior masked a foxy mind. In those days, Sihanouk kept Cambodia resolutely, sometimes mad-deningly, neutral in spite of SEATO and the obvious threats of Hanoi. No one starved, or even went hungry, in that lush tropical never-never land. And while the Thais disliked Cambodians on ancient and half-forgotten grounds there was no fear of real conflict on either side of the Thai-Cambodian border. Cambodia was mainly a curiosity, an independent little lotus land in a re-

gion where everyone else had chosen sides.

We found this Cambodian neutrality a frustration in the period leading up to Vietnam. It was hard to do regional planning with a key piece of the region abstaining, and we never failed to call Sihanouk a few names on our long southerly diversions between Saigon and Bangkok.

Mainly, however, Cambodia's stance was just a nuisance during the early sixties, even though the Viet Cong were making extensive use of its sparsely populated eastern areas. And then, later on, when Cambodia had become a sanctuary for Hanoi's forces, our limited invasion was the trigger for domestic antiwar riots. Those same protesters, with the notable exception of Joan Baez, are strangely quiet in this time of Cambodian agony.

Our military planning of twenty years ago never visualized, even in the worst-case scenario, the Southeast Asia of today. Nor did the military planners of that era realize the importance Southeast Asia might come to have in a world short of oil. It was, in fact, hard to come up with a rationale that tied our vital national interests to Southeast Asia.

Now, once more, Thailand is threatened, and threatened more directly than ever before. The Vietnamese are in Cambodia and Laos, just a short march away from Thailand. We remain weapons suppliers to the Thais, but this quartermaster role is a long cry from our old position as military advisors and guarantors to that kingdom.

The Association of Southeast Asian Nations—ASEAN—is a replacement of sorts for the defunct SEATO, but ASEAN is mainly an economic alliance. Besides, its other members have their own problems. In the Philippines, for instance, the resurgent Moros, along with the apparently indestructible Huks, are

keeping the Philippine military occupied at home. Malaysia has continued Communist insurgent problems in the wilds of the Thai-Malaysia border region. Thailand, the great survivor, must once more contemplate either bending with the bamboo, or looking to the United States as its protector, for no amount of military aid will make the Thais serious opponents of Vietnam.

Meanwhile, we have some new thinking to do, for it is no longer hard to tie Southeast Asia to our own national interests. The Strait of Malacca is a vital oil route, a sort of Oriental Suez, in the words of a thoughtful Chinese. Similarly, the South China Sea leading into that strait has assumed new importance in the coming struggle for oil.

The tragedy now being played out in Southeast Asia has enormous social significance, for whatever can human rights obligations be about if they are not about the salvation of millions of people from starvation, torture, and murder? On those grounds alone we have a stake in Southeast Asia's future.

If that is not enough, then there is the matter of the Malacca Strait, the South China Sea, and what will happen to us if they should be dominated by our enemies. ■

# BLAST

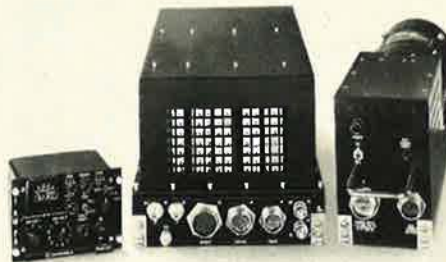


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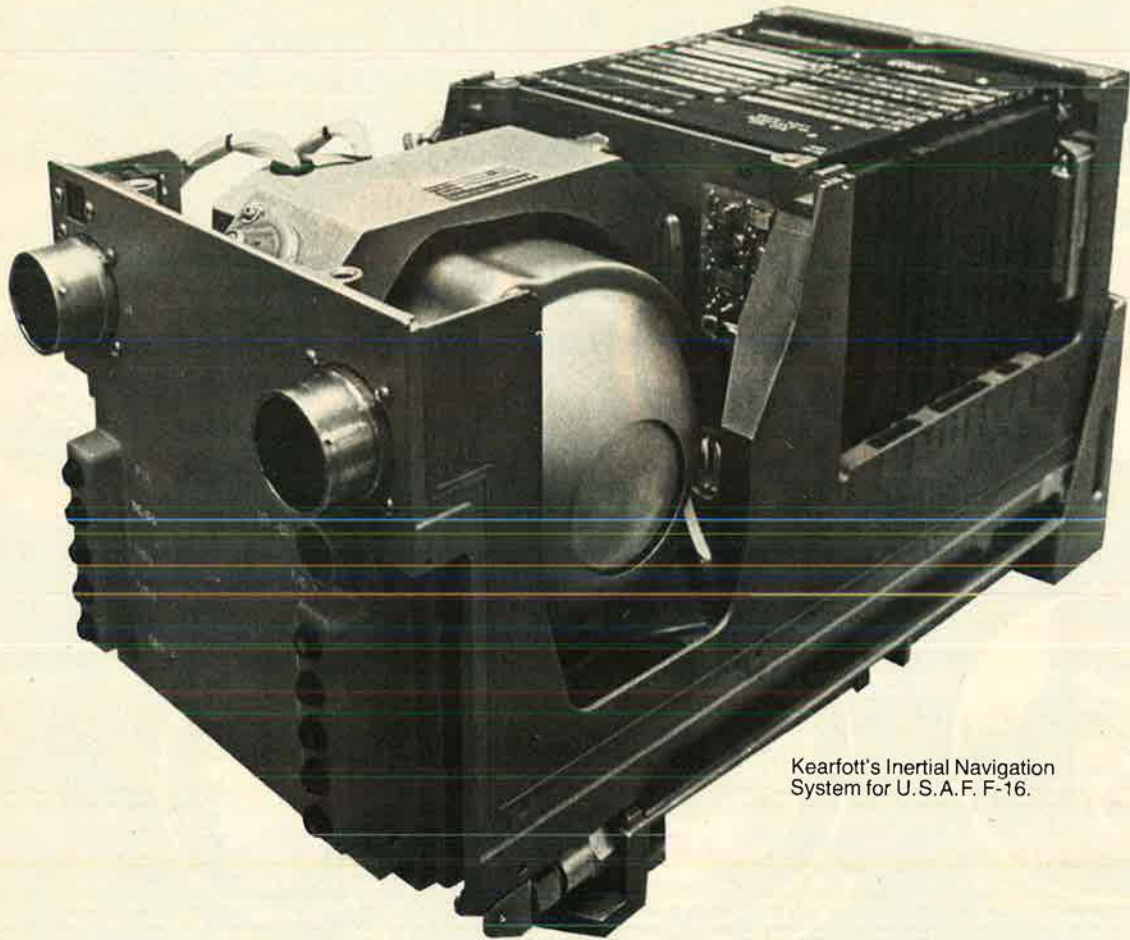
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THE MILITARY BALANCE 1979/80  
As Compiled by The International Institute for  
Strategic Studies, London

# FOREWORD

It is once again a privilege for AIR FORCE Magazine to present "The Military Balance," compiled by The International Institute for Strategic Studies, London, England, which has been an exclusive feature of each December issue since 1971. 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 power and defense expenditure of countries throughout the world. It examines the facts of military power as they existed in July 1979, and no projections of force levels or weapons beyond this date have been included except where specifically noted. 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.

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. Included this year is a supplementary essay, "The Balance of Theater Nuclear Forces in Europe."

As in the past, space limitations make it necessary for us to exclude some tabular material, including data on arms production in developing countries, 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. The table on characteristics of military helicopters has been abridged to include only the US and USSR. (A copy of the study with full tabular material may be purchased from The International Institute for Strategic Studies, 23 Tavistock St., London WC2E

7NQ, England, for \$8.50 postpaid, or in hard cover from Westview Press, 5500 Central Ave., Boulder, Colo. 80301, for \$12.50.)

In preparing "The Military Balance 1979/80" 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.

Figures for defense expenditures are the latest available. Table 5 on page 133 shows current and past expenditures of the major nations, expressed in US dollars. However, since many countries update these figures each year, they will not in all cases be directly comparable with those in previous editions of "The Balance." Defense expenditures for the USSR and the People's Republic of China are estimates. Notes on estimating their defense expenditures appear at the end of the sections on those countries. 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 105.

For easier comparisons, national currency figures have been converted into United States dollars, using the rate prevailing at the end of the first quarter of the relevant year. In all cases the conversion rates used are shown in the coun-

try entry but may not always be applicable to commercial transactions. An exception is the Soviet Union, since the official exchange rate is unsuitable for converting rouble estimates of GNP. Various estimates of more appropriate conversion rates have been made, but they have shortcomings too great to warrant their being used here. The official rate is, however, given in the country section. Further exceptions are certain East European countries which are not members of the IMF and Romania (which is), for which the conversion rates used are those described in Alton's study mentioned above.

Unless otherwise stated, the manpower figures given are those of active forces, regular and conscript. An indication of the size of militia, reserve, and para-military forces is also included in the country entry where appropriate. Para-military forces are here taken to be forces whose equipment and training goes beyond that required for civil police duties and whose constitution and control suggest that they may be usable in support, or in lieu, of regular forces. Further manpower information is also included in Table 6, p. 134.

Equipment figures in the country entries cover total hold-

ings, 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 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. Basic technical details of the nuclear delivery vehicles available to NATO and Warsaw Pact countries are given in Table 1 starting on page 130.

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 EDITOR

### ABBREVIATIONS

<	under 100 tons	ECM	electronic counter-	log	logistic	RL	rocket launcher
-	indicates part of estab-	ELINT	measures	LPD	landing platform, dock	RV	re-entry vehicle(s)
	lishment is detached	enr	electronic intelligence	LPH	landing platform,		
AA	anti-aircraft	eqpt	engineer		helicopter	SAM	surface-to-air missile(s)
AAM	air-to-air missile(s)	EW	equipment	LRCM	long-range cruise	SAR	search and rescue
AB	airborne		early warning		missile(s)	sig	signal
ABM	anti-ballistic missile(s)	FAC(G)	fast attack craft (gun)	LSD	landing ship, dock	SLBM	submarine-launched
ac	aircraft	FAC(M)	fast attack craft (missile)	LSM	landing ship, medium		ballistic missile(s)
AD	air defence	FAC(P)	fast attack craft (patrol)	LST	landing ship, tank	SLCM	sea-launched cruise
AEW	airborne early warning	FAC(T)	fast attack craft (torpedo)	lt	light		missile(s)
AFV	armoured fighting	FB	fighter-bomber	m	million	SOV	Soviet
	vehicle(s)	fd	field	MARV	manoeuvrable re-entry	SP	self-propelled
AFB	air force base	FGA	fighter, ground-attack		vehicle(s)	spt	support
ALBM	air-launched ballistic	flt	flight	MCM	mine counter-measures	sqn	squadron
	missile(s)	Fr	French	mech	mechanized	SRAM	short-range attack
ALCM	air-launched cruise	GDP	gross domestic product	med	medium		missile(s)
	missile(s)	GDR	German Democratic	MICV	mechanized infantry	SRBM	short-range ballistic
amph	amphibious		Republic		combat vehicle(s)		missile(s)
APC	armoured personnel	Ger	German (West)	MIRV	multiple independently-	SSBN	ballistic-missile
	carrier(s)	GNP	gross national product		targetable re-entry		submarine(s), nuclear
Arg	Argentinian	GP	general purpose	mor	vehicle(s)	SSM	surface-to-surface
armd	armoured	gp	group	mot	motorized		missile(s)
arty	artillery	GPS	Global Positioning	MR	maritime reconnaissance	SSN	submarine(s), nuclear
ASM	air-to-surface missile(s)		System	MRBM	medium-range ballistic	sub	submarine
ASW	anti-submarine warfare	GW	guided weapon(s)		missile(s)	TA	territorial army
ATGW	anti-tank guided			MRCA	multi-role combat	tac	tactical
	weapon(s)	hel	helicopter(s)		aircraft	TAVR	Territorial and Army
ATK	anti-tank	how	howitzer(s)	MRV	multiple re-entry		Volunteer Reserve
AUS	Australian	hy	heavy		vehicle(s)	tk	tank
AWACS	airborne warning and			msl	missile	tp	troop
	control system	ICBM	inter-continental ballistic	MT	megaton (1 million tons	tpt	transport
AWX	all-weather fighter		missile(s)		TNT equivalent)	trg	training
bbr	bomber	indep	independent	n.a.	not available	UNDOF	United Nations
bde	brigade	inf	infantry	Neth	Netherlands		Disengagement
bn	battalion or billion	IRBM	intermediate-range			UNEF	Observation Force
Br	British		ballistic missile(s)	OCU	operational conversion	UNFICYP	UN Emergency Force
bty	battery	KT	kiloton (1,000 tons TNT		unit	UNIFIL	UN Force in Cyprus
			equivalent)	para	parachute		UN Interim Force in
Can	Canadian			pdr	pounder	UNTSO	Lebanon
cav	cavalry	LCA	landing craft, assault	Pol	Polish		UN Truce Supervisory
cdo	commando	LCM	landing craft,	Port	Portuguese		Organization
CEP	circular error probable		medium/mechanized	PSMM	patrol ship,	USGW	Organization
Ch	Chinese (PRC)	LCT	landing craft, tank		multi-mission		underwater-to-surface
COIN	counter-insurgency	LCU	landing craft, utility				guided weapon
comd	command	LCVP	landing craft, vehicles			vch	vehicle(s)
comms	communications		and personnel	RCL	recoilless launcher(s)	v(/s)TOL	vertical (/short) take-off
coy	company	LHA	amphibious general	regt	regiment	Yug	and landing
det	detachment		assault ship(s)				
div	division						



## INDEX TO COUNTRIES AND PRINCIPAL PACTS

Afghanistan .....	107	Guatemala .....	118	Papua New Guinea .....	111
Albania .....	89	Guinea .....	101	Paraguay .....	119
Algeria .....	93	Honduras .....	118	Peru .....	119
Angola .....	100	Hungary .....	73	Philippines .....	111
Argentina .....	114	India .....	108	Poland .....	73
Australia .....	107	Indonesia .....	109	Portugal .....	88
Austria .....	89	Iran .....	94	Qatar .....	96
Bahrain .....	93	Iraq .....	94	Romania .....	73
Bangladesh .....	107	Israel .....	95	Saudi Arabia .....	96
Belgium .....	76	Italy .....	86	Senegal .....	102
Bolivia .....	114	Ivory Coast .....	101	Singapore .....	112
Brazil .....	114	Japan .....	109	Somali Democratic Republic .....	102
Britain .....	76	Jordan .....	95	South Africa .....	102
Brunei .....	108	Kampuchea (Cambodia) .....	109	Soviet Union .....	68
Bulgaria .....	72	Kenya .....	101	Spain .....	90
Burma .....	108	Korea: Democratic People's Republic (North) .....	109	Sri Lanka (Ceylon) .....	112
Cambodia (Kampuchea) .....	109	Korea: Republic of (South) .....	110	Sudan .....	97
Cameroon .....	100	Kuwait .....	95	Sweden .....	91
Canada .....	82	Laos .....	110	Switzerland .....	91
Ceylon (Sri Lanka) .....	112	Lebanon .....	95	Syria .....	97
Chile .....	117	Libya .....	96	Taiwan (Republic of China) .....	108
China: People's Republic .....	104	Luxembourg .....	87	Tanzania .....	103
China: Republic of (Taiwan) .....	108	Malaysia .....	110	Thailand .....	112
Colombia .....	117	Mali .....	101	Tunisia .....	98
Congo .....	100	Malta .....	96	Turkey .....	88
Cuba .....	117	Mexico .....	118	Uganda .....	103
Cyprus .....	94	Mongolia .....	110	United Arab Emirates .....	98
Czechoslovakia .....	72	Morocco .....	96	United States .....	66
Denmark .....	82	Mozambique .....	101	Uruguay .....	119
Dominican Republic .....	118	NATO .....	74	Venezuela .....	119
Ecuador .....	118	Nepal .....	111	Vietnam: Socialist Republic .....	112
Egypt .....	94	Netherlands .....	87	Warsaw Pact .....	71
Eire .....	90	New Zealand .....	111	Yemen: Arab Republic (North) .....	98
Ethiopia .....	100	Nigeria .....	101	Yemen: People's Democratic Republic (South) .....	98
Fiji .....	108	Norway .....	87	Yugoslavia .....	91
Finland .....	90	Oman .....	96	Zaire .....	103
France .....	82	Pakistan .....	111	Zambia .....	103
Gabon .....	100			Zimbabwe-Rhodesia .....	103
Germany: Democratic Republic (East) .....	72				
Germany: Federal Republic (West) .....	85				
Ghana .....	100				
Greece .....	86				



*NATO is modernising its general purpose forces with the F-15 (above) and the multinational Tornado (above, right), while the Pact countries put increased reliance for theatre defence on SAMs such as the SA-4s at right.*





THE MILITARY BALANCE 1979/80

# The United States and the Soviet Union

## AMERICAN STRATEGIC FORCES

The second Strategic Arms Limitation Talks agreement (SALT II) is now undergoing consideration by the US Senate. Pending completion of this process, both super-powers have continued to modernize their strategic forces within the context and limits imposed by SALT I and stipulated in the Vladivostok Accord of 1974. Although the Interim Agreement (SALT I) was due to expire on 3 October 1977, both sides have undertaken to observe its provisions while SALT II is being negotiated.

In the case of the United States, some programmes are in train for modernizing and upgrading strategic forces, but important decisions remain to be taken about the ICBM force. For many years the ICBM force has remained at 1,054 (550 *Minuteman* III each with 3 MIRV warheads, 450 single-warhead *Minuteman* II, and 54 *Titan* II), but plans are in hand to upgrade *Minuteman* III yield and accuracy with the NS-20 guidance system and the Mk 12A warhead. Development of the Mk 12A should be complete by the end of 1979 and production will then begin. Accuracy should then increase from a CEP of 0.25 nautical miles (nm) to 700 feet. MARV development continued, as did component development of the MX ICBM, but some fundamental decisions remain to be taken on the basing mode for the new missile. The MX will be 92 ins in diameter and have 10 warheads.

At sea, 496 *Poseidon* SLBM, each with 10-14 MIRV, form the missile complement of 31 SSBN, and a further 160 *Polaris* SLBM (each with 3 MRV) are carried in 10 SSBN. Of the *Poseidon* C3 warheads, 400 are allocated to SACEUR for European missions, although the submarines concerned are no longer based at Rota in Spain, having been withdrawn in early 1979. Construction of the first seven of the new 24-tube *Trident* boats continues and the first has been launched. Delays in the programme have been reported. Testing of the *Trident* C4 missile has continued. With a range of 4,000 nm, this will also be retrofitted into 12 of the in-service *Poseidon* boats starting this year. The C4 has not only almost twice the range of in-service SLBM but accuracy will improve to about 1,500 feet CEP. It will carry 8x100KT MIRV. A second-generation SLBM for *Trident* boats (the D5) is under early development. This is expected to have a range of 6,000 nm, to carry 14x150KT MIRV warheads, and may employ a manoeuvrable warhead, the Mk 500 *Evader*. In conjunction with GPS

*Navstar* satellites, very high degrees of accuracy might be obtainable.

Some 120 B-52G/H strategic bombers are to be adapted for the carriage of ALCM or a mix of ALCM and short-range attack missiles (SRAM). This will involve structural and avionics improvements. Flight-testing continued on 3 B-1 bomber prototypes but plans to procure further aircraft were cancelled. There are two ALCM designs competing for a production contract, and a fly-off is taking place. Range will be of the order of 1,500 nm and ALCM could be in service by about 1982/3. Although there is considerable and perhaps growing interest in ground- and sea-launched cruise missiles, the SALT II Protocol will prohibit their deployment with effective ranges of over 350 nm until its expiry at the end of 1981. However, testing and development may proceed.

There has been a slight drop in total numbers of American delivery systems (2,270 in 1969, 2,142 in 1979), although the number of deliverable warheads has doubled (to 11,000) in the same period.

By contrast, defence against strategic attack has been accorded a lower priority. Interceptor aircraft to handle a Soviet bomber attack were held at six active and ten reserve (Air National Guard) squadrons. One of these ANG squadrons is due to disband in FY 1979. Radar development continued and several programmes are in hand to enhance satellite survivability; these include satellite 'hardening', manoeuvrability, and an anti-satellite capability.

## SOVIET STRATEGIC FORCES

The Soviet Union's pace of modernization continued to be impressive. Although total ICBM numbers fell (to a little under 1,400, as older ICBM were replaced by new SLBM), at least 230 new ICBM (SS-17, -18, -19) were deployed during the year in single-warhead and MIRV variants. Accuracy has improved dramatically, and the SS-18 and SS-19 reportedly have accuracies comparable to American systems. The SS-16 ICBM is ready for deployment in a mobile mode, but the Soviet Union has undertaken in SALT II not to deploy it in this way and to dismantle any facilities for the rapid conversion of the mobile 3-MIRV SS-20 IRBM to the SS-16 by the addition of an extra stage. SS-20 deployment, however, is not constrained by SALT, and about 120 launchers are deployed,

at least some of them assumed to be targeted against China. It is unclear as yet whether the rather elderly SS-4 and SS-5 IRBM are being retired as the new (and much more capable) missile is brought into service, but it appears probable that at least some of the older missiles will be placed in storage. There is little doubt that several ICBM are being developed, but only one of these could be deployed before 1985, which is 'new' under the terms of SALT II.

At sea there is also marked improvement. Soviet SLBM now number 950 in 64 submarines (this figure excludes SS-N-4 and SS-N-5 SLBM, which are not counted in SALT). Five *Delta II* and nine *Delta III* SSBN are in service. The former carry 16 4,800nm-range SS-N-8 missiles each, and the latter are being fitted with the 5,000nm-range SS-N-18—a new 3-MIRV replacement for the SS-N-8. Another new SLBM, the SS-N-17, is believed to be in service on one *Yankee*-class SSBN. It is believed that a new SLCM to replace the ageing SS-N-3 is under development.

Tu-22M *Backfire* bombers are entering service at a rate of about 25 per year, but a letter of understanding is attached to SALT II in which the USSR undertakes not to use this aircraft as a strategic nuclear delivery vehicle (SNDV) and to limit production to 30 a year. A new ASM is expected before long, and there are persistent reports of a new strategic bomber being flight-tested.

In 1969 the Soviet Union was deploying 1,369 SNDV. The total is now 2,504 which, under the terms of SALT II, will have to reduce to 2,250 by 1982. Some retirements of elderly systems are therefore expected, provided SALT II is ratified. Warheads, however, are increasing quite sharply as a direct result of the switch to MIRVed systems on land and at sea. The figure is now about 5,000, and this will rise to 7,500 in the early 1980s. The average yield of these warheads is substantially higher than the average yield of American warheads.

Strategic defence is provided for by extensive air defence radars, SAM, interceptors, and the Moscow ABM complex of 64 launchers. Considerable effort is being devoted to defences against the US ALCM threat which will develop in the 1980s. It is believed that research is continuing on anti-satellite and exotic technologies which may have application for ballistic missile defence.

## AMERICAN GENERAL-PURPOSE FORCES

Numbers in the American armed forces have not changed significantly in the past year, although there is recurrent concern over recruitment. A number of significant programmes for improving the capability of conventional weapons are in train, with marked emphasis on aircraft and anti-tank systems. One American infantry division is being mechanized. Procurement of *TOW* and *Dragon* ATGW continued. Cannon-launched guided projectiles (CLGP) and scatterable mines are being developed, together with the GSRs rocket launcher. Tank production continued to increase, but numbers remain at much the same level (10,500) as ten years ago. The first 110 of the new XM-1 tank are due for delivery this year, to be followed by 569 in FY 1980. Plans to develop a new infantry/cavalry fighting vehicle have been cancelled and a less-costly alternative is being considered. As an interim measure, 1,207 more M-113 APC will be produced by FY 1980.

Deployment of the new generation of tactical fighters has continued, with the Navy F-14 and the Air Force F-15 and F-16 entering service in substantial numbers. Development of the less costly F-18 continued. The A-10 ground-attack aircraft is in full production. Fourteen E-3A AWACS aircraft are in service and eight are on order (and NATO has agreed to purchase a further eighteen for deployment in Europe). New scout, attack, and transport helicopters are being developed. In the field of long-range air transport, in-flight refuelling for C-141 transports and production of the advanced tanker cargo aircraft (ATCA) will significantly enhance strategic airlift in the early 1980s.

The number of American naval units declined sharply in the 1970s, reaching a low of 172 major surface combatants. This trend should be reversed if plans proceed as intended. The building of a large new nuclear-powered carrier was vetoed by the President, although the decision may be challenged in Congress. Planning has concentrated on a new class of smaller, conventionally-engined carrier. A total of 42 SSN-688 attack submarines are to be built, nine of which have entered service, with three more due this year. The *Harpoon* anti-shiping missile has entered service with a range of 100km. The *Tomahawk* SLCM, with a much greater range and a nuclear capability, may enter service after 1981. Improvements are also under way for amphibious lift and afloat support. Development is proceeding on a new type of air-cushion vehicle for ship-to-shore movement.

## SOVIET GENERAL-PURPOSE FORCES

There has been no sign of any slackening in Soviet improvement programmes. Holdings of all types of armoured vehicles have increased as the BMP MICV, T-64, and T-72 tanks continue to enter service. Tank numbers are assessed at about 50,000, compared with 34,000 in 1967, although a significant proportion of these are obsolete and are considered to be in reserve. Nevertheless, the Soviet Union thus can rapidly increase the number of formations at short notice on full mobilization. *Hind* attack helicopters are being seen in much greater numbers, and new SAM, new ATGW, and new tactical nuclear missiles (SS-21 and SS-22) have all been identified. Self-propelled artillery deployment continues to take place rapidly.

Greater numbers of modern Soviet tactical aircraft—Su-17 *Fitter C*, MiG-23 *Flogger B*, MiG-27 *Flogger D*, and Su-19 *Fencer*—have been brought in, and all have greater range and payload than the aircraft they are replacing, as well as much improved avionics. Many are nuclear-capable and have considerable ability to penetrate at low level. Armament and ECM are improving. Long-range transport aircraft (especially the Il-76 *Candid*), with impressive payload/range characteristics, continue to enter service. The Soviet Navy received more *Forger* VTOL and *Backfire* aircraft, both to improve the air defences of the fleets and to enhance long-range anti-shiping capabilities.

Although a very substantial number of Soviet naval vessels are overdue for replacement and can only be suitable for service close to shore, emphasis continues to be placed on new amphibious shipping (*Ivan Rogov*-class), carriers (two *Kiev*-class operational, another launched),

and attack submarines. Other major surface combatants under construction include *Kara-*, *Kresta-II-*, and *Krivak*-class vessels, and new missile attack boats of the

*Matka*-class are under construction to replace or augment the *Osa*-class. There are reports that a nuclear-powered cruiser of over 20,000 tons is now fitting out in the Baltic.

## THE UNITED STATES

Population: 220,300,000.  
Military service: voluntary.  
Total armed forces: 2,022,000 (134,310 women).  
Estimated GNP 1978: \$2,106.6 bn.  
Defence expenditure 1979-80: \$122.7 bn. (Expected Outlay in Fiscal 1980. Budget Outlay \$135.0 bn; Total Obligational Authority \$135.5 bn.)

**Strategic Nuclear Forces**  
(Manpower included in Army, Navy, and Air Force totals.)

### OFFENSIVE:

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

(b) **Strategic Air Command (SAC):**  
ICBM: 1,054.  
26 strategic msl sqns: 9 with 450 *Minuteman* II, 11 with 550 *Minuteman* III, 6 with 54 *Titan* II.  
(On order: 200 MX ICBM.)

### Aircraft:

Bombers: 573.  
66 FB-111A in 4 sqns } with  
240 B-52G/H in 15 sqns. } 1,020 SRAM.  
75 B-52D in 5 sqns.  
Training: 50 B-52D/F.  
Storage or reserve: 142 incl B-52D/G/H.  
Tankers: 515 KC-135A in 30 sqns.  
Strategic recce and comd:  
1 sqn with 10SR-71A, 1 sqn with 10U-2C1R,  
1 sqn with 4 E-4A/B, 3 sqns with 19 RC/EC-135.  
(On order: 25 TR-1.)

### DEFENSIVE:

North American Air Defense Command (NORAD), HQ at Colorado Springs, is a joint American-Canadian organization. It includes: **ABM:** *Safeguard* system (msls deactivated).  
**Aircraft** (excluding Canadian and tac units):  
Interceptors: 325  
(i) Regular: 6 sqns with 146 F-106A.  
(ii) Air National Guard (ANG): 3 sqns with 63 F-101B/F, 2 with 40 F-4C/D, 5 with 76 F-106A.  
*Genie*, *Falcon*, *Super Falcon* AAM.

### 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:** 1 station on US East, 1 on Gulf, 1 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 47 stations manned by ANG, augmented by Federal Aviation Administration (FAA) stations (to be replaced as surveillance element of JSS).

**Army:** 750,800 (56,840 women).  
4 armd divs.  
5 mech divs.  
5 inf divs (1 to become 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.  
4 *Pershing*, 8 *Lance* ssm bns.

**Tanks:** some 10,500 med, incl 1,825 M-48A5, 1,555 M-60, 5,875 M-60A1, 540 M-60A2 with *Shillelagh* ATGW, 615 M-60A3; 1,600 M-551 *Sheridan* lt tks with *Shillelagh*.

AFV: some 22,000 M-577, M-114, M-113 APC.  
**Arty and Msls:** about 2,500 105mm, 155mm towed guns/how; 4,000 175mm sp guns and 105mm, 155mm, and 203mm sp how; 3,500 81mm, 2,000 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 *Redeye*, *Stinger*, *Chaparral/Vulcan* 20mm AA msl/gun systems; *Nike Hercules* and *Improved HAWK* SAM (to be replaced by *Patriot*).

**Aircraft/Hel:** about 550 ac, incl 200 OV-10, 350 U-21C-12; hel incl about 1,000 AH-1G/Q/S, 4,000 UH-1H-19, 15 UH-60A, 500 CH-47-54, 2,500 OH-6A/-58A.

Trainers incl about 200 T-41/-42 ac; 250 TH-55A hel.  
(On order: 689 M-60A3, 110 XM-1 med tks, 1,100 M-901 *Improved TOW*, 550 M-113A1 *TOW* veh, 450 M-198 155mm, 232 M-109A2/3 155mm sp how, 485 *Roland*, 795 *Improved HAWK* SAM, 297 AH-1S, 234 UH-60A hel.)

### DEPLOYMENT:

**Continental United States:**  
Strategic Reserve: (i) 1 mech, 1 AB divs, 1 armd bde. (ii) To reinforce 7th Army in Europe: 2 armd, 2 mech, 3 inf, 1 airmobile divs, 1 armd cav regt, 1 inf bde (one armd div, 1 mech div, 1 armd cav regt have by eqpt stockpiled in W. Germany). (iii) Alaska: 1 bde. (iv) Panama: 1 bde.

**Europe:** 202,400.  
(i) Germany: 193,000. 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: 4,000.

(v) Turkey: 1,000.  
**Pacific:**  
(i) South Korea: 33,400. 1 inf div, 1 AD arty bde with 12 *Improved HAWK* btys.  
(ii) Hawaii: 1 inf div less 1 bde.

RESERVES: 534,000.

(i) Army National Guard: 348,000 capable after mobilization of manning 2 armd, 1 mech, 5 inf divs, 21 indep bdes (3 armd, 8 mech, 10 inf), and 4 armd cav regts, plus reinforcements and support units to fill regular formations. (The 21 indep bdes include 4 indep bdes and 11 bns incorporated in active army divs.)  
(ii) Army Reserves: 186,000 in 12 trg divs, 1 mech, 2 inf indep combat bdes; 49,000 a year do short active duty.

**Marine Corps:** 184,000 (5,085 women).  
3 divs.  
2 SAM bns with *Improved HAWK*.  
575 M-60A1 med tks; 950 LVTP-7 APC; 175mm sp guns; 105mm, 155mm towed, 155mm, 203mm sp how; 230 81mm mor; 106mm RCL; *TOW*, *Dragon* ATGW; *Redeye* SAM.  
3 Air Wings: 392 combat aircraft.  
12 FGA sqns with 144 F-4N/S with *Sparrow* and *Sidewinder* AAM.  
13 FGA sqns; 3 with 78 AV-8A *Harrier*, 5 with 80 A-4M, 5 with 60 A-6A/E.  
1 recce sqn with 10 RF-4B.  
2 ECM sqns with 20 EA-6B.  
2 observation sqns with 36 OV-10A.  
3 assault tpt/tanker sqns with 36 KC-130F/R.  
3 attack hel sqns with 54 AH-1J/T.  
6 lt hel sqns with 96 UH-1N.  
9 med hel sqns with 162 CH-46F.  
6 hy hel sqns with 126 CH-53D.  
6 trg sqns with A-4M/TA-4J, A-6C, AV-8A, F-4J/N ac, CH-46F, CH-53D hel.

DEPLOYMENT: *Pacific:* 1 div, 1 air wing.

RESERVES: 33,000.

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 18 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:** 524,200 (25,290 women); 180 major combat surface ships, 80 attack submarines.

### Submarines, attack:

73 nuclear: 9 *Los Angeles* with *Harpoon* SSM and *SUBROC*. 52 with *SUBROC* (1 *Lipscomb*, 1 *Narwhal*, 37 *Sturgeon*, 13 *Thresher*), 5 *Skipjack*, 7 *Skate*.  
7 diesel: 3 *Barbel*, 2 *Grayback*, 2 *Tang*.

### Aircraft carriers: 13.

3 nuclear: 2 *Nimitz* (91,400 tons), 1 *Enterprise* (89,600 tons).  
10 conventional: 4 *Kitty Hawk* and *J. F. Kennedy* (78/82,000 tons), 4 *Forrestal* (76/79,000 tons), 2 *Midway* (62,200 tons).

These normally carry 1 air wing (70-95 ac) of 2 fighter sqns with 24 F-14A or 24 F-4J, 3 attack (1 AWX, 2 with 24 A-7E, 1 with 10 A-6E), 1 recce with 3 RA-5C or 3 RF-8G, 2 ASW (1 with 10 S-3A ac, 1 with 8 SH-3A/D/G/H hel), 1 ECM with 4 EA-6B, 1 AEW with 4 E-2B/C, 4 KA-6D tankers, and other specialist ac.

### Other surface ships:

8 nuclear-powered GW cruisers with SAM, *ASROC* (3 *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).  
 35 gun/ASW destroyers, most with SAM or ASROC (21 Spruance, 13 F. Sherman/Hull, 1 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).  
 2 Asheville large patrol craft.  
 1 Pegasus gw hydrofoil with Harpoon ssm.  
 3 Aggressive ocean minesweepers.  
 65 amph warfare ships (1 Raleigh, 2 Blue Ridge comd, 3 Tarawa LHA, 7 Iwo Jima LPH, 12 Austin, 2 Raleigh LPD, 5 Anchorage, 8 Thomaston LSD, 20 Newport LST, 5 Charleston amph cargo ships).  
 105 LCU (60 Type 1610, 24 Type 1466, 21 Type 501).  
 36 replenishment and 47 depot and repair ships.  
 (On order or funded: 25 SSN, 1 nuclear carrier, 1 nuclear gw cruiser, 11 destroyers, 32 gw frigates, 5 gw hydrofoils, 2 LHA.)

**Ships in reserve:**

3 subs, 6 aircraft carriers, 4 battleships, 7 cruisers, 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.

5 recce sqns with 30 RA-5C, 30 RF-8G.

24 land-based MR sqns with 260 P-3B/C.

11 ASW sqns with 110 S-3A.

13 AEW sqns with 52 E-2B/C.

12 ASW hel sqns with 72 SH-3A/D/G/H.

7 lt ASW hel sqns with SH-2F.

17 misc support sqns with 12 C-130F/LC-130, 7 C-118, 2 C-9B, 16 CT-39, 13 C-131, 6 C-117, 20 C-1, 10 C-2, 36 EA-6B ac; 30 RH-53D, CH-46, SH-3, SH-2F hel.

38 trg sqns with A-7, A-6, F-4, F-5E, F-14, E-2, P-3, TA-4J, T-2C, T-34/-39, TS-2A ac, TH-57A, TH-1L, HH-64, UH-1H, HH-1K hel.

**Standard, Bullpup, Shrike ASM, Sparrow, Phoenix AAM.**

(On order: 12 A-6E, 12 A-7E, 60 F-14A, 24 F-18 fighters, 24 P-3C MR, 12 E-2C AEW ac.)

**DEPLOYMENT AND BASES (average strengths of major combat ships; some in Mediterranean and Western Pacific based overseas, rest rotated from US):**

**Second Fleet (Atlantic):** 5 carriers, 61 surface combatants. Norfolk, Mayport, Roosevelt Roads (Puerto Rico), Charleston, Philadelphia, Brooklyn, New London, Newport, Boston, Guantánamo Bay (Cuba), Argentia (Newfoundland), Keflavik (Iceland), Holy Loch (Scotland).

**Third Fleet (Eastern Pacific):** 4 carriers, 67 surface combatants. Pearl Harbor, San Francisco, San Diego, Long Beach, Adak (Alaska).

**Sixth Fleet (Mediterranean):** 2 carriers, 16 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 Bn Landing Team (MAU less hel) also deployed in the Pacific; 1 occasionally formed for the Atlantic.) Naples (Italy), Rota (Spain).

**Seventh Fleet (Western Pacific):** 2 carriers, 19 surface combatants, 1 MAU, 1 Marine Bn Landing Team. Yokosuka (Japan), Subic Bay (Philippines), Apra Harbor (Guam), Midway.

**RESERVES: 83,000. Ships in commission with the Reserve include 28 destroyers, 3 amph warfare ships, 22 ocean minesweepers.**

2 carrier wings: 6 attack sqns with A-7B, 4 fighter with F-4N, 2 recce with RF-8G, 2 AEW with E-2B, 3 electronic with EA-6A, EKA-3.



US strategic airlift, provided mainly by the C-5 (above, left) and the C-141, is no more than marginally adequate to meet potential contingencies. The US Army will begin equipping with new XM-1 tanks (left) in 1980.



13 MR sqns with P-3A.  
 4 tac spt sqns with 12 C-9B, 30 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:** 563,000 (47,095 women); about 3,400 combat aircraft. (Excluding ac in SAC and NORAD; incl ac in ANG and Air Force Reserve.)

81 FGA sqns: 43 with 1,100 F-4, 3 Wild Weasel (1 with 24 F-105G, 2 with 48 F-4G), 12 with 282 F-111A/D/E/F, 13 with 312 F-15, 3 with 72 A-7D, 7 with 112 A-10A.

7 tac recce sqns with 192 RF-4C.  
 3 AWACS sqn with 14 E-3A.

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.

17 OCU: 1 with F-16, 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 231 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 23 C-9.

2 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 F-16B, 300 T-33A, 680 T-37B, 730 T-38, 113 T-39, 52 T-41A/C, 15 T-43A, C-5A, C-130E, C-141A.

**Standard, Maverick, Shrike ASM, Sparrow, Sidewinder AAM.**

(On order: 320 F-16, 138 F-15 fighters, 483 A-10 FGA.)

**DEPLOYMENT:**

**Continental United States (incl Alaska):**

(i) Tactical Air Command: 87,000, 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): 74,300.

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; 28 fighter sqns (plus 5 in US on call) with 108 A-10, 204 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): 23,000. 5th Air Force (Japan, Okinawa, 1 wing in Korea), 13th Air Force (Philippines). 10 fighter sqns, 1 tac recce sqn, 1 spec ops sqn.

**RESERVES: 147,000.**

(i) Air National Guard: 93,000; about 800 combat aircraft.

10 interceptor sqns; 30 fighter sqns (4 with 80 F-105B/D, 8 with 160 F-4C, 14 with 320 A-7D, 2 with 40 A-10, 2 with 49 A-37B); 9 recce sqns (1 with 20 RF-101C, 8 with 135 RF-4C); 19 tac tpt sqns (18 with 150 C-130A/B/H, 1 with 16 C-7A); 6 tac air spt sqns with 120 O-2A; 13 tanker sqns with 104 KC-135, 1 ECM sqn with 10 C/EC-121; 2 special electronics sqns with 20 EB-57B, EC-130; 2 SAR sqns with 8 HC-130 ac, HH-3 hel.

(ii) Air Force Reserve: 54,000; about 180 combat aircraft.

8 fighter sqns (3 with 69 F-105D, 4 with 90 A-37B, 1 with 20 F-4); 17 tac tpt sqns (11 with 121 C-130A/B, 4 with 64 C-123K, 2 with 32 C-7); 1 AEW sqn with 10 EC-121, 1 recce drone sqn with DC-130 ac, E/CH-3 hel; 3 tanker sqns with 24 KC-135; 1 special operations sqn with 10 AC-130; 4 SAR sqns (2 with 13 HC-130 ac, 2 with 20 HH-3E, HH-1H hel); 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: 385 long-range commercial ac (113 cargo-convertible, 272 passenger).

## THE SOVIET UNION

Population: 261,300,000.  
 Military service: Army and Air Force 2 years,  
 Navy and Border Guards 2-3 years.  
 Total armed forces: 3,658,000. (Excludes some  
 500,000 internal security forces, railroad, and  
 construction troops.)  
 Estimated GNP 1977: 516 bn roubles. (See "Fore-  
 word," p. 61. Official exchange rate 1977,  
 \$1=0.661 roubles.)  
 Estimated defence expenditure 1979: see essay  
 on following page.

### Strategic Nuclear Forces:

(For characteristics of nuclear delivery vehi-  
 cles, see Table 1, pp. 130-131.)

#### OFFENSIVE:

(a) **Navy:** 1,028 SLBM in 90 subs.  
 9 D-III SSBN, each with 16 SS-N-18 (more  
 building).  
 5 D-II SSBN, each with 16 SS-N-8.  
 15 D-I SSBN, each with 12 SS-N-8  
 34 Y-class SSBN: 33 with 16 SS-N-6 *Sawfly*, 1  
 with 12 SS-N-17.  
 1 H-III SSBN with 6 SS-N-8.

(The following 78 launchers are not consid-  
 ered strategic missiles under the terms of  
 the Strategic Arms Limitation [Interim  
 Agreement:]

7 H-II SSBN, each with 3 SS-N-5 *Serb*.  
 13 G-II diesel, each with 3 SS-N-5.  
 6 G-I 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 1,398.

100 SS-9 *Scarp* (converting to SS-18).  
 638 SS-11 *Sego* (converting to SS-17 and  
 SS-19).  
 60 SS-13 *Savage*.  
 100 SS-17.  
 200 SS-18.  
 300 SS-19.

**IRBM and MRBM:** some 710 deployed (most  
 in Western USSR, rest east of Urals).  
 90 SS-5 *Skean* IRBM.  
 120 SS-20 IRBM (mobile).  
 500 SS-4 *Sandal* MRBM.

(c) **Long-Range Air Force (LRAF):** about 850 air-  
 craft. (About 75% based in the European  
 USSR, most of the remainder in the Far East;  
 there are also staging and dispersal points in



The Soviet Yankee-class submarine is still the most numerous type in the USSR's fleet of ballistic missile subs. Most of the Y-class carry sixteen SLBMs.

the Arctic.)

Long-range bombers: 156.

113 Tu-95 *Bear* A/B, 43 Mya-4 *Bison*.

Medium-range bombers: 503.

318 Tu-16 *Badger*, 135 Tu-22 *Blinder*, 50

Tu-22M *Backfire* B (all with ASM).

Tankers: 53.

9 Tu-16 *Badger*, 44 Mya-4 *Bison*.

ECM: 100 Tu-16 *Badger*.

Recce: 35.

4 Tu-95 *Bear*, 18 Tu-16 *Badger*, 13 Tu-22  
*Blinder*.

#### DEFENSIVE:

**Air Defence Force (PVO-Strany)** 550,000: early  
 warning and control systems, with 7,000 early  
 warning and ground control intercept (EW/  
 GCI) radars; interceptor sqns and SAM units.  
**Aircraft:** about 2,600.

Interceptors: incl some 80 MiG-17 *Fresco*, 500  
 Su-9 *Fishpot* B, Su-11 *Fishpot* C, 320 Yak-  
 28P *Firebar*, 150 Tu-28P *Fiddler*, 850 Su-15

*Flagon* A/D/E/F, 400 MiG-23 *Flogger* B,  
 300 MiG-25 *Foxbat* A.

**Airborne Warning and Control Aircraft:** 10  
 modified Tu-126 *Moss*, 8 Il-76.

**Trg ac** incl 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 Mos-  
 cow, with *Try Add* engagement radars. Target  
 acquisition and tracking by phased-array *Dog*  
*House* and *Cat House*, early warning by  
 phased-array *Hen House* radar on Soviet bor-  
 ders. Range of *Galosh* believed over 200  
 miles; warheads nuclear, presumably MT  
 range.

#### SAM:

**Fixed-site Systems:** some 10,000 launchers, at  
 over 1,000 sites. SA-1 *Guild*, SA-2 *Guidel-*  
*ine*, SA-3 *Goa*, SA-5 *Gammon*. (Develop-  
 ment of SA-X-10 continues.)

**Army:** 1,825,000.

47 tk divs.

118 motor rifle divs.

8 AB divs.

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

**AFV:** 55,000 BRDM scout cars; BMP micv;  
 BTR-40/-50/-60/-152, OT-64, 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, 240mm multiple RL; 10,800 76mm,  
 85mm, and 100mm towed and ASU-57/-85 sp  
 ATK guns; *Swatter*, *Sagger*, *Spigot*, *Spandrel*,  
*Spiral* ATGW.

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

**SAM** (mobile systems): SA-4 *Ganef*, SA-6 *Gain-*  
*ful*, SA-7 *Grail*, SA-8 *Gecko*, SA-9 *Gaskin*,  
 SA-11.

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

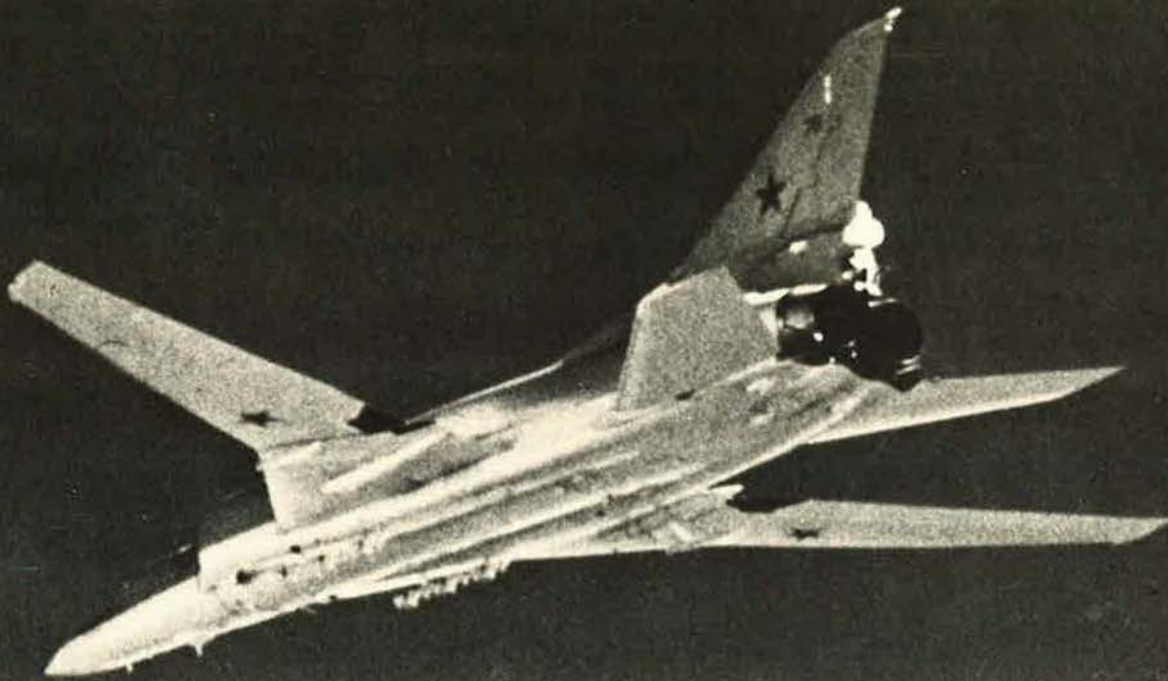
#### DEPLOYMENT AND STRENGTH:

**Central and Eastern Europe:** 31 divs: 20 (10 tk) in  
 East Germany, 2 tk in Poland, 4 (2 tk) in Hun-  
 gary, 5 (2 tk) in Czechoslovakia; 10,500 med  
 and hy tks. (Excluding from the area tks in re-  
 serve, replaced by new ones but not with-  
 drawn.)

**European USSR** (Baltic, Byelorussian, Carpa-



The Il-76 *Candid*, with a payload of 88,000 pounds, is the USSR's principal long-range transport. It also has been tested as a tanker for the *Backfire* bomber.



The Tu-22M Backfire, a Mach 2-plus bomber, is operated by both the Soviet Long-Range Air Force and Navy. Many are air-refuellable.

thian, Kiev, Leningrad, Moscow, and Odessa Military Districts (MD): 66 divs (about 23 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): 46 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 over 320 med tks, motor rifle divs up to 265, 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; 275 major surface combat ships, 248 attack and cruise-missile subs (87 nuclear, 162 diesel). A further 29 major surface combat ships and 115 attack submarines are in reserve.

**Submarines, attack:**

41 nuclear: 13 N-, 17 V-I-, 5 V-II-, 5 E-, 1 A-class.  
 138 diesel: 60 F-, 1 G-, 10 R-, 10 Z-IV-, 40 W-, 4 B-, 8 T-, 5 coastal Q-class.

**Submarines, cruise missile:**

5 nuclear: 1 P-class (10 unidentified msls), 15 C-class (8 SS-N-7 *Siren* each), 29 E-II (8 SS-N-3 *Shaddock* each).  
 6 diesel: 16 J-class (4 SS-N-3 each), 6 *Long Bin* (4 SS-N-3 each), 2 *W-Twin Cylinder* (2 SS-N-3 each).

**Surface Ships:**

2 *Kiev* carriers (43,000 tons) with SSM, SAM, SUW-N-1 SSM/ASW msl launcher, 12 VTOL ac, 20 hel (2 building).  
 2 *Moskva* ASW hel cruisers with SAM, SUW-N-1 launcher, 18 Ka-25 hel.  
 16 ASW cruisers with SAM, SS-N-14 ASW msls, 1 hel; 6 *Kara* (more building), 10 *Kresta-II*.  
 8 GW cruisers with SSM, SAM: 4 *Kresta-I* (with 1 hel), 4 *Kynda*.  
 11 cruisers: 10 *Sverdlov* (3 with SAM, 1 with hel), 1 *Chapaev* (trg).  
 50 ASW destroyers with SAM: 23 *Krivak-I-II* (with SS-N-14 ASW msls, more building), 8 *Kanin*, 19 *Kashin* (5 with SSM).  
 50 destroyers: 4 *Kildin* (with SSM), 8 modified *Kotlin* (with SAM), 18 *Kotlin*, 20 *Skory*.  
 136 frigates: 20 *Mirka*, 48 *Petya*, 35 *Riga*, 32 *Grisha* (with SAM), 1 *Koni* (with SAM).  
 143 FAC(M): 18 with SSM, SAM (17 *Nanuchka*, 1 *Saranacha* hydrofoil), 125 with SSM (70 *Osa-I*, 50 *Osa-II*, 5 *Matka*).  
 90 FAC(P) (70 *Stenka*, 20 *Pchela* hydrofoils<).  
 90 FAC(T) (30 *Turya* hydrofoils, 45 *Shershen*, 15 P-6<).  
 124 large patrol craft (64 *Poti*, 60 SO1).  
 25 *Zhuk* coastal patrol craft<.  
 About 160 ocean minesweepers (25 *Natya*, 50 *Yurka*, 20 T58, 60 T43, 5 T43/GR).  
 About 140 coastal and inshore minesweepers (4 *Zhenya*, 70 *Vanya*, 20 *Sonya*, 16 *Sasha*, 30 *Evgenya*<).  
 About 100 minesweeping boats < (8 *Ilusha*, 2 *Olya*, 20 TR40, 70 K8).  
 About 85 amph ships, incl 1 *Ivan Rogov*, 14 *Alligator*, 11 *Ropucha* LST (more building), 59 *Polnochny* LCT.  
 About 70 LCU (30 *Vydra*, 40 SMI).  
 61 hovercraft (15 *Aist*, 11 *Lebed*<, 35 *Gus*<).  
 85 underway replenishment oilers, 40 oilers, 25 supply ships, 145 fleet spt ships.  
 54 intelligence collection vessels (AGI).  
 Ships in reserve, 10 Z-; 90 W-, 15 Q-class subs, 2

*Sverdlov* cruisers, 15 *Skory* destroyers, 12 *Riga* frigates, 35 T43 minesweepers.

**NAVAL AIR FORCE:** some 870 combat aircraft.  
 30 Tu-22M *Backfire* B strike bbrs with ASM.  
 295 Tu-16 *Badger* C/G med bbrs with ASM.  
 40 Tu-22 *Blinder* C med bbrs, MR, ECM ac.  
 Some 30 Yak-36 *Forger* MP VTOL FGA, 30 *Fitter* C FGA.  
 40 Tu-16 *Badger* D/F recce, 30 Tu-16 ECM ac.  
 215 MR ac: 45 Tu-95 *Bear* D, 30 *Bear* F, 50 Il-38 *May*, 90 Be-12 *Mail* amphibians.  
 80 Tu-16 *Badger* tankers.  
 Some 275 ASW hel: 25 Mi-14 *Haze*, 250 Ka-25A/B *Hormone*.  
 280 misc tpts and trainers.

**NAVAL INFANTRY (Marines):** 12,000.  
 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 AND BASES** (average strengths, excluding SSBN and units in reserve):  
**Northern Fleet:** 120 subs, 70 major surface combat ships. Severomorsk (HQ), Archangelsk, Polyarny, Severodvinsk.  
**Baltic Fleet:** 30 subs, 50 major surface combat ships. Baltiisk (HQ), Kronstadt, Tallin, Lepaia.  
**Black Sea Fleet** (incl Caspian Flotilla and Mediterranean Squadron): 25 subs, 75 major surface combat ships. Sevastopol (HQ), Tuapse, Poti, Nikolayev.  
**Pacific Fleet:** 75 subs, 70 major surface combat ships. Vladivostok (HQ), Nakhodka,

Sov'yetskaya Gavan, Magadan, Petropavlovsk.

**Air Force:** 475,000; about 4,350 combat aircraft. (Excluding PVO-Strany and Long-Range Air Force.)

**Tactical Air Force:** aircraft incl 60 Yak-28 Brewer, 220 Su-7 Fitter A, 1,400 MiG 23/27 Flogger B/D, about 1,000 MiG-21 Fishbed J/K/L/N, 640 Su-17 Fitter C/D, 230 Su-19 Fencer A FGA; about 250 Beagle, Brewer, 170 MiG-25 Foxbat B/D, 300 Fishbed recce; 60 Brewer E, 6 An-12 Cub ECM ac; 230 tpts; 3,460 hel, incl 800 Mi-1/2, 130 Mi-4, 470 Mi-6, 1,470 Mi-8, 10 Mi-10, 580 Mi-24 Hind; 1,100 tac trg ac.

**Air Transport Force:** about 1,200 aircraft, incl 50 An-8, 560 An-12 Cub, 70 An-24-26 Coke/Curl, 130 Il-14 Crate, 15 Il-18 Coot, 2 Il-62 Classic, 50 Il-76 Candid, 60 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 5,000,000 have served in last five years.

**Para-Military Forces:** 460,000.

200,000 KGB border troops, 260,000 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.

## 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.

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 forgone and, in turn, a rouble value of defence expressed as a percentage of Soviet GNP measured in roubles may not reflect the true burden.

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

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

Accordingly, the estimates produced by a number of methods are given 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.

Source	Price base	Defence expenditure			1970-1978	
		1970	1975	1978	% annual growth rate	Burden (% of GNP)
<b>Billions of Roubles</b>						
CIA	(1) 1970	40-45	50-55	56-61	4.5	11-13
Lee	(2) 1970	43-49	72-79	91-101	8-10	14-15
Lee	(2) Current	43-49	67-76	88-100	—	—
China	(3) Current	49	72.5	92.5	8.26	15+
USSR	(4) Current	17.9	17.4	17.2	n.a.	n.a.
<b>Billions of Dollars</b>						
CIA	(5) 1978	105	120	148	4.5	—
CIA	(6) Current	66-99	105-108	148	—	—
Lee	(7) 1970	80-105	97-133	116-154	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 1978 using their growth rate.

(4) Official declared budget.

(5) *A Dollar Cost Comparison of Soviet and US Defense Activities 1967-1978*, CIA SR 79-10002, January 1979. 1970 and 1975 figures taken from diagram.

(6) *Ibid.*: 1978 prices converted to current ones using wholesale price index.

(7) W. T. Lee, 'Soviet Defense Expenditures' in W. Schneider and F. P. Hoerber (eds), *Arms, Man & Military Budgets, Issues for Fiscal Year 1977* (New York: Crane Russak, 1976). 1978 figures by extrapolation.





## THE MILITARY BALANCE 1979/80

# 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 Parties, 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



WARSAW PACT

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

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 in peacetime 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.

The divisions of all East European Warsaw Pact countries 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; and Category 3 little more than cadres.

## BULGARIA

Population: 8,890,000.  
Military service: Army and Air Force 2 years, Navy 3 years.  
Total regular forces: 150,000 (94,000 conscripts).  
Estimated GNP 1978: \$25.1 bn.  
Defence expenditure 1979: 649 m leva (\$720 m).  
\$1=0.9 leva.

**Army:** 115,000 (75,000 conscripts).  
8 motor rifle divs.  
5 tk bdes.  
1 AB regt.  
3 SSM bdes with *Scud*.  
4 arty, 3 AA arty regts.  
1 mountain bn.  
2 recce bns.  
200 T-34, 1,600 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-Sov; 2 R-, 2 W-class).  
2 *Riga* frigates.  
3 *Poti* corvettes.  
6 SO1 large patrol craft.  
4 *Osa-I* FAC(M) with *Styx* SSM.  
12 FAC(T) (4 *Shershen*, 8 P4<).



The MiG-21, first flown in 1955, has gone through countless modifications. Some 2,000 are still in Pact air forces. This is a Czech Air Force MiG-21 Fishbed-J.

6 minesweepers (2 T43 ocean, 4 *Vanya* coastal).  
18 PO2 minesweeping boats.<  
18 *Vydra* LCU, 8 MFP D-3 landing craft.  
6 Mi-4, Mi-2 SAR hel.

Bases: Varna, Burgas, Sozopol.

RESERVES: 20,000.

**Air Force:** 25,000 (13,000 conscripts); 166 combat aircraft.  
6 FGA sqns with 64 MiG-17, some MiG-23.  
6 interceptor sqns: 5 with 60 MiG-21, 1 with 18 MiG-19.  
2 recce sqns with 24 MiG-17.  
1 tpt regt with 10 Il-14, 4 An-24, 2 Tu-134, 9 An-2.  
1 hel regt with 30 Mi-2, 40 Mi-4/-8, Ka-26.  
Trg ac incl 80 L-29, Yak-11/-18, 30 MiG-15UTI.  
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: 15,240,000.  
Military service: Army 2 years, Air Force 3 years.  
Total regular forces: 194,000 (118,000 conscripts).  
Estimated GNP 1978: \$61.6 bn.  
Defence expenditure 1979: 20.29 bn koruny (\$2.41 bn).  
\$1=8.4 koruny.

**Army:** 140,000 (100,000 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; 400 BMP MICV; 3,000 OT-62/-64/-81 APC; 150 100mm, 600 122mm, 50 130mm, 120 152mm guns/how; 122mm SP guns; 82mm 120mm mor; 300 RM-70 122mm, M-51 130mm RL; 40 *FROG*, 27 *Scud* SSM; 125 82mm RCL  
150 *Sagger* ATGW; 400 57mm towed, M53/59 30mm SP AA guns; SA-4/-6/-7 SAM.

RESERVES: 300,000.

**Air Force:** 54,000 (18,000 conscripts); 462 combat aircraft.  
12 FGA sqns: 6 with 80 Su-7BM/U, 3 MiG-23, with 42 MiG-21/-21U, 3 with 30 MiG-17.  
18 interceptor sqns with 252 MiG-21/-21U.  
3 recce sqns: 1 with 25 MiG-21RF, 2 with 3 L-29/-39.  
Tpts incl 6 An-24, 40 Il-14, 1 Tu-134, Le L-410M.  
Hel incl Mi-1/-2, 50 Mi-4, 20 Mi-8.  
Trg ac incl 150 L-29, 24 L-39, Zlin 326.  
AA-2 *Atoll* AAM.  
5 SAM regts (60 btyes) SA-2/-3.

RESERVES: 50,000.

**Para-Military Forces:** 10,000 border troops, some AFV, ATK guns; about 120,000 part-time People's Militia; 2,500 Civil Defence Troops

## GERMAN DEMOCRATIC REPUBLIC

Population: 16,700,000.  
Military service: 18 months.  
Total regular forces: 159,000 (92,000 conscripts).  
Estimated GNP 1978: \$72.7 bn.  
Defence expenditure 1979: 13.0 bn ostmark (\$4.76 bn).  
\$1=2.73 ostmarks.

**Army:** 107,000 (67,000 conscripts).  
2 tk divs.  
4 motor rifle divs.  
2 SSM bdes with *Scud*.  
2 arty, 2 AA arty regts.  
1 AB bn.  
2 ATK bns.  
About 2,500 T-54/-55 med tks (600 T-34 in stock); about 120 PT-76 lt tks; 880 BRDM-1/-FUG-70 scout cars; 1,500 BMP MICV, BT1 50P/-60P/-152 APC; 335 122mm, 100 130mm, 7 152mm guns/how; 82mm, 250 120mm mor; 10 BM-21 122mm, RM-70 122mm RL; 24 *FROG-7*, 16 *Scud* B SSM; 120 100mm ATK guns; *Sagger*, *Snapper* ATGW; 100 57mm, 48 100mm towed, 105 ZSU-23-4 SP AA guns; SA-4/-6/-7 SAM.

DEPLOYMENT: Angola 1,500.

RESERVES: 250,000.

**Navy:** 16,000 (10,000 conscripts).  
2 frigates (1 *Riga*, 1 *Koni*).  
12 *Hai* large patrol craft.  
15 *Osa-I* FAC(M) with *Styx* SSM.  
48 FAC(T) (18 *Shershen*, 30 *Libelle*<).  
18 coastal patrol craft (border guard).  
51 *Kondor* VII coastal minesweepers.  
9 *Frosch* LST, 2 *Robbe* LSM, 2 *Labo* LCT.  
2 *Kondor* intelligence collection vessels (AGI).  
1 hel sqn with 8 Mi-4, 5 Mi-8.

Bases: Rostock, Peenemunde, Warnemunde, Dranske-Bug, Sassnitz, Wolgast, Tarnowitz

RESERVES: 25,000.

AIR FORCE Magazine / December 1979



All of the Pact armies have Scud missiles with a range of 130-270 km. The missile is dual-capable, but those of European Pact armies are not nuclear armed.

**Air Force:** 36,000 (15,000 conscripts); 335 combat aircraft.  
 3 FGA sqns with 35 MiG-17.  
 19 interceptor/recce sqns with 300 MiG-21F/MF/FL/R/U.  
 3 tpt sqns with 20 Il-14, 3 Tu-124, 8 Tu-134, An-2, An-14.  
 6 hel sqns with 40 Mi-2/-4, 70 Mi-8.  
 Trg ac incl Yak-11, L-29/-39, Zlin 226, MiG-15UTI.  
 AA-2 Atoll AAM.  
 5 AD regts with 120 57mm and 100mm AA guns.  
 5 SAM regts with SA-2/-3.  
 2 para bns.

RESERVES: 30,000.

**Para-Military Forces:** 71,500. 46,500 border guards, some tks, AFV, 18 coastal craft; 25,000 security troops. 500,000 Workers' Militia.

## HUNGARY

**Population:** 10,730,000.  
**Military service:** 2 years (incl Border Guard).  
 Total regular forces: 104,000 (58,000 conscripts).  
 Estimated GNP 1978: \$33.5 bn.  
 Defence expenditure 1979: 16.0 bn forints (\$900 m).  
 \$1=17.8 forints.

**Army:** 80,000 (50,000 conscripts).  
 1 tk div.  
 5 motor rifle divs.  
 1 SSM bde with Scud.  
 1 arty, 1 AA arty regt.  
 1 SAM regt with SA-6.  
 1 AB bn.  
 Danube Flotilla.

About 1,250 T-54/-55 med, 100 PT-76 lt tks; about 700 BRDM and FUG-63 scout cars; 1,500 PSZH (FUG-70) APC; 250 122mm, 80 152mm guns/how; 300 82mm, 100 120mm mor; 40 BM-21 122mm RL; 24 FROG, 12 Scud ssm; 150 85mm ATK guns; 100 Sagger, Snapper ATGW; 200 57mm towed, 50 ZSU-23-4, and ZSU-57-2 SP AA guns; 20 SA-6, 300 SA-7, 50 SA-9 SAM; 10 100-ton patrol craft, some river MCM, 5 small landing craft.

RESERVES: 130,000.

**Air Force:** 24,000 (8,000 conscripts); 150 combat aircraft.  
 9 interceptor sqns with 150 MiG-21/-21U.  
 1 tpt regt with 24 An-2/-24/-26, 10 Il-14, 10 Li-2.  
 Hel: 30 Mi-1/-2, 35 Mi-4/-8, Ka-26.  
 Trg ac incl Yak-11/-18, L-29, MiG-15UTI.  
 AA-2 Atoll AAM.  
 2 SAM bns with SA-2.

RESERVES: 13,000.

**AIR FORCE Magazine / December 1979**

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

## POLAND

**Population:** 35,330,000.  
**Military service:** Army, internal security forces, Air Force 2 years; Navy, special services 3 years.  
 Total regular forces: 317,500 (185,000 conscripts).  
 Estimated GNP 1978: \$112.7 bn.  
 Defence expenditure 1979: 65.3 bn zloty (\$3.49 bn).  
 \$1=18.7 zloty.

**Army:** 210,000 (154,000 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, 5 AA arty regts.  
 3 ATK regts.  
 3,400 T-54/-55 med, 300 PT-76 lt tks; 2,000 OT-65 and BRDM-1/-2 scout cars; 5,500 BMP, OT-62/-64 APC; 400 76mm, 85mm, 100mm, 122mm, 250 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; Snapper, Sagger ATGW; 400 23mm, 57mm, 85mm, 100mm towed, 100 ZSU-23-4, 24 ZSU-57-2 SP AA guns; SA-6/-7/-9 SAM.

**DEPLOYMENT:** Egypt (UNEF): 917; Syria (UNDOF): 89.

RESERVES: 500,000.

**Navy:** 22,500, incl Marines and 6,000 conscripts.  
 4 W-class submarines.  
 1 SAM Kotlin destroyer with 2 Goa SAM.  
 13 Osa FAC(M) with Styx SSM.  
 10 Wisla FAC(T).  
 25 large patrol craft (13 Obluze, 3 Oksywie, 9 Gdansk), some coastguard.  
 24 ocean minesweepers (12 Krogulec, 12 T43).  
 25 K-8 minesweeping boats.  
 23 Polnocny LCT, 20 landing craft.  
 6 trg ships.  
 1 B10 intelligence vessel.  
 1 Naval Aviation Regt (52 combat aircraft):  
 1 lt bbr/recce sqn with 10 Il-28.  
 3 FGA sqns with 42 MiG-17.  
 2 hel sqns with 25 Mi-1/-2/-4.

**Bases:** Gdynia, Hel, Swinoujscie, Kolobrzeg.

RESERVES: 45,000.

**Air Force:** 85,000 (25,000 conscripts); 679 combat aircraft.  
 18 FGA sqns: 3 with 35 Su-7/-7U, 3 with 35 Su-20, 12 with 150 MiG-17.  
 33 interceptor sqns with 378 MiG-17/-21/-21U.  
 6 recce sqns with 72 MiG-15/-21, 5 Il-28, 4 Il-14.  
 Tpts: 9 An-2, An-12, 12 An-26, 9 Il-14, 2 Tu-134, 13 Yak-40.  
 Hel: 165 Mi-1/-2, 19 Mi-4, 26 Mi-8.  
 300 trainers: TS-8 Bies, TS-11 Iskra, MiG-15UTI, Yak-18.  
 AA-2 Atoll AAM.  
 9 SAM regts with 240 SA-2/-3 at some 40 sites.

RESERVES: 60,000.

**Para-Military Forces:** 95,000. 18,000 Border Troops (Ministry of Interior), 77,000 Internal Security and Internal Defence Troops (incl 21,000 Construction Troops). Some tks, AFV, ATK guns; 34 small boats operated by coastguard. 350,000 Citizens' Militia.

## ROMANIA

**Population:** 22,090,000.  
**Military service:** Army and Air Force 16 months.  
 Total regular forces: 180,500 (110,000 conscripts).  
 Estimated GNP 1978: \$75.7 bn.  
 Defence expenditure 1979: 11.96 bn lei (\$1.26 bn).  
 \$1=9.5 lei.

**Army:** 140,000 (95,000 conscripts).  
 2 tk divs.  
 8 motor rifle divs.  
 3 mountain bdes.  
 1 AB regt.  
 2 SSM bdes with Scud.  
 2 arty bdes, 3 arty, 2 AA arty regts.  
 2 ATK regts.  
 200 T-34, 1,300 T-54/-55 med tks; 800 BRDM scout cars; 1,500 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; 400 30mm, 37mm, 250 57mm, 85mm, 100mm AA guns; SA-6/-7 SAM.

RESERVES: 450,000.

**Navy:** 10,500 (5,000 conscripts).  
 3 Poti corvettes.  
 3 Kronstadt large patrol craft.  
 5 Osa FAC(M) with Styx SSM.  
 28 FAC(G) (ex-Ch Shanghai).  
 27 FAC(T) (20 ex-Ch Hu Chwan hydrofoils, 7 ex-Sov P4).  
 28 river patrol craft.  
 4 ex-GDR M40 coastal, 10 ex-Sov T301 inshore minesweepers, 8 ex-Pol TR-40 MCM boats.  
 4 Mi-4 SAR hel.

**Bases:** Mangalia, Constanta, Tucea (Danube).

RESERVES: 27,000.

**Air Force:** 30,000 (10,000 conscripts); 328 combat aircraft.  
 6 FGA sqns with 70 MiG-17.  
 12 interceptor sqns with 240 MiG-21F/FF/U.  
 1 recce sqn with 18 Il-28.  
 2 tpt sqns with some 3 Il-14, 4 Il-18, 1 Il-62, 10 An-24, 2 An-26, 12 Li-2, 1 Boeing 707.  
 Hel: 6 Mi-4, 20 Mi-8, 45 Alouette III.  
 Trg ac: 50 L-29, 50 MiG-15UTI, 60 IAR-823.  
 AA-2 Atoll AAM.  
 108 SA-2 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 MILITARY BALANCE 1979/80

# 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. The exact status of Greece 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,



### THE NORTH ATLANTIC TREATY ORGANIZATION

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

Iceland, and Luxembourg do not take part); it meets at Defence Minister level 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), 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 1979 these were: the Netherlands, Canada, Norway, 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 Independent European Programme Group (IEPG), open to all European members of NATO but independent of it. Its members now include France and the ten Eurogroup members.

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 obtains its military advice from 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 international military staff. The major NATO commanders are responsible to the Committee, although they also have direct access to the Council, DPC, 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 (CINCHAN), one of the two Deputies to SACEUR and the Deputy SACLANT, British; the other deputy to SACEUR is German. SACEUR is also Commander-in-Chief of the United States Forces in Europe (CINCUSEUR).

(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 over 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 earmarked for assignment or assigned to SACEUR in peacetime. The Command also 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. During 1978 a decision was taken to deploy an integrated force of AWACS aircraft to improve early-warning and the control of interceptor fighters. These will be compatible with UK *Nimrod* AEW aircraft.

The 2nd French Corps of three divisions (which is not integrated in NATO forces) is stationed in Germany under a status agreement reached between the French and German Governments. Co-operation 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 (CINCENT) 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-Liege axis, includes the Belgian, British, and Dutch divisions and four German divisions and is supported by 2nd Allied Tactical Air Force (2 ATAF), composed of Belgian, British, Dutch, and German units. One newly-formed American brigade is stationed in the NORTHAG area. American forces, seven German divisions, and the Canadian battle group are under CENTAG, supported by 4 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 sys-

tem is based upon two separate commands: the Southern (LANDSOUTH), comprising Italy and the approaches to it, under an Italian commander, 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, coordinated by Maritime Air Forces Mediterranean (MARAIRED), 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. COMARAIRED 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 normally 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. The composition of the Force varies depending on the flank to which it is to be deployed. Approximately half of the forces listed are declared for each flank.

(II) ALLIED COMMAND ATLANTIC (ACLANT) 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 co-operation 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.

## BELGIUM

Population: 10,010,000.

Military service: 8 or 10 months. (Conscripts serve 8 months if posted to Germany, 10 months if serving in Belgium.)

Total armed forces: 86,800 (23,600 conscripts).

Estimated GNP 1978: \$97.6 bn.

Defence expenditure 1979: 77.9 bn francs (\$2.65 bn).

\$1 = 29.43 francs (1979), 31.50 francs (1978).

**Army:** 62,300, incl Medical Service and 19,500 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 60 *HAWK*.

5 engr bns (3 fd, 1 bridge, 1 eqpt).

4 aviation sqns.

334 *Leopard*, 62 M-47 med, 136 *Scorpion* lt tks;

154 *Scimitar* AFV; 1,167 APC (M-75, AMX-

VCI, 238 *Spartan*); 22 105mm, 15 203mm how;

96 M-108 105mm, 26 M-44, 41 M-109 155mm,

11 M-110 203mm SP how; 5 *Lance* SSM; 80 JPK

C-90 SPATK guns; 95 *ENTAC*, 65 *Milan* ATGW;

44 *Striker* AFV with *Swingfire* ATGW; 115

20mm, 25 *Gepard* 35mm SP AA guns; 60

*HAWK* SAM; 6 *Super Cub*, 12 *Islander* ac, 73

*Alouette II* hel; 46 *Epervier* RPV.

(On order: 90 *Spartan* APC, 330 *Milan* ATGW, *Improved HAWK* SAM.)

DEPLOYMENT: *Germany*: 25,000; 1 corps HQ, 2 div HQs, 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:** 4,400 (900 conscripts).

4 E-71 frigates with *Exocet* SSM, *Sea Sparrow* SAM.

7 ocean minehunters (ex-US Type 498).

6 coastal minesweepers/minehunters (ex-US Type 60).

14 *Herstal* inshore minesweepers.

2 log support and comd ships (for MCM).

6 river patrol boats.

3 *Alouette III*, 1 S-58 hel.

*Bases:* Kallo, Nieupoort, Ostend, Zeebrugge.

RESERVES: 4,400.

**Air Force:** 20,100 (3,200 conscripts); 150 combat aircraft.

2 FB sqns with 36 F/TF-104G.

3 FB sqns with 54 *Mirage* 5BA/D.

2 AWX sqns with 36 F/TF-104G (being replaced

by F-16A/B), 4 F-16A, 2 F-16B.

1 recce sqn with 18 *Mirage* 5BR.

2 tpt sqns with 12 C-130H, 2 Boeing 727QC, 3

HS-748, 6 *Merlin IIIA*, 2 *Falcon* 20.

1 SAR sqn with 4 HSS-1, 5 *Sea King* hel.

Trg ac incl 33 SF-260MB, 2 sqns with 37 *Magis-*

*ter* (being replaced by *AlphaJet*).

*Sidewinder* AAM.

8 SAM sqns with *Nike Hercules*.

(On order: 104 F-16A fighters, 10 F-16B, 33 *AlphaJet* trg ac, *Super Sidewinder*, AIM-7E

*Sparrow* AAM, 40 BDX APC.)

*Para-Military Forces:* 16,300 Gendarmerie with 62 FN armd cars, 5 *Alouette II*, 3 *Puma* hel. (On order: 80 BDX APC.)

## BRITAIN

Population: 55,960,000.

Military service: voluntary.

Total armed forces: 322,891 (15,297 women and 8,000 enlisted outside Britain).

Estimated GNP 1978: \$302 bn.

Defence expenditure 1979-80: £8.56 bn (\$17.56 bn).

\$1 = £0.487 (1979), £0.531 (1978).

**Strategic Forces:**

*SLBM:* 4 *Resolution* SSBN, each with 16 *Polaris* A3 msls.

Ballistic Missile Early Warning System (BMEWS) station at Fylingdales.

**Army:** 163,681 (5,817 women and 7,500 enlisted outside Britain).

1 corps, 4 armd, 1 arty div HQs.

10 armd regts.

9 armd recce regts.

48 inf bns (incl 1 demonstration bn).

5 Gurkha inf bns.

3 para bns (1 in para role).

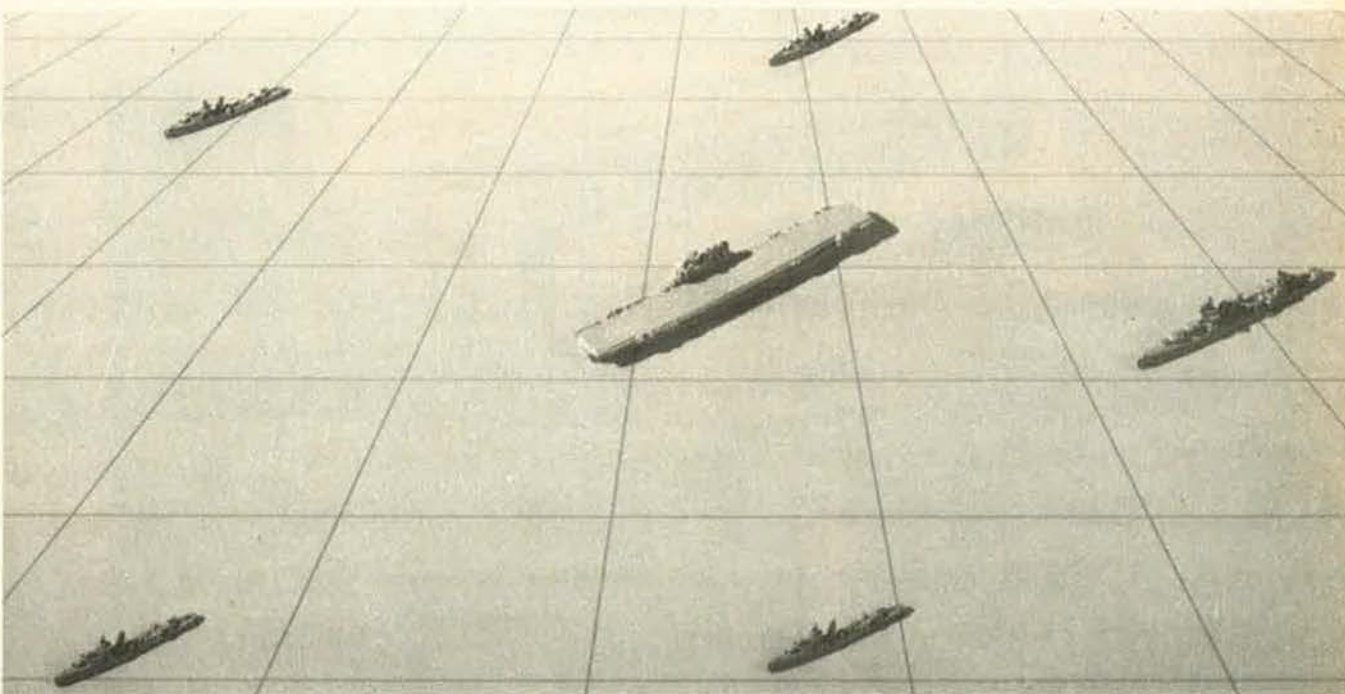
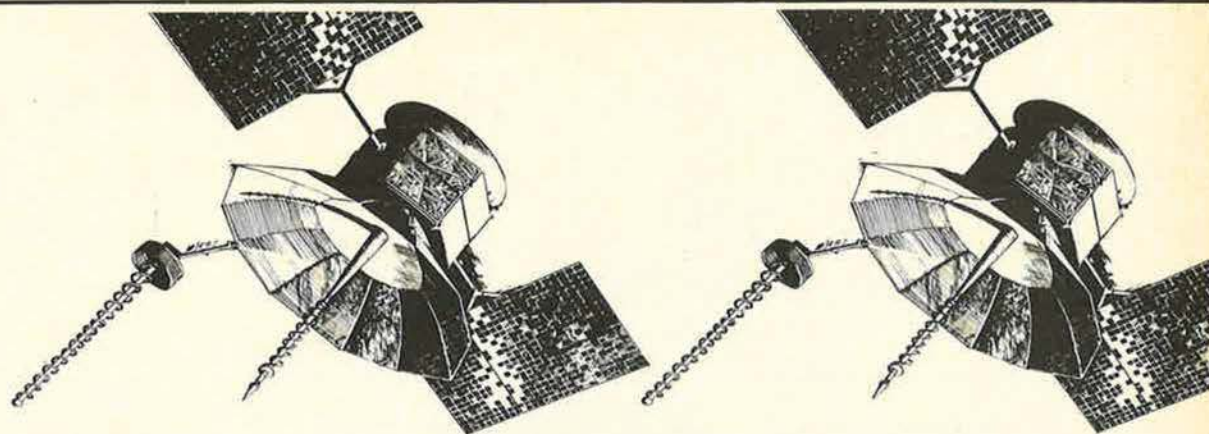
1 special air service (SAS) regt.

1 msl regt with *Lance* SSM.

3 AD regts with *Rapier* SAM.

18 arty regts (1 hy, 1 med, 12 field, 1 gw, 1 cdo, 1 ATK, 1 locating).

# GLOBAL TACTICAL COMMUNICATIONS



FleetSatCom 1 has been performing flawlessly since early 1978, delivering the highest-quality communications service to ships, submarines, aircraft, and other small mobile terminals. FleetSatCom 2 joined it on orbit in May 1979 and Flight 3 will be launched in November.

The most powerful military communications satellite on orbit, FleetSatCom provides communications for the National Command Authorities Network as well as for the Navy and U.S. Air Force. It has more than twice

the RF power and communications capacity of any other UHF satellite. Users are delighted. Later launches will give the Navy the global fleet communications system it needs for the 1980s.

TRW also builds DSCS II satellites for another Department of Defense network and we're developing the TDRSS Tracking and Data Relay Satellite System for Western Union to serve NASA and commercial users.

## TELECOMMUNICATIONS SATELLITES

*from a company called* **TRW**

# ROLM'S 1602B: An Army Standard Computer Designed for Full Integrated Logistics Support

## IT'S A COMPLETE PROCESSOR IN A SINGLE 20" CHASSIS.

The 1602B (AN/UYK-19) has space for 7 I/O modules, control panel interface, CPU and 64K of directly addressable memory. An additional 15 I/O slots can be made available with ROLM's 2150 Expansion Chassis.

## INDEPENDENT CARDS & INTERCHANGEABLE I/O SLOTS.

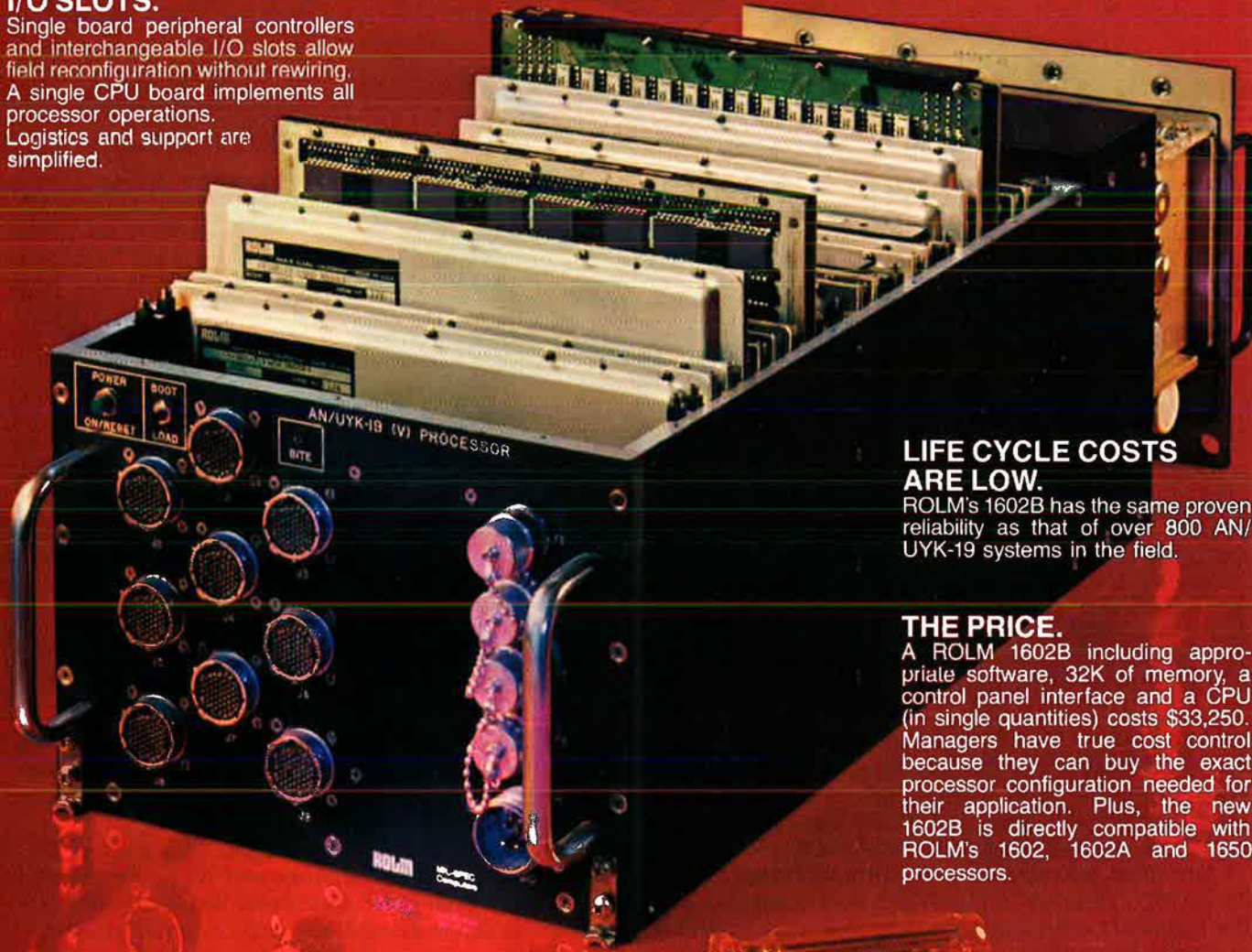
Single board peripheral controllers and interchangeable I/O slots allow field reconfiguration without rewiring. A single CPU board implements all processor operations. Logistics and support are simplified.

## IT HAS SINGLE SIDED ACCESS.

Maintenance is simplified by quick, easy access to the interior of the conductively cooled chassis. The 1602B also has a new plug-in AC or optional DC power supply.

## EXCELLENT DELIVERY WITH FULL SUPPORT.

Since AN/UYK-19 processors are in continuous production, delivery is no problem. They are fully mil-qualified and backed up by complete training and documentation. And ROLM's extensive software has really impressed program managers. They find that our total support program can't be matched.



## LIFE CYCLE COSTS ARE LOW.

ROLM's 1602B has the same proven reliability as that of over 800 AN/UYK-19 systems in the field.

## THE PRICE.

A ROLM 1602B including appropriate software, 32K of memory, a control panel interface and a CPU (in single quantities) costs \$33,250. Managers have true cost control because they can buy the exact processor configuration needed for their application. Plus, the new 1602B is directly compatible with ROLM's 1602, 1602A and 1650 processors.

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4900 Old Ironsides Drive, Santa Clara, CA 95050. (408) 988-2900. TWX 910-338-7350.

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See us at AFCEA Western Conference, Anaheim, Jan. 9-11.



9 engr regts (4 armd div, 1 amph).  
 6 army aviation regts.  
 900 *Chieftain* med, 271 FV101 *Scorpion* lt tks;  
 243 FV601 *Saladin* armd cars; 290 FV107  
*Scimitar*, 178 FV438/FV712 AFV with  
*Swingfire* ATGW; 1,429 *Ferret*, 200 *Fox* scout  
 cars; 2,338 FV432, 600 FV603 *Saracen*, 60  
 FV103 *Spartan* APC; 100 105mm pack how and  
 lt guns; 155 FV433 *Abbot* 105mm, FH70  
 155mm, 50 M-109 155mm, 31 M-107 175mm,  
 16 M-110 203mm sp guns/how; *Lance* SSM;  
*Carl Gustav* 84mm, 120mm RCL; *Milan*,  
*Swingfire* ATGW; FV102 *Striker* with  
*Swingfire* ATGW; L/70 40mm AA guns; *Blow-*  
*pipe*, *Rapier/Blindfire* SAM; 100 *Scout*, 7  
*Alouette II*, 20 *Sioux*, 150 SA-341 *Gazelle*, 20  
*Lynx* hel.  
 (On order: 184 FH70 155mm how, 18 M-109A2  
 sp how; TOW, LAW ATGW.)

**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 units; 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 HQs, 1 armd recce regt, variable  
 number of major units in inf role (5 resident inf  
 bns, 8 units in inf role), 1 SAS, 3 engr sqns, 2  
 army aviation sqns, and 1 flt.

**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 inf bn.

**Hong Kong:** Gurkha Field Force with 1 British,  
 3 Gurkha inf bn, 1 hel sqn, 1 engr sqn, and spt  
 units.

**Cyprus:** 1 inf bn less 2 coys, 1 armd recce sqn, 1  
 hel flt, log spt with UNFICYP (817); 1 inf bn plus  
 2 inf coys, 1 armd recce sqn, 1 engr spt sqn, 1  
 hel flt in garrison at Sovereign Base Areas.

**Gibraltar:** 1 inf bn, 1 engr team.

**Belize:** 1 inf bn, 1 inf bn (—), 1 armd recce tp, 1  
 arty bty, 1 lt AD tp, 1 engr sqn (—), 1 hel flt.

**RESERVES:** 125,100 Regular reserves. 58,900 Ter-  
 ritorial and Army Volunteer Reserve (TAVR): 2  
 armd recce regts, 38 inf bns, 2 SAS, 2 med, 3 lt  
 AD, 7 engr regts. 7,740 Ulster Defence Regi-  
 ment (11 bns).

**Navy:** 72,900 incl Fleet Air Arm, Royal Marines,  
 3,836 women and 400 enlisted outside Britain;  
 72 major surface combat vessels.

**Submarines, attack:** 26.

10 nuclear (4 *Swiftsure*, 5 *Valiant*, 1 *Dread-*  
*nought*).

16 diesel (13 *Oberon*, 3 *Porpoise*).

**Surface Ships:**

2 ASW/cdo (*Hermes*, *Bulwark*) carriers with *Sea*  
*King* hel, 1 with *Seacat* SAM.

2 assault ships with *Seacat* SAM (1 trg).

2 *Tiger* hel cruisers each with 4 *Sea King* hel,  
*Seacat* SAM.

13 GW destroyers: 7 *County* (all with 1 *Wessex*  
 ASW hel, 6 with *Seaslug*, *Seacat* SAM, 4 with  
*Exocet* SSM); 1 Type 82 with *Sea Dart* SAM,  
*Ikara* ASW; 5 Type 42 with *Sea Dart* SAM, 1  
*Lynx* ASW hel.

53 frigates: 50 GP (1 Type 22 with *Exocet* SSM,  
*Sea Wolf* SAM and 2 *Lynx* hel; 8 Type 21, 5 with  
*Exocet* SSM, *Seacat* SAM, 1 *Wasp/Lynx* hel; 26  
*Leander*, all with 1 *Wasp/Lynx* hel, 9 with  
*Exocet* SSM, 8 with *Ikara* ASW, 25 with *Seacat*  
 SAM, 1 with *Seawolf* SAM; 7 *Tribal*; 8 *Rothsay*  
 with *Seacat* SAM and 1 *Wasp* hel (1 trg)); 1  
 Type 41 AA; 1 Type 61 aircraft direction with  
*Seacat* SAM; 1 Type 12 ASW.

33 *Ton* coastal minesweepers/minehunters (1  
 trg).

5 inshore minesweepers (trg).

5 *Island* offshore patrol vessels.

4 *Bird* patrol craft, 5 *Ton* coastal patrol, 1 FPB, 2  
 inshore patrol craft.



More than 350 British/French Jaguar Mach 1.5 tactical support aircraft have been produced for the RAF and France. Ecuador and Oman also fly the Jaguar.

13 survey, 1 ice patrol, 1 Royal Yacht/hospital, 3  
 depot/support ships.  
 4 hovercraft (1 VT2, 2 SRN-6, 1 BH-N7).  
 Included above are 2 nuclear, 5 diesel subs, 1 as-  
 sault ship, 2 GW destroyers, 12 frigates, 3  
 minesweepers in reserve or undergoing refit.  
 (On order: 3 ASW cruisers, 4 SSN (2 *Trafalgar*, 2  
*Swiftsure*), 9 Type 42 destroyers, 5 Type 22  
 frigates, 5 *Hunt* MCM, 2 *Island* offshore patrol  
 boats, 1 Boeing hydrofoil, VT2 hovercraft,  
*Ikara* ASW msls, *Sub-Harpoon* USGW, *Sea*  
*Skua* ASM.)

**Bases:** Devonport, Faslane, Portland,  
 Portsmouth, Rosyth.

**THE FLEET AIR ARM:**

5 ASW hel sqns with 31 *Sea King* HAS2/2A (4  
 sqns embarked).

1 ASW hel sqn with 36 *Wasp* HAS1 (32 flts em-  
 barked).

1 ASW hel and trg sqn with 16 *Wessex* HAS3 (5  
 flts embarked).

1 ASW hel and trg sqn with 18 *Lynx* HAS2 (11 flts  
 embarked).

2 cdo assault sqns with 24 *Wessex* HU5 (4 hel  
 embarked).

6 SAR and hel trg sqns with 11 *Wessex* HAS1, 23  
*Wessex* HU5, 13 *Sea King* HAS1/2/2A, 11  
*Wasp* HAS1, 18 *Gazelle* HT2.

Intensive Flying Trials Unit with 1 *Sea Harrier*  
 FRS1 (forming).

1 comms sqn and 3 flts with 3 *Sea Heron* C2, 1  
*Heron* C4, 5 *Sea Devon* C20, 1 *Devon* C2/2, 3  
*Chipmunk* T40 ac, 5 *Wessex* HU5 hel.

1 observer trg sqn with 6 *Jetstream* T2, 6 *Sea*  
*Prince*, 1 trg flt with 9 *Chipmunk* T10.

1 fleet requirements and direction trg unit with 12  
*Canberra* T4/TT18/T22, 21 *Hunter* T8C/  
 GA11.

(On order: 34 *Sea Harrier* FRS1/T4 VTOL, 2  
*Hunter* T8M, 10 *Jetstream* T2 ac, 21 *Sea King*  
 HAS2, 15 *Sea King* HC4, 30 *Lynx* HAS2 hel.)

**THE ROYAL MARINES:** 7,447.

1 cdo bde with 4 cdo gps, 1 lt hel sqn, spt units.  
 120mm RCL; SS-11 ATGW; *Blowpipe* SAM; *Milan*  
 ATGW; 12 *Gazelle* AH1, 6 *Scout* AH1 hel.  
 (On order: 4 *Lynx* hel.)

**DEPLOYMENT:**

*Falkland Islands:* 1 marine det.

**RESERVES** (naval and Marines): 28,800 regular  
 and 6,500 volunteers.

**Air Force:**

86,310 (5,644 women); about 540 combat ac.  
 6 strike/attack sqns with 48 *Vulcan* B2.

4 strike/attack sqns with 50 *Buccaneer* S2A/B.  
 6 strike/attack sqns with 72 *Jaguar* GR1/T2.

3 close support sqns with 48 *Harrier* GR3/T4.

9 interceptor sqns: 2 with 24 *Lightning* F6/F3/F5  
 (+40 in reserve), 7 with 85 *Phantom* FGR2/  
 FG1.

5 recce sqns: 1 with 8 *Vulcan* SR2/B2, 2 with 24  
*Jaguar* GR1/T2, 2 with 22 *Canberra* PR7/9.

1 AEW sqn with 12 *Shackleton* AEW2.

4 MR sqns with 28 *Nimrod* MR1/1A.

2 tanker sqns with 16 *Victor* K2.

1 strategic tpt sqn with 11 VC-10C1.

4 tac tpt sqns with 45 C-130 (+10 in reserve).

3 comms sqns with 6 HS-125 CC1/2, 4 *Andover*,  
 7 *Pembroke*, 15 *Devon* ac, 2 *Whirlwind*,  
 1 *Gazelle* hel.

Queen's Flt with 3 *Andover* ac, 2 *Wessex* hel.

4 ECM/target facilities/calibration sqns with 58  
*Canberra*, 5 *Andover* E3/C1.

Ocus with 8 *Vulcan* B2, 15 *Buccaneer* S2A/B, 24  
*Phantom* FGR2, 30 *Jaguar* GR1/T2, 8 *Light-*  
*ning* F3/T5, 4 *Hunter* T7A, 19 *Harrier* GR3/  
 T4, 4 *Nimrod* MR, 7 *Canberra* B2/T4, 1 *An-*  
*dover*, 5 C-130, 3 *Victor* K2; 3 *Wessex* HC2, 5  
*Puma* HC1, 6 *Sea King* HAR3.

3 tac weapons units with 62 *Hunter* FGA9/F6A/  
 T7, 46 *Hawk* T1, 2 *Jet Provost* T4.

6 hel sqns: 4 tac tpt (2 with 40 *Wessex*, 2 with 26  
*Puma* HC1), 2 SAR with 9 *Whirlwind*, 9 *Wes-*  
*sex*, 8 *Sea King*.

Trg units with 51 *Hawk* T1, 141 *Jet Provost*, 17  
*Hunter* F6/T7, 9 *Jetstream* T1, 108 *Bulldog*  
 T1, 50 *Chipmunk* T10, 18 *Dominie* T1, 10 *Gnat*  
 T1, 1 *Husky* T1 ac, 14 *Whirlwind*, 5 *Wessex*  
 HU5, 12 *Gazelle* HT3 hel.

*Sidewinder*, *Sparrow*, *Red Top*, *Firestreak* AAM;  
*Martel*, AS-12, AS-30 ASM.

2 SAM sqns with *Bloodhound* 2.

(On order: 24 *Harrier* GR3, 78 *Tornado* (out of  
 220 FGA, 165 AD planned, 11 *Nimrod* AEW3,  
 84 *Hawk*, 9 VC-10 tankers, 33 CH-47D  
*Chinook*, 7 *Puma* hel, *Super Sidewinder*, *Sky*  
*Flash* AAM.)

**ROYAL AIR FORCE REGIMENT:**

4 wing HQs.

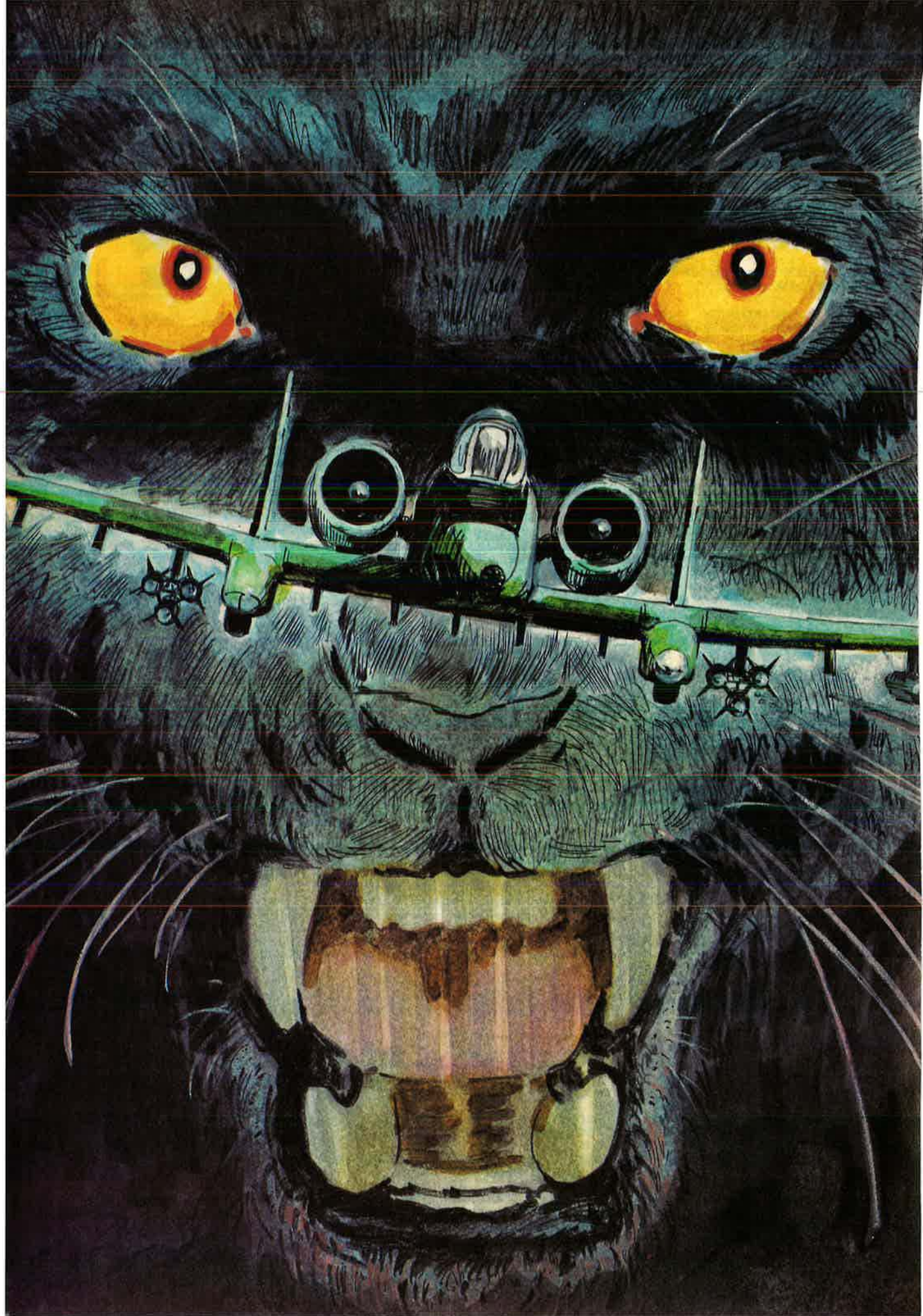
6 fd and 6 AD sqns with *Rapier* SAM.

(On order: *Scorpion* lt tks, *Spartan* APC.)

**DEPLOYMENT:**

The Royal Air Force includes an operational  
 home command (Strike Command), responsi-  
 ble 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*, 1 fd sqn RAF Regt.





# **NOW THERE'S AN A-10 THAT CAN SEE IN THE DARK.**

## **FAIRCHILD NIGHT/ADVERSE WEATHER A-10**

*No longer can an enemy attack unchallenged under the protection of darkness or low ceilings that would ground other aircraft. Fairchild has demonstrated and proved the capability of its two-place Night/Adverse Weather (N/AW) A-10 to provide effective ground attack around-the-clock and in poor weather.*

*Equipped with FLIR, radar and other proven advanced avionics and utilizing the partnership of the pilot and the electronics systems operator, the N/AW A-10*

*can stalk its target at low altitudes using the terrain as well as ECM to mask itself from an enemy's electronic detection systems. Devastating gunfire and missiles virtually assure target destruction.*

*The two-man concept of the N/AW A-10 not only expands the attack capability over its single-place counterpart but improves survivability as well. The N/AW A-10 is a superior battlefield weapon system that has been effectively demonstrated. And it is available now.*



**FAIRCHILD**

REPUBLIC COMPANY  
Farmingdale, L.I., New York 11735

Cyprus: 1 *Whirlwind* (4 ac with UNFICYP); periodic detts of other ac; 1 sqn RAF Regt.  
Hong Kong: 1 *Wessex*.  
Belize: *Harrier* FGA (6 ac), *Puma* hel, 1 sqn RAF Regt.

RESERVES: 30,300 regular; about 300 volunteer.

## CANADA

Population: 23,920,000.  
Military service: voluntary.  
Total armed forces: 80,000 (4,500 women).  
Estimated GNP 1978: \$US 204 bn.  
Defence Expenditure 1979-80: \$Can 4.38 bn (\$US 3.75 bn).  
\$US 1 = \$Can 1.16 (1979), \$Can 1.14 (1978).

**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:  
1 armd regt, 3 inf bns, 1 lt arty regt (2 close spt, 1 ad btys), 1 engr regt, spt units.  
1 special service force comprising:  
1 lt armd regt, 1 inf bn, 1 AB regt, 1 arty regt (2 close spt btys), 1 sigs regt, spt units.  
1 mech bde gp comprising:  
1 armd regt, 2 inf bns, 1 med arty regt, 1 engr regt, spt units.

114 *Leopard* C-1 med tks; 174 *Lynx* AFV; 827 M-113 APC; 58 105mm pack, 170 105mm how, 50 M-109 155mm sp how; 820 *Carl Gustav* 84mm RCL; 149 *TOW* ATGW; 57 40mm AA guns; 103 *Blowpipe* SAM.  
(On order: 174 *Cougar* armd cars; 337 *Grizzly* APC.)

### DEPLOYMENT:

**Europe:** One mech bde gp of 3,000 with 57 *Leopard* med tks, 375 M-113 APC/recce, 24 M-109 155mm sp how, 11 CH-136 (*Kiowa*) hel.  
**Cyprus** (UNFICYP): 515.  
**Egypt** (UNEF): 840.  
**Syria** (UNDOF): 171.  
**Lebanon** (UNIFIL): 169.  
Other UN: 20.

RESERVES: about 15,200 Militia; 100 combat arms units plus spt units (all in Mobile Command).

**Navy** (Maritime): 14,200.

**Maritime Command** (about 9,000).  
3 *Oberon* submarines.  
4 DD280 ASW hel destroyers, each with 2 *Sea King* hel and *Sea Sparrow* SAM.  
19 ASW frigates (2 *Annapolis* with 1 hel; 4 *MacKenzie*, 4 *Improved Restigouche* with AS-ROC; 6 *St Laurent* with 1 hel, 3 *Restigouche* in reserve).  
3 replenishment spt ships with 3 *Sea King* hel.  
6 coastal patrol trg ships.  
6 small patrol craft.

### DEPLOYMENT:

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

**Bases:** Halifax, Esquimalt.

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*, 1 CC-132 (DHC-7R), 4 CC-117 (C-47).  
5 tpt/SAR sqns with 12 CC-115 (DHC-5), 8 CC-138 (DHC-6) ac, 3 CH-113 *Labrador*, 6 CH-113A *Voyageur*, 3 CH-135 (UH-1N) hel.

**Maritime Air Group:**

3 maritime patrol sqns, 1 trg and 1 resting sqn with 22 CP-107 *Argus*.  
1 MR, 1 trg, and 1 res sqn with 15 CP-121 (*Tracker*) (being replaced by CP-140 *Aurora*).  
2 ASW hel sqns and 1 trg sqn with 32 CH-124 (*Sea King*).  
2 utility sqns with 9 T-33, 3 CP-121 ac.  
(On order: 18 CP-140 *Aurora* (*Orion*), 1 CC-132.)

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.

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

## DENMARK

Population: 5,140,000.

Military service: 9 months.

Total armed forces: 34,650 (10,550 conscripts).

Estimated GNP 1978: \$55.3 bn.

Defence expenditure 1979: kr 7.36 bn (\$1.42 bn).

\$1 = 5.18 kroner (1979), 5.57 kroner (1978).

**Army:** 21,400 (8,000 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); 72 M-109 155mm sp how; 120mm mor; 252 106mm RCL; *TOW* ATGW; 224 L/60 and L/70 40mm AA guns; *Redeye* (*Hamlet*) SAM; 9 Saab T-17 lt ac; 12 Hughes OH-6A hel.

DEPLOYMENT: Cyprus (UNFICYP): 365.

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 to provide combat and log support; 24,000 Regional Defence Force, with 21 inf, 7 arty bns, ATK sqns, spt units; 56,600 Army Home Guard.

**Navy:** 6,100 (1,500 conscripts).

6 submarines (2 *Narhvalen*, 4 *Delfinen*).

2 *Peder Skram* frigates with *Harpoon* SSM, *Sea Sparrow* SAM.

2 *Triton* corvettes.

5 *Hvidbjørnen* fishery-protection frigates, each with 1 hel.

10 *Willemoes* FAC(M) with *Harpoon* SSM.

6 *Søløven* FAC(T).

7 minelayers (4 *Falster*, 2 *Lindormen*, 1 *Langeland*).

8 ex-US Type 60 coastal minesweepers.

23 large patrol craft (8 *Daphne*, 3 *Agdeleg*, 2 *Maagen*, 9 *Barsø*, 1 *Tejsten*).

8 *Alouette* III hel.

(On order: 3 corvettes with *Harpoon* SSM, *Sea Sparrow* SAM, 7 *Lynx* hel.)

**Bases:** Copenhagen, Korsør, Frederikshavn.

RESERVES: 4,500; Navy Home Guard 4,860.

**Air Force:** 7,150 (1,050 conscripts); 113 combat aircraft.

1 FB sqn with 20 F-35XD *Draken*.

2 FB sqns with 24 F-100D, 14 TF-100F (to be replaced by F-16).

2 interceptor sqns with 39 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.

2 TF-35XD *Draken*, 22 Saab T-17 trainers.

8 SAM sqns: 4 with 36 *Nike Hercules*, 4 with 24 *Improved HAWK*.

*Sidewinder* AAM, *Bullpup* ASM.

(On order: 58 F-16A/B fighters.)

RESERVES: 8,500; Air Force Home Guard 10,300.

## FRANCE

Population: 53,750,000.

Military service: 12 months.

Total armed forces: 509,300 including 8,600 on inter-service central staff (274,500 conscripts).

Estimated GNP 1978: \$463 bn.

Defence expenditure 1979: fr 92.24 bn (\$21.51 bn).

\$1 = 4.29 francs (1979), 4.61 francs (1978).

**Strategic forces**

*SLBM:* 64 in 4 SSBN, each with 16 M-20 msls (2 with 16 M-4 building).

*IRBM:* 18 in 2 sqns, each with 9 SSBS S-2 msls (being 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:** 326,800, incl Army Aviation and 209,300 conscripts.

1 army HQ.

3 corps HQ.

8 armd divs.

4 inf divs.

1 alpine div.

1 air-portable mot div (Marines).

1 para div of 2 bdes.

Berlin sector force (1 lt armd regt, 1 mech inf regt).

5 SSM regts with 32 *Pluton*.

5 SAM regts: 3 with 54 *HAWK*, 1 with 16 *Roland*.

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, 500 VAB APC; 195 Model

56 105mm pack, 115 155mm towed, 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.

(On order: 130 AMX-30 med tks; 140 AMX-

10RC armd cars, 220 AMX-10 MICV, 330 VAB

APC; *HOT*, *Milan* ATGW; 120 *Vadar* 20mm sp

AA guns; 15 *Roland* I, 32 *Roland* II SAM.)

**ARMY AVIATION** (ALAT): 6,450.

7 lt hel gps and 5 combat hel regts with: 190

*Alouette* II, 70 *Alouette* III, 135 SA-330 *Puma*,

166 SA-341F *Gazelle* hel, 30 *Broussard*, 90

L-19 lt ac. (On order: 160 SA-342M *Gazelle*.)

**DEPLOYMENT:**

**Germany:** 34,000; 3 armd divs.

**Berlin:** 2,000 1 lt armd regt, 1 mech inf regt.

**Chad:** 1,800.

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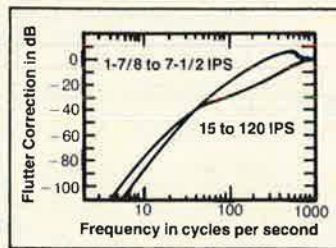
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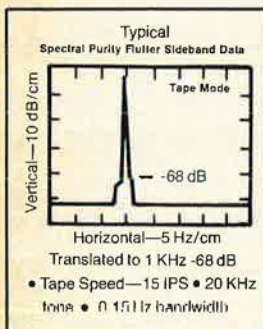
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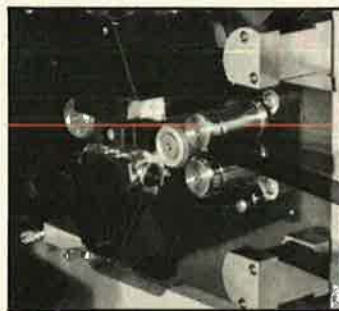
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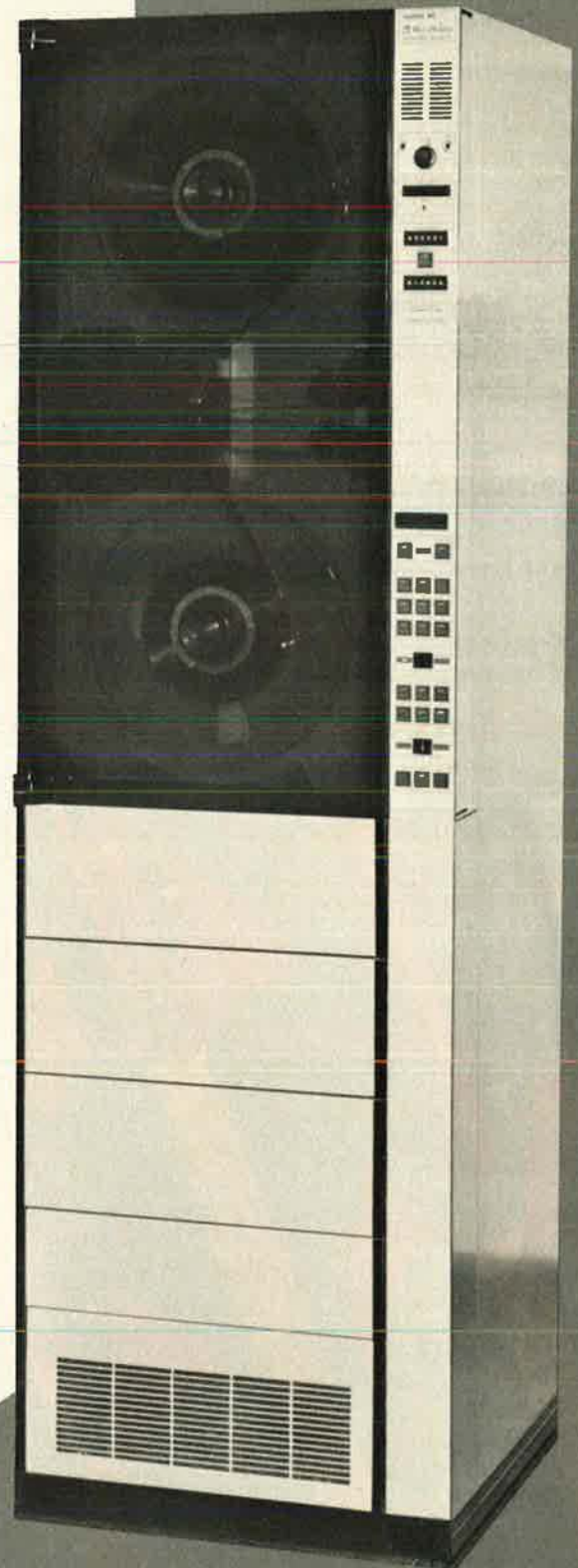
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**Djibouti:** 4,150; 2 inf regts, 1 arty regt, 2 sqns lt tks.

**Gabon:** 450.

**Ivory Coast:** 470.

**Lebanon:** (UNIFIL): engr coy, log unit (609).

**Senegal:** 1,170 (all services).

#### Overseas Commands:

There are four overseas comds (Antilles-Guyana, South Indian Ocean, New Caledonia, Polynesia), and two naval comds (ALINDIEN, ALPACI). Some 19,000 from all services are deployed overseas (numbers vary according to local circumstances); equipment incl: 130 AFV, 36 hel, 9 frigates, 2 FAC, 1 tender ship, 2 lt tpt ships, 12 combat and 15 tpt ac.

**RESERVES:** about 300,000 (10 inf divs, and 4 divs formed from military schools).

**Navy:** 70,250, incl Naval Air and 19,200 conscripts; 48 major surface combat vessels.

23 submarines (4 *Agosta*, 9 *Daphne*, 4 *Arethuse*, 6 *Narval*).

2 *Clemenceau* med attack aircraft carriers (each with 40 ac).

1 *Jeanne D'Arc* hel carrier (trg ship) with *Exocet* SSM, 4 hel.

1 *Colbert* cruiser with *Masurca* SAM.

19 destroyers: 2 *Suffren* with *Exocet* SSM, *Malafon* ASW/SSM, *Masurca* SAM; 3 Type F67 with *Exocet* SSM, *Crotale* SAM, 2 hel; 1 Type 56 with *Malafon*, 1 hel; 1 Type T53 with *Exocet*, 1 hel; 9 Type T47 (4 with *Tartar* SAM, 5 ASW with *Malafon*); 1 Type C65 with *Malafon*; 2 air-direction Type T53 (1 trg, 1 res).

25 frigates: 9 *Riviere*, 8 with *Exocet* SSM; 8 Type E52; 8 Type A69, 3 with *Exocet* SSM.

5 FAC(M) (4 *Trident* with SS-12, 1 *La Combatante* with SS-11 SSM).

20 large patrol craft (7 *Sirius*, 4 *Le Fougueux*, 4 ex-Can *La Dunkerquoise*, 5 ex-Br *Ham*).

5 *Circe* minehunters, 13 ex-US *Aggressive* ocean minesweeper/hunters, 21 coastal minesweepers (6 *Sirius* (5 in reserve), 15 ex-US *Adjutant* (6 in reserve)).

2 LSD, 5 LST, 2 log spt ships, 36 LCM.  
(Planned: 1 SSN, 2 ASW corvettes, 2 frigates, 2 minehunters.)

**Bases:** Cherbourg, Brest, Lorient, Toulon.

**NAVAL AIR FORCE:** 13,000; 119 combat aircraft.  
2 attack sqns: 1 with 12 *Etendard* IVM, 1 with 12

*Super Etendard*.

2 interceptor sqns with 17 F-8E(FN) *Crusader*, 8 *Super Etendard*.

2 ASW sqns with 24 *Alizé*.

5 MR sqns with 28 *Atlantic*, 10 SP-2H *Neptune*.

1 recce sqn with 8 *Etendard* IVP.

2 OCU with 12 *Etendard* IVM, 14 *Magister*, 8 Nord 262, 8 *Alizé*.

3 ASW hel sqns with 12 *Super Frelon*, 12 *Lynx*, 12 *Alouette* III.

1 assault hel sqn with 12 SH-34J.

2 SAR/trg/liaison sqns with 20 *Alouette* II/III.

1 hel OCU with *Alouette* II, *Super Frelon*, *Lynx*.

7 comms flts with 8 *Alizé*, 8 *Frégate*, *Falcon*, 8 SP-2H *Neptune*, C-47, DC-4, DC-6A, 3 Nord 262, 11 *Navajo* ac, *Alouette* II/III, *Super Frelon* hel.

7 trg and liaison sqns with 8 Nord 262, 15 C-47, 2 *Falcon*, 11 *Paris*, *Navajo*, 15 *Rallye* ac, *Alouette* II/III hel.

(Planned: 54 *Super Etendard* fighters, 5 *Falcon Guardian* MR ac, 22 *Lynx* hel.)

**MARINES:** 1 bn.

**RESERVES:** about 50,000.

**Air Force:** 103,650 (40,750 conscripts); 477 combat aircraft.

**Air Defence Command (CAFDA):** 6,300.

8 interceptor sqns: 2 with 30 *Mirage* IIIC, 6 with 90 *Mirage* F-1C, 1 OCU with 14 *Mirage* F-1B.

4 liaison and comms flts with 15 *Magister*, 13 T-33A, 8 *Broussard*.

9 SAM bns with *Crotale*.

Automatic *STRIDA II* air-defence system.

*Sidewinder*, R.530, R.550 *Magic* AAM.

**Tactical Air Force (FATAC):** 7,400.

16 FB sqns: 7 with 105 *Mirage* IIIE, 2 with 40 *Mirage* 5F, 7 with 105 *Jaguar* A/E.

3 recce sqns with 45 *Mirage* IIIR/RD (to be replaced by *Mirage* F-1R).

2 OCU: 1 with 23 *Mirage* IIIB/BE, 1 with 25 *Jaguar* A/E.

8 liaison and comms flts with 25 *Magister*, 30 T-33A, 10 *Broussard*, 5 *Paris*, 3 *Frégate*, 7 *Noratlant*, 2 *Mystère* 20 ac, 13 *Alouette* II/III hel.

AS-30, *Martel* ASM.

**Air Transport Command (COTAM):** 4,600.

6 tac tpt sqns: 3 with 48 *Transall* C-160, 3 with 54 *Noratlant*.

1 OCU with 15 *Noratlant*, 6 *Frégate*.

4 tpt sqns with 4 DC-8F, 18 *Frégate*, 7 *Mystère* 20, 2 *Caravelle*, 24 *Paris*, 12 *Broussard* ac; 2 *Puma*, 3 *Alouette* III hel.

5 hel sqns with 31 *Alouette* II, 24 *Alouette* III, 8 *Puma*.

1 hel OCU with 9 *Alouette* II, 10 *Alouette* III, 5 *Puma*.

**Training Command (CEAA):** Some 400 aircraft, incl *AlphaJet*, *Magister*, T-33A *Mystère* IV, *Falcon*, *Flamant*, *Noratlant*, *Broussard*, *Paris*, CAP-10.

(Planned: 21 *Mirage* F-1B/R, 48 *Mirage* 2000 fighters; 44 *AlphaJet* trg ac, 28 *Transall* tpts; 6 SAM bns with *Crotale*.)

**Para-Military Forces:** 78,500 *Gendarmerie* (5,000 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:** 61,600,000 (incl West Berlin).

**Military service:** 15 months.

**Total armed forces:** 495,000 (225,000 conscripts); (military divisions of the Ministry of Defence, Central Military Agencies, and the Central Medical Agencies comprise 11,300 military personnel. The overall strength of the armed forces includes 6,000 reserve duty training positions); mobilization strength about 1,250,000.

**Estimated GNP 1978:** \$634.2 bn.

**Defence expenditure 1979:** DM 36.66 bn (\$19.69 bn).

\$1 = DM 1.86 (1979), DM 2.03 (1978).

**Army:** 335,200 (176,000 conscripts). (The Army being reorganized to form 17 armd bdes (each of 3 tk, 1 armd inf, 1 armd arty bns), 16 armd inf bdes (each of 1 tk, 3 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)).



Left, a Roland surface-to-air missile system of the West German Army. Above, several NATO nations use the US-built Lance surface-to-surface battlefield missile.

15 ssm bns: 11 with 65 *Honest John*, 4 with 26 *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, 27 mot inf bns, 290 inf coys. In support are 4 service support comds, 1 sig bde, 2 sig, 2 engr regts. Territorial Army provides defensive comms, military police, and service units on mobilization.

1,342 M-48A2/A4, 2,437 *Leopard* 1 med tks; 408 Spä Pz-2 *Luchs*, 1,448 SPz 11-2, 469 SPz 12-3 (HS-30) armd cars; 2,136 *Marder* MICV, 4,030 M-113 APC; 256 105mm, 56 155mm how; 586 M-109 155mm, 149 M-107 175mm, 77 M-110 203mm sp guns/how; 956 120mm mor; 208 *LARS* 110mm multiple RL; 65 *Honest John*, 26 *Lance* ssm; 770 JPz 4-5 SP ATK guns; 204 106mm RCL; 316 SS-11, 845 *Milan*, *HOT*, 347 *TOW* ATGW; 1,745 20mm, 624 40mm towed, 190 *Gepard* 35mm SP AA guns; 903 *Redeye*, *Roland* SAM; 192 UH-1D, 228 *Alouette* II/III, 108 CH-53G hel; 60 CL-89 drones.

(On order: 1,800 *Leopard* 2 med tks, 214 FH-70 155mm how, 1,655 *Milan* ATGW, 162 RJPz-(*TOW*), 316 RJPz-(*HOT*), SP ATGW, 230 *Gepard* SP AA, 140 *Roland* II SAM, 212 PAH-1, 100 BO-105M hel.)

**Navy:** 36,500, incl Naval Air Arm and 11,000 conscripts.

24 submarines (18 Type 206, 6 Type 205).

11 destroyers (3 *C F Adams* with *Tartar* ssm and *ASROC*; 4 *Hamburg* with *Exocet* ssm; 4 ex-US *Fletcher*).

6 *Köln* frigates.

6 corvettes (5 *Thetis*, 1 *Hans Birkner*).

30 FAC(M) with *Exocet* ssm (10 Type 143, 20 Type 148).

10 Type 142 FAC(T).

18 *Lindau* coastal minesweepers/hunters.

21 *Schütze* fast coastal minesweepers.

18 inshore minesweepers (14 type 393/394A, 4 type 393/394B).

11 *Rhein* depot, 8 *Lüneberg* spt ships.

19 Type 520 LCU, 28 Type 521 LCM.

(On order: 6 Type 122 frigates, 10 Type 143A FAC(M).)

**Bases:** Flensburg, Wilhelmshaven, Kiel, Olpenitz.

**NAVAL AIR ARM:** 132 combat aircraft.

3 FB sqns with 83 F/TF-104G.

1 recce sqn with 30 RF/TF-104G.

2 MR sqns with 15 *Atlantic*, 4 ECM *Atlantic*.

1 SAR hel sqn with 21 *Sea King* Mk 41.

1 utility sqn with 20 Do-28-2 ac.

AS-20, AS-30, AS-34 *Kormoran* ASM.

(On order: 112 *Tornado* MRCA, 12 *Lynx* hel.)

**Air Force:** 106,000 (38,000 conscripts); about 480 combat aircraft.

#### Tactical Command:

8 FB sqns with 144 F/TF-104G (to re-equip with *Tornado*).

4 FB sqns with 60 F-4F.

6 FGA sqns with 120 G-91R/3, G-91T (65 in store), 18 *AlphaJet*.

4 recce sqns with 60 RF-4E.

1 OCU with 18 TF-104G.

8 ssm sqns with 72 *Pershing* 1A.

AS-20/-30 ASM.

#### Air Defence Command:

4 interceptor sqns with 60 F-4F.

4 SAM regts (each of 6 btys) with 216 *Nike Hercules* launchers.

2 SAM regts (each of 18 btys) with 216 *Improved HAWK* launchers.

4 aircraft control and warning regts.

*Sparrow*, *Sidewinder* AAM.

#### Transport Command:

3 tpt sqns with 75 *Transall* C-160D.

5 hel sqns with 92 UH-1D.

1 special air mission sqn with 4 *Boeing* 707-

320C, 3 *Jetstar*, 6 HFB320 *Hansa Jets*, 3 VFW614, 6 Do-28D-2 ac, 4 UH-1D hel.

#### Training Command:

Primary trg unit with 45 P-149D.

Pilot trg wing (Williams AFB, USA) with 47 T-37B, 45 T-38A.

Combat trg wing (Luke AFB, USA) with 30 F-104G, 25 TF-104G.

OCU (George AFB, USA) with 10 F-4E.

Miscellaneous liaison, range, and base flts with 10 F-4F, 20 G-91, P-149D, 3 *Noratlant*, 17 OV-10B/Z, 100 Do-28-D, 30 Do-27, 25 *Super Cub*. (On order: 210 *Tornado*, 157 *AlphaJet* FGA, 175 *Roland* SAM.)

**Federal Border Guard:** 20,000; armd cars, APC, mor, ATK weapons. This is no longer considered as a para-military force.

## GREECE

**Population:** 9,490,000.

**Military service:** 24-32 months.

**Total armed forces:** 184,600 (149,000 conscripts).

**Estimated GNP 1978:** \$32.3 bn.

**Defence expenditure 1978:** 55.8 bn drachmas (\$1.52 bn).

\$1 = 36.6 drachmas (1978), 37.3 drachmas (1977).

**Army:** 145,000 (123,000 conscripts).

1 armd div.

11 inf divs (some mech).

2 armd bdes.

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.

350 M-47, 800 M-48, 170 AMX-30 med, 190 M-24 lt tks; 180 M-8 armd cars; AMX-10P MICV, 460 M-59, 520 M-113, Mowag APC; 100 75mm pack, 80 105mm, 240 155mm how; M-52 105mm, M-44 155mm, M-107 175mm, M-110 203mm sp guns/how; *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-17A, 15 L-21 ac; 5 Bell 47G, 20 UH-1D, 42 AB-204B/-205 hel.

(On order: 115 AMX-30 med tks, AMX-10P MICV, 144 M-101A1 105mm towed, 11 M-109 155mm sp how.)

**RESERVES:** about 250,000.

**Navy:** 17,000 (11,000 conscripts).

7 submarines (4 Type 209, 2 ex-US *Guppy*, 1 ex-US *Balao*).

12 ex-US destroyers (5 *Gearing* with 1 hel, 6 *Fletcher*, 1 *Sumner*).

4 ex-US *Cannon* frigates.

10 FAC(M) (8 *La Combattante* II/III with *Exocet* ssm, 2 with SS-12 ssm).

19 FAC(T) (5 *Silbermöwe*, 5 *Nasty*, 7 *Jaguar*, 1 *Vesper Brave*, 1 *Ferocity*<).

3 coastal patrol craft.

2 coastal minelayers.

15 coastal minesweepers (10 MSC 294, 5 ex-US *Adjutant*).

1 LSD, 10 LST, 5 LSM, 6 LCU, 13 LCM.

4 *Alouette* III ASW/sar hel.

(On order: 4 Type 209 subs, 6 FAC(M) with *Penguin* ssm, 6 AB-212 ASW hel.)

**Bases:** Mithilini, Piraeus, Salamis, Salonika, Suda Bay, Volos.

**RESERVES:** about 20,000.

**Air Force:** 22,600 (15,000 conscripts); 259 combat aircraft.

3 strike sqns with 56 A-7H.

5 FB sqns: 3 with 45 F/RF-4E, 2 with 31 F/TF-

104G.

5 interceptor sqns: 3 with 40 F-5A, 2 with 39 *Mirage* F1CG.

1 recce sqn with 20 RF-5A, 20 RF-84F.

OCU with 8 F-5B.

1 MR sqn with 8 HU-16B *Albatross* ac, 4 *Alouette* III hel.

3 tpt sqns with 12 C-130H, 20 C-47, 38 *Noratlant*, 1 *Gulfstream*, 7 CL-215.

3 hel sqns with 14 AB-205, 2 AB-206A, 10 Bell 47G, 1 Bell 212, 8 UH-19D, 35 UH-1D.

Trainers incl 20 T-41A, 1 sqn with 18 T-37C, 1 sqn with 40 T-2E.

*Sparrow*, *Sidewinder*, *Falcon*, R.550 *Magic* AAM.

1 SAM bn with *Nike Hercules*.

(On order: 6 TA-7H trainers, 20 CH-47C hel, 300 *Super Sidewinder* AAM.)

**RESERVES:** about 20,000.

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

## ITALY

**Population:** 57,200,000.

**Military service:** Army and Air Force 12 months, Navy 18 months.

**Total armed forces:** 365,000 (226,000 conscripts).

**Estimated GNP 1978:** \$259 bn.

**Defence expenditure 1979:** 5,119.1 bn lire (\$6.11 bn).

\$1 = 838 lire (1979), 852 lire (1978).

**Army:** 254,000 (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 amphib bns.

1 msl bde with 1 *Lance* ssm, 4 *HAWK* SAM bns.

620 M-47, 300 M-60A1, 730 *Leopard* med tks; 4,000 M-106, M-113, M-548, M-577 APC; 1,500 guns/how, incl 334 105mm pack, 155mm, 203mm; 100 M-44, 200 M-109 155mm, 36 M-107 175mm, 150 M-55 203mm sp guns/how; 81mm, 107mm, 120mm mor; 6 *Lance* ssm; 57mm, 106mm RCL; *Mosquito*, *Cobra*, SS-11, *TOW* ATGW; 220 40mm AA guns; 22 *Improved HAWK* SAM.

(On order: 100 *Leopard* tks, 500 M-113 APC, 160 FH-70 towed, SP-70, M-109 SP 155mm how, *TOW* ATGW, CL-89 drones.)

**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, 25 CH-47C, 5 A-109.

(On order: 60 A-129, 1 CH-47C hel.)

**RESERVES:** 550,000.

**Navy:** 42,000, incl 1,500 air arm, 1,000 Marines and 23,000 conscripts.

9 submarines (1 *Sauro*, 4 *Toti*, 2 ex-US *Tang*, 2 ex-US *Guppy* III).

1 *Vittorio Veneto* hel cruiser with 9 AB-204B/AB-212 ASW hel, *Terrier/ASROC* msls.

2 *Andrea Doria* cruisers with 4 ASW hel, *Terrier* SAM.

4 GW destroyers (2 *Audace* with 2 ASW hel, *Tartar* SAM; 2 *Impavido* with *Tartar*).

3 destroyers (1 *San Giorgio* (trg), 2 *Impetuoso*).

12 frigates (2 *Lupo* with *Otomat* ssm, *Sea Sparrow* SAM, 1 ASW hel; 2 *Alpino* with 2 hel; 4 *Bergamini* with 1 hel; 4 *Centauro*).

8 corvettes (4 *De Cristofaro*, 4 *Albatros*).

1 *Sparviero* hydrofoil with *Otomat* ssm<.

4 FAC(G/T): 2 *Freccia* (1 with *Sea Killer* ssm), 2 *Lampo*.

4 ex-US *Agile* ocean, 13 ex-US *Adjutant*, and 17 *Agave* coastal 8 *Aragosta* inshore minesweepers.



2 ex-US *De Soto County* LST, 19 ex-US LCM.  
 2 *Stromboli* replenishment tankers.  
 1 Marine inf bn with M-113A1, LVTP-7 APC,  
 81mm mor, 106mm RCL.  
 (On order: 3 *Sauro* subs, 1 hel carrier, 6 *Maestrale*, 2 *Lupo* frigates, 6 ssm hydrofoils, 4 minehunters.)

**Bases:** La Spezia, Taranto, Ancona, Brindisi, Augusta, Messina, La Maddalena, Cagliari, Naples, Venice.

**NAVAL AIR ARM:**  
 5 ASM hel sqns with 24 SH-3D, 24 AB-204AS, 20 AB-212.  
 (On order: 35 AB-212, 6 SH-3D.)

**RESERVES:** 160,000.

**Air Force:** 69,000 (23,000 conscripts); 311 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.  
 2 MR sqns with 36 F/RF-104G.  
 2 MR sqns with 18 *Atlantic*.  
 1 ECM/recce sqn with 6 PD-808, 2 EC-119G, EC-47.  
 3 tpt sqns: 2 with 20 G-222, 1 with 10 C-130H.  
 4 comms sqns with 26 P-166M, 32 SIAI-208M, 8 PD-808, 2 DC-9, 1 DC-6 ac; 2 SH-3D, 20 AB-47 hel.  
 4 SAR sqns with 8 HU-16 ac; 24 AB-204, 14 HH-3F hel.  
 1 OCU with 15 TF-104G.  
 6 trg sqns with 70 G-91T, 100 MB-326/-339, 14 P-166M, 20 SF-260M ac; 35 AB-47J, 5 AB-204B hel.  
 AIM-7E *Sparrow*, *Sidewinder* AAM.  
 8 SAM groups with 96 *Nike Hercules*.  
 (On order: 100 *Tornado* MRCA, 100 MB-339 trg, 24 G-222 tpts.)

**RESERVES:** 28,000.

**Para-Military Forces:** 84,500 *Carabinieri* (1 mech bde with 13 bns, 1 AB bn, 2 cav sqns) with 29 M-47 tks, 120 M-6, M-8 armd cars, 200 M-113 APC, 23 AB-47, 2 A-109, 5 AB-205, 23 AB-206 hel. 70,000 Public Security Guard (16 mot, 4 rescue bns) with 13 P-64B ac, 18 AB-47J, 13 AB-206, 2 AB-212 hel (on order: 30 Fiat 6616 armd cars). 42,000 Finance Guards with 47 AB-47J, 49 NH-500M hel.

## LUXEMBOURG

Population: 360,000  
 Military service: voluntary.  
 Total armed forces: 660.  
 Estimated GDP 1978: \$3.38 bn.  
 Defence expenditure 1979: 1.05 bn francs (\$35.6 m).  
 \$1=29.4 francs (1979), 31.5 francs (1978).

**Army:** 660.  
 1 lt inf bn.  
 1 indep coy.  
 81mm mor; *TOW* ATGW.

**Para-Military Forces:** 430 Gendarmerie.

## NETHERLANDS

Population: 14,100,000.  
 Military service: Army 14 months, Navy and Air Force 14-17 months.  
 Total armed forces: 114,820 (50,050 conscripts). (There are 3,970 regulars and 600 conscripts in the Royal Military Constabulary and interservice bodies.)  
 Estimated GNP 1978: \$130.3 bn.  
 Defence expenditure 1979: 9.97 bn guilders (\$4.96 bn).

**AIR FORCE Magazine / December 1979**



The Netherlands, Belgium, Denmark, and Norway are reequipping their air forces with F-16 fighters. This one wears the colours of the Dutch Air Force.

\$1=2.01 guilders (1979), 2.17 guilders (1978).

**Army:** 75,000 (43,250 conscripts).  
 2 armd bdes.  
 2 mech inf bdes.  
 1 ssm bn with *Lance*.  
 3 army aviation sqns (Air Force crews).  
 460 *Leopard*, 1, 340 *Centurion* med, 120 AMX-13 lt tks; 1,300 AMX-VCI and M-113, 750 YP-408, 860 YPR-765 APC; 105mm, 155mm, 203mm how; 48 AMX 105mm, 80 M-109 155mm, 24 M-107 175mm, M-110 203mm SP guns/how; 6 *Lance* ssm; 107mm, 120mm mor; *Carl Gustav* 84mm, 106mm RCL; *LAW*, *TOW* ATGW; 40 L/70 40mm towed, 45 *Gepard* 35mm SP AA guns; 60 *Alouette III*, 24 BO-105 hel.  
 (On order: 445 *Leopard* 2 med tanks, 350 *Dragon* ATGW, 50 *Gepard* 35mm SP AA guns.)

**DEPLOYMENT:** *Germany:* 1 armd bde, 1 recce bn  
*Lebanon:* (UNIFIL) 1 bn, 800.

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

**Navy:** 16,850 (2,200 conscripts, 2,920 Marines, 1,800 naval air arm).  
 6 submarines (2 *Zwaardvis*, 2 *Potvis*; 2 *Dolfijn*).  
 2 *Tromp* GW destroyers with *Harpoon* SSM, *Tartar/Sea Sparrow* SAM, 1 *Lynx* hel.  
 7 *Friesland* destroyers.  
 8 frigates (2 *Kortenaer* with *Harpoon* SSM, *Sea Sparrow* SAM, 1 *Lynx* hel; 6 *Van Speijk* with *Seacat* SAM, 1 hel).  
 6 *Wolf* corvettes.  
 5 *Balder* large patrol craft.  
 3 *Onversaagd* MCM spt ships; 18 *Dokkm* coastal, 16 *Van Straelen* inshore minesweepers.  
 2 *Poolster* fast combat spt ships.  
 (On order: 2 subs, 10 frigates, 15 minehunters.)

**Bases:** Den Helder, Flushing, Curacao.

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

**NAVAL AIR ARM:**  
 2 MR sqns with 7 SP-13A *Atlantic*, 13 P-2 *Nep-tune*.  
 2 hel sqns with 6 *Lynx*, 10 *Wasp*.  
 (On order: 13 P-3C *Orion* ASW ac; 18 *Lynx* ASW hel.)

**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:** 19,000 (4,000 conscripts); 170 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 AWX interceptor sqns with 36 F-104G.  
 1 recce sqn with 18 RF-104G.  
 1 OCU with 6 TF-104G, 2 F-16A/B.  
 1 tpt sqn with 3 F-27, 9 F-27M.  
*Sidewinder* AAM.  
 4 SAM sqns with *Nike Hercules*.  
 11 SAM sqns with *Improved HAWK*.  
 (On order: 89 F-16A FGA, 11 F-16B trainers, 25 *Shorad/Flycatcher* AA systems.)

**RESERVES:** about 6,000.

**Para-Military Forces:** 3,900 Gendarmerie; 4,300 Home Guard.

## NORWAY

Population: 4,090,000.  
 Military service: Army 12 months, Navy and Air Force 15 months.  
 Total armed forces: 39,000 (28,250 conscripts).  
 Estimated GNP 1978: \$39.4 bn.  
 Defence expenditure 1979: 7.29 bn kroner (\$1.43 bn).  
 \$1=5.10 kroner (1979), 5.28 kroner (1978).

**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 (M-24/90) lt tks; 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 AA guns; 40 O-1E, L-18 lt ac.

**DEPLOYMENT:** *Lebanon* (UNIFIL): 942, 1 bn, 1 service coy, 1 medical coy, 1 hel flt.

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

**Navy:** 9,000, incl 1,600 coast artillery, 6,000 conscripts.

15 Type 207 *Kobben* submarines.

5 *Oslo* frigates with *Penguin* SSM, *Sea Sparrow* SAM.

3 corvettes (2 *Sleipner*, 1 *Vadsø*).

33 FAC(M) with *Penguin* SSM (20 *Storm*, 7 *Hauk*, 6 *Snögg*).

13 *Tjeld* FAC(T).

2 *Vidar* coastal minelayers, 10 ex-US *Falcon* coastal minesweepers.

1 *Horten* depot ship.

7 LCT (2 *Kvalsund*, 5 *Reinøysund*).

6 patrol ships.

36 coastal arty btys.

(On order: 7 *Hauk* FAC(M), 1 inshore minesweeper, 3 fishery protection ships, 6 *Lynx* hel.)

**Bases:** Horten, Bergen, Harstad, Tromsø.

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

**Air Force:** 10,000 (5,000 conscripts); 119 combat aircraft.

3 FGA sqns with 54 F-5A.

1 FGA sqn with 18 CF-104G/D.

1 AWX sqn with 16 F-104G.

1 recce sqn with 12 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, 3 *Falcon* 20 ECM.

1 SAR sqn with 10 *Sea King* Mk 43 hel.

2 hel sqns with 32 UH-1B.

27 Saab *Safir* trainers.

*Sidewinder* AAM, *Bullpup* ASM.

4 lt AA bns with L/70 40mm guns.

1 SAM bn with 4 *Nike Hercules* btys.

(On order: 72 F-16 fighters, 1 *Sea King* hel, 40 *Roland II*, Rbs-70 SAM.)

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

## PORTUGAL

**Population:** 9,840,000.

**Military service:** Army 16 months, Navy 24 months, Air Force 20-21 months.

**Total armed forces:** 60,500.

**Estimated GNP 1978:** \$15.85 bn.

**Defence expenditure 1979:** 28.19 bn escudos (\$587 m).

\$1=48.05 escudos (1979), 40.85 escudos (1978).

**Army:** 37,000.

6 regional commands.

1 inf bde.

1 tk regt.

2 cav regts.

16 inf regts.

1 cdo regt.

4 indep inf bns.

3 fd, 1 coast arty regts.

1 AA/coast arty bn.

2 engr regts.

1 sigs regt.

34 M-47, 30 M-48 med, 17 M-24 lt tks; 36 Panhard EBR arm'd cars; 86 M-113, 79 *Chaimite* (Commando) APC; 30 5.5-in. guns, 130 105mm guns/how; 43 107mm, 81 120mm mor; 12 90mm, 87 106mm RCL; 6 TOW ATGW; coast and 40mm AA arty.

**Navy:** 14,000 (2,500 Marines).

3 *Albacora* submarines.

17 frigates (4 *Belo*, 3 *Silva*, 6 *Coutinho*, 4 *Baptista de Andrade*).

20 *Cacine* large patrol craft.

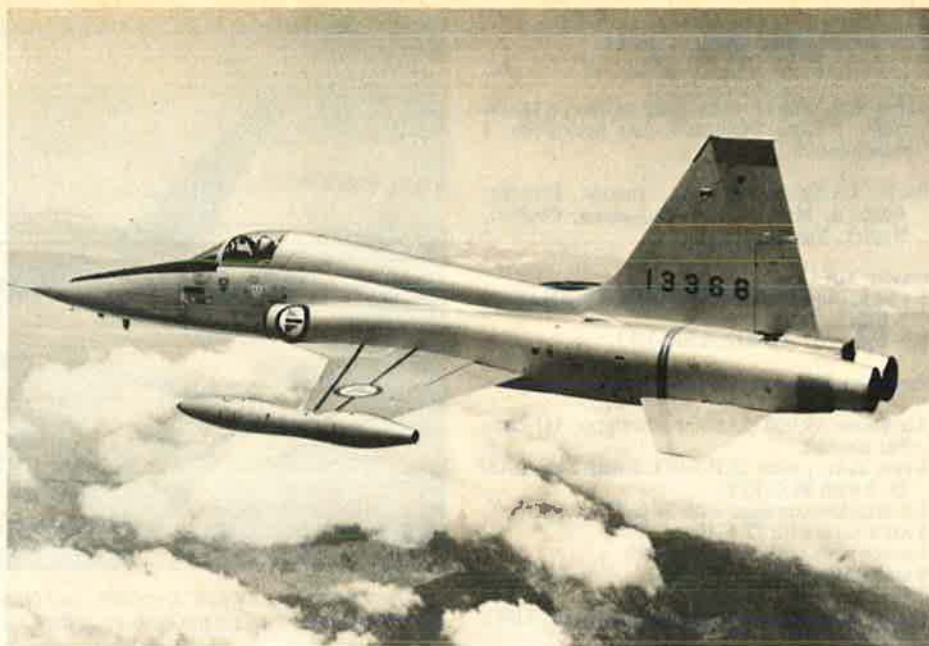
8 coastal patrol craft<.

4 *São Roque* coastal minesweepers.

2 LCT, 11 LCM.

7 auxiliaries.

**Base:** Lisbon.



The Norwegian Air Force is one of many in NATO and elsewhere around the world that is equipped with Northrop F-5 lightweight fighters.

**Air Force:** 9,500 (1,300 para); 24 combat aircraft.

1 FGA sqn with 18 G-91R-3/-4, 6 G-91T.

2 tpt sqns with 5 C-130H, 22 CASA C-212 *Aviocar*.

Trainers incl 9 T-33A, 18 T-37C, 6 T-38A, 19 Do-27, 25 *Chipmunk*, 32 Reims-Cessna FTB 337G ac, 12 *Alouette III* hel.

2 hel sqns with 24 *Alouette III*, 10 SA-330 *Puma*. 3 para bns.

**Para-Military Forces:** 12,650 National Republican Guard, 12,200 Public Security Police, 7,000 Fiscal Guard.

**RESERVES:** 400,000.

**Navy:** 45,000 (31,000 conscripts).

13 submarines (3 Type 209, 10 ex-US *Guppy*).

12 ex-US destroyers (5 *Gearing* with *ASROC*, 5 *Fletcher*, 1 *Sumner*, 1 *R H Smith*).

2 *Berk* frigates with 1 hel.

11 FAC(M) (2 Lürssen with *Harpoon* SSM, 9 *Kar-tal* with *Penguin* SSM).

8 FAC(T) (7 *Jaguar*, 1 *Girne*).

42 large patrol craft (incl 2 ex-US *Asheville*, 6 PC1638, 4 PGM 71, 1 SAR33 type) some with *Gendarmerie*.

4 83-ft coastal patrol craft.

1 *Nusret*, 6 coastal minelayers.

21 coastal (12 ex-US *Adjutant*, 4 ex-Can MCB, 5 ex-Ger *Vegeack*), 4 ex-US *Cape* inshore minesweepers.

4 ex-US LST, 32 LCT, 16 LCU, 20 LCM.

1 ex-Ger depot ship (trg).

1 ASW sqn with 12 S-2E *Tracker*, 2 TS-2A.

3 AB-204B, 6 AB-212 ASW hel.

(On order: 1 Type 209 sub, 2 FAC(M), *Harpoon* SSM, 10 AB-212 ASW hel.)

**Bases:** Gölcuk, Istanbul, Izmir, Eregli, Iskenderun.

**RESERVES:** 25,000.

**Air Force:** 51,000 (30,000 conscripts); 303 combat aircraft.

11 FGA sqns: 3 with 65 F-4E and 8 RF-4E, 3 with 60 F-5A/B, 3 with 50 F-100C/D/F, 2 with 30 F/TF-104G.

3 interceptor sqns: 1 with 20 F-5A/B, 2 with 32 F-104S, 4 TF-104G.

2 recce sqns with 30 RF-5A, 4 F-5B.

5 tpt sqns with 7 C-130E, 20 Transall C-160, 30 C-47, 3 C-54, 3 *Viscount* 794, 2 *Islander*, 2 CASA C-212, 6 Do-28, 3 Cessna 421 ac; 5 UH-19, 6 HH-1H, 10 UH-1H hel.

Trainers incl 40 T-33A, 30 T-37, 19 T-41, 50 F-100C/F.

*Sidewinder*, *Sparrow*, *Falcon* AAM; AS.12, *Bullpup*, *Maverick* ASM.

8 SAM sqns with 170 *Nike Hercules*.

(On order: 6 RF-4E, 30 T-38A trainers, *Sidewinder Sparrow* AAM).

**Para-Military Forces:** 120,000 *Gendarmerie* (incl 3 mobile bdes).

## TURKEY

**Population:** 44,400,000.

**Military service:** 20 months.

**Total armed forces:** 566,000 (271,000 conscripts).

**Estimated GNP 1978:** \$45.3 bn.

**Defence expenditure 1979-80:** 64.8 bn liras (\$2.59 bn).

\$1=25 liras (1979), 25 liras (1978).

**Army:** 470,000 (210,000 conscripts). (About half the divs and bdes are below strength.)

1 arm'd div.

2 mech inf divs.

14 inf divs.

5 arm'd bdes.

4 mech inf bdes.

5 inf bdes.

1 para bde, 1 cdo bde.

4 SSM bns with *Honest John*.

3,500 M-47 and M-48 med tks; 1,600 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, 6 Cessna 206, 3 Cessna 421, 7 Do-27, 7 Do-28, 20 Beech *Baron*, 40 *Champion Citabria* 150S trg ac; 100 AB-205/-206, 20 Bell 47G, 48 UH-1D hel.

(On order: 193 *Leopard* med tks, TOW, *Milan* ATGW.)

**DEPLOYMENT:** *Cyprus*: 2 inf divs (26,000).



## THE MILITARY BALANCE 1979/80

# Other European Countries

### ALBANIA

Population: 2,770,000.  
 Military service: Army 2 years; Air Force, Navy, and special units 3 years.  
 Total armed forces: 43,000 (22,500 conscripts).  
 Estimated GNP 1978: \$750 m.  
 Defence expenditure 1979: 835 m leks (\$170 m).  
 \$1 = 4.92 leks (1979), 5.36 leks (1978).

**Army:** 30,000 (20,000 conscripts).

1 tk bde.  
 5 inf bdes.  
 2 tk bns.  
 3 arty regts.  
 2 AD regts.  
 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 ex-Sov W-class submarines.  
 3 ex-Sov *Kronstadt* large patrol craft.  
 44 FAC(T) (32 ex-Ch *Hu Chwan* hydrofoils<, 12 P4<).  
 6 ex-Ch *Shanghai-II* FAC(G).  
 6 ex-Sov minesweepers (2 T43 ocean, 4 T301 inshore).  
 11 ex-Sov PO-2 minesweeping boats<.

Bases: Durazzo, Valona.

**Air Force:** 10,000 (1,500 conscripts); 100 combat aircraft.  
 6 interceptor sqns with 20 MiG-15/F-2, 30 MiG-17/F-4, 30 MiG-19/F-6, 20 MiG-21/F-8.  
 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: 7,540,000.  
 Military service: 6 months, followed by 60 days reservist training for 12 years.  
 Total armed forces: 38,000 (21,000 conscripts; total mobilizable strength 155,000). In addition some 70,000 reservists called up for trg at some time during the year.

AIR FORCE Magazine / December 1979



### OTHER EUROPEAN COUNTRIES

- |            |            |                |
|------------|------------|----------------|
| 1. Albania | 4. Finland | 7. Switzerland |
| 2. Austria | 5. Spain   | 8. Yugoslavia  |
| 3. Eire    | 6. Sweden  |                |



Austria developed and produced this tank destroyer for its army. It has a 105mm antitank gun and is equipped with a laser rangefinder.

Estimated GNP 1978: \$58.1 bn.  
Defence expenditure 1979: 11.69 bn schilling (\$857 m).  
\$1 = 13.65 schilling (1979), 14.58 schilling (1978).

**Army:** 34,000 (19,000 conscripts).  
1 mech div of 3 mech bdes, each with 1 tk, 1 mech inf, 1 armd arty and/or 1 armd ATK bns.  
28 *Landwehrstammregimente* (trg regts) to train and form reserves.  
4 arty bns.  
3 AA arty bns.  
3 engr bns.  
5 sigs bns.  
120 M-47, 150 M-60A1 med tks; 460 Saurer 4K4F APC; 22 SFKM2 155mm guns; 108 M-101 105mm, 24 M-1 155mm how, 38 M-109 155mm sp how; 301 81mm, 107 M-2 107mm, 82 M-30 120mm mor; 18 Steyr 680 M3 130mm multiple RL; 240 M52/M55 85mm towed, 153 *Kuerassier* SP ATK guns; 400 M-40 106mm RCL.  
(On order: 50 M-60A3 med tks.)

**DEPLOYMENT:** *Cyprus* (UNFICYP): 1 inf bn (330); *Syria* (UNDOF): 1 bn (523); other Middle East (UNTSO): 13.

**RESERVES:** 117,000; 8 reserve bdes (each of 3 inf, 1 arty, 1 engr/ATK bns) and 26 inf regts *Landwehr* distributed among 8 regional military comds. 830,000 have a reserve commitment.

**Air Force:** 4,000 (2,000 conscripts); 34 combat aircraft. (Austrian air units, an integral part of the Army, are listed separately for purposes of comparison.)  
4 FB sqns with 34 Saab 105Ö.  
1 tpt sqn with 2 *Skyvan*, 12 *Turbo-Porter*.  
7 hel sqns with 23 AB-204B, 13 AB-206A, 26 *Alouette III*, 12 OH-58B, 2 S-650e (HH-53).  
1 trg sqn with 19 Saab 91D.  
Other ac incl 20 Cessna L-19, 3 DHC-2.  
2 indep AD bns.  
370 20mm Oerlikon, 72 35mm Z/65, Z/75, 60 40mm Bofors AA guns; *Super-Bat* and *Skyguard* AD system.  
(On order: 24 AB-212 hel.)

**RESERVES:** 700.

*Para-Military Forces:* 11,250 Gendarmerie.

## EIRE

Population: 3,270,000.  
Military service: voluntary.  
Total armed forces: 13,876.  
Estimated GNP 1978: \$10.2 bn.  
Defence budget 1979: £100 m (\$205 m).  
\$1 = £0.49 (1979), £0.53 (1978).

**Army:** 12,483.  
6 inf bdes: 1 with 3, 2 with 2, 3 with 1 inf bns; each bde also has 2 TA inf bns, 1 fd arty regt (1 regular, 2 TA btys), 1 engr coy, 1 sig sqn.  
1 indep inf bn.  
1 AA arty bn.  
4 AML-90, 26 AML-60 armd cars; 30 Panhard VTT/M3, 17 *Unimog*, 5 *Timoney* APC; 48 25-pdr gun/how; 204 81mm, 72 120mm mor; 447 *Carl Gustav* 84mm, 60 PV-1110 90mm RCL; 26 Bofors 40mm AA guns.  
(On order: 4 *Scorpion* 1t tks, 105mm 1t guns, *Milan* ATGW.)

**DEPLOYMENT:** *Lebanon*: (UNIFIL): 1 bn, 1 HQ coy (754); *Cyprus* (UNFICYP): 7.

**Navy** (Naval service): 682.  
3 ex-Br *Ton* coastal minesweepers.  
3 fishery protection vessels, 1 survey vessel.

**Base:** Cork.

**Air Force** (Air Corps): 711; 16 combat aircraft.  
1 COIN sqn with 6 *Super Magister*.  
1 COIN/trg sqn with 10 SF-260W.  
1 liaison sqn with 8 Cessna 170H.  
1 hel sqn with 8 *Alouette III* hel.  
1 ft with 2 *Dove*, 2 *King Air*.  
(On order: 1 HS-125-600-8 tpt.)

**RESERVES:** 20,136 (1st line 466, 2nd line 19,670).

## FINLAND

Population: 4,780,000.  
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 1978: \$30.8 bn.  
Defence expenditure 1979: 2.08 bn markka (\$523 m)  
\$1=3.97 markka (1979), 4.17 markka (1978).

**Army:** 34,400 (28,000 conscripts).  
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, 28 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; SA-7 SAM.  
(On order: SA-3 SAM.)

**DEPLOYMENT:** *Syria* (UNDOF): 523; *Cyprus* (UNFICYP): 11.

**Navy:** 2,500 (incl 2,000 conscripts).  
2 ex-Sov *Riga* frigates.  
2 *Turunmaa* corvettes.  
5 FAC(M) (4 ex-Sov *Osa-II*, 1 *Isku* with *Styx* ssm).  
14 FAC(G) (12 *Nuoli* <, 2 *Vasama* <).  
5 large patrol craft (3 *Ruissalo*, 2 *Rihtniemi*).  
1 minelayer, 6 *Kuha* inshore minesweepers.  
1 HQ and logistic ship.  
13 small LCU/tpts, 6 utility spt ships.  
(On order: 5 *Osa-II* FAC(M), 1 minelayer.)

**Air Force:** 3,000 (2,000 conscripts); 59 combat ac.  
2 fighter sqns with 17 MiG-21F, 12 MiG-21bis, 12 J-35S, 6 J-35F, 5 J-35B *Draken*.  
1 OCU with 4 MiG-21U, 3 J-35C.  
Tpts incl 6 C-47, 2 Cessna 402.  
Trainers incl 60 *Magister*, 24 Saab *Safir*.  
Liaison ac: 5 *Cherokee Arrow*.  
1 hel ft with 3 Mi-4, 6 Mi-8, 1 Hughes 500, 1 AB-206A.  
AA-2 *Atoll*, *Falcon* AAM.  
(On order: 18 MiG-21bis fighters, 50 *Hawk*, 30 *Leko-70* trg ac.)

**RESERVES** (all services): 700,000 (30,000 a year do training).

*Para-Military Forces:* 4,000 frontier guards, 5 large, 10 coastal patrol craft.

## SPAIN

Population: 37,340,000.  
Military service: 15 months.  
Total armed forces: 321,000 (191,000 conscripts).  
Estimated GNP 1977: \$127.5 bn.  
Defence expenditure 1979: 235.7 bn pesetas (\$3.37 bn).  
\$1 = 69.91 pesetas (1979), 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  
1 mountain bde.  
1 airportable bde.  
1 para bde.  
2 arty bdes.  
2 armd cav regts.  
1 lt cav rgt.  
5 inf regts.  
3 Foreign Legion regts.  
4 *Regulares* inf gps.  
12 arty regts (2 fd, 1 rocket, 1 ATK, 6 coast/AA, 2 hy AA).  
7 engr regts, 1 engr bn.  
2 sigs regts.  
2 cdo coys.  
2 special sea coys.  
1 SAM bn with *Nike Hercules* and *HAWK*.  
200 AMX-30, 360 M-47, 110 M-48 med, 180 M-41 lt tks; 88 AML-60, 100 AML-90 armd cars; BMR-600 MICV, 542 M-113 APC; 860 105mm, 200 122mm, 80 155mm, 24 203mm guns/how; 48 M-108 105mm, 10 M-44, 70 M-109 155mm, 12 M-107 175mm, 4 M-110/203mm guns/how; 216mm, 300mm, 381mm multiple RL; 60mm, 860 81mm, 105mm, 400 120mm mor; 90mm, 106mm RCL; SS-11, *Milan*, *Cobra*, *Dragon* ATGW; 54 35mm, 280 40mm, 150 90mm AA guns; 200 8mm, 6-in, 12-in, 15-in coast arty guns; *Nike Hercules*, *Improved HAWK* SAM; 10 CH-47C, 3 *Puma*, 54 UH-1B/H, 3 *Alouette III*, 1 AB-206A, 10 OH-13, 13 OH-58A hel.  
(On order: 100 AMX-30 med tks, 550 M-113 APC, 18 M-109 155mm how, *TOW* ATGW, 28 *Skyguard* AD systems; 18 OH-58A hel.)

**DEPLOYMENT:** *Balearic Islands:* 8,600; 3 inf, 2 coast/AA regts, 1 engr bn, 1 lt cav gp, 1 cdo coy.  
*Canary Islands:* 16,000; 2 inf, 1 Foreign Legion, 2 coast/AA regts, 2 engr bns, 2 lt cav gps, 1 cdo coy.  
*Ceuta/Melilla:* 19,000; 2 armd cav, 2 Foreign Legion, 2 coast/AA, 2 engr regts, 4 *Regulares* gps, 2 special sea coys.

**RESERVES:** 700,000.

**Navy:** 40,000 (10,000 Marines, 32,000 conscripts).  
8 submarines (4 *Daphne*, 3 ex-US *Guppy* IIA, 1 ex-US *Balao*).  
1 ex-US *Independence* aircraft carrier (6 AV-8A, 18 hel).  
13 destroyers, 7 with 1 hel (2 *Roger de Lauria*, 5 ex-US *Gearing*, 5 ex-US *Fletcher*, 1 *Oquendo*).  
16 frigates (3 F30, 5 *Baleares* with *Standard* SAM, *ASROC*, 1 *Audaz*, 2 *Alava*, 1 *Pizarro*, 4 *Atrevida*).  
12 FAC(P) (6 *Lazaga*, 6 *Barcelo*).  
4 ex-US *Aggressive* ocean, 12 *Nalon* coastal minesweepers.  
2 attack tpts, 1 LSD, 3 LST, 8 LCT, 2 LCU, 6 LCM.  
1 FGA sqn with 5 AV-8A *Matador* (*Harrier*), 2 TAV-8A.  
1 comms sqn with 4 *Comanche*.  
5 hel sqns with 10 SH-3D, 4 AB-204B, 3 AB-212, 12 Bell 47G, 12 Hughes 500HM, 5 AH-1G.  
4 Marine lt inf regts and 2 indep gps.  
(On order: 4 *Agosta* subs, 1 aircraft carrier, 8 frigates, *Harpoon* SSM, 6 AV-8A FGA, 8 AB-212, 12 *Puma* SAR hel.)

**Bases:** Ferrol, San Fernando, Cadiz, Cartagena.

**RESERVES:** 285,000.

**Air Force:** 41,000 (9,000 conscripts); 168 combat aircraft.  
*Air Defence Command.*  
5 interceptor sqns: 2 with 36 F-4C(S), 2 with 22 *Mirage IIIE*, 6 *IIID*, 1 with 13 *Mirage F1CE*.

### ical Command.

FB sqns with 16 F-5A, 2 F-5B, 20 HA-220 Super Saeta.

2 recce sqns with 4 RF-4, 19 RF-5A, 4 RF-4C.

1 MR sqn with 2 P-3A.

5 liaison flts with 12 O-1E, 27 Do-27.

Sparrow, Sidewinder, R.550 Magic AAM.

### Transport Command.

7 sqns with 7 C-130H, 3 KC-130H, 1 DC-8-52, 12 CASA-27 Azor, 40 C-212 Aviocar, 12 DHC-4, 5 Aztec, 1 Navajo, 1 Falcon, 4 Convair 440, 3 Mystere 20.

### Training Command.

2 OCU with 24 F-5B.

5 sqns with 35 F-33C Bonanza, 40 Ha-200 A/B Saeta, 40 T-33A, 14 T-34, 60 T-6, 8 King Air, 18 Baron.

34 AB-47 and AB-205 hel.

Other ac incl:

3 SAR sqns with 3 F-27-400 MPA, 3 HU-16A, 6 Do-27 ac, 17 AB-205-206, 3 Alouette III.

1 SAR sqn with 8 CL-215.

(On order: 58 Mirage F1 fighters, 4 P-3 Orion MR, 11 Aviocar, 2 C-130H tpts, 60 CASA C-101 trainers, 17 Hughes 300C, 69 BO-105 hel, Super Sidewinder AAM.)

RESERVES: 100,000.

Para-Military Forces: 60,000 Guardia Civil, 40,000 Policia Armada.

## SWEDEN

Population: 8,320,000.

Military service: Army and Navy 7½-15 months, Air Force 8-12 months.

Total armed forces: 65,900 (47,570 conscripts; 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; total mobilizable strength about 750,000 within 72 hours).

Estimated GNP 1978: \$84.9 bn.

Defence expenditure 1979-80: Kr 14.51 bn (\$3.33 bn).

\$1 = 4.34 kronar (1979), 4.60 kronar (1978).

Army: 44,500 (35,800 conscripts). (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.)

### 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.

26 Local Defence Districts with 100 indep bns and 400-500 indep coys.

350 Strv 101, 102 (Centurion), 310 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; Miniman 74mm, Carl Gustav 84mm RCL; Bantam ATGW; 20mm, 40mm AA guns; Redeye, RBS-70, HAWK SAM; 19 Sk-61 (Bulldog), 17 Super Cub ac; 15 HKP-3 (AB-204B), 22 HKP-6 (Jet Ranger) hel.

(On order: Ikv 91 lt tanks, FH77 155mm how, TOW ATGW, Improved HAWK SAM.)

DEPLOYMENT: Cyprus (UNFICYP): 425; Egypt (UNEF): 645.

Navy: 11,800 (6,970 conscripts).

14 submarines (3 Näcken, 5 Sjöormen, 6 Draken).

3 destroyers (1 Södermanland with Rb08A ssm, Seacat SAM, 2 Halland with Rb08A ssm).

5 Hugin FAC(M) with Penguin ssm.

30 FAC(T) (12 Spica T131, 6 Spica T121, 12 T45).

1 large, 26 coastal patrol craft.

2 Alvsborg minelayers, 1 minelayer/trg ship.

9 coastal, 36 small minelayers.

18 coastal (6 Hanö, 12 Arkö), 18 inshore mine-sweepers.

9 LCM, 86 LCU.

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 hel.

(On order: 12 FAC(M), 1 minelayer.)

Bases: Stockholm, Karlskrona, Goteborg, Harnosand.

Air Force: 9,600 (4,800 conscripts); 432 combat aircraft. (More ac in store, including 110 A-32A Lansan.)

6 FGA sqns: 5 with 90 AJ-37 Viggen, 1 with 18 SK-60C (Saab 105).

15 AWX sqns: 11 with 234 J-35F Draken, 4 with 72 J-35D.

3 recce sqns: with 54 SH/SF-37 Viggen.

2 tpt sqns with 3 C-130E/H, 2 Caravelle, 6 C-47.

5 comms sqns with 110 SK-60A/B, 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; Rb604E, Rb05A ASM.

A fully computerized, semi-automatic control and air surveillance system, Stril 60, coordinates all air defence components.

(On order: 30 JA-37 Viggen interceptors, Skyflash AAM, Maverick ASM.)

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. In addition, some 300,000 reservists are called up for refresher training at some time during the year.)

Estimated GNP 1978: \$83.9 bn.

Defence expenditure 1979: fr3.10 bn (\$1.84 bn).

\$1 = 1.68 francs (1979), 1.88 francs (1978).

Army: 580,000 on mobilization (excluding Aviation Corps [Air Force]).

### War establishment:

3 fd corps, each of 1 armd, 2 inf divs.

1 mountain corps of 3 mountain inf divs.

23 indep bdes (11 frontier, 6 territorial, 3 fortress, 3 redoubt).

Indep units (1 armd car bn, 3 hy arty, 2 engr, 2 sigs regts).

320 Centurion, 150 Pz-61, 370 Pz-68 med tks; 1,250 M-113 APC; 105mm guns; 260 M-109U

155mm SP how; 81mm, 120mm mor; 75mm, 90mm, 105mm ATK guns; 83mm, 106mm RCL

Bantam ATGW; 10 patrol boats.

(On order: 160 Pz-68 med tks, 225 M-113 APC, 207 M-109 155mm SP how, Dragon ATGW.)

Air Force (Aviation Corps, an integral part of the Army, is listed separately for purposes of comparison): 45,000 on mobilization (maintenance by civilians); 329 combat aircraft.

7 FB sqns with 100 Venom FB50, 30 F-5E.

9 FGA/interceptor sqns with 140 Hunter F58.

2 interceptor sqns with 33 Mirage IIIS.

1 recce sqn with 18 Mirage IIIRS, 8 Venom FB54 Mk IR.

7 lt ac sqns with 6 Do-27, 6 Porter, 24 Turbo-

Porter, 3 Bonanza ac, 26 Alouette II, 70

Alouette III hel.

Other ac incl 48 Pilatus P-2, 60 P-3, 35 Vampire T55, 3 Mirage IIIBS, 8 Hunter T58, 6 F-5F, 23 FFA C-3605 target tugs.

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 with 20mm, 35mm, 40mm AA guns.

(On order: 40 F-5E FGA, 45 Skyguard AA systems.)

RESERVES: Militia 621,500.

## YUGOSLAVIA

Population: 22,110,000.

Military service: Army and Air Force 15 months Navy 18 months.

Total armed forces: 259,000 (145,000 conscripts).

Estimated GNP 1977: \$37.8 bn.

Defence expenditure 1979: 52.47 bn dinars (\$2.81 bn).

\$1 = 18.69 dinars (1979), 18.28 dinars (1977).

Army: 190,000 (130,000 conscripts).

8 inf divs.

7 indep tk bdes.

12 indep inf bdes.

2 mountain bdes.

1 AB bn.

12 arty, 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-6C

APC; 76mm, 105mm, 122mm, 130mm, 152mm, 155mm guns/how; SU-76, SU-100, 105mm SF

how; 81mm, 120mm mor; 128mm multiple RL; FROG-7 ssm; 57mm, 75mm, 100mm towed,

ASU-57, M-18 76mm, M-36 90mm 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-6/7 SAM.

Navy: 25,000, incl Marines (8,000 conscripts).

5 submarines (3 Heroj, 2 Sutjeska).

1 Split destroyer.

3 corvettes (2 Mornar, 1 Le Fougueux).

13 FAC(M) with Styx ssm (3 Rade Koncar, 10 ex-Sov Osa-I).

15 ex-Sov Shershen FAC(T).

20 large patrol craft (10 Kraljevica, 10 Type 131).

4 Vukovklanac coastal, 10 inshore (4 Ham, 6 M-111), 17 river minesweepers.

24 LCT/minelayers, 2 LCA.

25 coast arty btys.

1 ASW sqn with Ka-25 hel, Mi-8, Gazelle hel.

1 marine bde.

(On order: 2 subs, 6 FAC(M), 1 LST.)

Bases: Lora/Split, Pula, Sibenik, Ploce, Gulf of Cattaro.

Air Force: 44,000 (7,000 conscripts); 332 combat aircraft.

15 FGA sqns with 12 Kraguj, 110 Galeb/Jastreb.

9 interceptor sqns with 126 MiG-21F/PF/M.

3 recce sqns with 21 RT-33A, 25 Galeb/Jastreb.

OCU with 18 MiG-21U, 20 Jastreb.

Tpts incl 15 C-47, 10 Il-14, 2 Il-18, 6 Yak-40, 1 Caravelle, 2 An-12, 13 An-26, 4 Li-2, 1 Boeing

727-200.

60 Galeb/Jastreb 3 T-33, 30 UTVA-75 trainers.

14 Mi-1, 20 Mi-4, 48 Mi-8, 20 SA-341H Gazelle hel.

AA-2 Atoll AAM.

8 SA-2, 4 SA-3 SAM bns.

(On order: 94 Gazelle hel.)

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



THE MILITARY BALANCE 1979/80

# The Middle East and the Mediterranean

## BILATERAL AGREEMENTS WITH EXTERNAL POWERS

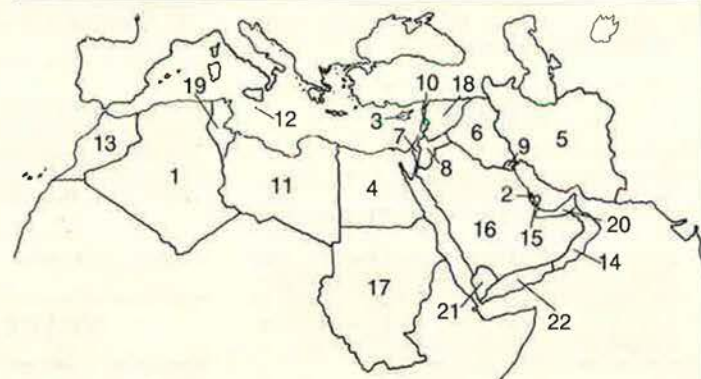
The Soviet Union has a fifteen-year treaty of friendship and co-operation with Iraq which was signed in April 1972. A similar but more comprehensive treaty with Egypt, signed in May 1971, was abrogated by Egypt in March 1976. Before May 1975 the Soviet Union was a major arms supplier to Egypt, but no 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, but SSBN were withdrawn from the Rota base in early 1979. (There is also an agreement with Portugal for the use of the Azores.)

Britain had an agreement with the Republic of Malta, signed on 26 March 1972, which permitted her to base forces on the island for British and for NATO purposes. This expired in March 1979 and 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. Egypt is believed to be assisting Oman with forces.

Britain—a signatory, with Greece and Turkey, of the 1959 Treaty of Guarantee which guarantees the indepen-



THE MIDDLE EAST AND THE MEDITERRANEAN

- |             |   |
|-------------|---|
| 1. Algeria  | 14. Oman  |
| 2. Bahrain  | 15. Qatar                                       |
| 3. Cyprus   | 16. Saudi Arabia                                |
| 4. Egypt    | 17. Sudan                                       |
| 5. Iran     | 18. Syria                                       |
| 6. Iraq     | 19. Tunisia                                     |
| 7. Israel   | 20. United Arab Emirates (UAE)                  |
| 8. Jordan   | 21. Yemen Arab Republic (North)                 |
| 9. Kuwait   | 22. Yemen: People's Democratic Republic (South) |
| 10. Lebanon |   |
| 11. Libya   |   |
| 12. Malta   |   |
| 13. Morocco |   |

dence, 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.

## MULTILATERAL AGREEMENTS INCLUDING EXTERNAL POWERS

A number of Mediterranean countries are members of NATO.

The Central Treaty Organization (CENTO), consisting of Britain, Iran, Pakistan, and Turkey, with the United States as an associate, became defunct when the regional powers withdrew in 1979.

There are United Nations forces stationed in Cyprus (UNFICYP), Syria (UNDOF), and Lebanon (UNIFIL). The future presence of the UN in Sinai is under discussion, but UNEF is being withdrawn.

## 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, and, although little of substance resulted until 1979, much closer co-operation appears to be in train. 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 remains unclear, but it must be presumed to be in abeyance. Algeria and Libya signed a defence agreement in December 1975, and Egypt signed one with Sudan in January 1977. Mauritania and Morocco signed a defence agreement in May 1977.

Iran has provided military assistance to Oman. This ceased with the revolution in Iran, but the new regime is showing interest in renewing the assistance.

In 1975 the Arab Military Industrial Organization (AMIO) was set up to encourage indigenous Arab arms production. British, French, German, and American equipment was to be produced under licence. The Arab states originally involved include Egypt, Saudi Arabia, Qatar, the United Arab Emirates (UAE), and Sudan. Production was to have been in Egypt, at least in the first instance, but, in protest at Egypt's policies towards Israel, Saudi Arabia, Qatar, and the UAE have withdrawn their promises of financial support and AMIO must be regarded as defunct.

## ALGERIA

Population: 19,070,000.  
Military service: 6 months.  
Total armed forces: 88,800.  
Estimated GNP 1978: \$15.9 bn.  
Defence expenditure 1979: 2.32 bn dinars (\$605 m).  
\$1=3.83 dinars (1979), 4.04 dinars (1978).

Army: 78,000.  
1 armd bde.  
4 mot inf bdes.  
3 indep tk bns.  
70 indep inf bns.  
1 para bn.  
12 coys desert troops.

12 indep arty bns.  
7 AA arty bns.  
3 engr bns.  
500 T-54/-55/-62 med, 40 AMX-13 lt tks; AML armd cars; 450 BTR-40/-50/-60/-152, *Walid* APC; 600 85mm, 122mm, 152mm guns and how; 70 SU-100, 15 ISU-122/-152 sp guns; 80 120mm, 160mm mor; 20 140mm, 30 240mm RL; FROG-4 SSM; *Sagger* ATGW; 57mm, 85mm, 100mm AA guns; SA-7 SAM.

RESERVES: up to 100,000.

Navy: 3,800.  
6 ex-Sov SO1 large patrol craft.  
16 ex-Sov FAC(M) with *Styx* SSM (3 *Osa-I*, 7 *Osa-II*, 6 *Komar*<).

10 ex-Sov P-6 FAC(T)< (6 coastguard).  
10 Baglietto FAC(G).  
2 ex-Sov T-43 ocean minesweepers.  
1 ex-Sov *Polnocny* LCT.  
2 F-28 tpt ac.  
(On order: 1 F-28 tpt.)

Bases: Algiers, Annaba, Mers el Kebir.

Air Force: 7,000; 260 combat aircraft.  
1 lt bbr sqn with 24 Il-28.  
3 interceptor sqns with 90 MiG-21.  
6 FGA sqns: 2 with 30 Su-20, 2 with 30 MiG-17, 2 with 40 MiG-23.  
1 recce sqn with 6 MiG-25R.  
1 COIN sqn with 20 *Magister*.  
OCU with 20 MiG-15.  
1 tpt sqn with 8 An-12, 5 An-24, 10 F-27.  
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/-21UTI, Su-7U, 19 Yak-11/-18, 6 T-34C, 7 *Beech Sierra*.  
AA-2 *Atoll* AAM.  
SA-2/-6 SAM.

Para-Military Forces: 10,000 Gendarmerie.

## BAHRAIN

Population: 355,000.  
Estimated GNP 1977: \$1.7 bn.  
Total armed forces: 2,300.  
Defence expenditure 1979: 37.5 m dinars (\$98 m).  
\$1=0.384 dinars (1979), 0.400 dinars (1977).

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



Several countries in the region have these Soviet-built SA-2 SAMs with a slant range of 40 to 50 km, as well as a variety of other Soviet air defence missiles.

Coastguard: 200.  
9 small coastal patrol craft.  
1 *Loadmaster*, 1 60-ft landing craft.  
(On order: 4 FAC(P).)

Police: 2,500.  
2 *Scout*, 3 BO-105 hel.

## CYPRUS

Population: 652,000 (508,000 Greek, 117,000 Turkish, 27,000 other).  
Estimated GNP 1977: \$1.02 bn.  
\$1 = £C 0.41 (1977).

1. GREEK-CYPRIOI FORCES  
Military service: 26 months.  
Total armed forces: 10,000 (reducing to about 8,000).  
Defence expenditure 1979: £C 7.0 m (\$0.36 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 *rece/mech* inf bns.  
20 inf bns (under strength).  
15 arty and support units.  
25 T-34 med tks; BTR-50 APC; 30 Marmion-Harrington armd cars; 120 100mm, 105mm, and 25-pdr guns and 75mm how; 40mm, 3.7-in. AA guns.

RESERVES: 20,000.

Para-Military Forces: 3,000 armed police.

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

## EGYPT

Population: 40,460,000.  
Military service: 3 years.  
Total armed forces: 395,000.  
Estimated GNP 1977: \$18.1 bn.  
Defence expenditure 1979-80: £E 1.5 bn (\$2.17 bn).  
\$1 = £E 0.692 (1979), £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).  
2 Republican Guard Brigades (div).  
3 indep armd bdes.  
8 indep inf bdes.  
2 airmobile bdes.  
1 para bde.  
6 cdo gps.

6 arty, 2 hy mor bdes.  
2 ATGW bdes.  
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, 240mm mor; 300 122mm, 132mm, 140mm, 240mm RL; 30 *FROG-4/-7*, 24 *Scud B*, *Samlet* SSM; 900 57mm, 85mm, and 100mm ATK guns; 900 82mm, 107mm RCL; 1,000 *Sagger*, *Snapper*, *Swatter*, *Milan*, *Beeswing* ATGW; 350 ZSU-23-4, ZSU-57-2 sp AA guns; 20 *Crotale*, SA-7/-9 SAM. (There is a shortage of spares for Soviet equipment.)  
(On order: *Swingfire* ATGW.)

DEPLOYMENT: Oman: 200. Sudan: 2 armd, 3 inf bdes (50,000).

AIR DEFENCE COMMAND (78,000): 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.)

RESERVES: about 500,000.

Navy: 20,000.

12 ex-Sov submarines (6 W-, 6 R-class).  
5 destroyers (4 ex-Sov *Skory*, 1 ex-Br Z-class).  
3 ex-Br frigates (1 *Black Swan*, 1 *Hunt*, 1 *River* sub spt ship).  
12 ex-Sov SO1 large patrol craft.  
16 FAC(M); 10 ex-Sov with *Stryx* SSM (6 *Osa-I*, 4 *Komar*<), 6 *October* 6< with *Otomat* SSM.  
26 ex-Sov FAC(T) (2 *Shershen*, 20 P-6<, 4 P-4<).  
4 ex-Sov *Shershen* FAC(G).  
10 ex-Sov ocean (6 T-43, 4 *Yurka*), 4 inshore (2 T-301, 2 K-8) minesweepers.  
3 SRN-6 hovercraft.  
4 ex-Sov LCT (3 *Polnocny*, 1 MP4).  
14 ex-Sov LCU (10 *Vydra*, 4 SMB1).  
6 *Sea King* ASW hel.  
(On order: 6 *Vosper Ramadan* FAC(M), 3 SRN-6 hovercraft, *Otomat* SSM.)

Bases: Alexandria, Port Said, Mersa Matruh, Port Suez, Hurghada, Safaqa.

RESERVES: about 15,000.

Air Force: 25,000; about 563 combat aircraft.

(There is a shortage of spares for Soviet equipment, and many ac are grounded.)  
1 bbr regt with 23 Tu-16 (some with AS-5 ASM).  
4 FB regts: 2 with 100 MiG-21/PFM/F, 1 with 90 MiG-17F, 1 with 46 *Mirage* IIIIEE/DE.  
4 FGA/strike regts: 3 with 120 Su-7BMK, 1 with 46 Su-20.  
3 interceptor regts with 108 MiG-21MF/U, 1 sqn with 24 MiG-23S, 6 MiG-23U.  
2 EC-130H, IL-14 ELINT ac.  
Tpts incl 5 C-130, 26 Il-14, 16 An-12, 1 *Falcon*, 1 Boeing 707, 1 Boeing 737.  
Hel incl 20 Mi-4, 32 Mi-6, 55 Mi-8, 28 *Commando*, 6 *Sea King*, 54 *Gazelle*.  
Trainers incl 50 MiG-15UTI, 100 L-29, 40 *Gomhouria*.  
AA-2 *Atoll*, R.530 AAM, AS-1 *Kennel*, AS-5 *Kelt* ASM.  
(On order: 42 F-5E, 8 F-5F, 35 F-4E, 14 *Mirage* 5, 60 MiG-19/F-6 fighters, 164 *AlphaJet* trainers, 12 C-130H tpts, 50 *Lynx*, 20 *Gazelle* hel, *Sidewinder* AAM.)

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: 39,330,000.

Military service: 1 year.

Total armed forces: 415,000. (60% of army reported to have deserted. Details listed relate to pre-revolution situation. Serviceability of equipment, particularly ships and ac, is doubtful.)

Estimated GNP 1977: \$75.1 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.  
875 *Chieftain*, 400 M-47/-48, 460 M-60A1 med, 250 *Scorpion* lt tks; BMP MICV, about 325 M-113, 500 BTR-40/-50/-60/-152 APC; 710 guns/how, incl 75mm pack, 330 M-101 105mm, 130mm, 112 M-114 155mm, 14 M-115 203mm

towed, 440 M-109 155mm, 38 M-107; 14 M-110 203mm sp; 72 BM-21, 122n 106mm RCL; ENTAC, SS-11, SS-12, D; TOW ATGW; 1,800 23mm, 35mm, 40 57mm, 85mm towed, 100 ZSU-23-4/-57. AA guns; *HAWK* SAM.  
Ac incl 40 Cessna 185, 6 Cessna 310, 10 Cessna O-2A, 2 F-27, 5 *Shrike Commander*, 2 *Falcon*. 205 AH-1J, 285 Bell 214A, 50 AB-205A, 20 AB-206, 90 CH-47C hel.

RESERVES: 300,000.

Navy: 30,000.

1 ex-US *Tang* submarine.  
3 destroyers with *Standard* SSM (1 ex-Br *Battle* with *Seacat* SAM, 2 ex-US *Sumner* with 1 hel).  
4 *Saam* frigates with *Seakiller* SSM and *Seacat* SAM.  
4 ex-US PF103 corvettes.  
7 large patrol craft (3 *Improved PGM-71*, 4 *Cape*).  
6 *Kaman* FAC(M) with *Harpoon* SSM.  
3 ex-US coastal, 2 *Cape* inshore minesweepers.  
2 landing ships logistic, 1 ex-US LCU.  
1 replenishment, 2 fleet supply ships.  
8 SRN-6 and 6 BH-7 hovercraft.  
(On order: 1 *Tang* sub, 6 FAC(M) with *Harpoon* SSM, 2 log spt ships.)

Bases: Bandar Abbas, Booshehr, Kharg Island, Korramshar, Chah Bahar, Bandar Pahlavi.

NAVAL AIR:

1 MR sqn with 6 P-3F *Orion*.  
1 assault sqn with 6 S-65A.  
1 ASW sqn with 20 SH-3D.  
1 MCM sqn with 6 RH-53D.  
1 tpt sqn with 6 *Shrike Commander*, 4 F-27, 1 *Mystere* 20.  
Hel incl 4 AB-205A, 14 AB-206, 6 AB-212.  
3 Marine bns.  
(On order: 3 P-3C MR ac, 17 SH-3D hel.)

Air Force: 100,000; 447 combat ac.  
10 strike/FGA sqns with 190 F-4D/E.  
8 FGA sqns with 166 F-5E/F.  
4 interceptor/FGA sqns with 77 F-14A.  
1 *rece* sqn with 14 RF-4E.  
2 tanker/tpt sqns with 13 Boeing 707, 9 Boeing 747.  
4 tpt sqns with 54 C-130E/H.  
1 tpt sqn with 18 F-27, 3 *Aero Commander* 690, 4 *Falcon* 20.  
Hel: 10 HH-34F, 10 AB-206A, 5 AB-212, 39 Bell 214C, 2 CH-47C, 16 *Super Frelon*, 2 S-61A-4.  
Trainers incl 45 F33A/C *Bonanza*, 9 T-33, *Phoenix*, *Sidewinder*, *Sparrow* AAM, AS.12, *Maverick*, *Condor* ASM.  
5 SAM sqns with *Rapier*, 25 *Tigercat*.

Para-Military Forces: 74,000 Gendarmerie with Cessna 185/310 lt ac, 32 AB-205/-206 hel, 32 patrol boats.

## IRAQ

Population: 12,730,000.

Military service: 2 years.

Total armed forces: 222,000.  
Estimated GNP 1978: \$15.5 bn.  
Defence expenditure 1978: 586.5 m dinars (\$2.02 bn).  
\$1=0.295 dinars (1979), 0.290 dinars (1978).

Army: 190,000.

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.  
2 special forces bdes.  
1,700 T-54/-55/-62, 100 T-34 med, 100 PT-76 lt tks; 200 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*.

AIR FORCE Magazine / December 1979



12 *Scud B* ssm; *Sagger*, SS-11, *Milan* ATGW; 1,200 23mm, 37mm, 57mm, 85mm, 100mm towed, ZSU-23-4, ZSU-57-2 SP AA guns; SA-7 SAM.  
(On order: T-62, 100 AMX-30 med tks, 200 *Cas-cavel* APC, *Scud* SSM, 360 *HOT* ATGW.)

RESERVES: 250,000.

Navy: 4,000.  
12 ex-Sov FAC(M) with *Styx* SSM (4 *Osa-I*, 8 *Osa-II*).  
10 ex-Sov P6<FAC(T).  
3 ex-Sov SO1 large patrol craft.  
16 ex-Sov coastal patrol craft (incl 2 PO2<, 5 *Zhuk*<, 2 *Nyryat II*<, 2 *Poluchat*).  
5 ex-Sov minesweepers (2 T43 ocean, 3 *Yevgenya* inshore<).  
3 ex-Sov *Polnocny* LCT.

Bases: Basra, Umm Qasr.

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*, 12 *Super Frelon*, 40 *Gazelle*, 3 *Puma*.  
Trainers incl MiG-15/-21/-23U, Su-7U, Hunter T69, 10 Yak-11, 12 L-29, 24 L-39.  
AA-2 *Atoll* AAM, AS.11/12, AM-39 ASM.  
SA-2, SA-3, 25 SA-6 SAM.  
(On order: 32 *Mirage* F-1C, 4 F-1B fighters, 11-76 tpts, 48 AS.202/18A *Bravo* trg ac.)

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

## ISRAEL

Population: 3,820,000.  
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: 165,600 (125,300 conscripts) mobilization to 400,000 in about 24 hours.  
Estimated GNP 1978: \$10.5 bn.  
Defence expenditure 1979-80: \$1 34.5 bn (\$1.62 bn).  
\$1 = \$I 21.25 (1979), \$I 16.44 (1978).

Army: 138,000 (120,000 conscripts, male and female), 375,000 on mobilization.  
24 armd bdes.  
9 mech bdes.  
9 inf bdes.  
5 para bdes.  
9 arty bdes.  
(11 bdes [5 armd, 4 inf, 2 para] normally kept near full strength; 6 [1 armd, 4 mech, 1 para] between 50% and full strength; the rest at cadre strength.)  
3,050 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; RBV *Ramta*, BRDM recce vchs; M-2/-3/-113, BTR-40/-50P(OT-62)/-60P/-152 APC; 500 105mm how; 450 122mm, 130mm, and 155mm guns/how; 120 M-109 155mm, L-33 155mm, 60 M-107 175mm, 48 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 *Vulcani/Chaparral* 20mm msl/gun systems, 30mm and 40mm AA guns; *Redeye* SAM.

(On order: 325 M-60 med tks, 800 M-113 APC, 175mm guns, *Lance* SSM, *TOW* ATGW.)

Navy: 6,600 (3,300 conscripts) 10,000 on mobilization.  
3 Type 206 submarines.  
19 FAC(M) (7 *Reshef* with *Gabriel* and *Harpoon* SSM, 12 *Saar* with *Gabriel* SSM).  
35 *Dabur* < coastal patrol craft.  
3 ex-US LSM, 6 LCT.  
3 *Westwind* 1124N MR ac.  
Naval cdo: 300  
(On order: 5 *Reshef* FAC(M), 2 Qu-9-35 corvettes, 2 *Flagstaff II* hydrofoils with *Harpoon* SSM, 3 *Westwind* MR ac.)

Bases: Haifa, Ashdod, Sharm-el-Sheikh, Eilat.

Air Force: 21,000 (2,000 conscripts, AD only), 27,000 on mobilization; 576 combat aircraft.  
12 FGA/interceptor sqns: 1 with 48 F/TF-15, 5 with 170 F-4E, 3 with 30 *Mirage III*CJ/BJ, 3 with 60 *Kfir*-C2.  
6 FGA sqns with 250 A-4E/H/M/N *Skyhawk*.  
1 recce sqn with 12 RF-4E, 2 OV-1E, 4 E-2C AEW.  
Tpts incl 10 Boeing 707, 24 C-130E/H, 12 C-97, 10 C-47, 20 *Noraitas*, 2 KC-130H tankers, 14 *Arava*, 12 *Islander*.  
Liaison: 23 Do-27, 15 Do-28D, 5 Cessna U206, 3 *Westwind*.  
Trainers incl 24 TA-4H, 50 *Kfir*, 70 *Magister*, 16 *Queen Air*, 30 *Super Cub*.  
Hel incl 8 *Super Frelon*, 17 CH-53G, 12 CH-47C, 12 S-61R, 6 AH-1G, 23 Bell 205A, 20 Bell 206, 12 Bell 212, 25 UH-1D, 19 *Alouette II/III*.  
Sidewinder, AIM-7E/F *Sparrow*, *Shafir* AAM: *Luz*, *Maverick*, *Shrike*, *Wallye*, *Bullpup* ASM.  
15 SAM btys with *Improved HAWK*.  
(On order: 75 F-16 fighters, 30 Hughes 500 hel gunships.)

RESERVES (all services): 460,000.

Para-Military Forces: 4,500 Border Guards and 5,000 *Nahal* Militia.

## JORDAN

Population: 3,050,000.  
Total armed forces: 67,200.  
Estimated GNP 1977: \$1.85 bn.  
Defence expenditure 1979: 114 m dinars (\$381 m).  
\$1 = 0.300 dinars (1979), 0.334 dinars (1977).

Army: 60,000.  
2 armd, 2 mech divs.  
3 special forces bns.  
2 AA bdes, incl 6 btys with *Improved HAWK* SAM.  
300 M-47/-48/-60, 200 *Centurion* med tks; 140 *Ferret* scout cars; 750 M-113, 120 *Saracen* APC; 110 25-pdr, 90 105mm, 10 155mm, 4 203mm how; 35 M-52 105mm, 20 M-44 155mm SP how; 16 155mm guns; 81mm, 107mm, 120mm mor; 106mm, 120mm RCL; *TOW*, *Dragon* ATGW; *Vulcan* 20mm, 200 M-42 40mm SP AA guns; *Redeye*, *Improved HAWK* SAM.  
(On order: 150 M-113 APC, 18 M-109-155mm, M-110 203mm SP how, 100 M-163 *Vulcan* 20mm AA guns, *Improved HAWK* SAM.)

Navy: 200.  
9 small patrol craft.

Base: Aqaba.

Air Force: 7,000; 73 combat aircraft.  
1 FGA sqn, 1 OCU with 8 F-5A/B, 24 F-5E/F.  
2 interceptor sqns with 17 F-104A/B, 24 F-5E/F.  
Tpts: 3 C-130B/H, 1 Boeing 727, 1 *Falcon* 20, 4 *CASA* 212A *Aviocar*.  
Hel: 15 *Alouette III*, 2 S-76.  
Trainers: 8 T-37C, 11 *Bulldog*, 2 *Dove*.  
*Sidewinder* AAM.  
(On order: 4 F-5E, 36 *Mirage* F-1 fighters, 10

Bell AH-1H, 4 S-76 hel.)

RESERVES: 30,000.

Para-Military Forces: 10,000, 3,000 Mobile Police Force, 7,000 Civil Militia.

## KUWAIT

Population: 1,200,000.  
Military service: 18 months.  
Total armed forces: 11,100.  
Estimated GNP 1977: \$11.9 bn.  
Defence expenditure 1977-78: 93 m dinars (\$336 m).  
\$1 = 0.277 dinars (1978), 0.277 dinars (1977).

Army: 9,000.  
1 armd bde.  
2 inf bdes.  
160 *Chieftain*, 70 *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.  
(On order: *Scorpion* lt tks, 175 M-113 APC, arty, *TOW* ATGW, SA-7 SAM.)

Navy: 200 (coastguard).  
28 coastal-patrol craft<.  
3 88-ft landing craft.  
(On order: 3 FAC(P).)

Air Force: 1,900 excluding expatriate personnel; 50 combat aircraft.  
2 FB sqns with 30 A-4KU.  
1 interceptor sqn with 18 *Mirage* F-1C, 2 F-1B.  
Tpts: 2 DC-9, 2 L-100-20, 1 Boeing 737-200.  
3 hel sqns with 30 SA-342K *Gazelle*, 10 *Puma*, 4 AB-205.  
Trainers incl 2 *Hunter* T67, 6 TA-4KU.  
R.550 *Magic*, *Sidewinder* AAM, *Super* 530 ASM.  
50 *Improved HAWK* SAM.

Para-Military Forces: Police: 15,000.

## LEBANON

Population: 2,680,000.  
Military service: conscription, from 1 July 1979.  
Total armed forces: 8,750.  
Estimated GNP 1978: \$3.4 bn.  
Defence expenditure 1979: \$L 738 m (\$235 m), plus \$L 3 bn (\$995 m) spread over 10 years to rebuild the armed forces.  
\$1 = \$L 3.14 (1979), \$L 2.93 (1978).

Army: 8,000. (A new 15,500-strong army incl 4 inf bdes supported by armour and arty is planned.)  
2 armd recce bns.  
6 inf bns.  
2 arty bns.  
*Saladin* armd cars; 80 M-113, *Saracen* APC; 10 122mm, 155mm guns; *Milan* ATGW.  
(On order: 100 AMX-30 med and AMX-13 lt tks, 200 *Saladin* armd cars, 50 M-113 APC.)

Navy: 250.  
1 large<, 3 *Byblos*< coastal patrol craft.  
1 LCU.  
(On order: 3 FAC(M).)

Air Force: 500; 16 combat aircraft.  
1 FGA sqn with 6 *Hunter* F70, 1 T66.  
1 interceptor sqn with 9 *Mirage III*EL/BL (not in use).  
1 hel sqn with 12 *Alouette II/III*, 6 AB-212.  
Trainers: 6 SA *Bulldog*, 6 *Magister*, and 1 *Vampire*.  
Tpts: 1 *Dove*, 1 *Turbo-Commander* 690A.  
R.530 AAM.  
(On order: *Puma*, *Gazelle* hel.)

Para-Military Forces: Internal Security Force 5,000; small arms, 40 *Saladin* armd cars, 5 *Saracen* APC.

## LIBYA

Population: 2,870,000.  
Military service: conscription.  
Total armed forces: 42,000.  
Estimated GNP 1978: \$19.0 bn.  
Defence expenditure 1978: 130 m Libyan dinars (\$448 m).  
\$1 = 0.296 dinars (1979), 0.290 dinars (1978).

### Army: 35,000.

1 armd bde.  
2 mech inf bdes.  
1 National Guard bde.  
1 special forces bde.  
2 arty, 2 AA arty bns.  
2,000 T-54/-55/-62 med tks; 100 *Saladin*, Panhard, 200 EE-9 *Cascavel* armd cars; 140 *Ferret* scout cars; 200 BMP MICV, 400 BTR-40/-50/-60, 140 OT-62/-64, 70 *Saracen*, 100 M-113A1 APC; 75 M-101 105mm, 80 130mm how; 40 M-109 155mm SP how; 106mm RCL; 300 *Vigilant*, SS-11, *Sagger* ATGW; 25 *Scud-B* SSM; 180 23mm, L40/70, 57mm, ZSU-23-4 SP AA guns; SA-7 SAM; 6 AB-47, 5 AB-206, 4 *Alouette* III, 14 CH-47C hel; some Cessna O-1 lt ac.  
(On order: 200 *Lion* med tks, 400 *Cascavel* armd cars, and *Urutu* APC.)

### Navy: 3,000.

3 ex-Sov F-class submarines.  
1 Vosper Mk 7 frigate with *Seacat* SAM.  
1 Vosper corvette.  
7 FAC(M) (6 ex-Sov *Osa-II* with *Stryx* SSM, 1 *Susa* with SS-12 SSM).  
4 *Garian*, 6 Thorneycroft large patrol craft.  
1 coastal patrol craft.  
2 PS700 LST, 1 ex-Sov *Polnocny* LCT.  
1 LSD type log spt ship.  
(On order: 3 F-class subs, 4 corvettes with *Otomat* SSM, 10 *La Combattante II* FAC(M), *Otomat* SSM.)

**Bases:** Tripoli, Benghazi, Darna, Tobruk, Buraygah.

**Air Force:** 4,000; some 201 combat aircraft. (Some may be in storage. Soviet, North Korean, Pakistani, and Palestinian pilots fly Libyan aircraft.)

2 bbr sqns with 24 Tu-22 *Blinder A*.  
2 interceptor sqns (1 ocu) with 24 MiG-23 *Flogger E*, some *Mirage F-1ED*.  
4 FGA sqns and ocu with 90 *Mirage 5D/DE*, 10 *SDR*, 10 *5DD*, some *Mirage F-1AD*.  
1 recce sqn with 5 MiG-25C/U (Soviet crews).  
2 COIN sqns with 38 *Galeb*.  
2 tpt sqns with 7 C-130H, 1 Boeing 707, 9 C-47, 2 *Falcon*, 2 *Jetstar*.  
Trainers incl Tu-22 *Blinder C*, 6 *Mirage F-1BD*, 2 *Mystère 20*, 5 MiG-23U, 12 *Magister*, *Falcon ST2*, 100 SF-260S.  
4 hel sqns with 10 *Alouette* III, 6 AB-47, 1 AB-212, 8 *Super Frelon*, 6 CH-47C, 12 Mi-8, Mi-24.  
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.  
(On order: 32 *Mirage F-1AD/ED* fighters, 20 G-222 tpts, 160 SF-260 trainers, 1 AB-212, *Gazelle*, 1 AS-61A hel.)

## MALTA

Population: 332,000.  
Military service: voluntary.  
Total armed forces: 1,000.  
Estimated GNP 1978: \$750 m.  
Defence expenditure 1978-79: £M 3.69 m (\$9.4 m).  
\$1 = £M 0.360 (1979), £M 0.393 (1978).

### Army: 1,000.

1st Regt.  
2nd (Engr) Regt.  
2 *Susa* FAC(M) with SS-12 SSM, 10 launches (8<).

3 Bell 47G, 1 AB-206, 1 AB-212, 4 *Alouette* III, 2 *Super Frelon* hel.

**Para-Military Forces:** Police: 1,400.

## MOROCCO

Population: 19,340,000.  
Military service: 18 months.  
Total armed forces: 98,000.  
Estimated GNP 1977: \$9.5 bn.  
Defence expenditure 1979: 3.62 bn dirham (\$916 m).  
\$1 = 3.95 dirham (1979), 4.51 dirham (1977).

### Army: 90,000.

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.  
100 M-48, 40 T-54 med, 80 AMX-13 lt tks; 36 EBR-75, 50 AML-90 and M-8 armd cars; VAB, 40 M-3 half-track, 60 OT-62/-64, 30 UR-416, 330 M-113 APC; 75mm, 160 105mm, 34 M-114 155mm towed; 20 AMX-105, 36 M-109 155mm SP how; 81mm, 82mm, 120mm mor; 50 M-56 90mm, 121 *Kuerassier* 105mm SP ATK guns; 75mm, 106mm RCL; *ENTAC*, *Dragon*, *TOW* ATGW; 50 37mm, 57mm, 100mm AA guns; SA-7, 10 *Chaparral*, *Crotale* SAM; 4 *Alouette* II, 3 *Gazelle* hel.  
(On order: 60 M-48 med tks, AML-90 armd cars, 400 VAB APC.)

**DEPLOYMENT:** Mauritania: 10,000; Zaire: 1,700.

### Navy: 2,000 (600 Marines).

2 PR72 FAC(G).  
3 large patrol craft (1 *Fougeux*, 1 ex-Fr VC<).  
9 coastal patrol craft.  
1 *Sirius* coastal minesweeper.  
4 *Batral* landing ship log.  
1 naval inf bn.  
(On order: 1 *Descubierta* frigate, 4 *Lazarga* FAC(G).)

**Bases:** Casablanca, Safi, Agadir, Kenitra, Tangier.

**Air Force:** 6,000; 72 combat aircraft. (Some ac, incl 2 MiG-15, 12 MiG-17 FGA are kept in storage.)

4 FB sqns with 20 F/RF/-5A, 5 F-5B, 25 *Mirage F-1CH*.  
1 COIN sqn with 22 *Magister*.  
1 tpt sqn with 12 C-130H, 1 *Gulfstream*, 6 *King Air*, 10 *Broussard*.  
2 hel sqns with 40 AB-205A, 8 AB-206, 2 AB-212, 40 *Puma*, 4 HH-43B SAR, 4 Bell 47G, 2 CH-47C.  
12 T-34C, 10 AS.202 *Bravo*, 28 SF-260M trainers.  
*Sidewinder*, R.550 *Magic* AAM.  
(On order: 25 *Mirage F-1CH* fighters, 24 *Al-phaJet* trainers, 4 CH-47C hel.)

**Para-Military Forces:** 30,000, incl 11,000 *Suret  Nationale*.

## OMAN

Population: 870,000.  
Military service: voluntary.  
Total armed forces: 19,200 (excluding expatriate personnel).  
Estimated GNP 1978: \$2.55 bn.  
Defence expenditure 1979: 238 m rial omani (\$688 m).  
\$1 = 0.346 rial (1979), 0.346 rial (1978).

### Army: 16,200.

2 bde HO.  
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 corvettes (1 Royal Yacht, 2 ex-Neth *Wildervank*).  
6 Brooke Marine large patrol craft (2 with *Exocet* SSM).  
4 75-ft coastal patrol craft (marine police)<.  
1 log spt ship.  
3 *Loadmaster* landing craft.  
1 trg ship (500-ton ex-log ship).  
(On order: 3 *Skima-12* hovercraft.)

**Bases:** Muscat, Raysut.

**Air Force:** 2,100 (excluding expatriate personnel); 35 combat aircraft.

1 FGA/recce sqn with 11 *Hunter*, 2 T7.  
1 FGA sqn with 12 *Jaguar* S(O) Mk 1, 2 T2.  
1 COIN/trg sqn with 8 BAC-167.  
3 tpt sqns: 1 with 3 BAC-111, 1 *Falcon*, 2 with *Defender*, 15 *Skyvan*.  
Royal flt with 1 *Gulfstream*, 1 VC-10 tpt, 3 AS.202 *Bravo* trainers, 3 AB-212 hel.  
1 hel sqn with 16 AB-205, 2 AB-206, and 5 AB-214B hel.  
2 AD sqns with 28 *Rapier* SAM.  
(On order: 2 DHC-5D tpts.)

**Para-Military Forces:** 3,300 tribal Home Guard (Firqats). Police Air Wing with 1 *Learjet*, 2 *Turbo-Porter*, 2 *Merlin* IVA ac, 4 AB-205, 3 AB-206 hel.

## QATAR

Population: 210,000.  
Total armed forces: 4,700.  
Estimated GNP 1977: \$1 bn.  
Defence expenditure 1978: 238 m ryal (\$61 m).  
\$1 = 3.87 ryal (1978), 3.95 ryal (1977).

### Army: 4,000.

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-10F MICV, 8 *Saracen* APC; 4 25-pdr guns; 81mm mor.  
(On order: *HAWK* SAM.)

### Navy: 400, incl Marine Police.

6 Vosper Thorneycroft large patrol craft.  
29 small coastal patrol craft (2 75-ft<, 2 Keith Nelson 45-ft<, 25 *Spear*<).

**Base:** Doha.

### Air Force: 300; 4 combat aircraft.

3 *Hunter* FGA, 1 T-79.  
1 *Islander* tpt.  
2 *Whirlwind*, 4 *Commando*, 2 *Gazelle*, 3 *Lynx* hel. *Tigercat* SAM.

## SAUDI ARABIA

Population: 7,984,000.  
Military service: voluntary (conscription to be introduced end-1979).  
Total armed forces: 44,500.  
Estimated GNP 1978: \$64.2 bn.  
Defence expenditure 1979-80: 47.8 bn Saudi riyals (\$14.18 bn).  
\$1 = 3.37 riyals (1979), 3.46 riyals (1978).

Army: 35,000.  
 1 armd bde.  
 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, 100 M-60 med tks; 200 AML-60/-90 armd, *Ferret*, 50 *Fox* scout cars; 150 AMX-10P MICV, 200 M-113, Panhard M-3 APC; 105mm pack how, 105mm and 155mm sp how; 75mm RCL; *TOW*, *Dragon* ATGW; M-42 40mm, AMX-30 SP AA guns; HAWK SAM.  
 (On order: 150 M-60 med tks, 94 V-150 *Commando* armd, 50 *Fox* scout cars, M-163 *Vulcan* 20mm SP AA, 86 35mm AA guns on M-60A1, *Redeye*, *Shahine* (*Crotale*), 6 btys Improved HAWK SAM.)

Navy: 1,500.  
 3 *Jaguar* FAC(T).  
 1 large patrol craft (ex-US coastguard cutter).  
 About 120 small coastal patrol craft (some with coastguard).  
 8 SRN-6 hovercraft (coastguard).  
 2 ex-US LCU.  
 (On order: 9 corvettes, 4 FAC(M) with *Harpoon* SSM, 4 MSC322 coastal minesweepers, 4 LCM.)

Bases: Jiddah, Al Qatif/Jubail, Ras Tanura Damman, Yanbo.

Air Force: 8,000; 178 combat aircraft.  
 3 FB sqns with 65 F-5E.  
 2 COIN/trg sqns with 39 BAC-167.  
 1 interceptor sqn with 18 *Lightning* F53, 2 T55.  
 3 OCU with 24 F-5F, 16 F-5B, 12 *Lightning* F53, 2 T55.

2 tpt sqns with 11 C-130E, 25 C-130H, 4 KC-130H, 2 *Jetstar*, CASA C-212.  
 2 hel sqns with 16 AB-206, 24 AB-205, 6 KV-107.  
 Other ac incl 1 Boeing 707, 2 *Falcon* 20, 2 *Alouette* III, 1 AB-206, 1 Bell 212, 2 AS-61A hel.  
 Trainers: 11 *Strikemaster*, 12 Cessna 172G/H/L. *Red Top*, *Firestreak*, *Sidewinder*, R.530, R.550 *Magic* AAM; *Maverick* ASM.  
 (On order: 45 F-15 fighters, 15 TF-15 trainers, 1 Boeing 747 tpt.)

Para-Military Forces: 20,000 National Guard in 20 regular and semi-regular bns with 150 V-150 *Commando* APC. 6,500 Frontier Force and Coastguard with about 120 small patrol boats, 8 SRN-6 hovercraft.

## SUDAN

Population: 20,900,000.  
 Military service: conscription.  
 Total armed forces: 62,900.  
 Estimated GDP 1977: \$6.15 bn.  
 Defence expenditure 1978: £S 84.9 m (\$244 m).  
 \$1 = £S 0.35 (1978), £S 0.34 (1977).

Army: 60,000.  
 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, 30 Chinese T-62 lt tks; 50 *Saladin* armd, 60 *Ferret* scout cars; 100 BTR-40/-50/-152, 60 OT-64, 49 *Saracen*, 45 V-150 *Commando*, 50 AMX-10 APC; 55 25-pdr, 40

100mm, 20 M-101 105mm, 18 122m guns/how; 30 120mm mor; 30 85mm ATK guns; 80 40mm, 80 37mm, 85mm AA guns.  
 (On order: 50 M-60A1 med tks, 100 M-113 APC.)

Navy: 1,400.  
 6 large patrol craft (2 ex-Yug *Kraljevica*, 4 PBR).  
 6 FAC(G) (ex-Yug '101').  
 3 70-ton coastal patrol craft.  
 2 ex-Yug DTK221 LCT, 1 DTM231 LCU<.

Base: Port Sudan.

Air Force: 1,500; 36 combat aircraft.  
 2 FGA/interceptor sqns with 24 *Mirage* 50.  
 1 FGA sqn with 12 MiG-17F/F-4.  
 1 tpt sqn with 6 C-130H, 5 An-24, 4 F-27, 1 DHC-6, 4 DHC-5D, 8 *Turbo-Porter*.  
 1 hel sqn with 10 Mi-8.  
 Trainers incl 5 BAC-145, 6 *Jet Provost* Mk 55 (some in storage).  
 AA-2 *Atoll* AAM.  
 (On order: 10 F-5E, 2 F-5F fighters, 2 C-130, 6 EMB-111P2 tpts, 12 *Puma*, 6 BO-105 hel.)

Para-Military Forces: 3,500; 500 National Guard, 500 Republican Guard, 2,500 Border Guard.

## SYRIA

Population: 8,370,000.  
 Military service: 30 months.  
 Total armed forces: 227,500.  
 Estimated GDP 1977: \$7.1 bn.  
 Defence expenditure 1979: £Syr 8 bn (\$2.04 bn).  
 \$1 = £Syr 3.93 (1979), £Syr 3.68 (1977).



Iraq, Jordan, Kuwait, Libya, and Morocco either have or have on order French *Mirage* F-1 all-weather interceptors. The F-1, which competed against the US F-16 for selection by four NATO air forces, is a Mach 2.2 aircraft with a ceiling of 65,000 feet.

**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).  
 4 armd bdes.  
 1 mech bde.  
 4 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, 900 T-62 med, 100 PT-76 lt tks; BRDM recce vchs; BMP MICV, 1,600 BTR-40/-50/-60/-152, OT-64 APC; 800 122mm, 130mm, 152mm, 180mm guns/how; ISU-122/-152 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.  
 (On order: 60 T-62 med tks, *Milan*, *HOT* ATGW, SA-6/-8/-9 SAM, 24 *Gazelle* hel.)

#### DEPLOYMENT:

**Lebanon:** (Arab Peace-keeping Force): 30,000.

**RESERVES:** 100,000.

**AIR DEFENCE COMMAND** (under Army, 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 ex-Sov *Petya* I frigates.  
 14 ex-Sov FAC(M) with *Styx* ssm (6 *Osa-I*, 2 *Osa-II*, 6 *Komar*<).  
 8 ex-Sov P4 FAC(T)<.  
 1 ex-Fr CH large patrol craft.  
 1 ex-Sov T43 ocean, 2 *Vanya* coastal minesweepers.

**Bases:** Latakia, Tartus, Al-Mina-al-Bayda.

**RESERVES:** 2,500.

**Air Force:** 25,000; about 389 combat ac. (Some ac believed to be in storage.)  
 7 FGA sqns: 4 with 50 MiG-17, 3 with 60 Su-7.  
 3 FGA/interceptor sqns with 16 MiG-23, 48 MiG-27.  
 12 interceptor sqns with 215 MiG-21PF/MF.  
 Tpts incl 8 Il-14, 3 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, 4 Ka-25 ASW, 15 *Super Frelon*, 6 CH-47C, 20 *Gazelle*.  
 AA-2 *Atoll* AAM.  
 (On order: 12 MiG-23 fighters, 18 AB-212, 21 *Super Frelon* hel.)

**Para-Military Forces:** 9,500. 8,000 Gendarmerie, 1,500 Desert Guard (Frontier Force).

## TUNISIA

**Population:** 6,390,000.  
**Military service:** 12 months selective.  
**Total armed forces:** 22,300 (13,000 conscripts).  
**Estimated GNP 1978:** \$5.83 bn.  
**Defence expenditure 1979:** 59 m dinars (\$145 m).  
 \$1 = 0.41 dinars (1979), 0.42 dinars (1978).

**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; 45 *Kuerassier* sp ATK guns; SS-11 ATGW; 40mm AA guns.  
 (On order: 60 M-113A1 APC, 1,200 *TOW* ATGW, 26 M-163A1 20mm *Vulcan* sp AA guns; 328

*Chaparral* SAM.)

**Navy:** 2,600 (500 conscripts).  
 1 ex-US *Savage* frigate.  
 4 large patrol craft (1 ex-Fr *Le Fougueux*, 3 P48 with SS-12 ssm).  
 2 Vosper Thornycroft 103-ft FAC(P).  
 2 ex-Ch *Shanghai-II* FAC(G).  
 2 ex-US *Adjutant* coastal minesweepers.  
 10 coastal patrol boats<.

**Bases:** Tunis, Susa.

**Air Force:** 1,700 (500 conscripts); 14 combat air-craft.

1 fighter/trg sqn with 10 MB-326B/K, 4 MB-326L.  
 Trainers: 12 SF-260WT, 6 SF-260C, 12 T-6.  
 Liaison ac: 4 S-208.  
 Hel: 8 *Alouette* II, 6 *Alouette* III, 4 UH-1H, 1 *Puma*.

**Para-Military Forces:** 2,500. 1,500 Gendarmerie (3 bns), 1,000 National Guard.

## UNITED ARAB EMIRATES (UAE)

**Population:** 905,000.

**Military service:** conscription.  
**Total armed forces:** 25,150. (The Union Defence Force and the armed forces of the United Arab Emirates [Abu Dhabi, Dubai, Ras Al Khaimah, and Sharjah] were formally merged in May 1976.)

**Estimated GNP 1978:** \$12.0 bn.  
**Defence expenditure 1979:** 2.88 bn dirhams (\$750 m).  
 \$1 = 3.84 dirhams (1979), 3.88 dirhams (1978).

**Army:** 23,500.

1 Royal Guard 'bde'.  
 4 armd/armd car bns.  
 7 inf bns.  
 3 arty bns.  
 3 AD bns.  
 30 *Scorpion* lt tks; 70 *Saladin*, 6 *Shorland*, Panhard armd, 60 *Ferret* scout cars; AMX VCI, Panhard M-3, 12 *Saracen* APC; 22 25-pdr, 105mm guns; 6-10 AMX 155mm sp how; 81mm mor; 120mm RCL; *Vigilant* ATGW; *Rapier*, *Crotale* SAM.  
 (On order: 20 *Lion* med, 50 *Scorpion* lt tks.)

**Navy:** 900.

6 Vosper Thornycroft large patrol craft.  
 3 Keith Nelson coastal patrol craft<.  
 (On order: 6 *Jaguar* FAC(G).)

**Base:** Abu Dhabi.

**Air Force:** 750; 52 combat aircraft.  
 2 interceptor sqns with 26 *Mirage* 5AD, 3 5RAD, 3 5DAD.

1 FGA sqn with 7 *Hunter* FGA 76, 2 T77.  
 1 COIN sqn with 10 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, 4 DHC-5D, 1 Cessna 182.  
 Hel incl 8 AB-205, 6 AB-206, 3 AB-212, 7 *Alouette* III, 10 *Puma*.  
 R.550 *Magic* AAM, AS.11/12 ASM.  
 (On order: 1 G-222 tpt, *Lynx* hel.)

## YEMEN ARAB REPUBLIC (NORTH)

**Population:** 7,500,000.

**Military service:** 3 years.  
**Total armed forces:** 36,600.  
**Estimated GNP 1978:** \$1.5 bn.  
**Defence expenditure 1977-78:** 360m riyals (\$79 m).

\$1 = 4.56 riyals (1978), 4.54 riyals (1977).

**Army:** 35,000.  
 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.  
 32 M-60, 200 T-34, T-54 med tks; 50 *Saladin* armd, *Ferret* scout cars; 50 M-113, 350 BTR-40/-152, *Walid* APC; 50 76mm, 122mm guns; 50 SU-100 sp guns; 82mm, 120mm mor; 75mm RCL; *LAW*, 20 *Vigilant* ATGW; 37mm, 57mm AA guns.  
 (On order: 32 M-60 med tks, 50 M-113 APC, 155mm how, *TOW*, *Dragon* ATGW, 72 M-163/167 *Vulcan* AA guns.)

**Navy:** 600.

3 ex-Sov P4 FAC(T)<.  
 2 LCM.  
 5 small patrol craft.

**Base:** Hodeida.

**Air Force:** 1,000; 11 combat ac. (Some ac believed to be in storage.)

1 fighter sqn with 3 MiG-17F.  
 Tpts: 2 C-130E, 3 C-47, 2 *Skyvan*, 3 Il-14, 4 An-26.  
 Trainers: 4 F-5B, 4 MiG-15UTI, 18 Yak-11.  
 Hel: 1 Mi-4, 2 AB-205.  
 AA-2 *Atoll* AAM.  
 (On order: 12 F-5E fighters.)

**Para-Military Forces:** 20,000 tribal levies.

## YEMEN: PEOPLE'S DEMOCRATIC REPUBLIC (SOUTH)

**Population:** 1,870,000.

**Military service:** conscription, 24 months.  
**Total armed forces:** 20,800.  
**Estimated GNP 1978:** \$500 m.  
**Defence expenditure 1978-79:** 19 m South Yemeni dinars (\$56 m).  
 \$1 = 0.34 dinars (1978).

**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, 10 *Ferret* scout cars; BTR-40/-152 APC; 25-pdr, 105mm pack, 122mm, 130mm how; 120mm mor; 122mm RCL; 37mm, 57mm, 85mm towed, ZSU-23-4 sp AA guns; SA-7/-9 SAM.

**Navy:** 500 (subordinate to Army).

2 ex-Sov SO1 large patrol craft.  
 2 ex-Sov P6 FAC(T)<.  
 2 ex-Sov *Zhuk* FAC(P)<.  
 1 ex-Sov *Podgorny* small patrol craft.  
 3 *Spear* coastal patrol craft<.  
 3 ex-Br *Ham* inshore minesweepers.  
 3 ex-Sov *Polnocny* LCT.

**Bases:** Aden, Mukalla.

**Air Force:** 1,300; 109 combat ac. (Some ac believed to be in storage.)

1 lt bbr sqn with 12 Il-28.  
 3 FGA sqns with 37 MiG-17F, 10 Su-20/-22.  
 3 interceptor sqns with 50 MiG-21F.  
 1 tpt sqn with 4 Il-14, 3 An-24.  
 1 hel sqn with 8 Mi-8, some Mi-4.  
 Trainers: 3 MiG-15UTI.  
 AA-2 *Atoll* AAM.

**Para-Military Forces:** Popular Militia; 15,000 Public Security Force.



## THE MILITARY BALANCE 1979/80

# 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.

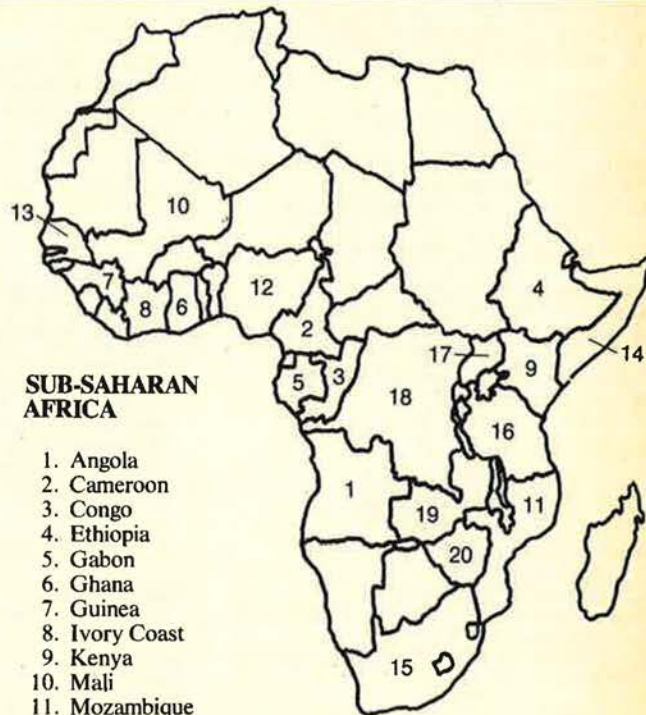
The Soviet Union signed Treaties of Friendship with Somalia in July 1974 (it is unclear whether this has been formally abrogated), with Angola in October 1976, with Mozambique in March 1977, and with Ethiopia in November 1978. Military aid has been given to Angola, Ethiopia, Guinea, Guinea-Bissau, Mali, Mozambique, Nigeria, Somalia, and Uganda. Soviet naval facilities were constructed in Somalia but are no longer in use, and facilities were again provided in the People's Democratic Republic of Yemen (Aden) when the Soviet Union was asked to leave Somalia.

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 Madagascar has been terminated, but military co-operation between the two countries has been 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.

Cuba has given military aid to the People's Republic of



SUB-SAHARAN AFRICA

1. Angola
2. Cameroon
3. Congo
4. Ethiopia
5. Gabon
6. Ghana
7. Guinea
8. Ivory Coast
9. Kenya
10. Mali
11. Mozambique
12. Nigeria
13. Senegal
14. Somali Democratic Republic
15. South Africa
16. Tanzania
17. Uganda
18. Zaire
19. Zambia
20. Zimbabwe-Rhodesia

Congo, Guinea, Somalia, and Ethiopia and has some 20,000 men in Angola, now engaged in training Angola's armed forces and assisting with internal security, and 16,000 to 17,000 in Ethiopia. Cuban and East German advisers are present in a number of other African countries.

Egypt, Morocco, China, Belgium, and France have given military assistance to Zaire.

Military links exist between South Africa and Israel.

### ARRANGEMENTS WITHIN THE REGION

Kenya and Ethiopia signed a Treaty of Friendship and Co-operation in January 1979.

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. South Africa has raised a number of local battalions for Namibian security.

## ANGOLA

Population: 6,600,000.  
Military service: 2 years.  
Total armed forces: 40,000.  
Defence expenditure 1975: 2.5 bn Kwanzas (\$98.0 m).  
\$1 = 25.5 escudos (1975).

**Army:** 35,000.  
1 arm'd bde.  
1 mot inf bde.  
17 inf bdes.  
4 AD arty bdes.  
85 T-34, 150 T-54 med, some 50 PT-76 lt tks; 200 BRDM-2 arm'd cars; 150 BTR-50/-60/-152, OT-62 APC; 120 guns, incl 76mm, 105mm, 122mm; 500 82mm, 120mm mor; 110 BM-21 122mm multiple RL; ZIS-3 76mm ATK guns; 75mm, 82mm, 107mm RCL; Sagger ATGW; 23mm, 37mm AA guns; SA-7 SAM. (Eqpt totals uncertain. Some 20,000 Cubans and 2,500 East Germans serve with the Angolan forces and operate ac and hy eqpt. Some Portuguese also serve; several hundred Soviet advisers and technicians are also in Angola.)

**Navy:** 2,500.  
4 ex-Port Argos large patrol craft.  
2 ex-Sov Shershen FAC(I).  
7 coastal patrol craft: 1 ex-Sov Zhuk<, 6 ex-Port (2 Jupiter<, 4 Bellatrix<).  
1 ex-Sov Polnocny, 1 ex-Port Alfange LCT.

**Bases:** Luanda, Lobito, Moçamedes.

**Air Force:** 2,500; 31 combat aircraft.  
15 MiG-17, 12 MiG-21, 4 G-91 fighters.  
Tpts incl 6 Noratlas, 3 C-47, 5 An-26, 4 Turbo-Porter, 6 Islander, 10 Do-27.  
Hel incl 19 Mi-8, 30 Alouette III, 2 Bell 47.  
Trainers incl 3 MiG-15UTI.  
AA-2 Atoll AAM.

## CAMEROON

Population: 7,440,000.  
Total armed forces: 8,500.  
Estimated GDP 1977: \$3.18 bn.  
Defence expenditure 1978-79: 14.0 bn CFA francs (\$61 m).  
\$1 = 231 CFA francs (1978), 249 CFA francs (1977).

**Army:** 7,700.  
4 inf bns.  
1 arm'd car sqn.  
1 para coy.  
Engr/spt units.  
M-8 arm'd, Ferret scout cars; 18 Commando APC; 75mm, 105mm how; 60mm, 81mm mor; 106mm RCL.

**Navy:** 500.  
2 ex-Ch Shanghai-II FAC(G).  
1 PR48 large patrol craft.  
6 small patrol craft (3 building)<.  
1 LCM<.  
5 LCVP<.

**Base:** Douala.

**Air Force:** 300.  
4 Magister COIN/trg ac.  
Tpts: 2 C-130, 4 C-47, 2 HS-748, 2 DHC-4, 2 Do-28, 7 Broussard.  
Hel: 1 Puma, 2 Alouette II, 2 Alouette III.  
(On order: 1 Boeing 727-20 VIP tpt.)

**Para-Military Forces:** 5,700 Gendarmerie.

## CONGO

Population: 1,510,000.  
Military service: voluntary.

Total armed forces: 7,000.  
Estimated GDP 1978: \$877 m.  
Defence expenditure 1976: 8.89 bn CFA francs (\$37.2 m).  
\$1 = 231 CFA francs (1978), 239 CFA francs (1976).

**Army:** 6,500.  
1 arm'd 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; AML arm'd, 10 BRDM-1 scout cars; 44 BTR-152, Panhard M-3 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 ex-Ch Shanghai FAC(G).  
4 river patrol craft<.

**Base:** Pointe-Noire.

**Air Force:** 300; 10 combat aircraft.  
10 MiG-15/-17 fighters.  
Tpts: 3 C-47, 5 An-24, 1 F-28, 1 Frégate, 5 Il-14, 3 Broussard.  
Hel: 4 Alouette II/III.

**Para-Military Forces:** 1,400 Gendarmerie; 2,500 militia.

## ETHIOPIA

Population: 30,270,000.  
Military service: conscription.  
Total armed forces: 221,600. (Incorporating 150,000 People's Militia. Some 16-17,000 Cubans and about 300 Warsaw Pact technicians and advisers serve with the Ethiopian forces and operate ac and hy equip.)  
Estimated GNP 1978: \$3.0 bn.  
Defence expenditure 1979-80: 1,100 m birr (\$526 m).  
\$1 = 2.09 birr (1979), 2.09 birr (1978).

**Army:** 215,000.  
14 inf divs with some 12 tk bns.  
1 lt div.  
2 para/cdo bdes.  
30 arty bns.  
2 engr bns.  
24 M-60, 6 M-47, 100 T-34, 500 T-54/-55 med, 50 M-41 lt tks; BRDM-2 scout cars; BMP-1 MICV, about 70 M-113, 12 V-150 Commando, 500 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, SA-2/-3/-7 SAM.

**Navy:** 2,000.  
1 ex-Neth Wildervank coastal minesweeper.  
1 ex-US Barnegat frigate (trg ship).  
9 large patrol craft (4 ex-US PGM, 4 105-ft Swift, 1 ex-Yug Kraljevica).  
2 ex-Sov Osa-II FAC(M) with Styx SSM.  
2 ex-Sov Mol FAC(T).  
4 Sewart 15-ton coastal patrol craft.  
4 ex-US LCM, 2 LCVP, 4 LCU.

**Bases:** Massawa, Assab.

**Air Force:** 4,600; 100 combat aircraft.  
5 FGA sqns: 1 with 7 F-5A/E, 1 with 17 MiG-17, 2 with 50 MiG-21, 1 with 20 MiG-23.  
1 COIN sqn with 6 T-28A.  
1 tpt sqn with 8 An-12, 4 An-22, 4 C-47, 2 C-54, 6 C-119G, 3 Dove, 1 Il-14, 1 DHC-3, 3 DHC-6.  
3 trg sqns with 20 Safir, T-28 A/D, 11 T-33A, 2 F-5B.  
Hel incl 10 AB-204, 3 Alouette II, 25 Mi-8, Mi-6, 10 UH-1H, 1 Puma.

RESERVES (all services): 20,000.

**Para-Military Forces:** 169,000. 9,000 mobile emergency police force; 150,000 People's Militia, in 10 divs with mor, ATK guns; 10,000 People's Protection bdes.

## GABON

Population: 560,000.  
Military service: voluntary.  
Total armed forces: 1,300.  
Estimated GDP 1976: \$3.01 bn.  
Defence expenditure 1978: 12.16 bn CFA francs (\$52.6 m).  
\$1 = 249 CFA francs (1978), 249 CFA francs (1977).

**Army:** 1,000.  
1 inf bn.  
Presidential Guard.  
1 para/cdo bn.  
1 engr coy.  
1 service coy.  
5 AML-90 arm'd cars; 6 V-150 Commando, 1 VXB APC; 81mm mor; 106mm RCL.

**DEPLOYMENT:** Zaire: 45.

**Navy:** 100.  
1 FAC(M) with SS-12 SSM.  
3 FAC(G).  
3 large patrol craft (2<).

**Bases:** Libreville, Port Gentil.

**Air Force:** 200; 9 combat aircraft.  
3 Mirage 5G, 2 5DG, 4 A-1D FGA.  
Tpts: 1 C-130H, 1 L-100-20, 1 L-100-30, 2 DC-6, 3 C-47, 3 Nord 262, 1 Falcon, 1 Gulfstream. YS-11A, 4 Broussard, 1 Reims Cessna 337.  
Hel: 3 Puma, 4 Alouette III.

**Para-Military Forces:** 1,600 Force de Police Nationale (FPN).

## GHANA

Population: 11,070,000.  
Military service: voluntary.  
Total armed forces: 20,000.  
Estimated GNP 1977: \$6 bn.  
Defence expenditure 1979-80: 426 m cedi (\$15 m).  
\$1 = 2.75 cedi (1979), 1.15 cedi (1977).

**Army:** 17,400.  
2 bdes (6 inf bns and spt units).  
1 recce bn.  
1 mor bn.  
1 fd engr bn.  
1 sigs bn.  
1 AB coy.  
60 Mowag arm'd cars; M-56 105mm how; 81mm 10 120mm mor; Carl Gustav 84mm RCL.

**DEPLOYMENT:** Egypt (UNEF): 1 bn (595).

**Navy:** 1,200.  
2 Kromantse ASW corvettes.  
1 ex-Br Ton coastal minesweeper.  
4 patrol craft (2 ex-Br Ford).  
(On order: 4 Lürrsen FAC(M): 2 with Exocet, 2 with Harpoon SSM.)

**Bases:** Secondi, Tema.

**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 trg sqn with 6 Bulldog.  
1 comm and liaison sqn with 6 F-27, 1 F-28.  
2 Alouette III hel.

**Para-Military Forces:** 3,000, 3 Border Guard bns.

## GUINEA

Population: 4,860,000.  
 Military service: voluntary.  
 Total armed forces: 8,650.  
 Estimated GNP 1977: \$740 m.  
 Defence expenditure 1971: 260 m sily (\$10.5 m).  
 \$1 = 22.18 sily (1977), 24.68 sily (1971).

Army: 8,000.  
 1 arm'd bn.  
 1 inf bns.  
 1 cdo bn.  
 1 engr bn.  
 10 T-34/-54 med, 10 PT-76 lt tks; 40 BTR-40/-152 APC; 76mm, 85mm, 105mm, 122mm guns/how; 57mm ATK guns; 37mm, 57mm, 100mm towed AA guns.

Navy: 350.  
 ex-Ch *Shanghai* FAC(G).  
 ex-Sov P6 FAC(T)<.  
 1 coastal patrol craft (3 ex-Sov *Poluchat*, 2 MO VI)<.  
 1 small LCU.  
 On order: 1 Type 28 patrol boat.)

Bases: Conakry, Kakanda.

**Air Force:** 300; 13 combat aircraft.  
 10 MiG-17, 3 MiG-21 FGA.  
 Tpts: 4 Il-14, Il-18, 4 An-4.  
 Trainers: 2 MiG-15UTI, 7 Yak-18, 3 L-29.  
 Hel: 1 Bell 47G, 1 *Puma*, 1 *Gazelle*.  
 On order: 1 Reims Cessna 337.)

Para-Military Forces: 8,000.

## IVORY COAST

Population: 5,400,000.  
 Military service: voluntary.  
 Total armed forces: 4,950.  
 Estimated GNP 1977: \$6.11 bn.  
 Defence expenditure 1978: 32,897 bn CFA francs (\$142.7 m).  
 \$1 = 231 CFA francs (1978), 249 CFA francs (1977).

Army: 4,500.  
 1 inf bns.  
 1 engr bn.  
 1 arm'd sqn.  
 1 para coy.  
 1 arty btys.  
 1 AA arty bty.  
 1 AMX-13 lt tks; 16 AML-60/-90 arm'd cars; 4 105mm how; 81mm, 120mm mor; 10 40mm AA guns.

Deployment: Zaire: 110 medical personnel.

Navy: 250.  
 1 large patrol craft with SS-12 ssm (2 Franco-Belge type, 2 *Patrol*).  
 1 river patrol craft.  
 1 patrol landing ship.  
 1 LCVP<.  
 1 trg and supply ship.

Bases: Abidjan.

**Air Force:** 200; no combat aircraft.  
 Tpts: 2 C-130H, 3 C-47, 2 F-27, 5 F-28, 1 *Aero Commander*, 1 *Falcon*, 2 *Gulfstream*.  
 Trg ac: 3 Cessna F-337, 2 Cessna 150.  
 Hel: 3 *Puma*, 5 *Alouette* II/III, 2 *Dauphin* 2.  
 On order: 12 *AlphaJet* trainers.)

Para-Military Forces: 3,000 Gendarmerie.

## KENYA

Population: 15,380,000.  
 Military service: voluntary.



The MiG-17, dating back to the mid-1950s, is still in service with about half of the region's air forces. It also is flown by all the Warsaw Pact countries except Hungary, and by the USSR itself. This one is from the Cuban Air Force.

Total armed forces: 12,400.  
 Estimated GNP 1977: \$4.2 bn.  
 Defence expenditure 1977-78: 668 m shillings (\$80 m).  
 \$1 = 8.35 shillings (1977).

Army: 10,000.  
 4 inf bns (fifth forming).  
 1 arty bn.  
 1 spt gp (incl 1 para coy).  
 1 engr bn.  
 3 *Saladin*, 30 AML-60/-90 arm'd cars; 15 UR-416, 10 Panhard M-3 APC; 8 105mm lt guns; 20 81mm, 8 120mm mor; 56 *Carl Gustav* 84mm and 120mm RCL; 8 *Swingfire* ATGW.  
 (On order: 60 Vickers Mk 3 med tks, *Rapier* SAM.)

Navy: 400.  
 7 large patrol craft: 3 Vosper 31-metre, 4 Brooke Marine (3 32.6-metre, 1 37.5-metre).

Base: Mombasa.

**Air Force:** 2,000; 21 combat aircraft.  
 1 FGA sqn with 4 Hunter FGA9, 10 F-5E, 2 F-5F.  
 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, 4 DHC-5D, 6 Do-28D.  
 Other ac incl 1 *Turbo Commander*, 2 *Navajo*.  
 Hel: 6 *Puma*, 2 Bell 47G.  
*Sidewinder* AAM.  
 (On order: 12 *Hawk* T52 trainers, 32 Hughes 500MD *Defender* hel with *TOW* ATGW.)

Para-Military Forces: 2,000 police (General Service Unit); Police Air Wing, 9 Cessna lt ac.

## MALI

Population: 6,290,000.  
 Military service: voluntary.  
 Total armed forces: 4,450. (All services form part of the army.)  
 Estimated GNP 1977: \$615 m.  
 Defence expenditure 1978: 13.40 bn Mali fr (\$29.1 m).  
 \$1 = 461 Mali fr (1978), 498 Mali fr (1977).

Army: 4,000.  
 5 inf bns.  
 1 arty bn.  
 1 tk coy.  
 1 para coy.  
 1 engr coy.  
 20 T-34 med, 6 Type 62 lt tks; 20 BRDM-2 arm'd cars; BTR-40, 10 BTR-152 APC; 85mm, 100mm guns; 81mm, 120mm mor; 37mm, 57mm AA guns.

Navy: 50.  
 3 river patrol craft.

Bases: Bamako, Mopti, Segou, Timbuktu.

**Air Force:** 400; 8 combat aircraft.  
 8 MiG-17 fighters.  
 Tpts: 2 C-47, 3 An-2, 2 An-24, 2 Il-14.  
 Trainers: 2 MiG-15UTI, Yak-12/-18.  
 Hel: 2 Mi-4, 1 Mi-8.

Para-Military Forces: 5,700.

## MOZAMBIQUE

Population: 10,120,000.  
 Military service: 2 years.  
 Total armed forces: 24,000. (Chinese, Cuban, East German, Romanian, and Soviet advisers are reported with Mozambique forces.)  
 Estimated GNP 1978: \$16.0 bn.  
 Defence expenditure 1979: 3.7 bn escudos (\$117 m).  
 \$1 = 31.72 escudos (1979), 33.51 escudos (1978).

Army: 22,800.  
 4 bdes.  
 240 T-34/-54/-55 med, some PT-76 lt tks; BTR-40, BRDM arm'd cars; BTR-40/-152 APC; 76mm, 85mm, 100mm, 105mm, 122mm, 152mm guns/how; BM-21 122mm RL; 60mm, 82mm, 120mm mor; 82mm, 107mm RCL; *Sagger* ATGW; 23mm, 37mm, 57mm AA guns; 24 SA-6, SA-7 SAM.

Navy: 700.  
 1 ex-Sov *Poluchat* large patrol craft<.  
 6 ex-Port patrol craft (1 *Antares*, 3 *Jupiter*<, 2 *Bellatrix*<).  
 1 ex-Port *Alfange* LCT.

Bases: Beira, Nacala.

**Air Force:** 500. (There have been reports of 30-35 MiG-21 fighters flown by Cuban pilots in Mozambique.)  
 Tpts incl 7 *Norlatas*, An-24.  
 Lt ac incl 7 Zlin, 4 Cessna 182.  
 Trg ac: 15 *Harvard*, 5 Cessna 152.  
 Hel: 4 *Alouette* II/III, some Mi-8.

## NIGERIA

Population: 70,410,000.  
 Military service: voluntary.  
 Total armed forces: 173,000.  
 Estimated GNP 1977: \$34.2 bn.  
 Defence expenditure 1979-80: 1.12 bn naira (\$1.75 bn).  
 \$1 = 0.641 naira (1979), 0.643 naira (1977).

Army: 160,000.  
 4 inf divs.  
 4 arty bdes.  
 4 engr bdes.  
 4 recce regts.  
 50 *Scorpion* lt tks; 20 *Saladin*, 15 AML-60/-90

armed, 25 Ferret, 50 Fox scout cars; 8 Saracen APC; 32 105mm, 122mm, 130mm guns/how; 81mm mor; 76mm ATK guns; 20mm, 40mm AA guns.

DEPLOYMENT: Lebanon (UNIFIL): 1 bn (776).

Navy: 6,000.

1 Nigeria ASW frigate.  
3 Hippo corvettes (1 Vosper Thornycroft Mk 9, 2 Mk 3).  
8 large patrol craft (4 Brooke Marine, 4 Abeking & Rasmussen).  
(On order: 1 corvette, 3 Lürssen S-143, 3 La Combattante FAC(M) with Exocet and Otomat SSM, 2 RoRo 1300 landing ships, Seacat SAM.)

Bases: Apapa (Lagos), Calabar.

RESERVES: 2,000.

Air Force: 7,000; 21 combat ac. (There are additional unserviceable ac.)  
2 FGA/interceptor sqns: 1 with 3 MiG-17, 1 with 18 MiG-21MF.  
2 tpt sqns with 6 C-130H, 2 F-27, 1 F-28, 1 Gulfstream II.  
1 SAR hel sqn with 10 BO-105C/D, 10 Puma, 10 Alouette III.  
3 trg/service sqns with 2 MiG-15UTI, 2 MiG-21U, 32 Bulldog, 15 Do-27/-28, 3 Navajo, 20 L-29, 5 AM-3C.  
AA-2 Atoll AAM.  
(On order: 12 AlphaJet FGA, 6 CH-47C hel.)

## SENEGAL

Population: 5,480,000.  
Military service: 2 years selective.  
Total armed forces: 8,350.  
Estimated GDP 1978: \$2.14 bn.  
Defence expenditure 1978-79: 11.14 bn CFA francs (\$48 m).  
\$1=231 CFA francs (1978).

Army: 7,500.  
4 inf bns.  
1 engr bn.  
1 recce sqn.  
2 para coys.  
2 cdo coys.  
1 arty bty.  
12 Panhard M-3, M-8, AML-60/90 armd cars; 12 VXB-170 APC; 6 105mm how; 8 81mm mor; 30mm, 40mm AA guns.

DEPLOYMENT: Lebanon (UNIFIL): 1 bn (592); Zaire: 500.

Navy: 650.  
3 P48 large patrol craft.  
2 ex-Fr VC patrol craft.  
1 Lance<, 12 Vosper 45-ft< coastal patrol craft.  
1 ex-Fr EDIC LCT.  
2 ex-US LCM<.

Base: Dakar.

Air Force: 200; no combat aircraft.  
Tpts: 5 C-47, 6 F-27, 1 Caravelle.  
Trg/liaison: 2 Magister, 2 Broussard, 1 Cessna 337.  
Hel: 2 Alouette I, 1 Gazelle.

Para-Military Forces: 1,600.

## SOMALI DEMOCRATIC REPUBLIC

Population: 3,530,000.  
Military service: voluntary.  
Total armed forces: 46,500.  
Estimated GNP 1977: \$425 m.  
Defence expenditure 1977: 200 m shillings (\$31.7 m).  
\$1=6.3 shillings (1977).

Army: 45,000 (plus 20,000 Militia). (Spares in all services are short and not all equipment is serviceable.)

7 div HQ.  
2 tk bdes.  
20 inf bdes.  
1 cdo bde.  
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.  
3 ex-Sov Osa-II FAC(M) with Styx SSM.  
8 ex-Sov FAC(T) (4 Mol, 4 P6<).  
1 ex-Sov Poluchat large, 6 ex-Sov PO2< coastal patrol craft.  
1 ex-Sov Polnochny LCT, 2 ex-Sov T4 LCM<.

Bases: Berbera, Mogadishu, Kismayu.

Air Force: 1,000; 25 combat aircraft.  
1 lt bbr sqn with 3 Il-28.  
2 FGA sqns with 15 MiG-17.  
1 fighter sqn with 7 MiG-21MF.  
1 tpt sqn with 3 An-2, 3 An-24/-26, 3 C-47, 1 G-222, 2 Do-28.  
1 hel sqn with 6 Mi-4, 4 Mi-8, 1 AB-204.  
Trainers incl 6 P-148, 15 Yak-11, 4 MiG-15UTI.  
AA-2 Atoll AAM.

Para-Military Forces: 29,500; 8,000 Police; 1,500 border guards; 20,000 People's Militia.

## SOUTH AFRICA

Population: 28,060,000.  
Military service: 24 months.  
Total armed forces: 63,250 (45,250 conscripts; total mobilizable strength 404,500).  
Estimated GNP 1978: \$43.77 bn.  
Defence expenditure 1979-80: 1.8 bn rand (\$2.23 bn).  
\$1=0.85 rand (1979), 0.87 rand (1978).

Army: 48,500 (6,000 White, 2,500 Black and Coloured regulars; 40,000 conscripts).  
1 corps, 2 div HQ (1 armd, 1 inf). (Units listed below are cadres, forming 2 divs when brought to full strength on mobilization of Citizen Force.)  
1 armd bde.  
2 mech bdes.  
4 mot bdes.  
1 para bde.  
9 fd, 4 med arty regts.  
1 missile regt.  
9 lt AA arty regts.

10 fd engr sqns.  
5 sigs regts.  
Some 250 Centurion, 20 Comet med tks; 1,600 Eland (AML-60/90), Mk IV armd cars; 23 scout cars, incl Ferret; 1,000 Ratel, 280 Saracen APC, 500 lt APC incl Hippo, Rhino; 125 25 pdr, 15 5.5-in, G-5 155mm guns; 155mm how (some sp); 50 Sexton 25-pdr sp guns; 81mm 200 120mm mor; 15 17-pdr, 90mm ATK guns SS-11, ENTAC ATGW; 20mm, 55 K-63 twi 35mm, 25 L/70 40mm, 15 3.7-in AA guns; 1 Cactus (Crotale), Tigercat SAM.

RESERVES: 100,000 Active Reserve (Citizen Force). Reservists serve 30 days per year for years. Some Citizen Force units have been deployed on the Angola border for up to 5 days.

Navy: 4,750 (1,250 conscripts).  
3 Daphne submarines.  
1 ex-Br W-class destroyer with 2 Wasp ASW hel  
3 Resident ASW frigates (each with 1 Wasp hel  
2 Reshef FAC(M) with Gabriel SSM.  
1 escort minesweeper (training ship).  
5 ex-Br Ford large patrol craft (1 survey vessel  
5 ex-Br Ton coastal minesweepers.

Bases: Simonstown, Durban.

RESERVES: 10,000 Citizen Force.

Air Force: 10,000 (4,000 conscripts); 416 combat aircraft (incl 307 with Citizen Force and operational trainers).

Strike Command:  
2 bbr sqns: 1 with 6 Canberra B(1)12, 3 T4; with 6 Buccaneer S50.  
1 fighter sqn with 32 Mirage F1AZ.  
1 AWW/FGA sqn with 23 Mirage IIICZ/BZ/RZ/RD2Z.  
1 AWW/FGA sqn with 14 Mirage F1CZ, 1 DC-3  
Maritime Command:  
2 MR sqns: 1 with 7 Shackleton MR3, 1 with 1 Piaggio P166S.  
1 tpt spt sqn with 11 C-47B.  
1 ASW flt with 11 Wasp HAS1, Alouette (trg).

Transport Command:  
3 tpt sqns: 1 with 7 C-130B, 9 Transall C-160; 1 with 5 DC-4, 17 C-47, 1 with 4 HS-1; Mercurius, 1 Viscount 781, 5 Swearingin Merlin IVA.  
4 hel sqns: 2 with 40 Alouette III, 1 with SA-330 Puma, 1 with 14 SA-321L Sup. Frelon.  
Other hel incl 17 Alouette III, 40 SA-330, AB-205A.

Light Aircraft Command:  
4 liaison sqns (army assigned) with 20 Cessna 185 A/D/E, 36 AM-3C Bosbok, 20 C-4 Kudu.

Training Command:  
Training schools with 45 T-6G Harvard, 10



The South African Air Force, by far the largest and best equipped in the region, uses British, French, and US aircraft, including these Mirage III tactical fighters.



MB-326M/K *Impala* I/II, 16 *Mirage* IIIEZ, 10 D2Z, 3 DZ, 25 *Vampire* FB6/9/T55, 12 F-86 *Sabre*, 5 C-47 ac, 10 *Alouette* III hel. R.530, R.550 *Magic* AAM, AS.20/30 ASM.

RESERVES: 25,000 Active Citizen Force; 8 COIN/trg sqns with 96 *Impala* I/II, T-6G.

**Para-Military Forces:** 90,000 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 (19,500 Whites, 16,000 Non-Whites). 20,000 Police Reserves.

## TANZANIA

Population: 16,980,000.  
Military service: voluntary.  
Total armed forces: 51,700.  
Estimated GNP 1977: \$3.37 bn.  
Defence expenditure 1977-78: 1.17 bn shillings (\$140 m).  
\$1=8.35 shillings (1977).

**Army:** 50,000.  
div HQ.  
inf bdes.  
tk regt.  
arty bns.  
enrg regt.  
10 T-59 med, T-60, 20 Type T-62 lt tks; BTR-40/152, K-63 APC; 76mm guns, 122mm how; 82mm, 120mm mor; 122mm RL; 14.5mm, 37mm AA guns, SA-3/-6 SAM.  
On order: 6 *Scorpion* lt tks.)

EMPLOYMENT: *Uganda*: some 25,000.

**Air Force:** 700.  
1 FAC(G) (7 ex-Ch *Shanghai*, 3 ex-GDR P6<).  
1 FAC(T) (4 ex-Ch *Hu Chwan* hydrofoils<, 4 ex-Sov P4<).  
1 ex-Sov *Poluchat* large patrol craft.  
1 coastal patrol craft (4 ex-GDR, 4 ex-Ch; 4 Vosper Thornycroft 75-ft in Zanzibar)<.  
1 ex-Ch LCM.

**Base:** Dar es Salaam.

**Para-Military Forces:** 1,400 Police Field Force and a police marine unit; 35,000 Citizen's Militia.

## UGANDA

Population: 12,500,000.  
Military service: voluntary.  
Total armed forces: 21,000. (The Ugandan forces disintegrated in the face of the Tanzanian/Ugandan National Liberation Force [UNLF] invasion. Data listed relates to pre-invasion situation.)  
Estimated GNP 1978: \$800 m.  
Defence expenditure 1976-77: 429 m shillings (\$52 m).  
\$1=7.81 shillings (1978), 8.38 shillings (1976).

**Army:** 20,000.  
bdes, each of 4 bns.  
rece bns.  
mech inf bn.  
marine/cdo bn.  
trg bn.  
arty regt.

10 T-34, 15 T-54/-55, 10 M-4 med tks; BRDM-2, *Saladin* armd cars; 120 BTR-40/-152, 30 OT-64 APC; 76mm, 122mm guns; 82mm, 120mm mor; *Sagger* ATGW; 50 37mm, 40mm AA guns; SA-7 SAM.

**Navy:** A small lake patrol service being formed.

**Air Force:** 1,000; 31 combat ac. (About 50% of the ac have been destroyed; those serviceable have been removed to Tanzania.)  
2 fighter sqns with 21 MiG-21, 10 MiG-17.  
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 2 MiG-15UTI, 14 L-29, 10 Piper, 6 AS.202 *Bravo*.  
AA-2 *Atoll* AAM.

## ZAIRE

Population: 27,710,000.  
Military service: voluntary.  
Total armed forces: 20,500.  
Estimated GNP 1977: \$4.65 bn.  
Defence expenditure 1976: 142 m zaires (\$164 m).  
\$1=0.86 zaires (1977), 0.81 zaires (1976).

**Army:** 18,500.  
3 inf bdes.  
3 armd regts.  
2 mech bns.  
10 inf bns.  
2 para, 1 cdo bns.  
38 ex-Ch Type-62 lt tks; 40 AML-90, 95 AML-60 armd cars; 9 M-113, 60 M-3 APC; 75mm pack, 122mm, 130mm guns/how; 82mm, 120mm mor; 107mm RL; 57mm ATK guns; 75mm, 106mm RCL; 20mm, 37mm, 40mm AA guns.

**Navy:** 1,000.  
4 ex-Ch *Shanghai* patrol boats.  
3 ex-Korean P4 FAC(T)<.  
15 small coastal patrol craft (6 *Swift*)<.  
11 ex-Fr river patrol boats<.

**Base:** Matadi.

**Air Force:** 1,000; 31 combat aircraft.  
1 fighter sqn with 10 *Mirage* 5M, 3 5DM.  
2 COIN sqns with 10 MB-326GB, 8 AT-6G.  
1 observation sqn with 20 Reims Cessna FTB 337.  
1 tpt wing with 6 C-130H, 2 DC-6, 2 DHC-4A, 3 DHC-5, 4 C-54, 8 C-47, 2 Mu-2.  
1 hel sqn with 11 *Alouette* III, 1 *Puma*, 1 *Super Frelon*, 7 Bell 47.  
Trg ac incl 15 Cessna 310.  
(On order: 8 MB-326G/K armed trainers, 3 DHC-5D tpts.)

**Para-Military Forces:** 35,000; 8 National Guard, 6 Gendarmerie bns.

## ZAMBIA

Population: 5,730,000.  
Military service: voluntary.  
Total armed forces: 14,300.  
Estimated GNP 1977: \$2.32 bn.  
Defence expenditure 1977: 246 m kwacha (\$310 m).  
\$1=0.828 kwacha (1978), 0.796 kwacha (1977).

**Army:** 12,800.  
1 armd car regt.  
4 inf bns.  
1 arty bty, 1 AA arty regt.  
1 enrg, 1 sigs sqn.  
30 T-54 med tks; 28 *Ferret* scout cars; 8 M-56 105mm pack how; 24 20mm AA guns.

**Air Force:** 1,500; 37 combat aircraft.  
2 FGA sqns; 1 with 6 *Galeb*, 6 *Jastreb*, 1 with 12 MiG-19/F-6.

1 COIN/trg sqn with 13 MB-326GB.  
2 tpt sqns: 1 with 2 Yak-40, 2 DC-6, 5 DHC-4, 6 DHC-5, 10 C-47, 1 HS-748, 1 with 7 DHC-2, 10 Do-28.  
1 liaison sqn with 20 Saab *Safari*.  
Trainers incl 6 *Chipmunk*, 8 SF-260MZ.  
1 hel sqn with 3 AB-205, 5 AB-206, 3 AB-212, 17 Bell 47G, 7 Mi-8.  
1 SAM unit with 12 *Rapier*, 3 *Tigercat*.  
(On order: 4 AB-47G hel.)

**Para-Military Forces:** 1,200; Police Mobile Unit (PMU) 700 (1 bn of 4 coys); Police Para-Military Unit (PPMU) 500 (1 bn of 3 coys), 2 hel.

## ZIMBABWE-RHODESIA

Population: 7,220,000 (200,000 White).  
Military service: 18 months for Whites, Asians, and Coloureds; 12 months for Blacks aged 18-25.  
Total armed forces: 21,500.  
Estimated GNP 1978: \$US 4.0 bn.  
Defence expenditure 1979-80: \$R 278 m. (\$US 400 m).  
\$US1=\$R 0.694 (1979), \$R 0.768 (1978).

**Army:** 20,000 (6,000 regular, 14,000 TA, and conscripts).  
4 bde HQs.  
1 armd car regt (incl 1 regular sqn).  
1 (White) inf bn (RLI, regular).  
4 (Black) inf bns (RAR, regular).  
1 (White) SAS regt (4 sqns).  
Selous Scouts (mixed special force unit, bn strength).  
Grey's Scouts (mixed mounted inf bn).  
8 TA inf bns (Rhodesian Rifles).  
1 (White) arty regt (1 regular, 3 TA btys).  
7 indep inf coys (each 130, Rhodesian Rifles).  
6 enrg sqns.  
5 sigs sqns.  
1 psychological warfare unit (mixed).  
2 Rhodesian Holding Units (3,000 Whites over age 38).  
60 AML-90 *Eland* armd, *Ferret* scout cars; UR-416, *Hippo*, *Hyena*, *Leopard* locally made lt APC; 25-pdr, 105mm pack how, 5.5-in gun/how; 105mm RCL.

**Air Force:** 1,500; 64 combat ac. (In addition, most of the lt ac are used in the COIN role.)  
1 lt bbr sqn with 5 *Canberra* B2, 2 T4.  
2 FGA sqns: 1 with 9 *Hunter* FGA9, 1 with 18 *Vampire* FB9.  
1 COIN/recce sqn with 12 AL-60C4, 14 Cessna 337 (*Lynx*), 4 OV-10F.  
1 trg/recce sqn with 31 Aermacchi (*Genet*), 17 SF-260W.  
1 tpt sqn with 13 C-47, 1 *Baron* 55, 6 *Islander*.  
2 hel sqns with 43 *Alouette* II/III, 11 Bell 205.

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. Whites aged 50-59 are liable for 42 days guard duties per year.

**Para-Military Forces:** British South African Police (BSAP): 8,000 active, 35,000 reservists (the Whites provide about a third of the regular strength but nearly three-fourths of the reservists). Guard Force: establishment 3,500. Auxiliaries: some 6,000 Blacks.



## THE MILITARY BALANCE 1979/80

# 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 Guofeng, 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 following note on defence expenditure). It is also too early to foresee the effect of Deng Xiaoping'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 has continued, bringing the total to twenty-five 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 have been deployed. An ICBM thought to have a range of 8,000 miles has also been under development and the first of these are probably operational. 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 para-military 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 115 of the 129 Main Force divisions; there are only 11 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 counterpart 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/F-6 and F-9 fighters (the latter 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 (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 Peking has indicated that

this will not be renewed in 1980, when it is due to expire. There is a mutual defence agreement with North Korea, dating from 1961, and an agreement to provide free military aid. There are non-aggression pacts with Afghanistan, Burma, and Kampuchea (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: 958,000,000.  
Military service: Army 2-4 years, Air Force 4 years, Navy 5 years.  
Total regular forces: 4,360,000.  
NP and defence expenditure—see note following.

### Strategic Forces:

SSBM: 2 CSS-3 (limited range).

SRBM: 50-70 CSS-2.

IRBM: 40-50 CSS-1.

Aircraft: about 90 Tu-16 med bbrs.

Army: 3,600,000.

### Main Forces:

11 arm'd divs.

115 inf divs.

3 AB divs.

40 arty divs (incl AA divs).

16 railway and construction engr divs.

150 indep regts.

### Local Forces:

85 inf divs.

130 indep regts.

1,000 Soviet IS-2 ht, T-34 and Chinese-produced Type-59-63 med, Type-60 (PT-76) amph and Type-62 lt tks; 1,500 M-1967 APC; 16,000 122mm, 130mm, 152mm guns/how, incl SU-76, SU-85, SU-100, and ISU-122 sp arty; 32,000 82mm, 120mm, 160mm mor; 107mm, 140mm RL; 75mm, 82mm RCL; 57mm, 76mm, 85mm, 100mm ATK guns; 37mm, 57mm, 85mm, 100mm AA guns.

In order: Milan, HOT ATGW, Crotale SAM.)

### 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 arm'd regts. Main Force (MF) divs are administered by Regions but are under central comd. The distribution of divs, excluding arty and engrs, is believed to be:

North and North-East China (Shenyang and Beijing (Peking) MR): 52 MF divs, 29 LF divs.

North and North-West China (Lanzhou and Xin-

jiang MR): 13 MF divs, 12 LF divs.

East and South-East China (Jinan, Nanjing, Fuzhou, and Guangzhou (Canton) MR): 32 MF divs, 26 LF divs.

Central China (Wuhan MR): 14 MF divs (incl 3 AB), 7 LF divs.

West and South-West China (Chengdu and Kunming MR): 18 MF divs, 11 LF divs.

(Figures include the equivalent of 2-3 divs of border troops in North and North-East and West and South-West Regions.)

Navy: 360,000, incl 38,000 Naval Air Force and 38,000 Marines; 25 major surface combat ships, 91 attack subs.

1 Han SSN.

1 G-class submarine (with SLBM tubes). China is not known to have any missiles for this boat.

91 submarines (68 Soviet R-, 21 W-class, 2 Ming, incl trg vessels).

11 destroyers with Styx SSM: 7 Luta (more building), 4 ex-Sov Gordy.

14 frigates: 3 Kiang Hu and 4 ex-Sov Riga with Styx SSM, 2 Kiang Tung with SAM, 5 Kiang Nan.

9 patrol escorts.

160 FAC(M) with Styx SSM (80 Osa/Hola, 80 Komar and Hoku<).

20 Kronstadt large patrol craft.

23 Hainan FAC(P).

403 FAC(G) (25 Shanghai I, 340 Shanghai II, 6 Haikou, 30 Swatow<, 2 Shantung hydrofoils<).

220 FAC(T) (70 P6<, 120 Hu Chwan< hydrofoils, 30 P4<).

20 T43 ocean minesweepers.

15 ex-US 511-1152 LST, LSM, 16 inf landing ships, some 450 LCU.

1,000 coast and river defence craft (most <).

### DEPLOYMENT AND BASES:

North Sea Fleet: about 300 vessels deployed from the mouth of the Yalu river to south of Lianyungang. Qingdao (HQ), Lushun, Weihai, Changshan, Luda, Huludao.

East Sea Fleet: about 450 vessels; deployed from south of Lianyungang to Dongshan.

Shanghai (HQ), Zhoushan, Daishan, Linhai, Xiamen, Wenzhou, Haimen, Fuzhou.

South Sea Fleet: about 300 vessels; deployed from Dongshan to the Vietnamese frontier. Zhanjiang (HQ), Yulin, Haikou, Guangzhou (Canton), Shantou, Beihei.

NAVAL AIR FORCE: 38,000; about 800 shore-based combat aircraft, organized into 4 bbr and 5 fighter divs, incl about 150 Il-28/B-5 torpedo-carrying, Tu-16 med, and Tu-2 lt bbrs, and some 575 fighters, incl MiG-17/F-4, MiG-19/F-6, and some F-9 Fantan A; a few Be-6 Madge MR ac; 50 Mi-4/H-5 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 4,700 combat aircraft.

About 80-90 Tu-16/B-6 Badger and a few Tu-4 Bull med bbrs.

About 300 Il-28/B-5 Beagle and 100 Tu-2 Bat lt bbrs.

About 500 MiG-15/F-2 and F-9 Fantan A FB.

About 3,700 MiG-17/F-4-5, MiG-19/F-6, 80 MiG-21/F-8, and some F-9 fighters organized into air divs and regts.

About 500 fixed-wing tpt ac, incl some 300 An-2/C-5, about 100 Li-2, 50 Il-14 and Il-18, some An-12/-24/-26, 18 Trident. 350 hel, incl Mi-4/H-5, Mi-8, and 13 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 85 CSA-1 (SA-2) SAM and over 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.

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 EXPENDITURE

### 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 CIA has estimated GNP for 1977 to be \$373 bn, while a recent British estimate for 1978 was \$400 bn.

### DEFENCE EXPENDITURE

The official Chinese defence expenditure figure, released this year for the first time, at 20,320 yuan (\$12.9 bn) is 18% of planned government expenditure. This figure is not, however, comparable to Western defence estimates, since it excludes a number of items, notably pay

and allowances for the troops. Chinese pricing practices are not known in detail, but they are certainly different from those in the West. The official budget figure, then, may not reflect the opportunity costs of even those elements it does cover, which are principally weapons and equipment.

Estimating how much it would cost to produce and man the equivalent of the Chinese defence effort in the US is speculative. A figure of roughly 10% of GNP, or about \$40.6 bn in 1978, is generally accepted in the West. This is not unreasonable when it is considered that the American defence budget, catering for more highly capital-intensive forces, only allocates 26% of its resources to procurement. If China's allocations were similarly distributed, her total defence budget would be nearly \$50 bn.



THE MILITARY BALANCE 1979/80

# 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. Taiwan has been notified that the treaty with her will lapse on 1 January 1980, when the one-year notice period expires. 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.

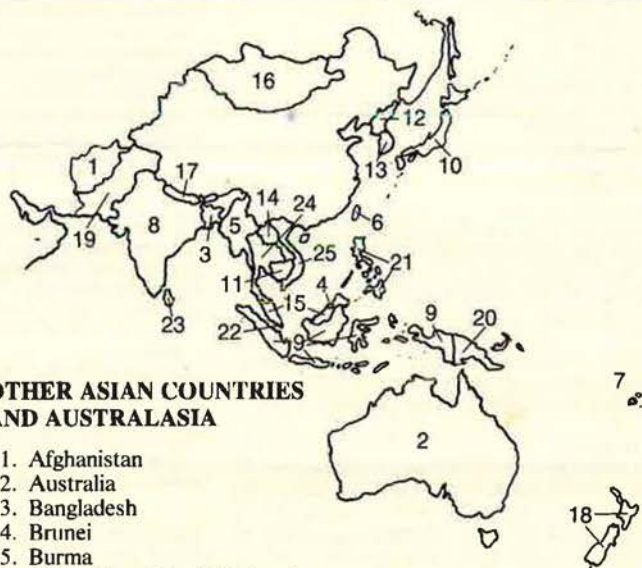
The Soviet Union has treaties of friendship, co-operation, and mutual assistance with Afghanistan, India, Bangladesh, Mongolia, the Democratic People's Republic of Korea, and Vietnam. Military assistance agreements exist with Sri Lanka (Ceylon).

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. A similar series of agreements seems to have been negotiated between Vietnam and the Heng Samrin regime in Kampuchea following the fall of Pol Pot and Ieng Sary.

## 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 that the Organization should



OTHER ASIAN COUNTRIES AND AUSTRALASIA

- |   |                                    |
|---|------------------------------------|
| 1. Afghanistan                                  | 17. Nepal                          |
| 2. Australia                                    | 18. New Zealand                    |
| 3. Bangladesh                                   | 19. Pakistan                       |
| 4. Brunei                                       | 20. Papua New Guinea               |
| 5. Burma  | 21. Philippines                    |
| 6. China: Republic of (Taiwan)                  | 22. Singapore                      |
| 7. Fiji   | 23. Sri Lanka (Ceylon)             |
| 8. India  | 24. Thailand                       |
| 9. Indonesia                                    | 25. Vietnam: Socialist Republic of |
| 10. Japan                                       |                                    |
| 11. Kampuchea (Cambodia)                        |                                    |
| 12. Korea: Democratic People's Republic (North) |                                    |
| 13. Korea: Republic of (South)                  |                                    |
| 14. Laos  |                                    |
| 15. Malaysia                                    |                                    |
| 16. Mongolia                                    |                                    |

be phased out, and it 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

vent of any externally organized or supported armed attack or threat of attack against Malaysia or Singapore, the two 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: 21,370,000.  
Military service: 2 years.  
Total armed forces: 90,000. (All figures uncertain, due to civil unrest.)  
Estimated GNP 1977: \$2.3 bn.  
Defence expenditure 1977-78: 2.73 bn afghanis (\$61 m).  
\$1 = 45 afghanis (1977).

Army: 80,000.  
armd divs.  
10 inf divs.  
mountain inf bdes.  
arty bde.  
arty regts.  
cdo regts.  
10 T-34, 500 T-54/-55, 100 T-62 med, 60 PT-76 lt tks; BMP MICV, 400 BTR-40/-50/-60/-152 APC; 900 76mm, 100mm, 122mm, and 152mm guns and how; 100 120mm mor; 50 132mm multiple RL; *Sagger*, *Snapper* ATGW; 350 37mm, 85mm, 100mm towed, 20 ZSU-23-4 SP AA guns; SA-7 SAM.

RESERVES: 150,000.

Air Force: 10,000; 169 combat aircraft.  
10 bbr sqns with 30 Il-28.  
FGA sqns: 4 with 80 MiG-17, 2 with 24 Su-7BM.  
interceptor sqns with 35 MiG-21.  
tpt sqns with 8 An-2, 10 An-26, 10 Il-14, 2 Il-18.  
hel sqns with 18 Mi-4, 22 Mi-8, 12 Mi-24.  
trainers incl 20 MiG-15/-17 UTU-21U, 2 Il-28U, L-39.  
A-2 *Atoll* AAM.  
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: 14,360,000.  
Military service: voluntary.  
Total armed forces: 70,261.  
Estimated GNP 1978: \$US 108 bn.  
Defence expenditure 1978-79: \$A 2.6 bn (\$US 2.97 bn).  
\$1 = \$A 0.875 (1978).

Army: 31,910.  
1 inf div HQ.  
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 AD).  
1 aviation regt.  
3 fd engr regts.  
1 fd survey regt.  
2 sigs regts.  
2 tpt regts.  
1 air tpt spt regt.  
103 *Leopard* med tks; 791 M-113 APC; 34 5.5-in guns; 254 105mm how; 66 M-40 106mm RCL; *Redeye*, 8 *Rapier* SAM; 17 *Porter*, 10 *Nomad* ac; 50 Bell 206B-1 hel; 32 watercraft.  
(On order: 12 *Rapier* SAM, 10 *Blindfire* AD radar.)

DEPLOYMENT: *Egypt* (UNEF/UNTSO): 10; *India/Kashmir* (UNMOGIP): 6.

RESERVES: 23,500 (with trg obligations) in combat, spt, log, and trg units.

Navy: 16,530 (incl Fleet Air Arm).  
6 *Oxley* (*Oberon*) submarines.  
1 aircraft carrier (carries 8 A-4, 6 S-2, 10 hel).  
3 *Perth* ASW destroyers with *Tartar* SAM, *Ikara* ASW msls.  
1 modified *Daring* destroyer.  
6 *River* frigates with *Seacat* SAM/SSM, *Ikara* ASW

msls.  
1 trg ship.  
1 coastal minesweeper.  
2 modified Br *Ton* coastal minehunters.  
12 *Attack* patrol boats.  
1 Fleet replenishment ship.  
1 destroyer tender.  
6 landing craft.  
(On order: 3 FFG7 frigates, 1 amph hy lift ship, 15 PCF-420 patrol craft.)

FLEET AIR ARM: 21 combat aircraft.  
1 FB sqn with 7 A-4G *Skyhawk*.  
2 ASW sqns with 3 S-2E, 11 S-2G *Tracker* (5 in reserve), 2 HS-748 ECM trg ac.  
1 ASW/SAR hel sqn with 6 *Sea King*, 6 *Wessex* 31B.  
1 hel sqn with 5 Bell UH-1H, 2 Bell 206B.  
1 trg sqn with 8 MB-326H, 3 TA-4G, 4 A-4G.  
2 HS-748 tpts.

Bases: Sydney, Jervis Bay, Brisbane, Cairns, Darwin, Cockburn Sound.

RESERVES 1,068 (with trg obligations).

Air Force: 21,821; 116 combat aircraft.  
2 strike/recce sqns with 21 F-111C.  
3 interceptor/FGA sqns with 48 *Mirage* IIIIO.  
1 recce sqn with 13 *Canberra* B20.  
2 MR sqns: 1 with 10 P-3B *Orion*; 1 with 10 P-3C.  
5 tpt sqns: 2 with 24 C-130E/H; 2 with 22 DHC-4; 1 with 2 BAC-111, 2 HS-748, 3 *Mystère* 20, 2 Boeing 707-338C.  
5 tpt flts with 16 C-47.  
1 Forward Air Controller flight with 6 CA-25.  
1 ocu with 14 *Mirage* IIIIO/D.  
1 hel tpt sqn with 6 CH-47 *Chinook* (6 more in reserve).  
3 utility hel sqns with 45 UH-1B/H *Iroquois*.  
Trainers incl 80 MB-326, 8 HS-748T2, 37 CT-4 *Airtrainer*.  
*Sidewinder*, R.530 AAM.  
(28 *Mirage* IIIIO/D in reserve.)

DEPLOYMENT: *Malaysia/Singapore*: 2 sqns with *Mirage* IIIIO, 1 flt with C-47, UH-1H hel; *Egypt* (UNEF/UNTSO): 1 flt with UH-1H hel.

RESERVES: 481 (with trg obligations) in 5 Citizens Air Force sqns.

## BANGLADESH

Population: 84,470,000.  
Military service: voluntary.  
Total armed forces: 76,500.  
Estimated GDP 1978: \$8.0 bn.  
Defence expenditure 1979: 1.765 bn taka (\$115 m).  
\$1 = 15.30 taka (1979), 14.78 taka (1978).

Army: 70,000.  
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 gun/how; 81mm, 50 120mm mor; 106mm RCL. (Spares are short; some Army and Air Force equipment unserviceable.)

Navy: 3,500.  
2 frigates (1 ex-Br Type 61, 1 Type 41).  
4 large patrol craft (2 ex-Yug *Kraljevica*, 2 ex-Ind *Akshay*).  
5 *Pabna* river patrol boats <.  
1 trg ship.

Bases: Chittagong, Dacca, Khulna.



The Royal Australian Air Force is one of more than forty throughout the world that is equipped with Lockheed C-130 tactical transports.

**Air Force:** 3,000; 27 combat aircraft.  
1 FB sqn with 3 MiG-21MF, 24 MiG-19S (F-6).  
1 tpt sqn with 3 An-12, 1 An-24, 2 An-26.  
1 hel sqn with 4 *Alouette* III, 2 *Wessex* HC2, 6 Bell 212, Mi-4, 8 Mi-8.  
Trainers incl 2 MiG-21U, 8 *Magister*.  
AA-2 *Atoll* AAM.  
(On order: 12 MiG-19 (F-6) FGA.)

**Para-Military Forces:** 30,000 Bangladesh Rifles, 36,000 Armed Police Reserve.

## BRUNEI

Population: 210,000.  
Military service: voluntary.  
Total armed forces: 2,800. (All services form part of the Army.)  
Estimated GNP 1978: \$970 m.  
Defence expenditure 1979: \$B 373 m (\$US 172.1 m).  
\$1US = \$B 2.18 (1979), \$B 2.31 (1978).

**Army:** 2,400.  
2 inf bns.  
1 armd recce sqn.  
1 special boat sqn.  
1 engr tp.  
16 *Scorpion* lt tks; 24 *Sankey* APC; 16 81mm mor.  
(On order: *Rapier/Blindfire* SAM.)

**Navy:** 300.  
3 *Waspada* FAC(M) with *Exocet* SSM.  
3 *Perwira* coastal patrol craft<.  
1 river patrol boat<.  
2 *Loadmaster* landing craft<.

**Base:** Muara.

**Air Force:** 100; no combat aircraft.  
1 HS-748 tpt, 2 *Cherokee* trg ac.  
Hel: 3 Bell 205, 3 Bell 206, 7 Bell 212.

**Para-Military Forces:** 1,750 Royal Brunei Police.

## BURMA

Population: 32,900,000.  
Military service: voluntary.  
Total armed forces: 169,500.  
Estimated GNP 1977: \$3.9 bn.  
Defence expenditure 1977-78: 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 9 regional comds).  
5 arty bns.  
*Comet* med tks; 40 *Humber* armd, 45 *Ferret* scout cars; 50 25-pdr, 5.5-in gun/how; 120 76mm, 80 105mm how; 120mm mor; 50 6-pdr and 17-pdr ATK guns; 10 40mm, 3.7-in AA guns.

**Navy:** 9,000 (800 marines).  
2 ex-Br frigates (1 *River*, 1 *Algerine*).  
4 corvettes; 2 ex-US (1 *PCE* 827, 1 *Admirable*), 2 *Nawarat*.  
36 gunboats (15<).  
35 river patrol craft<.  
1 ex-US LCU.  
8 ex-US LCM.

**Bases:** Bassein, Mergui, Moulmein, Seikyi, Sinmalaik, Sittwo.

**Air Force:** 7,500; 18 combat aircraft.  
2 COIN sqns with 6 AT-33, 12 SF-260M.  
Tpts incl 1 F-27, 4 FH-227, 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, 16 PC-7 *Turbo-Trainer*.  
(On order: 16 PC-7 *Turbo-Trainer*.)

**Para-Military Forces:** 38,000 People's Police

Force, 35,000 People's Militia.

## CHINA: REPUBLIC OF (TAIWAN)

Population: 17,500,000.  
Military service: 2 years.  
Total armed forces: 539,000.  
Estimated GNP 1978: \$23.4 bn.  
Defence expenditure 1977-78: \$NT 63.47 bn (\$US 1.67 bn).  
\$US1 = \$NT 37.97 (1978), 37.97 (1977).

**Army:** 400,000.  
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*.  
175 M-47/-48 med, 625 M-41 lt tks; 1,100 M-113 APC; 550 105mm, 300 155mm guns/how; 350 75mm M-116 pack, 90 203mm, 10 240mm how; 225 M-108 105mm SP how; 81mm mor; *Kung Feng* 126mm SP RL; *Honest John*, *Hsiung Feng* SSM; 150 M-18 76mm SP ATK guns, 500 106mm RCL; 300 40mm AA guns (some SP); *Nike Hercules*, *HAWK*, 20 *Chaparral* SAM; 118 UH-1H, 2 KH-4, 7 CH-34 hel.  
(On order: 100 M-48 med tks; 100 M-109 155 mm, 25 M-110 203mm SP how; *TOW* ATGW, 24 *Improved HAWK* SAM.)

**DEPLOYMENT:** *Quemoy*: 60,000; *Matsu*: 20,000.

**RESERVES:** 1,000,000.

**Navy:** 35,000.  
2 ex-US *Guppy*-II submarines.  
22 ex-US destroyers (10 *Gearing*, 2 with *Gabriel* SSM; 6 with *ASROC*; 8 *Sumner*, 3 with *Gabriel* SSM; 4 *Fletcher* with *Chaparral* SAM).  
11 ex-US frigates (10 *APD37/87*; 1 *Rudderow*).  
3 ex-US *Auk* corvettes.  
1 PSMM 5 FAC(M) with *Otomat* SSM.  
6 FAC(T).  
14 ex-US *Adjutant* coastal minesweepers.  
51 landing vessels: 2 dock, 23 LST, 4 medium, 22 utility.  
(On order: 2 PSMM 5 FAC(M) with *Otomat* SSM, *Harpoon*, *ASROC*, *Gabriel* SSM, *Sea Chaparral* SAM.)

**RESERVES:** 45,000.

**Bases:** Tsoying, Makung (Pescadores), Keelung.

**Marines:** 39,000.  
2 divs.  
M-47 med tks; LVT-4 APC; 105mm, 155mm how; 106mm RCL.

**RESERVES:** 35,000.

**Air Force:** 65,000; 388 combat aircraft.  
12 fighter sqns with 90 F-100A/F, 200 F-5A/E.  
3 interceptor sqns with 63 F-104G.  
1 recce sqn with 8 RF-104G.  
1 MR sqn with 9 S-2A, 18 S-2E.  
1 SAR sqn with 8 HU-16B ac, 10 UH-1H hel.  
Tpts incl 30 C-46, 50 C-47, 1 C-118B, 40 C-119, 10 C-123, 1 Boeing 720B.  
210 trainers, incl 55 PL-1B *Chien Shou*, 50 T-CH-1, 32 T-33, 30 T-38, F-5B/F, 3 TF-104G, 6 F-104D, F-100F.  
Hel incl 95 UH-1H, 7 UH-19, 10 Bell 47G, 6 Hughes 500MD/ASW hel.  
*Sidewinder*, *Shafir* AAM, *Bullpup* ASM.  
(On order: 48 F-5E/F fighters, 6 Hughes 500MD/ASW hel, *Maverick* ASM.)

**RESERVES:** 90,000.

**Para-Military Forces:** 100,000 militia.

## FIJI

Population: 620,000.  
Military service: voluntary.  
Total armed forces: 870.  
Estimated GDP 1977: \$760 m.  
Defence expenditure 1978: \$F 3.1 (\$3.6 m).  
\$1 = \$F 0.865 (1978).

**Army:** 750.  
1 inf bn.  
Engr and spt units.

**DEPLOYMENT:** *Lebanon* (UNIFIL): 1 bn (656).

**Navy:** 120.  
3 *Bluebird* coastal minesweepers.  
1 marine survey vessel.

**Para-Military Forces:** 900 Police.

## INDIA

Population: 652,820,000.  
Military service: voluntary.  
Total armed forces: 1,096,000.  
Estimated GNP 1978: \$106.4 bn.  
Defence expenditure 1977-78: 30.5 bn rupee (\$3.72 bn).  
\$1 = 8.25 rupees (1978), 8.83 rupees (1977).

**Army:** 950,000.  
2 armd divs.  
16 inf divs.  
11 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.  
50 *Centurion* Mk 57, 900 T-54/-55, 900 *Vijayant* med, 50 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 s 550 130mm, 5.5-in, 155mm, 203mm guns/hov 500 120mm, 160mm mor; 106mm RCL; SS-1 ENTAC ATGW; 57mm, 100mm ATK gun ZSU-23-4 SP, 30mm, 40mm AA guns; 40 *Tigercat* SAM; 40 *Krishak*, 20 *Auster* AOP9 It a some *Alouette* III, 38 *Cheetah* hel.  
(On order: 75 *Cheetah* hel.)

**RESERVES:** 200,000. Territorial Army 40,000.

**Navy:** 46,000, incl Naval Air Force.  
8 ex-Sov F-class submarines.  
1 *Vikrant* aircraft carrier (capacity 18 *Sea Hawk* 4 *Alizé*).  
1 ex-Br *Fiji* cruiser.  
22 frigates: 4 *Leander* with 2 *Seacat* SAM, 1 hel; ex-Br *Whitby*, with *Styx* SSM; 4 trg (3 ex-Br *Leopard*, 1 *Black Swan*); 10 ex-Sov *Petya* II; ex-Br *Blackwood* (coastguard).  
3 ex-Sov *Nanuchka* corvettes with SSM, SAM.  
16 ex-Sov *Osa*-III FAC(M) with *Styx* SSM.  
4 *Improved Abhay* FAC(P).  
1 *Abhay* large patrol craft.  
5 *Poluchat* coastal patrol craft (coastguard).  
2 ex-Sov *Natya* ocean, 4 ex-Br *Ton* coastal, *Ham* inshore minesweepers.  
1 ex-Br LST, 6 ex-Sov *Polnocny* LCT.  
(On order: 3 *Kashin* destroyers, 3 *Leander* frigates, 3 *Nanuchka* corvettes, 3 *Natya* minesweepers.)

**Bases:** Bombay, Vishakapatnam, Cochin, Calcutta, Goa, Port Blair.

**NAVAL AIR FORCE:** 2,000.  
1 attack sqn with 25 *Sea Hawk* (10 in carrier).  
1 ASW sqn with 12 *Alizé* (4 in carrier).  
2 MR sqns with 5 *Super Constellation*, 3 Il-38.  
4 ASW hel sqns with 12 *Sea King*, 5 Ka-25.  
1 SAR/liaison hel sqn with 10 *Alouette* III.  
3 trg/comms sqns with 7 HJT-16 *Kiran*, 4 *Vam*

pire T55, 5 Defender, 2 Devon ac, 4 Hughes 300 hel.  
(On order: 3 Il-38 MR ac, 5 Sea King ASW hel.)

**Force:** 100,000; about 620 combat aircraft.  
It bbr sqns with 50 Canberra B(I)58, B(I)12, B66.

**FGA sqns:** 4 with 72 Su-7BMK/U, 4 with 72 Hunter F/56/56A, 3 with 54 HF-24 Marut 1/1T, 5 with 90 Gnat Mk 1.

**interceptor/FGA sqns** with 252 MiG-21PF/FL/PFMA/MF/M/bis/U.

**recce sqn** with 6 Canberra PR57.

**U with 24 Hunter F56/T66/T66D.**

**g and conversion sqn** with Canberra T4/T13/T67, Hunter F56/T66, MiG-21, Su-7, Gnat.

**tpt sqns:** 1 with 16 HS-748, 2 with 32 C-119G, 2 with 28 An-12, 2 with 24 DHC-3, 3 with 50 C-47, 1 with 14 DHC-4.

**omms sqn** with 2 Tu-124, 6 HS-748, C-47, Devon.

**hel units:** 6 with 100 Mi-4, 3 with 35 Mi-8, 3 with 150 Chetak (Alouette III).

**ainers incl** 70 HT-2, 110 Kiran 1/1A, 15 Marut, 15 Iskra, 20 HS-748 ac, Chetak hel.

**A-2 Atoll AAM, AS.30 ASM.**  
**SAM sqns** with 120 SA-2/-3.

**On order:** 150 Jaguar (110 to be locally built), MiG-21M/bis, 100 Ajeet (Gnat Mk 2) fighters, 10 HS-748 tpts; 45 Chetak hel.)

**Para-Military Forces:** About 200,000 Border Security Force, 100,000 in other organizations.

## INDONESIA

**Population:** 150,830,000.

**Military service:** selective.

**Total armed forces:** 239,000.

**Estimated GNP 1977:** \$22.6 bn.

**Defence expenditure 1979-80:** 916.6 bn rupiahs (\$1.47 bn).

**\$1 = 625 rupiahs (1979), 415 rupiahs (1977).**

**Army:** 180,000. (About one-third of the army is engaged in civil and administrative duties.)

**Arm'd cav bde** (1 tk bn, support units in KOSTRAD or Strategic Reserve Command).

**Inf bdes** (90 inf, 14 arty, 13 AA, 10 engr bns, 1 n in KOSTRAD).

**6 inf bdes** (6 bns in KOSTRAD).

**1 arty regts.**

**4 arty regts.**

**M-34A1, 150 AMX-13, 75 PT-76 lt tks; 75 aladin arm'd, 55 Ferret scout cars; AMX-YCI 41CV, Saracen, 60 V-150 Commando, 130 BTR-40/-152 APC; 50 76mm, 40 105mm (incl 105mm lt), 122mm guns/how; 81mm, 200 20mm mor; 106mm RCL; ENTAC ATGW; 0mm, 40mm, 200 57mm AA guns; 2 C-47, 2 Aero Commander 680, 1 Beech 18, Cessna 85, 18 Gelatik ac; 16 Bell 205, 7 Alouette III, 6 BO-105 hel.**

**DEPLOYMENT:** Egypt (UNEF): 1 battalion (509).

**Army:** 39,000, incl Naval Air and 12,000 Marines. Some equipment and ships non-operational (or lack of spares.)

**ex-Sov W-class submarines.**

**frigates** (3 ex-Sov Riga, 4 ex-US Jones; 2 Surapati and 2 Pittimura in reserve).

**large patrol craft** (6 ex-Sov Kronstadt, 2 ex-Aus Attack, 5 ex-Yug Kraljevica, 3 Kelabang, 3 ex-US PGM39, 3 ex-US PC-461 2 in reserve).

**ex-Sov Komar FAC(M)** < with Styx SSM (2 in reserve).

**ürssen TNC-45 FAC(T).**

**oastal patrol craft** (2 Spear<, 6 Australian De Havilland<).

**ex-Sov T-43 ocean minesweepers** (2 R-class coastal in reserve).

**omd/spt ships.**

**ex-US LST, 3 LCU, 38 LCM.**

**arine bde.**

(On order: 2 Type 209 submarines, 3 corvettes, 4 FAC(P), Exocet SSM, 6 patrol boats, 5 minesweepers.)

**Bases:** Gorontalo, Jakarta, Surabaya.

**NAVAL AIR:** 1,000.

**5 HU-16, 6 C-47, 4 Aero Commander, 10 Nomad MR ac; 4 Bell 47G, 6 Alouette II/III, 4 BO-105 hel.**

(On order: 2 Nomad MR.)

**Air Force:** 20,000; 32 combat aircraft.

**2 FGA sqns** with 16 CA-27 Avon-Sabre.

**1 COIN sqn** with 16 OV-10F.

**Tpts incl** 12 C-130B, 1 C-140 Jetstar, 12 C-47, 1 Skyvan, 8 F-27, 7 DHC-3, 8 CASA C-212, 5 Nomad, 2 Aero Commander, 12 Cessna 207/401/402, 18 Gelatik.

**2 hel sqns** with 12 UH-34D, 5 Bell 204B, 4 Alouette III, 1 S-61A, BO-105, 19 Puma, 16 Bell 47.

**Trainers incl** 4 T-6, 10 T-33, 35 T-34, Airtourer.

(On order: 12 F-5E, 4 F-5F FGA, 14 CASA C-212 tpts, 8 Hawk T53, 12 T-34C trg ac, 21 Musketeer, 2 King Air tpts, 16 Bell 205A, 6 Puma hel.)

**Para-Military Forces:** 12,000 Police Mobile bde; about 100,000 Militia.

## JAPAN

**Population:** 115,810,000.

**Military service:** voluntary.

**Total armed forces:** 241,000.

**Estimated GNP 1978:** \$930 bn.

**Defence expenditure 1979-80:** 2,094 bn yen (\$10.08 bn).

**\$1 = 207.7 yen (1979), 221.9 yen (1978).**

**Army:** 155,000.

**1 mech div.**

**12 inf divs.**

**1 tk bde.**

**1 AB bde.**

**1 composite bde.**

**1 arty bde.**

**2 AD arty bdes.**

**1 sigs bde.**

**5 engr bdes.**

**8 SAM gps** (each of 4 btys) with HAWK.

**1 hel wing** and 34 aviation sqns.

**540 Type 61, 150 Type 74 med, 70 M-41 lt tks; 780 Type 60 and Type 73 APC; 800 75mm, 105mm, 155mm, 203mm guns/how; 75 105mm, 155mm SP how; 1,800 81mm and 107mm mor (some SP); Carl Gustav 84mm RL, 10 Type 75 130mm SP RL; 1,100 57mm, 75mm, 106mm SP RCL; Type 30 SSM; Type 64, KAM-9 ATGW; 260 35mm twin, 37mm, 40mm, 75mm AA guns; HAWK SAM; 90 L-19, 20 LM-1/2, 7 LR-1 ac; 50 KV-107, 48 UH-1H, 80 UH-1B, 70 OH-6J, 50 H-13 hel.**

(On order: 48 Type 74 tks, HAWK SAM, 5 LR-1 ac, V-107A, 5 UH-1H, 22 OH-6D, 1 AH-1S hel.)

**RESERVES:** 39,000.

**Navy:** 42,000 (including Naval Air).

**13 submarines** (6 Uzushio, 5 Ooshio, 2 Nat-sushio).

**32 destroyers:** 2 Tachikaze with Tartar SAM, ASROC; 2 Haruna with ASROC, 3 ASW hel; 4 Takatsuki with ASROC, 2 hel; 6 Yamagumo with ASROC; 3 Minegumo with 2 hel; 1 Amatsukaze with Tartar SAM, ASROC; 2 Akizuki; 3 Murasame; 7 Ayanami (2 trg); 2 Harukaze.

**15 frigates** (11 Chikugo with ASROC, 4 Isuzu).

**12 large patrol craft** (8 Mizutori, 4 Umitaka).

**5 FAC(T).**

**9 coastal patrol craft** <.

**3 MCM spt ships, 32 coastal minesweepers** (19 Takami, 13 Kasado), 6 Nana-go MCM boats.

**2 trg ships** (1 Azuma, 1 Katori).

**6 LST** (3 Miura, 3 Atsumi).

(On order: 1 submarine, 5 destroyers, 1 frigate, 4

coastal minesweepers, Harpoon SSM.)

**Bases:** Yokosuka, Kure, Sasebo, Maizuru, Oomino.

**NAVAL AIR:** 12,000.

**11 MR sqns** with 125 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, 8 S-62A hel.

**Trainers incl** 6 YS-11T, 5 TC-90, 30 B-65, 8 T-34, 43 KM-2 ac; S-61A, 7 Bell 47, 4 OH-6J hel.

(On order: 43 P-3C MR, 1 PS-1, 8 KM-2, 2 US-1, 3 TC-90 ac, 12 HSS-2, 3 S-61A hel.)

**RESERVES:** 600.

**Air Force:** 44,000; 361 combat aircraft.

**3 FGA sqns** with F-86F (phasing out), 59 F-1.

**10 interceptor sqns:** 5 with 150 F-104J, 5 with 138 F-4EJ.

**1 recce sqn** with 14 RF-4E.

**3 tpt sqns** with 13 YS-11, 25 C-1A.

**1 SAR wing** with 23 MU-2 ac, 22 KV-107, 26 S-62 hel.

**Trainers incl** 57 T-1A/B, 50 T-2A, 30 T-3, 183 T-33, 82 T-34, F-104DJ, 4 C-46, YS-11E, MU-2J.

**AAM-1, Sparrow, Falcon, Sidewinder AAM.**

**6 SAM gps** with Nike-J.

**A Base Defence Ground Environment** with 28 control and warning units.

(On order: 100 F-15, 14 TF-15, 10 F-4EJ, 18 F-1 fighters, 18 T-2, 24 T-3 trainers, 3 C-1, 1 MU-2 tpts, 4 E-2C AEW ac; 3 KV-107 hel.)

## KAMPUCHEA (CAMBODIA)

**Population:** 6,000,000.

**Armed Forces:** The former Khmer Liberation Army had about 12 divs before the invasion by Vietnam in December 1978. The country is now occupied by 12-14 Vietnamese divs (100,000-120,000 men).

## KOREA: DEMOCRATIC PEOPLE'S REPUBLIC (NORTH)

**Population:** 17,580,000.

**Military service:** Army, Navy 5 years, Air Force 3-4 years.

**Total armed forces:** 632,000-672,000.

**Estimated GNP 1978:** \$10.5 bn.

**Defence expenditure 1978:** 2.45 bn won (\$1.2 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:** 560,000-600,000.

**2 tk divs.**

**3 mot inf divs.**

**35 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, 1,800 T-54/-55 and Type 59 med, 100 PT-76, 50 T-62 lt tks; 800 BTR-40/-60/-152, M-1967 APC; 3,500 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.**

**RESERVES:** 260,000, 23 divs.

**Navy:** 27,000.

The Republic of Korea Air Force has three squadrons of McDonnell Douglas F-4s, with additional Phantoms on order. More than half the ROK's combat aircraft are Northrop F-5s.



15 submarines (4 ex-Sov W-, 11 ex-Ch R-class).  
3 *Najin* frigates (1 building).  
27 large patrol craft: 3 ex-Sov (2 *Tral*, 1 *Artillerist*), 15 SO1, 4 ex-Ch *Hai Nan*, 3 *Sariwan*, 2 *Taechong*.  
18 ex-Sov FAC(M) (8 *Osa-I*, 10 *Komar* < with *Stryx* SSM).  
134 FAC(G): 16 ex-Ch (8 *Shanghai*, 8 *Swatow*), 4 *Chodo*, 4 K-48, 20 ex-Sov MO IV<, 60 *Chaho*<, 30 *Chong-Jin*<).  
169 FAC(T): 78 ex-Sov (4 *Shersten*, 62 P6<, 12 P4<), 15 *Iwon*<, 6 *An Ju*<, 60 *Sin Hung*< and *Kosong*<, 10 *KMA*.  
70 *Nampo*< landing craft, 5-10 LCU, 15 LCM.

Bases: Wonsan, Nampo.

**Air Force:** 45,000; 565 combat aircraft.  
3 lt bbr sqns with 85 Il-28.  
3 FGA sqns with 20 Su-7, 40 MiG-15/-17.  
21 interceptor sqns with 120 MiG-21 and 300 MiG-15/-17/-19.  
Tpts incl 200 An-2, 40 An-24, 10 Il-14/-18, 1 Tu-154.  
Hel incl 50 Mi-4, 10 Mi-8.  
Trainers incl 70 Yak-18, 100 MiG-15UTI/-21U, Il-28.  
AA-2 *Atoll* AAM.  
3 SAM bdes with 150 SA-2.

**Para-Military Forces:** 40,000 security forces and border guards; civilian militia of 2,500,000 with small arms, some AA arty.

## KOREA: REPUBLIC OF (SOUTH)

Population: 37,760,000.  
Military service: Army and Marines 2½ years, Navy and Air Force 3 years.  
Total armed forces: 619,000.  
Estimated GNP 1978: \$46.0 bn.  
Defence expenditure 1979: 1,558 bn won (\$3.22 bn).  
\$1 = 484 won (1979), 484 won (1978).

**Army:** 520,000.  
1 mech div.  
17 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 *HAWK* and *Nike Hercules*.  
60 M-60, 800 M-47/-48 med tks; 500 M-113/-577, 20 Fiat 6614 APC; 2,000 105mm, 155mm, 203mm towed, 76 M-109 155mm, 12 M-107 175mm, 16 M-110 203mm SP guns/how; 5,300 81mm, 107mm mor; *Honest John* SSM; 80 M-18 76mm, 100 M-36 90mm SP ATK guns; 57mm, 75mm, 106mm RCL; *TOW*, *LAW* ATGW; 66 *Vulcan* 20mm, 40 40mm AA guns; 80 *HAWK*, 45 *Nike Hercules* SAM; 14 O-2A ac; 20 UH-1B, 44 OH-6A, 5 KH-4, 25 Hughes *Defender* hel.

(On order: 150 Fiat 6614 APC, 37 M-109 155mm SP how, *TOW* ATGW, 56 OH-6A hel.)

RESERVES: 1,100,000.

**Navy:** 47,000.  
9 ex-US destroyers (4 *Gearing*, 2 *Sumner*, 3 *Fletcher*).  
7 ex-US frigates (1 *Rudderow*, 6 *Lawrence* *Crossley*).  
6 ex-US corvettes (3 *Auk*, 3 PCE 827).  
8 FAC(M) with *Standard* SSM (7 PSMM 5, 1 ex-US *Asheville*).  
1 CPIC FAC(P)<.  
10 large patrol craft (8 ex-US *Cape*<, 2 100-ft).  
23 coastal patrol craft: 10 *Schoolboy*<, 13 *Sewart*< (9 65-ft, 4 40-ft).  
8 MSC 268/294 coastal minesweepers, 1 mine-sweeping boat<.  
22 ex-US landing ships (1 LSD, 8 LST, 12 LSM, 1 LCU).  
(On order: 1 *Frigate*, 120 *Harpoon* SSM.)

Bases: Chinhae, Inchon, Pusan, Cheju, Mokpo, Mukho, Pohang.

RESERVES: 25,000.

**Marines:** 20,000.  
1 div.  
2 bdes.  
LVTP-7 APC.

RESERVES: 60,000.

**Air Force:** 32,000; 254 combat aircraft.  
9 FB sqns: 3 with 37 F-4D/E, 4 with 135 F-5E, 2 with 50 F-86F.  
1 recce sqn with 12 RF-5A.  
1 ASW sqn 20 S-2F.  
1 SAR sqn with 6 UH-19, 5 UH-1D, 2 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.  
Hel incl 4 UH-19, 50 Hughes 500MD.  
*Sidewinder*, *Sparrow* AAM.  
(On order: 18 F-4E, 14 F-5E fighters, 24 OV-10G COIN, 6 C-130H tpts, 6 CH-47C, 50 Hughes 500MD, 27 UH-1H hel, AIM-9L *Super Sidewinder* AAM, *Maverick* ASM.)

RESERVES: 55,000.

**Para-Military Forces:** A local defence militia, 2,800,000 Homeland Defence Reserve Force.

## LAOS

Population: 3,450,000  
Military service: conscription.  
Total armed forces: 48,550.  
Estimated GNP 1978: \$260 m.  
Defence expenditure 1977-78: 11.0 bn kip (\$29 m).  
\$1 = 200 kip Pot Poi (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 105mm, 155mm how; 81mm, 82mm, 4.2-in mor; 107mm RCL; 37mm AA guns; 4 U-17A ac.

**Navy:** About 550.  
30 river patrol craft.  
14 landing craft/tpts<.

**Air Force:** 2,000; 45 combat aircraft. (Most aircraft inherited from the Royal Lao Air Force; degree of serviceability unknown.)

1 sqn with 10 MiG-21.  
30 T-28A/D COIN ac.  
5 AC-47 gunships.  
Tpts incl 1 Yak-40, 10 C-47, 10 C-123, 6 An-24, An-26, 1 *Aero Commander*, 1 DHC-2.  
Trainers: 6 T-41D.  
Hel: 10 UH-34, 10 Mi-8.  
AA-2 *Atoll* AAM.

## MALAYSIA

Population: 13,310,000.  
Military service: voluntary.  
Total armed forces: 64,500.  
Estimated GNP 1978: \$US 14.7 bn.  
Defence expenditure 1978: \$M 1.65 bn (\$US 6 m).  
\$1 = \$M 2.20 (1979), \$M 2.36 (1978).

**Army:** 52,500.  
2 div HQ.  
9 inf bdes, consisting of 29 inf bns, 3 recce, 3 a regts, 2 AD btys, 1 special service unit, 5 en 4 sigs regts, and administrative units.  
140 Panhard, M-3 armd, 60 *Ferret* scout cars; 1 V-150 *Commando*, M-3 APC; 80 105mm how; 81mm mor; 120mm RCL; 35 40mm AA guns.  
(On order: AT-105 APC, 12 105mm how.)

RESERVES: About 26,000.

**Navy:** 6,000.  
2 frigates (1 ASW with *Seacat*).  
4 *Perdana* FAC(M) with *Exocet* SSM.  
6 *Jerong* FAC(G).  
22 large patrol craft (4 *Kedah*, 4 *Sabah*, 14 *Kri*).  
5 ex-BR *Ton* coastal minesweepers.  
3 ex-US 511-1152 LST.  
(On order: 4 *Spica-M* FAC(M) with *Exocet* SSM; *Blowpipe* SAM.)

Bases: Johore Straits, Labuan.

RESERVES: 1,000

**Air Force:** 6,000; 32 combat aircraft.  
2 FGA sqns with 14 F-5E, 2 F-5F.  
2 COIN/trg sqns with 16 CL-41G *Tebuan*.  
3 tpt, 2 liaison sqns with 6 C-130H, 3 *Heron* HS-125, 2 F-28, 16 DHC-4A, 12 *Cessna* 400.  
4 hel sqns with 21 S-61A-4, 25 *Alouette* III, 5 F-206B, 3 AB-212, 9 Bell 47G, 4 UH-1H.  
1 trg sqn with 15 *Bulldog* 102.  
*Sidewinder* AAM.  
(On order: 1 C-130H tpt, 20 *Gazelle*, 16 S-6 hel, *Super Sidewinder* AAM.)

**Para-Military Forces:** Police Field Force 13,000; 17 bns, 200 V-150 *Commando* APC, patrol boats; People's Volunteer Corps, 0 200,000.

## MONGOLIA

Population: 1,620,000.  
Military service: 2 years.



tal armed forces: 30,000.  
imated GNP 1974: \$2.8 bn.  
ence expenditure 1979: 396 m tugrik (\$113 n).  
1 = 3.36 tugrik (1979), 4.00 tugrik (1974).

ny: 28,000.  
if bdes.  
onstruction bde.  
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; 7mm, 57mm AA guns.

RESERVES: 30,000.

Force: 2,000 excluding expatriate personnel; 2 combat aircraft.  
ghter sqn with 12 MiG-21.  
An-2, 6 Il-14, 4 An-24 tpts.  
Mi-1 and Mi-4 hel.  
c-11/-18 trainers.

a-Military Forces: about 18,000 frontier guards and security police.

## NEPAL

ulation: 13,830,000.  
ilitary service: voluntary.  
al armed forces: 20,000.  
imated GNP 1977: \$1.4 bn.  
ence expenditure 1977-78: 173 m rupees (\$13.8 m).  
1 = 12.53 rupees (1977).

ny: 20,000. (There is no Air Force: the 0-man Army Air Flight Department operates the aircraft.)  
if bdes (1 Palace Guard).  
ara bn.  
ty regt.  
gr regt.  
gs regt.  
ny air flt.  
X-13 lt tks; 4 3.7-in pack how; 4 4.2-in, 18 20mm mor; 2 40mm AA guns; 2 *Skyvan*, 1 S-748, 1 *Turbo-Porter* tpt, 3 *Alouette* III, 2 *Puma* hel.

LOYMENT: *Lebanon* (UNIFIL): 1 bn (643).

a-Military Forces: 12,000 Police Force.

## NEW ZEALAND

ulation: 3,190,000.  
ilitary service: voluntary, supplemented by territorial service of 12 weeks for the Army.  
al armed forces: 12,739.  
imated GNP 1978: \$US 16.3 bn.  
ence expenditure 1978-79: \$NZ 303.3 m (\$US 313 m).  
1 = \$NZ 0.95 (1979), \$NZ 0.97 (1978).

ny: 5,670.  
if bns.  
rty bty.  
gular troops also form the nucleus of 3 bde gps and a log gp; these would be completed by mobilization of Territorials.  
4-41 lt tks; 9 *Ferret* scout cars, 66 M-113 APC; 7 5.5-in. guns; 41 105mm how; 23 106mm CL.

LOYMENT: *Singapore*: 1 inf bn with log support.

RESERVES: 1,854 Regular, 5,903 Territorial.

ny: 2,827.  
gates with *Seacat* SAM (2 Type 12, 2 *Leander* with *Wasp* hel).  
ake large patrol craft.  
urvey ship.

ve: Auckland.

DEPLOYMENT: 1-2 frigates in Pacific area.

RESERVES: 1,607 Regular, 431 Territorial.

Air Force: 4,242; 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 6 *Sioux*, 3 *Wasp*, 11 UH-1D/H.  
1 comms sqn with 4 *Andover*, 3 *Devon*.  
Trainers: 7 *Devon*, 14 *Airtrainer*, 4 *Airtourer* ac, 3 *Sioux* hel.

DEPLOYMENT: *Singapore*: 1 tpt sqn (3 UH-1 hel).

RESERVES: 916 Regular, 164 Territorial.

## PAKISTAN

Population: 80,170,000.  
Military service: voluntary.  
Total armed forces: 429,000.  
Estimated GNP 1978: \$18.5 bn.  
Defence expenditure 1978-79: 10.24 bn rupees (\$1.05 bn).  
\$1 = 9.75 rupees (1978).

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 bdes.  
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; 12 M-7 105mm SP guns; 270 107mm, 120mm mor; 57mm towed, 8 M-36 90mm SP ATK guns; 75mm, 106mm RCL; *Cobra* ATGW; ZU-23, 30mm, 37mm, 60 40mm, 57mm, 15 90mm, 3.7-in AA guns; 9 *Crotale* SAM; 40 O-1E, 30 *Saab Supporter* lt ac; 12 Mi-8, 35 *Puma*, 20 *Alouette* III, 12 UH-1, 15 Bell 47G hel.  
(On order: TAM med tks; M-113 APC; TOW ATGW.)

RESERVES: 500,000.

Navy: 12,000.  
6 submarines (4 *Daphne*, 2 *Agosta*).  
5 SX-404 midget submarines.  
1 ex-Br *Dido* cruiser (cadet trg ship).  
6 destroyers: 2 ex-US *Gearing*, 4 ex-Br (1 *Battle*, 1 CH, 2 CR).  
1 ex-Br Type 16 frigate.  
3 large patrol craft (2 ex-Ch *Hai Nan*, 1 *Town*).  
12 ex-Ch *Shanghai-II* FAC(G).  
4 ex-Ch *Hu Chwan* hydrofoil FAC(T)<.  
7 ex-US MSC coastal minesweepers.  
1 ASW/MR sqn with 3 *Atlantic*, 2 HU-16B.  
3 *Alouette* III, 6 *Sea King* ASW/SAR hel.  
AM-39 ASM.  
(On order: 40 *ASROC* ASW msls, 40 Mk 46 torpedoes.)

Base: Karachi.

RESERVES: 5,000.

Air Force: 17,000; 256 combat aircraft.  
1 lt bbr sqn with 11 B-57B (*Canberra*).  
12 FGA sqns: 4 with 17 *Mirage* IIIIEP, 38 *Mirage* 5PA/DP, 5 with 140 MiG-19/F-6, 3 with 40 *Sabre* 6/F-86F.  
1 recce sqn with 10 *Mirage* IIIIRP.  
2 tpt sqns with 14 C-130B/E, 1 L-100, 1 *Falcon* 20, 1 F-27, 1 *Super King Air*, 1 *Bonanza*.  
Hel: 10 HH-34B, 4 *Super Frelon*, 14 *Alouette* III, 1 *Puma*, 12 Bell 47G.  
Trainers incl 5 MiG-15UTI, 24 MiG-17 (F-4), 5 *Mirage* IIIIDP, 23 *Saab Supporter*, 20 T-33A, 50 T-37C.  
*Sidewinder*, R.530, R.550 *Magic* AAM.

(On order: 32 *Mirage* 5 FGA; 25 *Supporter* trg ac.)

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.

## PAPUA NEW GUINEA

Population: 2,500,000.  
Military service: voluntary.  
Total armed forces: 3,500. (All services form part of the Army.)  
Estimated GNP 1978: 200 m kina.  
Defence expenditure 1978-79: 19.5 m kina (\$27.8 m).  
\$1 = 0.702 kina (1979), 0.730 kina (1978).

Army: 3,500.  
2 inf bns.  
1 engr bn.  
1 sigs bn.  
log units.

Navy:  
5 *Attack* large patrol craft.  
3 LCH landing craft.

Bases: Manus Island, Port Moresby.

Air Force:  
3 C-47, 3 *Nomad* tpts.

## PHILIPPINES

Population: 47,680,000.  
Military service: selective.  
Total armed forces: 103,000.  
Estimated GNP 1978: \$23.2 bn.  
Defence expenditure 1978: 5.85 bn pesos (\$793 m).  
\$1 = 7.37 pesos (1978).

Army: 65,000.  
4 lt inf divs.  
1 indep inf bde (being mechanized).  
28 *Scorpion*, 7 M-41 lt tks; 60 M-113, 20 V-150 *Commando* APC; 120 105mm, 6 155mm how; 81mm, 40 107mm mor; 75mm, 106mm RCL; *HAWK* SAM.  
(On order: 45 AFV; 95 105mm how.)

RESERVES: 96,000, 6 divs.

Navy: 22,000 (7,000 Marines and naval engrs).  
8 ex-US frigates (1 *Savage*, 4 *Casco*, 3 *Cannon*).  
10 ex-US corvettes (1 *Auk*, 8 PCE827, 1 *Admirable*).  
15 large patrol craft (6 135 ton, 4 ex-US PC461, 5 PGM-39/71).  
61 coastal patrol craft<.  
2 ex-US MSC218 coastal minesweepers.  
39 ex-US landing ships (27 LST, 4 LSM, 8 spt), 61 LCM, 3 LCU.  
1 SAR sqn with 5 *Islander* ac, 5 BO-105 hel.  
6 marine bns with LVTP-5/-7 APC; 105mm how.  
(On order: 6 PSMM FAC(M), 12 LST.)

Base: Sangley Point.

RESERVES: 12,000.

Air Force: 16,000; 85 combat aircraft.  
3 FB sqns with 16 F-5A, 12 F-86D/F, 25 F-8H.  
3 COIN sqns with 16 SF-260WP, 16 T-28D.  
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 4 C-130H, 4 L-100-20, 1 Boeing 707, 1 BAC-111, 18 C-47, 9 F-27, 4 YS-11, 15 C-123K, 12 *Nomad*.  
1 liaison sqn with O-1E, Cessna 180, 6 U-17A/B, Cessna 310K, 18 DHC-2.  
3 trg sqns with 10 T/RT-33A, 12 T-41A, 32 SF-

260MP, 8 F-86F, 3 F-5B.  
Other hel incl 12 UH-1D, 8 FH-1100, 2 S-62A, 3 BO-105.  
*Sidewinder* AAM.  
(On order: 11 F-5E FB, 35 BO-105, 17 UH-1 hel.)  
RESERVES: 16,000.

*Para-Military Forces*: 82,000: 47,000 Philippine Constabulary, 35,000 Local Self-Defence Force.

## SINGAPORE

Population: 2,380,000.  
Military service: 24-36 months.  
Total armed forces: 36,000.  
Estimated GNP 1978: \$US 7.54 bn.  
Defence expenditure 1977-78: \$S 1.01 bn (\$US 410 m).  
\$US 1 = \$S 2.31 (1978), 2.46 (1977).

**Army**: 30,000.  
1 div HQ.  
1 armd bde (1 tk, 2 APC bns).  
3 inf bdes (9 inf, 1 cdo, 2 arty, 2 engr, 3 sigs bns).  
75 AMX-13 lt tks; 250 M-113, 30 V-100, 250 V-200 *Commando* APC; 60 155mm how; 50 120mm mor; 90 106mm RCL.  
(On order: 150 AMX-13 lt tks, M-113 APC.)

RESERVES: 45,000; 18 inf, 3 arty, 1 engr, 1 sigs bns.

**Navy**: 3,000.  
6 TNC48 FAC(M) with *Gabriel* SSM.  
6 Vosper FAC(G) (3 Type A, 3 Type B).  
2 large patrol craft (trg ships).  
2 ex-US *Redwing* coastal minesweepers.  
6 ex-US 511-1152 LST (2 in reserve), 6 landing craft<.

*Base*: Singapore.

**Air Force**: 3,000; 131 combat aircraft.  
2 FGA/recce sqns with 31 *Hunter* FGA74, 4 FR74, 7 T75.  
2 FGA sqns with 39 A-4S, 5 TA-4S, 18 F-5E, 3 F-5F.  
1 COIN/trg sqn with 21 BAC-167, 3 *Jet Provost*.  
1 tpt/SAR sqn with 4 C-130B, 6 *Skyvan*.  
1 hel sqn with 17 UH-1H, 3 AR-212.  
1 trg sqn with 14 SF-260MS.  
2 SAM sqns: 1 with 28 *Bloodhound* 2, 1 with 10 *Rapier*.  
(On order: 20 UH-1B hel, AIM-9L *Super Sidewinder* AAM.)

*Para-Military Forces*: 7,500 police/marine police; Gurkha guard units; 30,000 Home Guard.

## SRI LANKA (CEYLON)

Population: 14,420,000.  
Military service: voluntary.  
Total armed forces: 13,700.  
Estimated GNP 1978: \$2.62 bn.  
Defence expenditure 1979: 411 m rupees (\$26.6 m).  
\$1 = 15.5 rupees (1979), 14.7 rupees (1978).

**Army**: 8,900.  
1 bde of 3 inf 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: 9,000; 5 bns, supporting services, and a Pioneer Corps.

**Navy**: 2,600.  
6 FAC(G) (5 ex-Ch *Shanghai-II*, 1 ex-Sov *Mol*).

27 coastal patrol craft<.

*Bases*: Trincomalee, Karainagar, Colombo, Tangale, Kalpitiya.

RESERVES: 600 Naval volunteer force.

**Air Force**: 2,200; 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, 1 *Heron*.  
1 comms sqn with 3 Cessna 337.  
1 hel sqn with 7 AB-206, 6 Bell 47G, 2 SA-365 *Dauphin* 2.  
Trainers incl: 4 Cessna 150, 7 *Chipmunk*, 5 *Dove*.

RESERVES: 1,100; 4 sqns Air Force Regt, 1 sqn Airfield Construction Regt.

*Para-Military Forces*: 14,500 Police Force, 4,500 Volunteer Force.

## THAILAND

Population: 46,540,000.  
Military service: 2 years.  
Total armed forces: 216,000.  
Estimated GNP 1978: \$21.7 bn.  
Defence expenditure 1979-80: 19 bn baht (\$940 m).  
\$1 = 20.22 baht (1979), 20.35 baht (1978).

**Army**: 145,000.  
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.  
20 M-48 med, 150 M-41 lt tks; 32 *Shorland* Mk 3 recce; 250 M-113, 40 LVTP-7, 20 V-150 *Commando*, 20 *Saracen* APC; 300 105mm, 50 155mm how; 81mm mor; 57mm RCL; 40 40mm AA guns; 90 O-1 lt ac; 90 UH-1B/D, 4 CII-47, 24 OH-13, 16 FH-1100, 3 Bell 206, 2 Bell 212, 2 Bell 214B, 6 OH-23F, 28 KH-4 hel.  
(On order: 16 M-60A3 med, 150 *Scorpion* lt tks, 40 M-113, 94 V-150 APC, 24 105mm, 24 155mm how, *TOW* ATGW.)

RESERVES: 500,000.

**Navy**: 28,000 (8,000 Marines).  
4 frigates (1 with *Seacat* SAM, 2 PF-103, 1 ex-US *Cannon*).  
26 large patrol craft (4 *Trad*, 7 *Liulom*, 1 *Klongyai*, 10 ex-US PGM 71, 4 ex-US *Cape*).  
3 45-metre FAC(M) with *Gabriel* SSM.  
21 coastal patrol craft<.  
6 coastal minesweepers (2 *Bangrachan*, 4 *Bluebird*).  
1 MCM spt ship, 10 minesweeping boats<.  
5 511-1152 LST, 3 LSM, 6 LCU, 26 LCM (all ex-US), LCA.  
3 trg ships: 2 ex-Br (1 *Algerine*, 1 *Flower*), 1 *Maeklong*.  
1 MR sqn with 10 S-2F *Tracker*, 2 HU-16B *Albatross*, 2 CL-215 SAR ac.  
8 Bell 212 ASW hel.  
1 Marine bde (3 inf, 1 arty bns).  
(On order: 3 FAC(M) with *Exocet* SSM.)

*Bases*: Bangkok, Sattahip, Songkla, Paknam.

**Air Force**: 43,000; 168 combat aircraft.  
1 FGA/recce sqn with 14 F-5A/B, 17 F-5E, 3 F-5F, 4 RF-5A.  
7 COIN sqns with 45 T-28D, 31 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, 10 *Turbo-Porter*.  
2 hel sqns with 18 S-58T, 30 UH-1H.  
Trainers incl 10 *Chipmunk*, 14 T-37B, 15 T-41D,

12 SF-260MT, 15 CT-4.

*Sidewinder* AAM.

4 bns of airfield defence troops.  
(On order: 15 F-5E, 3 F-5F fighters, 6 OV-10C COIN, 4 CASA C-212, 3 *Merlin* IVA tpts, 18 S-48T, 4 CH-47A, 16 UH-1H hel.)

*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: 50,250,000.  
Military service: 2 years minimum.  
Total armed forces: 1,023,000. (A large amount of American eqpt of the former South Vietnamese forces has been refurbished and is being taken into service.)  
Estimated GNP 1978: \$8.6 bn.

**Army**: 1,000,000.  
1 armd div.  
28 inf divs. (Inf divs, normally totalling 8-10,000 men, include 1 tk bn, 3 inf, 1 arty regts, an support elements.)  
2 arty divs.  
1 AA div.  
1 engr div.  
5 indep armd regts.  
15 indep mot inf regts.  
35 indep arty regts.  
50 indep AA arty regts.  
25 SAM regts (10 with 180 SA-2, 10 with 180 SA-3, 5 with 45 SA-6).  
15 indep engr regts.  
1,000 T-34/85, T-54, T-55, T-62, Type 59, Typ 60/63, Type 62, 400 M-47 and M-48 med, 45 PT-76 and Type 60, 150 M-41 lt tks; BRDM M-8, M-20 armd cars; 1,000 BTR-40/50/60-152, Type 56, Type 63, 800 M-113, V-10 *Commando* APC; 300 76mm and 85mm 100mm, 105mm, 800 122mm, 200 130mm, 10 152mm (all ex-Sov), 800 ex-US M-101/10 105mm and M-114 155mm guns/how; 9 SU-76, SU-100, ISU-122, 200 M-108 105mm M-109, 155mm, M-107 175mm and M-11 203mm SP guns; 82mm, 100mm, 107mm 120mm, 160mm mor; 107mm, 122mm, 140mm RL; *Sagger* ATGW; 4,000 23mm, 37mm, 57mm 85mm, 100mm, 130mm towed, ZSU-23-4 ZSU-57-2 SP AA guns; SA-2/3/6/7/9 SAM.

DEPLOYMENT: 40,000 in Laos (numbers fluctuate), 100,000-120,000 in Kampuchea.

**Navy**: 3,000.  
1 ex-US *Barnegat* frigate.  
2 ex-US *Admirable* corvettes.  
22 large patrol craft (3 ex-Sov SO1, 19 ex-US PGM 59/71).  
2 ex-Sov *Komar* FAC(M) with *Styx* SSM<.  
12 FAC(T) (6 ex-Sov P4<, 6 ex-Ch P6<).  
22 ex-Ch FAC(G) (8 *Shanghai*, 14 *Swatow*<).  
About 30 small coastal patrol craft<.  
3 501-1152 LST, 5 LSM, 18 LCU (all ex-US).  
10 Mi-4 SAR hel.

**Air Force**: 20,000; 495 combat aircraft.  
1 lt bbr sqn with 10 Il-28.  
20 FGA sqns with 110 MiG-17/F4, 30 MiG-23/27 60 SU-7/-20, 35 F-5A, 70 A-37B.  
12 interceptor sqns with 60 MiG-19/F-6, 12 MiG-21.  
Tpts incl 35 An-2 and Li-2, An-12, 9 An-24, 1 Il-14, 4 Il-18, C-130.  
Hel incl 30 Mi-4, 10 Mi-6, 60 Mi-8, 20 CH-47, 10 UH-1.  
About 30 trg ac incl Yak-11/-18, MiG-15UTI-21U.  
AA-2 *Atoll* AAM.

*Para-Military Forces*: 70,000 Frontier, Coast Security, and People's Armed Security Forces; Armed Militia of about 1,500,000.



## THE MILITARY BALANCE 1979/80

# Latin America

### CONTINENTAL TREATIES AND AGREEMENTS

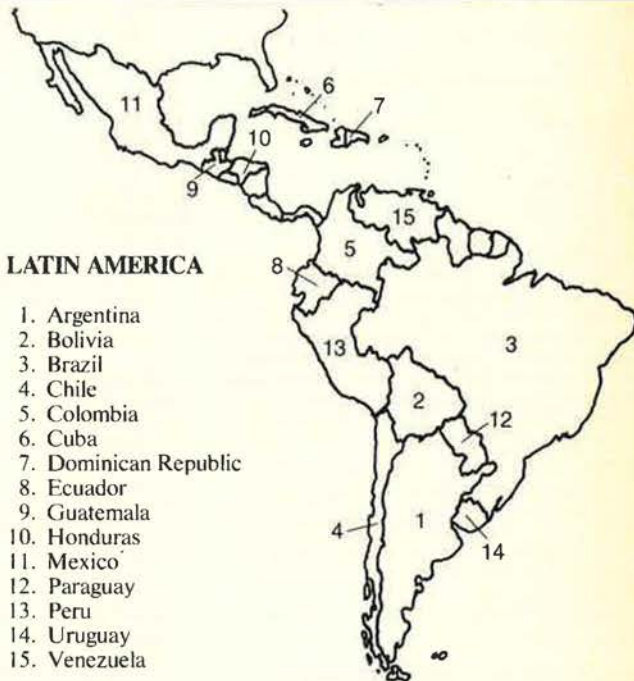
In March and April 1945 the Act of Chapultepec was signed by Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, Uruguay, and Venezuela. This Act declared that any attack 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 of 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, which corresponds with the Act of Havana, was signed in 1940 by the same states, with the exception of 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 to co-ordinate resistance to possible Communist aggression. Nicaragua's adherence is now doubtful.

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 has a treaty with the Republic of Panama granting her, in perpetuity,

virtual sovereign rights over the Canal Zone, but this treaty has been re-negotiated and two new treaties were ratified: the first, the so-called 'neutrality' treaty (ensuring the perpetual neutrality of the zone) was ratified on 16 March 1978, the second (covering arrangements for its transfer to Panama) 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: 26,740,000.  
 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 arm'd bdes.  
 4 inf bdes.  
 2 mountain bdes.  
 1 airmobile bde.  
 5 AD bns.  
 1 aviation bn.  
 100 M-4 Sherman, TAM med, 120 AMX-13 lt tks; *Shorland* arm'd cars; 250 M-113, 60 Mowag, AMX-VCI, M-3 APC; 200 105mm and 155mm guns; 105mm pack, 90 M-114 155mm towed, 24 Mk F3, 20 M-7 105mm, 6 M-109 155mm SP how; 81mm, 120mm mor; 50 *Kuerassier* 105mm SP ATK guns; 75mm, 90mm, 105mm RCL; SS-11/-12, *Bantam*, *Cobra*, *Mamba* ATGW; 30mm, 35mm, 40mm, 90mm AA guns; *Tigercat* SAM; 5 *Turbo-Commander* 690A, 3 *Turbo-Porter*, 2 DHC-6, 3 G-222, 4 *Metro* IIIA, 4 *Queen Air*, 1 *Sabreliner*, 5 Cessna 207, 15 Cessna 182, 1 *Citation*, 20 U-17A/B ac; 7 Bell 206, 4 FH-1100, 20 UH-1H, 4 Bell 47G, 2 Bell 212, 6 SA.315 *Lama* hel.  
 (On order: 120 *Kuerassier* SP ATK guns, 12 *Puma*, 12 *Lama*, 2 CH-47C hel.)

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*).  
 1 ex-Br *Colossus* aircraft carrier (15 A-4Q, 6 S-2A/E, 4 S-61D).  
 1 ex-US *Brooklyn* cruiser with *Seacat* SAM, 2 hel.  
 8 destroyers: 1 Type 42 with *Sea Dart* SAM, 1 *Lynx* hel, 7 ex-US (3 *Fletcher*, 3 *Sumner*, 1 *Gearing*).  
 2 ex-Fr A69 'Avisos' (frigates) with *Exocet* SSM.  
 9 corvettes: 2 ex-US *Cherokee*, 2 *King* (1 trg), 4 ex-US *Sotoyomo* (1 coastguard), 1 *Bouchard* (coastguard).  
 5 large patrol craft (4 coastguard).  
 2 *Dabur* FAC(P).  
 2 TNC-45 FAC(G).  
 2 ex-US *Higgins* FAC(T)<.  
 6 ex-Br *Ton* coastal minesweeper/hunters.  
 1 LSD, 2 LST, 27 ex-US landing craft<.  
 (On order: 2 Type 209 subs, 1 Type 42 destroyer, 6 frigates.)

**Bases:** Puerto Belgrano, Rio Santiago, Mar de Plata, Buenos Aires.

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, PBV-5A.  
 Tpts incl 2 *Electra*, 2 C-54, 2 DC-4, 8 C-47, 1 HS-125, 1 *Guaraní* II, 1 *Sabreliner*.  
 Other ac incl 2 DHC-2, 1 DHC-6, 2 *Super King Air*, 2 *King Air*, 4 *Queen Air*, 4 *Navajo*, 4 *Turbo-Porter*.  
 Hel incl 4 S-61D, 14 *Alouette* III, 3 UH-19, 5 S-55, 2 *Lynx*, 3 Bell 47G.  
 Trainers incl 12 MB-326GB, 12 T-6/-28, 2 AT-11.  
 (On order: 16 T-34C trg ac, 4 *King Air* tpts.)

MARINES: 9,000.

5 bns.  
 1 cdo bn.  
 1 amph bn.  
 1 fd arty bn.  
 1 AD bn.  
 2 security bns.  
 1 sigs bn.  
 6 indep inf coys.  
 22 LVTP-7, 15 LARC-5, 6 *Mowag* APC; 105mm, 155mm how; 81mm, 106mm mor; 75mm, 105mm RCL; *Bantam* ATGW, 30mm AA guns; 10 *Tigercat* SAM.

**Air Force:** 20,000; 210 combat aircraft.  
 1 bbr sqn with 9 *Canberra* B62, 2 T64.  
 4 FB sqns with 60 A-4P *Skyhawk*.  
 1 FB sqn with 18 F-86F.  
 4 FGA sqns: 1 with 18 *Mirage* 5, 3 with 48 MS-760A *Paris* I.  
 1 interceptor sqn with 23 *Mirage* IIIIEA, 2 IIIDA.  
 2 COIN sqns with 30 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 *Guaraní* 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.  
 (On order: 8 *Mirage* 5 fighters, 30 IA-58 *Pucará* COIN, 16 *Turbo-Commander* tpts, 2 KC-130 tankers, 2 UH-1H, 3 CH-47C, 8 Bell 212 hel.)

**Para-Military Forces:** 42,000. Gendarmerie: 11,000; M-113 APC, 20 lt ac, 10 hel under Army command, mainly for frontier duties. Argentine Naval Prefecture (coastguard): 9,000. Federal Police 22,000; APC, 4 BO-105 hel.

## BOLIVIA

Population: 6,280,000.  
 Military service: 12 months selective.  
 Total armed forces: 22,500.  
 Estimated GNP 1977: \$3.3 bn.  
 Defence expenditure 1979: 1.9 bn pesos (\$94 m).  
 \$1 = 20.2 pesos (1979), 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-100 *Commando*, 20 *Mowag* APC  
 6 75mm guns; 25 M-116 75mm pack, 2 FH-18, 25 M-101 105mm how, 18 *Kuerassier* 105mm SP ATK guns.

**Navy:** 1,500.  
 16 small patrol craft<.  
 1 river transport.

**Base:** Tiquina.

**Air Force:** 4,000; 38 combat aircraft.  
 1 fighter/trg sqn with 10 T-33A/N.  
 2 COIN sqns with 18 EMB-326G (*Xavante*), 1 T-6G.  
 Tpts incl 3 C-130H, 1 DC-6B, 1 *Electra*, 2 C-54, *Sabreliner*, 2 *Learjet*, 5 *Arava*, 4 CV-440, C-47, 1 *Super King Air*, 1 *King Air*, 5 F-27.  
 1 hel sqn with 5 UH-1H, 7 SA.315B *Lama* SAR.  
 Liaison ac incl 11 Cessna 185, 2 Cessna 206C, *Turbo-Centurion*, 1 *Turbo-Porter*, 1 Cessna 402, 1 Cessna 421.  
 Trainers incl 10 T-6G, 6 T-41D, 12 T-23 *Uirapuru*, 6 SF-260M, PC-7 *Turbo-Trainer*.  
 (On order: 15 PC-7 *Turbo-Trainer*.)

## BRAZIL

Population: 120,000,000.  
 Military service: 1 year.  
 Total armed forces: 281,000 (113,000 conscripts).  
 Estimated GDP 1978: \$202 bn.  
 Defence expenditure 1979: 47.3 bn cruzeiro (\$2.09 bn).  
 \$1 = 22.65 cruzeiros (1979), 16.9 cruzeiro (1978).

**Army:** 182,000 (110,000 conscripts).  
 8 divs: each up to 4 arm'd, mech, or mot inf bdes  
 2 indep inf bdes.  
 1 indep para bde.  
 5 lt 'jungle' inf bns.  
 60 M-4 med, 250 M-3A1, 250 M-41, 35 X-1A2 tks; 120 EE-9 *Cascavel*, M-8 arm'd car; EE-11 *Urutu*, M-59, 600 M-113 APC; 50 M-116 75mm pack, 450 105mm (50 M-7, 2 M-108 SP), 90 M-114 155mm how; 81mm mor 108-R, 114mm RL; 106mm RCL; *Cobra* ATGW 30 35mm, 30 40mm, 40 90mm AA guns; 4 *Roland* SAM; 40 L-42 *Regente*, O-1E lt ac; 1 AB-206A hel.  
 (On order: 35 X-1A2 lt tks.)

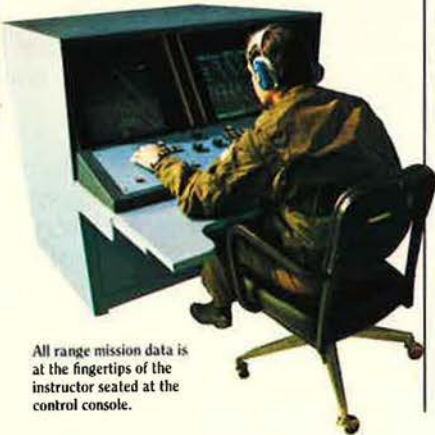
**Navy:** 49,000 (3,000 conscripts, 13,500 Naval Air Force, Marines, and Auxiliary Corps).  
 8 submarines (3 *Oberon*, 5 ex-US *Guppy* II/III).  
 1 ex-Br *Colossus* aircraft carrier (20 ac, incl S-2A ASW ac, 4 *Sea King* hel).  
 18 destroyers: 6 *Niteroi* (2 with *Seacat* SAM, *Ikara*, 1 *Lynx* hel, 4 with *Exocet* SSM), 5 ex-US *Fletcher* (1 with *Seacat*), 5 ex-US *Sumner* (with *Seacat*), 2 ex-US *Gearing* with ASROC.  
 10 *Imperial* *Marinheiro* patrol vessels.  
 2 *Pedro Teixeira*, 3 *Roraima* river patrol ships,

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"a rock with wings"**



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river monitor.  
*Piratiní* large, 10 river patrol craft<.  
*Schütze* coastal minesweepers.  
 survey ships (2 *Sirius*, 3 *Argus*).  
 ex-US LST, 4 LCU.

ases: Rio de Janeiro, Aratu, Belem, Recife,  
 Natal, Ladario.

NAVAL AIR FORCE: no combat aircraft.  
 ASW sqn with 5 SH-3D *Sea King* hel.  
 utility sqn with 5 *Whirlwind*, 6 *Wasp*, 1 FH-  
 1100, 2 Bell 47G, 18 AB-206B, 9 *Lynx* hel.  
 trg sqn with 10 *Hughes* 269/300 hel.  
 in order: 8 AS.350 *Ecureuil* hel.)

Air Force: 50,000; 142 combat aircraft.  
 interceptor sqn with 11 *Mirage* IIIIEBR, 3  
 DBR.

COIN/recce sqns with 34 F-5E, 5 F-5B.  
 COIN/recce sqns with 40 AT-26 *Xavante*, 20  
 T-25 ac, 11 UH-1D, 4 Bell 206, 4 OH-6A hel.  
 ASW sqn with 8 S-2E, 9 S-2A (7 in carrier).  
 MR sqn with 12 EMB-111M.  
 SAR sqns with 7 SA-16 *Albatross*, 3 RC-130E, 7  
 PBY-5A ac, 5 SH-1D, 2 Bell 47G hel.  
 tpt sqns with 2 Boeing 737, 9 C-130E/H, 2  
 KC-130H, 13 HS-125, 1 *Viscount*, 12 HS-748,  
 20 DHC-5, 96 EMB-110 *Bandeirante* (78 C-95,  
 6 R-95, 4 EC-95, 8 C-95A), 14 C-47 ac, 6  
 AB-206 hel.  
 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 *Uni-*  
*versal*, 10 T-33, 50 AT-26.  
 530 AAM.

in order: 4 *Mirage* IIIIEBR interceptors, 82  
 AT-26 trg, 20 EMB-110 (C-95A) tpts, 3 EMB-  
 111M MR ac.)

Para-Military Forces: Public security forces  
 about 200,000; state militias in addition.

## CHILE

Population: 11,060,000.  
 Military service: 1 year.  
 Total armed forces: 85,000 (21,600 conscripts).  
 Estimated GDP 1978: \$11.6 bn (Rapid inflation  
 makes defence expenditure and GNP figures in  
 local currency and dollar terms unreliable.)  
 Defence expenditure 1979: 25.6 bn pesos (\$726  
 m).  
 \$1 = 35.25 pesos (1979), 30.14 pesos (1978).

Army: 50,000 (20,000 conscripts).  
 Divs, incl 7 cav regts (3 armd, 3 horsed, 1 hel-  
 borne), 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;  
 10 EE-9 *Cascavel* armd cars; 300 M-113,  
 Mowag MR-8 APC; 105mm, 36 M-56 105mm  
 pack how; Mk F3 155mm sp how; 81mm,  
 20mm mor; 106mm RCL; 20mm, 40mm AA  
 guns; 6 CASA C-212 tpts, 4 *Navajo*, 4 O-1 ac,  
 1 *Puma*, 6 *Lama*, 3 UH-1H, 2 AB-206 hel.

RESERVES: 160,000.

Navy: 24,000 (1,600 conscripts), incl Naval Air  
 and Marines.  
 Submarines (2 *Oberon*, 1 ex-US *Balao*).  
 Cruisers (2 ex-US *Brooklyn* with 1 hel, 1 ex-  
 Sweden *Tre Kroner*).  
 Destroyers (2 *Almirante* with *Exocet* ssm, *Sea-*  
*cat* SAM, 2 ex-US *Sumner* with 1 hel, 2 ex-US  
*Fletcher*).  
 Frigates (2 *Leander* with *Exocet* ssm, *Seacat*  
 SAM, 1 hel, 3 ex-US *Lawrence*).  
 ex-US corvettes (2 *Sotoyomo*, 1 *Cherokee*).  
 Görssen type FAC(T).  
 Large, 2 coastal patrol craft.  
 11-1152 LST, 1 LCM, 6 LCVP (all ex-US).

ases: Talcahuano, Valparaiso, Puerto Montt,  
 Punta Arenas, Puerto Williams.



The IA-58 Pucará counterinsurgency aircraft was designed and produced in Argentina. The Argentine Air Force expects eventually to have about 100 of them.

NAVAL AIR FORCE: 500; no combat aircraft.  
 1 ASW/SAR sqn with 6 EMB-111, 2 PBY-5A, 3  
 PBY-6A, 4 SP-2E, 5 Beech D18S, 1 *Navajo*, 1  
 F-27 ac, 4 UH-19, 2 UH-1D hel.  
 Tpts incl 4 C-47, 6 EMB-110C *Bandeirante*, 4  
 CASA C-212.  
 Hel incl 4 AB-206, 3 UH-19, 2 UH-1D, 6 BO-105,  
 6 *Alouette* III.  
 5 T-34 trainers.

MARINES: 3,800.  
 1 bde; coast-defence units.

Air Force: 11,000; 84 combat aircraft.  
 3 FB sqns with 16 *Hunter* F71, 18 F-5E/F.  
 1 fighter/trg sqn with 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, 8 C-47,  
 2 utility sqns with 17 DHC-6, 10 C-45, 1 *King Air*,  
 5 *Twin Bonanza*, 10 Cessna 180.  
 Hel incl 6 S-55T, 13 UH-2H, 3 UH-12E, 1 *Puma*,  
 1 *Alouette* III.  
 Trainers incl 30 T-34A, 25 T-37B, 8 T-41, 11  
*Vampire* T22/55, 4 *Hunter* T77, 5 T-6, 9 Beech  
 99, 10 T-25, 1 F-27, 18 Cessna *Hawk* XP.  
*Sidewinder*, *Shafir* AAM, AS.11/12 ASM.  
 1 AA arty regt.

Para-Military Forces: 30,000 *Carabineros*, with  
 15 Mowag MR-8 APC, 25 lt ac.

6 mech cav, 26 inf, 7 arty, 6 engr units.  
 M-4A3 med, M-3A1 lt tks; M-8, M-20 armd cars;  
 48 M-101 105mm how; mor; 40mm AA guns.

RESERVES: 500,000.

Navy: 8,000 (2,800 Marines).  
 2 Type 209 submarines.  
 2 SX-506 midget submarines<.  
 3 destroyers (2 *Holland*, 1 ex-US *Sumner*).  
 6 ex-US frigates (1 APD, 1 *Courtney*, 4  
*Cherokee*).  
 6 large patrol craft (2 ex-US *Asheville*).  
 16 gun boats (13<).  
 1 ex-US 511-1152 LST.  
 2 marine bns.

Bases: Cartagena, Buenaventura.

Air Force: 4,500; 18 combat aircraft.  
 1 fighter/recce sqn with 14 *Mirage* 5COA, 4  
 5COR/D.  
 Tpts incl 2 C-130B, 5 C-54, 19 C-47, 2 HS-748, 1  
 F-28, 10 DHC-2, 3 Piper PA-23.  
 Hel incl 13 AH-1A, 3 UH-1B, 6 UH-1H, 1  
 UH-1N, 20 OH-6A, 8 OH-13.  
 Trainers incl 10 T-37C, 2 AT-37, 27 T-41D, 3  
 RT-33, 26 T-33A, 25 T-34B.  
 R.530 ASM.

Para-Military Forces: 50,000 National Police  
 Force.

## COLOMBIA

Population: 26,520,000.  
 Military service: 2 years.  
 Total armed forces: 67,500.  
 Estimated GNP 1977: \$19.3 bn.  
 Defence expenditure 1979: 9.01 bn pesos (\$215  
 m).  
 \$1 = 41.87 pesos (1979), 36.5 pesos (1977).

Army: 55,000.  
 11 inf bdes ('Regional Bdes').  
 1 Presidential Guard.  
 1 ranger bn.  
 4 AB bns.  
 1 AA arty bn.

## CUBA

Population: 9,870,000.  
 Military service: 3 years.  
 Total armed forces: 189,000.  
 Estimated GNP 1978: \$12.5 bn.  
 Estimated defence expenditure 1979: 841 m  
 pesos (\$1.17 bn).  
 \$1 = 0.72 pesos (1979), 0.76 pesos (1978).

Army: 160,000.  
 3 armd bdes.  
 15 inf 'divs' (bdes).  
 Some indep 'regts' (bn gps).  
 Over 600 tks, incl 60 IS-2 hy, 150 T-34/54/55, 50  
 T-62 med, PT-76 lt; BRDM-1 armd cars; 400  
 BTR-40/60/152 APC; M-116 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 towed, ZSU-23-4 SP AA guns; SA-7 SAM.

**DEPLOYMENT:** Angola: 20,000; Ethiopia: 16-17,000. (Cuban advisers and technicians are also reported in Algeria, Benin, Congo, Guinea, Libya, Mozambique, Sierra Leone, Tanzania, South Yemen, Zambia.)

**RESERVES:** 90,000.

**Navy:** 9,000.  
2 ex-Sov submarines (1 F-, 1 W-class).  
18 ex-Sov large patrol craft (12 SO1, 6 Kronstadt).  
28 ex-Sov FAC(M) with Styx SSM (5 Osa-I, 5 Osa-II, 18 Komar<).  
28 ex-Sov FAC(T) (2 Turya, 12 P6<, 12 P4<).  
8 ex-Sov Zhuk FAC(P<).  
6 small coastal patrol craft.  
7 T4 LCM.  
Some 50 Samlet coast-defence ssm.

**Bases:** Cabanas, Cienfuegos, Havana, Mariel, Varadero.

**Air Force:** 20,000, incl Air Defence Forces; 183 combat aircraft.  
3 FB sqns: 2 with 30 MiG-17, 1 with 10 MiG-23.  
8 interceptor sqns: 3 with 48 MiG-21F, 2 with 30 MiG-21MF, 2 with 40 MiG-19, 1 with 10 MiG-23.  
1 trg sqn with 15 MiG-15UTI.  
Tpts incl 10 Il-14, An-2, An-24, 20 An-26.  
Hel incl 10 Mi-1, 20 Mi-4, 10 Mi-8.  
Trainers incl 2 MiG-23U, 20 Zlin 326.  
AA-2 Atoll AAM.  
24 SAM bns with 144 SA-2 and SA-3.

**Para-Military Forces:** 10,000 State Security troops; 3,000 border guards; 100,000 People's Militia.

## DOMINICAN REPUBLIC

**Population:** 5,270,000.  
**Military service:** voluntary.  
**Total armed forces:** 18,500.  
**Estimated GNP 1977:** \$4.3 bn.  
**Defence expenditure 1979:** 91 m pesos (\$91 m).  
\$1 = 1 peso (1979), 1 peso (1977).

**Army:** 11,000.  
3 inf bdes.  
1 mixed armd bn.  
1 mountain inf bn.  
1 para 'bn'.  
1 Presidential Guard bn.  
1 arty, 1 AA arty regt.  
1 engr bn.  
1 armd recce sqn.  
20 AMX-13 lt tks; AML armd cars; M-3 APC; 20 M-101 105mm how.

**Navy:** 4,000.  
3 frigates: 2 ex-US Tacoma (in reserve), 1 ex-Can River.  
5 corvettes: 3 ex-US Cohoes, 2 ex-Can Flower (in reserve).  
2 ex-US Admirable minesweepers.  
5 ex-US large patrol craft (3 Argo, 1 PGM-71).  
5 coastal patrol craft<.  
2 LCU.  
1 cdo bn.

**Bases:** Santo Domingo, Bani.

**Air Force:** 3,500; 36 combat aircraft.  
1 fighter sqn with 10 Vampire F1/FB50.  
1 fighter/trg sqn with 20 F-51D Mustang.  
1 COIN/trg sqn with 6 T-28D.  
2 PBV-5A Catalina 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, 1 SA.365 Dauphin 2.

Trainers incl 4 Cessna 172, T-6, 4 T-41.

**Para-Military Forces:** 10,000 Gendarmerie.

## ECUADOR

**Population:** 8,080,000.  
**Military service:** 2 years, selective.  
**Total armed forces:** 32,800.  
**Estimated GNP 1978:** \$7.0 bn.  
**Defence expenditure 1979:** 4.39 bn sucres (\$163 m).  
\$1=26.9 sucres (1979), 24.9 sucres (1978).

**Army:** 25,000.  
11 inf bns (2 mot).  
1 para bn.  
3 recce sqns.  
4 horsed cav sqns.  
1 Presidential Guard sqn.  
10 indep inf coys.  
3 arty gps, 1 AA arty bn.  
2 engr bns.  
40 M-3, 90 AMX-13 lt tks; 27 AML-60/90 armd cars; 20 M-113, AMX-VCI APC; 18 105mm, 6 Mk F3 155mm SP how; 10 40mm AA guns; 1 Skyvan, 6 Arava, 3 Turbo-Porter tpts, 7 lt ac, 2 hel.  
(On order: VAB APC, 28 M-167 20mm towed and 44 M-163 Vulcan 20mm SP AA guns; 18 M-730 Chaparral SAM.)

**Navy:** 3,800 (700 marines).  
2 Type 209 submarines.  
1 ex-US Gearing destroyer.  
3 frigates (1 ex-US Lawrence, 2 ex-Br Hunt).  
2 ex-US PCE-827 corvettes.  
3 Lürssen type FAC(M) with Exocet SSM.  
3 Manta FAC(T).  
2 ex-US PGM-71 large, 5 coastal patrol craft<.  
1 511-1152 LST, 2 LSM (all ex-US).  
3 Arava, 2 T-37, 2 T-41, 1 Cessna 320, 1 Cessna 177 ac, 2 Alouette III hel.  
(On order: 6 corvettes, Exocet SSM.)

**Bases:** Guayaquil, San Lorenzo, Galápagos Islands.

**Air Force:** 4,000; 47 combat aircraft.  
1 lt bbr sqn with 5 Canberra B6.  
1 FB sqn with 10 Jaguar S.  
1 interceptor sqn with 4 Mirage F-1JA.  
1 recce sqn with 6 Meteor FR9.  
1 COIN sqn with 10 A-37B.  
1 COIN/trg sqn with 12 BAC-167 Strikemaster.  
1 PBV-5A Catalina MR aircraft.  
Tpts incl 4 Electra, 1 C-130H, 4 DC-6B, 3 Learjet, 5 HS-748, 12 C-47, 6 C-45, 2 DHC-5D, 3 DHC-6.  
Hel incl 2 Puma, 5 Alouette III, 4 Lama, 3 Bell 47G.  
Trainers incl 2 Jaguar B, 20 T-34C, 12 SF-260, 24 Cessna 150A.  
R.550 Magic AAM.  
(On order: 12 Mirage F-1JA interceptors, 2 Mirage F-1JE trainers.)

**Para-Military Forces:** 5,800.

## GUATEMALA

**Population:** 6,820,000.  
**Total armed forces:** 17,960.  
**Estimated GNP 1977:** \$5.5 bn.  
**Defence expenditure 1979:** 70.6 m quetzal (\$70.6 m).  
\$1 = 1 quetzal (1979), 1 quetzal (1977).

**Army:** 17,000.  
3 bde HQ.  
10 inf bns.  
1 Presidential Guard bn.  
1 para bn.  
1 engr bn.  
1 armd car coy.  
9 arty btys.  
Some M-3 Stuart lt tks; 15 M-8 armd cars; 6

M-3A1, 10 M-113, 10 RBV-1, 7 Command APC; 12 75mm, 12 105mm how; 81mm, 12 4.2-in mor.

**Navy:** 560 incl 200 marines.  
9 coastal patrol craft<.  
1 LCM.

**Air Force:** 400; 13 combat aircraft.  
1 FGA sqn with 10 A-37B, 3 Magister.  
1 tpt sqn with 1 DC-6, 12 C-47, 8 Arava.  
1 comms/trg sqn with 5 Cessna 172, 2 Cessna U-206C ac, 8 Bell UH-1D hel.  
Trainers incl 2 T-33A, 2 PC-7 Turbo-Trainer.  
(On order: 10 PC-7.)

**Para-Military Forces:** 3,000.

## HONDURAS

**Population:** 3,630,000.  
**Military service:** voluntary.  
**Total armed forces:** 11,300.  
**Estimated GNP 1978:** \$1.69 bn.  
**Defence expenditure 1979:** 62.8 m lempira (\$2 m).  
\$1=2 lempiras (1979), 2 lempiras (1978).

**Army:** 10,000.  
10 inf bns.  
1 Presidential Guard bn.  
2 arty bns.  
1 engr, 1 sigs bn.  
12 M-116 75mm pack, 12 M-101 105mm how.  
81mm, 120mm mor; 57mm RCL.  
(On order: Scorpion lt tks.)

**Navy:** 100.  
7 Swift patrol craft (3 105-ft fast, 4 65-coastal<).  
(On order: 1 105-ft patrol craft.)

**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, Westwind, 4 Cessna 180/185.  
Trainers incl 6 T-6, 12 T-28F, 5 T-41A, 3 R-33A.  
Hel: 1 Alouette III, 2 UH-19D.

**Para-Military Forces:** 3,000.

## MEXICO

**Population:** 69,200,000.  
**Military service:** voluntary, with part-time conscript militia.  
**Total armed forces:** 100,000 regular, 250,000 part-time conscripts.  
**Estimated GNP 1978:** \$83.6 bn.  
**Defence expenditure 1979:** 11.82 bn pesos (\$5 m).  
\$1=22.8 pesos (1979), 22.7 pesos (1978).

**Army:** 80,000 regular (250,000 conscripts).  
1 mech bde gp (Presidential Guard).  
2 inf bde gps.  
1 para bde.  
Zonal Garrisons incl:  
23 indep cav regts, 64 indep inf bns, 1 arty regt AA, engr, and spt units.  
M-3, M-5 lt tks; 100 M-3A1, M-8 armd car HWK-11 APC; M-116 75mm pack, 105mm towed, M-8 75mm, M-7 105mm SP how.

**Navy:** 15,000, incl Naval Air Force and Marines  
2 ex-US Fletcher destroyers.  
6 frigates: 1 ex-US Edsall (trg ship), 1 Durango, ex-US Lawrence/Crossley.  
34 ex-US corvettes (18 Auk, 16 Admirable minesweepers).  
22 Azteca large patrol craft.  
6 coastal, 9 river patrol boats<.  
2 ex-US 511-1152 LST.  
(On order: 9 Azteca large patrol craft.)

**AIR FORCE Magazine / December 1979**



ises: Gulf: Vera Cruz, Tampico, Ciudad del Carmen, Isla Mujeres. Pacific: Acapulco, Puerto Cortes, Guaymas, Manzanillo.

VAL AIR FORCE: 350.

HU-16 *Albatross* MR ac.  
ther ac incl 1 *Learjet* 24D, 4 C-45, 2 FH-227, 1 *Baron*, 3 *Bonanza*, 4 Cessna 150.  
el: 4 *Alouette* II, 3 Bell 47, 5 Hughes 269A.

ARINES: 2,000; 19 security companies.

r Force: 5,000; 79 combat aircraft.

COIN sqn with 14 AT-33A.

COIN/trg sqns with 20 T-6, 45 T-28A.

AR sqn with 18 LASA-60 ac, 9 *Alouette* III, 1 Hiller 12E hel.

ot sqns with 2 Boeing 727, 1 DC-7, 5 C-118, 5 C-54, 1 *Electra*, 1 *Jetstar*, 1 BAC-111, 20 C-47, 3 *Skyvan*, 12 *Islander*, 10 *Arava*, Aero *Commander*.

l incl 5 Bell 206B, 3 Bell 212, 10 Bell 205, 5 *Puma*.

ainers incl 20 T-6, 30 T-38, 20 Beech F33-19, 20 *Musketeer*, 2 PC-7 *Turbo-Trainer*.

ara bn.

n order: 10 PC-7 *Turbo-Trainer*.)

## PARAGUAY

Population: 2,970,000.

ilitary service: 18 months.

tal armed forces: 15,500.

timated GNP 1978: \$2.14 bn.

ence expenditure 1978: 5.19 bn guaranies (\$41 m).

\$1 = 126 guaranies (1978).

ny: 12,500.

av 'div' (bde) with 2 mech cav regts, 1 inf bn, 1 arty bty.

if 'divs' (bn gps).

idep horsed cav regts.

idep inf bns.

residential Guard bn.

ty regt.

gr bns.

gs bn.

-4 med, 12 M-3A1 lt tks; APC; 75mm pack, 48 1-101 105mm how; 40mm AA guns; 2 Bell 47, 3 FH-12E hel.

y: 2,000 (500 Marines and Naval Air).

umaita river defence vessels.

x-Arg *Bouchard* corvettes (ex-mine-weepers).

rge, 8 coastal patrol craft <.

-US LSM.

-US LCU.

arine 'regt' (bn).

essna U206, 2 Cessna 150 ac, 2 Bell 47G hel.

e: Asunción/Puerto Sajonia.

Force: 1,000; 28 combat aircraft.

GA sqn with 6 A-37B.

COIN/trg sqn with 22 T-6 *Texan*.

s incl 5 DC-6B, 2 C-54, 3 CV-240, 10 C-47, 1 HC-6, 1 *Dove*, 1 DHC-3.

UH-13A hel.

iners incl 8 Fokker S-11, 8 T-23 *Uirapuru*, 1 FS-760, 5 Cessna 185.

ara regt (bn).

l order: 12 EMB-326 *Xavante* COIN, 10 MB-110 tpts.)

a-Military Forces: 4,000 security forces.

## PERU

ulation: 17,530,000.

tary service: 2 years, selective.

il armed forces: 92,000 (49,000 conscripts).

mated GNP 1978: \$12.4 bn. (Rapid inflation akes defence expenditure and GNP figures in

local currency and dollars unreliable.)

Defence expenditure 1977: 30.04 bn soles (\$406 m).

\$1 = 130 soles (1978), 74 soles (1977).

Army: 70,000 (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, 50 M-3A1 scout cars; 200 M-113, 40

V-150 *Chaimite*, UR-416, Mowag APC; 90

105mm, 122mm, 130mm, 4 M-114 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 (35 in store), 4

*Alouette* III, 5 *Lama* hel.

(On order: 200 T-55 tks, 122m, 130mm guns, SA-3/-7 SAM, 2 *Nomad* lt tpt ac.)

Navy: 12,000 (incl Naval Air, 1,000 Marines).

8 submarines (2 Type 209, 2 ex-US *Guppy* I, 4 ex-US *Abtao*).

4 cruisers: 2 ex-Neth *De Ruyter* (1 with *Exocet* SSM, 3 hel), 2 ex-Br *Ceylon*.

6 destroyers (2 ex-Br *Daring* with *Exocet* SSM, 2 ex-US *Fletcher*, 2 ex-Neth *Holland*).

4 frigates (2 *Lupo* with *Otomat* SSM, *Albatross* SAM, 1 hel, 2 ex-US *Cannon*).

5 river gunboats, 3 river patrol craft <.

2 ex-US LST, 2 ex-US LSM.

9 S-2E *Tracker* ASW, 6 C-47, 2 F-27MPA, 1 *Aztec* tpt ac.

6 AB-212 ASW, 10 Bell 206, 6 UH-1D/H, 2 *Alouette* III, 2 Bell 47G hel.

6 T-34 trainers.

(On order: 4 Type 209 submarines, 2 *Lupo* frigates, 6 PR-72P FAC(M) with *Exocet* SSM.)

Bases: Callao, San Lorenzo, Talara, Iquitos.

Air Force: 10,000; 138 combat aircraft.

2 lt bbr sqns with 32 *Canberra* B2, B(I)8, B(I)56.

4 strike/interceptor sqns: 2 with 24 *Mirage* 5P, 2 with 27 Su-22.

1 fighter sqn with 10 *Hunter* F52.

1 trg sqn with 12 MiG-21 (on loan from Cuba).

2 COIN sqns with 24 A-37B.

1 OCU with 2 *Canberra* T4, 2 *Hunter* T67, 1 *Mirage* 5DP, 4 Su-22UTI.

Tpts incl 2 L-100-20, 4 C-130E, 5 DC-6, 4 C-54, 2 *Learjet*, 16 An-26, 2 F-27, 4 F-28, 6 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-37 B/C, 4 Cessna 150.

AS.30 ASM.

Para-Military Forces: 25,000 *Guardia Civil*.

## URUGUAY

Population: 2,840,000.

Military service: voluntary.

Total armed forces: 27,500.

Estimated GNP 1978: \$3.7 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), 5.41 pesos (1978).

Army: 20,000.

4 regional 'Armies' (divs) comprising:

3 armd regts, 6 cav regts, 13 inf bns, 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; 675mm guns; 25 M-101 105mm how.

Navy: 4,500 (incl naval air, naval infantry, coastguard).

3 ex-US frigates (1 *Dealey*, 2 *Cannon*).

2 ex-US corvettes (1 *Auk*, 1 *Aggressive*).

1 *Adjutant* large, 6 coastal patrol craft <.

2 ex-US LCM.

3 S-2A MR ac, 3 SNB-5 (C-45) tpts; 1 T-34B, 7

SNJ-4/6, 4 T-6, 2 *Super Cub* trainers, 2 SH-34J hel.

(On order: 3 patrol boats.)

Base: Montevideo.

Air Force: 3,000; 23 combat aircraft.

1 fighter/trg sqn with 5 AT-33A.

1 COIN sqn with 8 A-37B.

1 recce/trg sqn with 10 T-6G, 8 U-17A.

Tpts incl 12 C-47, 2 F-27, 2 FH-227, 2 *Queen Air*,

6 EMB-110B/C.

Hel inc 9 UH-1B/H, 2 H-23F.

3 Cessna 182A/D, 2 *Super Cub* liaison ac.

Trainers incl 6 T-41D, 26 T-34B, 2 C-45.

Para-Military Forces: 2,200.

## VENEZUELA

Population: 13,540,000.

Military service: 2 years, selective.

Total armed forces: 41,500.

Estimated GNP 1977: \$35.8 bn.

Defence expenditure 1979: 3.03 bn bolivares (\$706 m).

\$1 = 4.29 bolivares (1979), 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, 135 M-101 105mm how; 20 AMX 155mm

SP how; 81mm, 120mm mor; 35 M-18 76mm SP

ATK guns; 106mm RCL; SS-11 ATGW; 40mm AA

guns; 2 *Merlin*, 1 *King Air* tpt ac; 20 *Alouette* III, 3 UH-1D/H, Bell 47G, 6 Bell 206B hel.

Navy: 8,000, incl 4,000 Marines.

4 submarines (2 Type 209, 2 ex-US *Guppy* II).

4 destroyers: 2 *Aragua* (1 with *Seacat* SAM), 2 ex-US *Sumner*.

5 frigates (1 *Lupo* with *Otomat* SSM, *Albatross* SAM, 1 hel, 3 *Almirante Clemente*).

3 Vosper Thornycroft FAC(M) with *Otomat* SSM.

3 Vosper Thornycroft FAC(G).

16 *Rio Orinoco* coastal patrol craft <.

1 LST, 4 LSM, 1 tpt (all ex-US).

6 S-2E *Tracker*, 4 HU-16 SAR ac, 3 C-47, 1 HS-748, 1 *King Air* tpts, 2 Bell 47J hel.

(On order: 5 *Lupo* frigates, 6 AB-212 ASW hel.)

Bases: Caracas, Puerto Cabello, La Guaira, Puerto de Hierro.

MARINES: 3 bns.

Air Force: 5,500, 98 combat aircraft.

1 lt bbr sqn with 18 *Canberra* B2, 7 B(I)8, 2 PR3, 2 T4.

3 fighter sqns: 1 with 14 CF-5A, 4 CF-5B, 1 with 9 *Mirage* IIIIEV, 45V, 25DV, 1 with 20 F-86K.

1 COIN sqn with 16 OV-10E.

2 tpt sqns with 6 C-130H, 1 Boeing 737, 1 DC-9, 20 C-47, 12 C-123B, 2 HS-748, 1 Cessna *Citation*.

Hel incl 13 *Alouette* III, 20 UH-1D/H, 20 UH-19, 2 Bell 212.

Trainers incl 12 *Jet Provost*, 23 T-2 *Buckeye*, 25 T-34, 2 Beech 95, 9 *Queen Air*, 12 Cessna 182.

R.530 AAM.

1 para bn.

(On order: 1 *Mirage* IIIIEV fighter, 8 A-109 hel.)

Para-Military Forces: 10,000 National Guard.



THE MILITARY BALANCE 1979/80

# The East-West Theatre Balance in Europe

Any assessment of the military balance between NATO and the Warsaw Pact—a balance which tends to change fairly slowly—involves comparison of the strengths of both men and equipment, consideration of qualitative characteristics, of factors such as geographical advantages, deployment, training, and logistic support, and of differences in doctrine and philosophy. It must be set within the context of the strategic nuclear balance, of military forces world wide, and, in particular, of the relative strengths of the navies of the two sides.

Certain elements in the equation hardly change at all. Warsaw Pact equipment is 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 forces are designed for an offensive, while NATO forces are designed for defence. NATO forces are therefore intended 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 generally of different size and have different organizations and men-to-equipment ratios, it is sometimes useful to compare numbers of divisions. It must be emphasized, however, that quite substantial numbers of combat manpower on both sides 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 intended for deployment on what NATO terms the front of Allied Forces Northern Europe and those intended for the front of the Central Region. On the other hand, geography and politics impose a distinct degree of separation in forces opposing each other on the Southern Flank. There are three areas of NATO deployment in the Southern Region—Eastern Turkey, Greek and Turkish Thrace, and North-East Italy—and it would be difficult, if not impossible, for forces in any of these areas to be moved to

**Table I: Ground Forces Available Without Mobilization<sup>a</sup> (div equivalents)<sup>b</sup>**

	Northern and Central Europe <sup>c</sup>			Southern Europe <sup>d</sup>		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Armd	10	24	14	4	6	2
Mech	13	23	13	7	15	2
Inf and AB	4	—	—	26	—	—
TOTALS	27	47	—	37	21	—

<sup>a</sup> Includes: NATO ready forces, Soviet divisions in Eastern Europe, and non-Soviet Pact divisions in Category 1 (see note on p. 72).

<sup>b</sup> Divisions, brigades and similar formations aggregated on the basis of three brigades to a division.

<sup>c</sup> NATO figures are for AFCENT and AFNORTH combined. Since neither of the commanders of these forces can be assured of the support of ground forces in Portugal or Britain, these are not included. By the same criterion, French forces are also not included, although three divisions are currently deployed in Germany. Forces in Berlin are also excluded. Warsaw Pact forces include all Category 1 divisions of East Germany (2 tk, 4 mech), Czechoslovakia (3 tk, 3 mech) and Poland (5 tk, 3 mech), and Soviet divisions deployed in those countries in peacetime.

<sup>d</sup> NATO forces include Italian, Greek and Turkish land forces and, on the Warsaw Pact side, the Category 1 land forces of Bulgaria (1 tk, 5 mech), Hungary (1 tk, 3 mech), and Romania (2 tk, 5 mech), together with 4 Category 1 Soviet divisions (2 tk, 2 mech) stationed in Hungary.

another. Table I has therefore been divided into two parts, with NATO listed as a whole (because US ground forces do not constitute the major part of the total) and the Warsaw Pact divided into two—Soviet forces deployed in Eastern Europe in peace and non-Soviet Pact forces of Category 1. It can be assumed that all these formations are nearly fully manned in peacetime.

## MANPOWER

Manpower comparisons are not felt to be particularly valuable and we no longer attempt such a comparison. Manning levels for both sides are very difficult to assess and there are major definitional problems in determining what proportion of a given establishment are actually manning weapons systems. A substantial number of men in formations on both sides are not manning weapons, while there are, again on both sides, many combat troops in formations higher than divisions. In MBFR, all uniformed personnel are the units of account but within an area which is artificially restricted in scope. For all these reasons, totals of combat manpower are a very misleading guide to capabilities and are not pursued. Total manpower figures are, of course, given in each country entry.

## 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:

**Table II: Warsaw Pact Reinforcing Formations Available (div equivalents)<sup>b</sup>**

	Category 1			Category 2			Category 3		
	Armd	Mech	Other	Armd	Mech	Other	Armd	Mech	Other
USSR <sup>c</sup>	—	1	7	5	10	—	20	50	1
Bulgaria	—	—	—	—	2	½	¾	1	—
Czechoslovakia	—	—	—	—	—	—	2	2	—
Hungary	—	—	—	—	1	—	—	1	—
Poland	—	—	—	—	2	2	—	3	—
Romania	—	—	—	—	1	1½	—	2	—
	—	1	7	5	16	3½	22½	59	1
<b>GRAND TOTAL: 115½</b>									

<sup>c</sup> Based in Western and Central Military Districts.

- 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 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 at least initially tend to delay rail movement). Reinforcement by air is clearly feasible to overcome bottle-necks in land transport. The US faces great difficulties over reinforcement although measures are being taken to improve her response, including more pre-positioning of stocks in Europe and better air transport utilization rates.
- Any Western reinforcement by sea will become much more uncertain if it has to take place after

**Table III: Western Reinforcing Formations Available (div equivalents)<sup>b</sup>**

	Active				Reserve <sup>f</sup>			
	Armd	Mech	Marines	Other	Armd	Mech	Marines	Other
US <sup>g</sup>	2½	3½	2½	5½	3	3	1½	9½
Belgium	—	—	—	—	—	½	—	½
Britain	—	—	¾	1½	—	—	—	—
Canada	—	—	—	½	—	—	—	—
France	5	—	1	6	—	—	—	—
W. Germany	—	—	—	—	—	—	—	2
Netherlands	—	—	—	—	—	1	—	½
Norway	—	—	—	—	—	—	—	3½
	7½	3½	4½	13½	3	4½	1½	15½
<b>GRAND TOTAL: 52½</b>								

<sup>f</sup> 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.

<sup>g</sup> Including light divisions (infantry and airborne) and armoured cavalry regiments.

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 in Category 3 (see note in the section on the Warsaw Pact). The size of the USSR and its relative lack of good internal communications will make concentration of reserve manpower rather difficult and may preclude altogether the switching of divisions from the Eastern USSR at short notice.
- Some 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 II and III 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 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 Pact substantially. 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 2,842; Warsaw Pact 2,647. 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 wide 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 shown in Table IV. Tanks in French formations are not included in the table. If the three divisions

**Table IV: 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 <sup>a</sup>	7,000	20,500	13,500	4,000	6,700	2,500

<sup>a</sup> 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 and are presumed to be held in stockpiles or in independent units.

stationed in Germany are taken into account, 444 tanks should be added to the NATO total; if the three divisions in eastern France are also counted, a further 444 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-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 give more strength to the defence. NATO is indeed introducing large numbers of such weapons, but so is the Warsaw Pact.

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 over 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 Warsaw Pact countries may well be no better off. The Soviet logistic system has been greatly augmented in recent years, however, with the organization being improved and formations being 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 it has 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, bringing European capitals within range of tactical aircraft. The latest versions of the MiG-23/27 *logger*, 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, A-10, 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 and other precision-guided munitions.

**Table V: Tactical Aircraft**

Tactical Aircraft in Operation Service	Northern and Central Europe <sup>1</sup>			Southern Europe <sup>1</sup>		
	NATO	Warsaw Pact	(of which USSR)	NATO	Warsaw Pact	(of which USSR)
Light bombers	150	250	250	—	70	70
Fighter/ground-attack	1,500	1,350	930	625	325	70
Interceptors	400	2,050	1,000	200	1,000	400
Reconnaissance	300	550	300	125	200	125

<sup>1</sup> The area covered here is slightly wider than for ground troops as described in note c. 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 400 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, and also several hundred heavily armed Pact helicopters which pose a considerable threat to NATO ground forces. Overcrowding of forward airfields could prove a limiting factor in the amount of air power NATO can deploy.

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 a 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, whose strike aircraft have to meet 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 the table but from the length 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).

The Warsaw Pact enjoys the advantage of interior lines of communication, which makes for ease of command and control and logistics. It has in the past had a relatively high capability to operate 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 give 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 and *Nimrod* AEW aircraft 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 if enough airfields were available. While

the total tactical aircraft inventories of the two sides are not dissimilar in size, the Soviet Union keeps at least a quarter of her force 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 which 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 still 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 had committed themselves up to 1979, 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 (POMCUS) in Europe.
3. Increased reserves and improved mobilization techniques.
4. Co-operative measures (including, especially, 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. Communications, Command and Control (C<sup>3</sup>).
7. Electronic Warfare improvement on land, at sea, and in the air.
8. Consumer 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 are either in response to a specific and increasing Warsaw Pact threat—short-warning attack, increasing weight of air attack or interdiction of sea routes—or because of 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 coordination, 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. It would be too much to hope that LTDP can rectify all the problems or immediately eliminate any of them, but the plan, if followed through, will increase readiness and efficiency. Even if the symptoms have been accurately analysed, that will be a major step forward: a cure may follow, provided the machinery can be developed to maintain the impetus. 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 sixty tactical air squadrons) as against a current figure of only one division in that time and forty 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 analyse. 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. Secondly, 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, we see no reason to alter our conclusion of earlier years that the overall balance is still such as to make military aggression appear unattractive. NATO defences are of such a size and quality that any attempt to breach them would require a 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 in the Mediterranean) play a vital part in the equation as well.

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 force reductions while the Pact seeks to maintain the existing correlation although recent developments in the MBFR negotiations may indicate a substantial change in Soviet attitudes to the concept of parity in conventional strengths.



THE MILITARY BALANCE 1979/80

# The Balance of Theatre Nuclear Forces in Europe

In any attempt to make an objective analysis of the balance of theatre nuclear systems in Europe the definitions and assumptions made are critical. Changes in these lead unerringly to very different conclusions as to the state of the balance. There are two approaches to summation. The first is to add together all the nuclear-capable theatre systems in the inventories of the super-powers and their allies, regardless of whether all of these are in a position to affect the equation—making thereby an assumption that all *might* be used in some future conflict. The second is to attempt to make a judgment as to the numbers that seem likely to be employed against land targets in the European Theatre, excluding therefore many systems which have a theoretical nuclear capability against land targets but whose primary missions lie elsewhere. The first appears a rather crude method, embodying a significant number of distortions and leading, we would argue, to conclusions which are at best suspect and at worst extremely misleading. However, the second approach, which is used here, is heavily dependent on the validity of the detailed assumptions made. It is certainly possible to disagree with a number of them, and we shall be at pains to make quite clear what those assumptions are before entering the analysis. On the other hand there are clear limits as to how far one can proceed in this direction, for it leads towards the postulation of very specific scenarios which diverge rapidly. It is therefore useful to set out first some general assumptions which seem likely to hold good whatever the scenario. These will be followed by specific assumptions as to the constraints which states will face in deciding what systems to deploy to meet what threat.

## GENERAL ASSUMPTIONS

It must be made clear at the outset that this comparison is not concerned with short-range or battlefield delivery systems such as nuclear artillery or ssm with ranges of less than 100 miles. This is a very arbitrary boundary, since aircraft can clearly be used for the delivery of nuclear weapons on

the battlefield; however, an examination of the numbers of artillery pieces which can fire nuclear shells is not particularly illuminating since the number of shells in the stockpile will say more than the number of guns. This examination is concerned with weapon systems of longer range up to, but not including, those whose ranges entitle them to be included in SALT. There is an important exception to this rule: some US SLBM, which are included in SALT totals, are assumed to be diverted from the 'strategic' mission to the European Theatre. The first assessment is based on a count of separately targetable warheads.

Perhaps the most questionable assumption is also the most important: it is that, with the exception already noted, all 'strategic' systems will be withheld for the 'strategic' mission and will be used for nothing else. Such an assumption acknowledges implicitly that, if there were to be a nuclear war in Europe, it would be quite distinct from a strategic nuclear exchange between the super-powers and that both the super-powers would not be inclined, in the initial phase, to use any of their intercontinental systems to affect the outcome of a conflict confined at that time to Europe. This may be unrealistic, and, at least in the Soviet case, an unwarranted distinction to make, but it is made here in the interests of clarity.

Next, no attempt has been made to include any system whose primary mission is believed to be maritime. Excluded therefore are many Soviet submarine- and surface-launched nuclear cruise missiles, nuclear depth-charges, and Naval Air Force (NAF) aircraft. Similarly a decision has been taken to exclude most American nuclear-capable carrier borne aircraft on the grounds that the primary mission of American carrier task forces will be sea control in areas distant from the European Theatre. Some will be included, presumed to be those of the US Sixth Fleet in the Mediterranean. Nuclear-tipped SAM and ABM are not counted and nor are Atomic Demolition Munitions (ADM).

The assumptions made as to serviceability (*i.e.*, the numbers of systems actually ready for use at any moment) are as follows:

- **Naval Vessels: 70 per cent.** A figure that allows for refit and maintenance of a kind to preclude use in under one week. Where very small numbers of ships or boats are deployed, numbers will be rounded down rather than up. Britain, for example, can never expect to maintain more than two submarines out of four on station. A lengthy period of warning would push this figure up to about 80 per cent.

- **Aircraft: 80 per cent.** This might be increased if there were prolonged warning, but major servicing and repair will decrease numbers in squadron service.

- **Ballistic Missiles: 90 per cent.** In the case of SLBM, this figure is compounded with the serviceability of the submarines where applicable.

Although it must be acknowledged that there will be some attrition of nuclear-capable systems before nuclear release, no attempt has been made to degrade figures on this account in the first assessment. Because in most cases each side will wish to retain a particular level of nuclear-capable systems against such time as nuclear release is given, they are likely, for example, to withdraw aircraft from action in any conventional phase to replace losses on the ground of those earmarked for nuclear missions. And both will endeavour not to hazard nuclear systems before release; they will be hard to find and harder to attack.

No attempt has been made in the first balance to assess system reliability or their assurance of penetrating to their targets. Readers must make their own judgments of the likelihood of an aircraft surviving anti-aircraft fire and interceptor fighters, and this will be a function of numbers, avionics, weather, transit height, and ECM. In the absence of ballistic missile defences (BMD), ballistic missiles can be presumed to penetrate, but their reliability will be significantly less than 100 per cent. Malfunctions will occur.

It has not been thought useful to assess total yields, throw-weight, or bomber payloads. Assumptions have been made as to the numbers of gravity bombs or stand-off nuclear weapons that a particular type of aircraft can carry, but yields are variable. Total deliverable megatonnage is not considered to be very significant. Nor has any attempt been made to look at sortie rates or the reload capability of the different systems. It must be understood that some aircraft will surely survive to rearm, and the Soviet SS-20 launcher in particular is almost certain to be able to reload in due course with reserve missiles, as might the Western *Pershing*. Even some naval vessels could replenish in the unlikely event of a prolonged exchange. What then begins to matter is not the number of delivery systems deployed but the stockpile of nuclear warheads, and there is great uncertainty as to the numbers on hand on each side. It appears very likely that there are rather more warheads available to each side than there will be nuclear targets. Although there is considerable nervousness in Western Europe over the future reload capacity of the SS-20 in particular, it must be acknowledged that the number of *Poseidon* warheads allocated to SACEUR is an entirely arbitrary figure which, given the redundancy of American strategic second-strike systems which is generally believed to exist, could be raised to a substantially higher figure without difficulty. We have therefore excluded SS-20 reloads for the time being since it seems unlikely that these yet exist, as we have also excluded additional *Poseidon* warheads. We are assuming also that all warheads have been mated with their delivery system, *i.e.*, that nuclear outloading has been completed.

## SPECIFIC ASSUMPTIONS

In the case of the Soviet Union and the Warsaw Pact states, we assume that:

- No Soviet central systems are targeted against Western Europe.
- One-quarter of Soviet aviation and ballistic missiles (less SLBM) will be allocated to the Eastern



Front and these are most unlikely, given the present state of Sino-Soviet relations, to be deployable westwards in the event of a war in Europe.

- No NAF aircraft and seaborne cruise missiles would be used against land targets.
- One-half of medium bombers will be retained for the nuclear role.
- One-quarter of Fighter Ground Attack (FGA) totals will be retained for the nuclear role. The multi-role aircraft are listed separately to show numbers assumed to have missions against ground targets.
- A number of ageing diesel-powered ballistic missile submarines (SSB) are assumed to be deployed in the Baltic and to be targeted against Western Europe.
- The long-range bomber force would be reserved for intercontinental missions and thus does not affect the theatre balance.
- A number of nuclear-capable non-Soviet Pact aircraft are assumed to have a nuclear role. Some SCUD B missiles are similarly counted for Pact members.

It must be admitted that any one of these assumptions could be invalid, or, if valid now, changed at short notice. However, there are limits in terms of overall flexibility. Systems designed for a maritime mission are of peripheral value for other missions; weapon characteristics are optimised for the maritime mission and many rely on over-the-horizon target acquisition and terminal guidance for striking naval targets—techniques inapplicable on land. Furthermore, nuclear missions require special training and short-service aircrew cannot switch easily from the non-nuclear to the nuclear mission. Retention of a higher proportion of aircraft for the nuclear role would begin to affect conventional capabilities to a marked degree. Finally, nuclear arming and release gear is presumed not to be scaled for every ground-attack aircraft, so there will be a quite distinct upper limit to the number of aircraft that could be re-rolled at short notice.

The assumptions applicable to *Western* forces are of a rather different kind. We have already noted that the United States would be in a position to vary the commitment of her Central systems to the defence of Europe. Furthermore, a substantial number of strike aircraft are retained in the Continental United States. Some of these are formally dual-based and can be presumed to reach Europe as reinforcements; others are uncommitted but some at least must be considered as being available to NATO, although, as with the Soviet Union, it seems highly probable that there will be limits to crew training and nuclear arming and release gear for these aircraft. The following specific assumptions have been made:

- A total of 400 *Poseidon* warheads will be allocated to SACEUR; this number will be assured from the much larger pool of missiles actually available.
- The A-6E and A-7E aircraft of two carrier task forces will be in range of Warsaw Pact or Soviet territory, and half of them will be available for nuclear missions, the other half having maritime missions.
- One French aircraft carrier could be in range of Pact territory, and half its complement of *Etenlard* IVM aircraft would be retained for the nuclear role.
- All French land- and sea-based nuclear forces (less *Pluton*) must be counted, as must the whole force of *Mirage* IVA aircraft.
- All British sea-based strategic nuclear forces are counted as are the *Vulcan* bombers *in toto*.
- Half the British *Buccaneer* aircraft are presumed to be reserved for nuclear strike.
- One-third of all Western nuclear-capable fighter ground-attack aircraft are listed as being retained for the nuclear role.
- Half the US FB-111A are assumed to be in reserve for nuclear strike.

Tables A and B are compiled on the basis of the foregoing assumptions. They list the systems, their numbers, and the factors by which gross numbers should be reduced, so as to arrive at the system numbers that we believe should be counted. The warheads that can be carried are then multiplied by these numbers to arrive at a figure for total deliverable warheads for each system. These are then summed by general category and overall in the column headed 'Total Number of Warheads assumed available'.

Therefore a first refinement of the figures gives a NATO total of 1,811 warheads available, and a WP total of 2,244, and this might stand as the current balance of *usable* warheads as opposed to the unrefined balance of nuclear delivery vehicles (NDV) where the gross totals appear much less equal: 2,045 against 5,364. Yet even these somewhat refined figures are not entirely satisfactory, for it must be unrealistic to equate a modern mobile ballistic missile—such as the SS-20—with a fighter of limited range and doubtful penetrative powers. It is necessary to try to say something about the quality (and therefore utility) of each system under discussion. We therefore intend to judge the usefulness of the systems based on the evaluation of a number of factors. The three factors thought to be significant are survivability, penetration, and flexibility, and each has been given equal weight in the calculations. In specific scenarios this is unlikely to be fair, for survivability and assured penetration would tend more to deter a massive theatre-nuclear strike, whereas in a slower escalation, the value of flexibility (accuracy, selectivity, and the ability to retarget rapidly) will be relatively more important. Nevertheless, there is value in assessing quality, and these three factors are generally assumed to be equally significant. This second calculation allows a comparison to be made between numbers and the usefulness of systems.

Survivability is a relatively straightforward factor to assess. It is assessed as the ability of a system to withstand conventional or nuclear attack, and this, in turn, is a compound of hardness and concealment. If there is high expectation that a system can never be found, it matters little that it has no inherent protection. It follows that survivability is to some extent a function of the range of the system,

since the greater the range, the larger the area in which it can operate and the more difficult it will be to find and, even if found, more difficult to hit. A mobile system must be more difficult to target than one which is static or tied to fixed operating bases, such as an aircraft. Marking survivability against a maximum score of 0.33, this analysis will use the following figures for the survivability of launch vehicles before use:

SSBN, Mobile MRBM: 0.3

SSB: 0.25 (SSB are easier to detect and track than SSBN because they are noisier).

SRBM: 0.2 (as they must operate in a relatively confined area to stay in range).

Long-range aircraft, carrier-based aircraft, and fixed-based IRBM: 0.15.

Tactical aircraft (land-based) with hardened hangars: 0.1.

Tactical aircraft with no hardening: 0.05.

The second factor is penetration. In the absence of anything other than skeleton ballistic missile defences, there is a high degree of assurance that a ballistic missile will penetrate to its target. There is clearly no such assurance in the case of aircraft. Yet it is necessary to differentiate between modern high-performance aircraft with good ECM equipment and low-level performance and more elderly aircraft which can only fly high and have no means of deflecting enemy radars and missiles. A stand-off air-to-ground missile will also enhance the ability of an aircraft to strike its target. What one cannot assess is the effect of the attrition over time of enemy air defences, but it can be argued that this will

**Table A: Warsaw Pact Long- and Medium-range Nuclear Systems for the European Theatre**

Category and type	Range (nm)	Inventory	Factors			Indices						System utility figure	Operating countries and Notes	
			Utilization	Serviceability	No. of warheads	Warheads assumed available	Survivability	Penetration	Flexibility	Quality index				
<b>IRBM</b>														
SS-5 <i>Skean</i>	2,300	90	0.75	0.9	1	60	0.15	0.3	0.2	0.65	39	USSR		
SS-20	3-4,000	120	0.75	0.9	3	243	0.3	0.3	0.25	0.85	206	USSR	Mobile, MIRV	
<b>MRBM</b>														
SS-4 <i>Sandal</i>	1,200	500	0.75	0.9	1	337	0.15	0.3	0.15	0.6	202			
SS-N-4 <i>Sark</i>	300	27	1.0	0.7	1	16	0.25	0.3	0.1	0.65	10	USSR	On G-I-class ssb. Assumed deployed in Baltic only	
<b>SLBM</b>														
SS-N-5 <i>Serb</i>	700	54	1.0	0.7	1	33	0.25	0.3	0.1	0.65	21	USSR	On G-II-, H-II-class ssb sssbn. Assumed deployed in Baltic only	
SS-N-8	4,800	6	1.0	0.7	1	5	0.25	0.3	0.15	0.7	3	USSR	On 1 H-III-class sssbn. Assumed in Baltic and operational	
<b>SRBM</b>														
Scud B	185	400	0.75	0.9	1	270	0.2	0.3	0.1	0.6	162	USSR		
SS-12	500	16	1.0	0.9	1	14	0.2	0.3	0.1	0.6	8	Bulgaria, Czechoslovakia, GDR, Hungary and Romania have Scud, but only GDR believed to have Scud B		
Scud B	185	16	1.0	0.9	1	14	0.2	0.3	0.1	0.6	8			
<b>Ballistic missile sub-totals</b>		1,213				978					651			
<b>Aircraft</b>														
Tu-22M	3,000+	50	0.37	0.8	5	74	0.15	0.2	0.3	0.65	48	USSR	Long Range Air Force ac only (Naval Air Force ac excluded)	
<i>Backfire B</i>														
Tu-16 <i>Badger</i>	1,650	318	0.37	0.8	4	376	0.15	0.1	0.25	0.50	188	USSR		
Tu-22 <i>Blinder</i>	1,750	135	0.37	0.8	3	117	0.15	0.15	0.25	0.55	64	USSR		
Su-19 <i>Fencer</i>	600	230	0.19	0.8	2	68	0.1	0.2	0.15	0.45	30	USSR		
Su-17 <i>Fitter C/D</i>	325	640	0.19	0.8	2	194	0.1	0.1	0.12	0.32	62	USSR		
MiG-23/-27	450	1,400	0.19	0.8	1	212	0.1	0.2	0.15	0.45	95	USSR		
<i>Flogger B/D</i>														
MiG-21 <i>Fishbed J/K/L/N</i>	350	1,000	0.19	0.8	1	152	0.1	0.1	0.12	0.32	48	USSR		
Su-7 <i>Fitter A</i>	{ 275 275	{ 220 115	{ 0.19 0.25	{ 0.8 0.8	{ 1 1	{ 33 23	{ 0.1 0.1	{ 0.1 0.1	{ 0.12 0.12	{ 0.32 0.32	{ 10 7	USSR	Czechoslovakia, Poland	
Su-20 <i>Fitter C</i>	325	35	0.25	0.8	2	14	0.1	0.1	0.12	0.32	4	Poland		
Il-28 <i>Beagle</i>	1,400	5	0.30	0.8	1	2	0.1	0.05	0.15	0.3	1	Poland		
MiG-23 <i>Flogger B</i>	450	3	0.25	0.8	1	1	0.1	0.2	0.15	0.45	1	Czechoslovakia		
<b>Aircraft sub-totals</b>		4,151				1,266					558			
<b>GRAND TOTALS</b>		5,364				2,244					1,209			

be largely offset by the fact that attrition on the ground will also be higher over time. This effect has therefore been discounted in the figures which follow (also marked against a theoretical maximum of 0.33):

Ballistic missiles: 0.3.

Modern strike aircraft with good ECM, good performance at very low level, or stand-off ASM: 0.2.

Aircraft with no terrain-following radar and no ECM fit: 0.1.

Elderly aircraft forced to penetrate at high level: 0.05.

The final factor is by far the most difficult to assess, for not only is the judgment likely to be the most subjective but it will be a compound of several sub-factors. Flexibility is clearly a most valuable characteristic of any weapon system, and it will have something to do with its responsiveness, with the ease with which it can be retargeted, range (because the longer the range, the greater the possible selection of targets), and accuracy. However, it would seem wrong to accord flexibility any greater weight than either survivability or penetrability, and it too is marked out of a theoretical maximum of 0.33. We are aware that we have assessed Western systems on the assumption that a unified targeting plan exists and that there will not be political disagreements which might detract from the effectiveness of that plan. In the case of France, this assumption cannot be made but French forces have been counted against NATO totals and we have not degraded them in the table. In making the judgments which follow, it should be noted that it is not easy to communicate with submarines that remain submerged (and so it is not easy to redirect SLBM), that retargeting of land-based missiles depends upon communications that are resistant to interference, and upon sophisticated computers, and that only

aircraft with modern navigational aids have the ability to deliver their weapons accurately by day or night and in all conditions of visibility.

Modern strike aircraft: 0.15-0.3 (range dependent).  
 Modern MRBM: 0.25 (assumes data buffer system).  
 MRBM, IRBM, SRBM: 0.1-0.2 (range dependent).  
 SLBM: 0.10-0.15 (range and accuracy dependent).

In the tables, each of the three primary factors is assessed for every delivery system, and they are considered to be additive, giving a highest possible score of 1.0. Obviously no system is perfect, but its general utility is measured by how nearly its 'quality index' approaches unity. This index is then used to modify the figures for the total numbers of deployable warheads in order to arrive at aggregates which reflect more realistically the *usefulness* of the nuclear systems in the inventories of NATO and the Warsaw Pact.

This second approximation tends to narrow the gap between the blocs. Whereas the first refinement gave the Warsaw Pact an advantage of 2,244 to 1,811 (a ratio of 1.24 : 1), the 'System Utility Figures' shown in the tables give the Warsaw Pact an assessment of 1,209 as against NATO's 1,065—a ratio of 1.13 : 1. Given that there are a substantial number of variables, the errors inherent in the calculations are at least of the order of 10 per cent. We therefore conclude that something very close to parity now exists between the Theatre Nuclear Forces of NATO and the Warsaw Pact, although it is moving

**Table B: NATO Long- and Medium-range Nuclear Systems for the European Theatre**

Category and type	Range (nm)	Factors				Warheads assumed available	Indices			Quality index	System utility figure	Operating countries and Notes
		Inventory	Utilization	Serviceability	No. of warheads		Survivability	Penetration	Flexibility			
<b>SLBM</b>												
Polaris A-3	2,880	64*	1.0	0.45*	1	28	0.25	0.3	0.1	0.65	18	Britain, nav counted as single warhead France
M-20	3,000	64*	1.0	0.45*	1	28	0.25	0.3	0.1	0.65	18	
<b>IRBM</b>												
SSBS S-2	1,875	18	1.0	0.9	1	14	0.15	0.3	0.2	0.65	9	France
<b>SRBM</b>												
Pershing	450	180	1.0	0.9	1	162	0.2	0.3	0.15	0.65	105	US, W. Germany US inventory in Europe 108; German 72 (under dual US-German control)
<b>Ballistic missile sub-totals</b>		<b>326</b>				<b>232</b>					<b>150</b>	
<b>Land-based aircraft</b>												
Vulcan B2	2,000	48	1.0	0.8	4	152	0.15	0.15	0.3	0.6	91	Britain. Range varies with flight profile
Buccaneer	500	30	0.5	0.8	2	40	0.15	0.15	0.3	0.6	24	Britain
Mirage IVA	2,000	33	1.0	0.8	3	78	0.15	0.15	0.3	0.6	46	France
F-4	1,400	175	0.33	0.8	2	92	0.1	0.1	0.2	0.4	36	W. Germany, Greece, Turkey
F-111E/F	2,925	156	0.5	0.8	3	186	0.15	0.2	0.3	0.65	120	US. 156 known to be based in Europe
FB-111A	3,000	66	1.0	0.8	4	208	0.15	0.2	0.3	0.65	135	US. Assumes half US inventory moved to Europe
F-4	1,400	324	0.33	0.8	2	170	0.1	0.1	0.2	0.4	68	US. European-based plus dual-based ac.
F-104	750	367	0.33	0.8	1	96	0.1	0.1	0.15	0.35	33	Belgium, W. Germany, Italy, Netherlands, Norway, Turkey
Jaguar	1,000	177	0.33	0.8	1	48	0.1	0.1	0.15	0.35	16	Britain, France
Mirage 5F	650	94	0.33	0.8	1	24	0.1	0.1	0.12	0.32	7	Belgium, France
Mirage IIIE	650	105	0.33	0.8	1	27	0.1	0.1	0.12	0.32	8	France
<b>Carrier-based aircraft</b>												
A-6E	800	20	0.5	0.8	3	24	0.15	0.2	0.3	0.65	15	US. Assumes 2 carriers in range and half strike ac used in nuclear role Assumes 1 out of 2 carriers in range
A-7E	1,200	40	0.5	0.8	1	16	0.15	0.1	0.3	0.55	8	
Etendard IVM	350	24	0.5	0.8	2	18	0.15	0.1	0.2	0.45	8	
<b>Aircraft sub-totals</b>		<b>1,679</b>				<b>1,179</b>					<b>615</b>	
<b>Totals, less Poseidon</b>		<b>2,005</b>				<b>1,411</b>					<b>765</b>	
<b>US central systems</b>												
Poseidon	2,800	(40)			(10)	400	0.3	0.3	0.15	0.75	300	Assumes 400 'central' US Poseidon warheads allocated to SACRE Strike Plan
<b>Totals, with Poseidon</b>		<b>2,045</b>				<b>1,811</b>					<b>1,065</b>	

\* Inventory figure of 64 represents SLBM complement of 4 SSBN. But no more than 2 SSBN are likely to be on patrol, and it is to their 32 SLBM that a 0.9 serviceability factor is applied.

favour of the Warsaw Pact. It is important to stress that the Western figures include US *Poseidon* warheads whereas the Warsaw Pact figures do not include any Soviet central systems. Without *Poseidon*, the ratios are 1.59 and 1.58 to one in the Pact's favour.

However, we are bound to note that certain disturbances are likely to occur as a result of modernization. On the Warsaw Pact side we note that the deployment of something over 100 SS-20 missiles as already accounted for 17 per cent of total system utility. If the Soviet Union were to retire the SS-4 and SS-5 missiles, our calculations show that another 140 SS-20s would do the job of the 590 SS-4 and SS-5 missiles. Deployment above that figure would clearly indicate a significant enhancement of capability which would, before long, move the overall balance clearly away from parity. As we are as yet unaware of substantial retirements of the older missiles, there exists a danger that the balance might change by about 85 points per year, assuming an annual rate of introduction for SS-20 from now on of some 50 missiles per year.

In conclusion, it is necessary to reiterate the subjective nature of this examination and to stress that different assumptions will alter the balances derived. However, it would certainly require some very major displacements of the figures to show any substantial imbalance in terms of overall system utility. It is even doubtful in our view whether the adverse ratio in terms of the total numbers of warheads assumed to be deliverable is significant at present, but one must acknowledge that the introduction of new and more capable systems on the Soviet side could, if unconstrained, begin to produce a theatre nuclear advantage which will be used to legitimate a NATO response. One must also acknowledge that a substantial advantage, although unquantifiable, may lie with the tightly controlled Warsaw Pact when compared with the politically diverse Western Alliance. Co-ordinating the nuclear forces of many countries into an efficient strike plan, using all the systems listed in an optimal way, will present a major challenge to NATO.



THE MILITARY BALANCE 1979/80

# 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* and type	Number deployed (7/79)	First deployment	Max. range (mi) <sup>a</sup>	Throw-weight (000 lb) <sup>c</sup>	Warheads, max. yield <sup>d</sup> and notes	Category* and type <sup>e</sup>	Number deployed (7/79)	First deployment	Max. range (mi) <sup>a</sup>	Throw-weight (000 lb) <sup>c</sup>	Warheads, max. yield <sup>d</sup> and notes	
<b>Land-based</b>						<b>Land-based</b>						
<i>ICBM</i>						<i>ICBM</i>						
<i>Titan II</i>	54	1962	7,000	7.5	1 x 5-10 MT	<i>SS-9 Scarp</i>	100	1965	7,300	12-15	Mod 1: 1 x 18 MT. Mod 2: 1 x 25 MT. Mod 4: 3 x 4-5 MT (MRV)	
<i>Minuteman II</i>	450	1966	7,000	1-1.5	1 x 1-2 MT	<i>SS-11 Sego</i>	638	1966	6,500	1.5-2	Mod 1: 1 x 1-2 MT. Mod 3: 3 x 100-300 kt (MRV). Mod 3 has replaced some Mod 1 x 1 MT. A solid-fuel successor, the SS-11 is ready for deployment; but is banned by SALT II; it could be deployed in land-mobile mode	
<i>Minuteman III</i>	550	1970	7,500	1.5-2	3 x 170 KT (MRV). Shortly to be converted to Mk 12A warheads and NS-20 guidance	<i>SS-13 Savage</i>	60	1968	5,000	1	Mod 1: 1 x 18-25 MT. Mod 2: 8 x 600 kt (MRV). Deployed. Reported accuracy 600 ft	
						<i>SS-17</i>	100	1975	6,500	6	Mod 1: 4 x 900 KT (MRV). Mod 2: 1 x 5 x operational. Deployment in modified SS-11 silos	
						<i>SS-18</i>	200	1975	6,300+	16-20	Mod 1: 1 x 18-25 MT. Mod 2: 8 x 600 kt (MRV). Deployed. Reported accuracy 600 ft	
						<i>SS-19 Mod 1</i>	300	{ 1975 n.a. }	7,000	6,300+	7	{ 6 x 550 KT (MRV) operational at 1 x 5 MT has been tested. Deployed in modified SS-11 silos
						<i>Mod 2</i>						
						<i>NIIRBM</i>						
						<i>SS-4 Sandal</i>	500	1959	1,200	n.a.	{ 1 x 1 MT. May be retired as SS-20 deployment continues	
						<i>SS-5 Slean</i>	90	1961	2,300	n.a.		
						<i>SS-20</i>	120	1977	3-4,000	1.2		3 x 150 KT (MRV). Tested at longer range with 1 lower-yield warhead
						<i>SRBM</i>						
<i>Pershing</i>	108*	1962	450	n.a.	Dual-capable. 1 x high KT range; conventional warheads under development	<i>SS-1b Scud A</i>	1,300	1957	50	n.a.	1 x KT range	
<i>Lance</i>	36*	1972	70	n.a.	Dual-capable. 1 x low KT range; new conventional warheads under development	<i>FROG 7</i>		1965	10-45	n.a.	1 x KT range	
						<i>SS-1c Scud B</i>		1965	185	n.a.	1 x KT range	
						<i>SS-12 Scaleboard</i>		1969	500	n.a.	1 x MT range	
						<i>SS-21</i>		1978	65	n.a.	n.a.	
						<i>LRCM</i>						
						<i>SS-N-3 Shaddock</i>	(100)	1962	450	n.a.	1 x KT range	
<b>Sea-launched</b>						<b>Sea-launched</b>						
<i>SLBM</i>						<i>SLBM</i>						
<i>Polaris A3</i>	160	1964	2,880	1	3 x 200 KT (MRV)	<i>SS-N-4 Sark</i>	18	1961	350	n.a.	1 x 1-2 MT. Not included in SALT II total	
<i>Poseidon C3</i>	496	1971	2,880	2	10 x 50 KT (MRV). Can carry up to 14 RV over reduced range	<i>SS-N-5 Serb</i>	60	1964	750	n.a.		
						<i>SS-N-6 Sawfly</i>	528	1969	{ 1,750 2,000 }	1.5	{ 1 x 1-2 MT, tested 2 x 3 x KT range (MRV)	
						<i>Mod 3</i>						
						<i>SS-N-8</i>						266
						<i>SS-NX-17</i>	12	1977	3,000+	3	1 x MT; also tested with MRV. Solid-fuel successor for SS-N-6	
						<i>SS-N-18</i>	144	1978	5,000+	5	3 x 1-2 MT (MRV). Solid-fuel successor for SS-N-8.	
						<i>SLCM</i>						
						<i>SS-N-3 Shaddock</i>	324	1962	450	n.a.	1 x KT range.	
<b>Air-launched</b>						<b>Air-launched</b>						
<i>ALCV</i>						<i>ALCM</i>						
<i>Hound Dog</i>	(400)	1961	600	n.a.	1 x KT range. Obsolete or obsolescent	<i>AS-3 Kangaroo</i>	n.a.	1961	400	n.a.	1 x MT range	
						<i>AS-4 Kitchen</i>	(800)	1962	450	n.a.	1 x KT range	
						<i>AS-6 Kingfish</i>	n.a.	1977	160	n.a.	1 x KT range	
						<i>ALBM</i>						
						<i>Artillery</i>						
<i>M-110A1 203mm sp how</i>	(215)	1962	13	—	Dual-capable. 1 x KT range	<i>M-55 203mm towed gun/how</i>	n.a.	1950s	18	—	Possibly dual-capable. If so, 1 x KT range	
<i>M-109A1 155mm sp how</i>	(300)	1964	11	—	Dual-capable. 1 x 2 KT							

(i) Aircraft\*

Category <sup>a</sup> and type	United States					Soviet Union					
	Number deployed (7/79)	First deployment	Max. range (mi) <sup>b</sup>	Max. speed (Mach)	Weapons load (000 lb)	Category <sup>a</sup> and type <sup>c</sup>	Number deployed (7/78)	First deployment	Max. range (mi) <sup>b</sup>	Max. speed (Mach)	Weapons load (000 lb)
<b>Bombers</b>						<b>Bombers</b>					
<i>Long-range</i>						<i>Long-range</i>					
S2D	365	1956	10,000	0.95	60	Tu-95 Bear	113	1956	8,000	0.78	40
S2G/H			12,500	0.95	70	Mya-4 Bison	43 <sup>d</sup>	1956	7,000	0.87	20
<i>Medium-range</i>						<i>Medium-range</i>					
B-111A	66	1969	6,000	2.5	37.5	Tu-16 Badger	613 <sup>f</sup>	1955	4,000	0.8	20
						Tu-22M Backfire B <sup>g</sup>	80 <sup>f</sup>	1974	5,500	2.5	17.5
<b>Strike aircraft</b>						<b>Strike-aircraft</b>					
<i>Land-based (incl short-range bombers)</i>						<i>Land-based (incl short-range bombers)</i>					
AC/D/E	(190) <sup>h</sup>	1962	1,400	2.4	16	Il-28 Beagle	(3,500)	1950	1,400	0.8	4.85
B-111A/E			1967	2,925	2.2/2.5	28			Su-7 Fitter A	1959	900
					Tu-22 Blinder	1962			1,400	1.5	12
					MiG-21 Fishbed J/K/L	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						
<i>Carrier-based</i>											
AJ/N	(100) <sup>h</sup>	1962	1,400	2.2	16						
6E			1963	2,000	0.9	18					
7E			1966	2,800	0.9	20					

(ii) Historical Changes in Launcher Strength

	United States											Soviet Union										
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
ICBM	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,028	1,299	1,513	1,527	1,527	1,575	1,618	1,527	1,477	1,400	1,398
SLBM	656	656	656	656	656	656	656	656	656	656	656	196	304	448	500	628	720	784	845	909	1,015	1,028
Long-range bombers	560	550	505	455	422	437	432	432	432	432	431	145	145	145	140	140	140	135	135	135	135	156

(B) Other NATO and Warsaw Pact Countries

Missiles and Artillery

Category <sup>a</sup> and type <sup>b</sup>	NATO (excluding USA)					Warsaw Pact (excluding USSR)					
	Number deployed (7/79)	First deployment	Max. range (mi) <sup>b</sup>	Warheads and max. yield <sup>d</sup>	Countries equipped	Category and type <sup>b</sup>	Number deployed (7/79)	First deployment	Max. range (mi) <sup>b</sup>	Warheads and max. yield <sup>d</sup>	Countries equipped
<b>Land-based</b>						<b>Land-based</b>					
SSBMs						SSBMs					
SBS S-2	18	1971	1,875	1 x 150 KT	France	SS-1b Scud A	(132)	1957	50	Dual-capable, 1 x KT range	All <sup>e</sup>
						SS-1c Scud B			185	Dual-capable, 1 x KT range	All <sup>e</sup>
BM						PROG 3-7	(206)	1957-65	10-45	Dual capable, 1 x KT range	All <sup>e</sup>
onest John	(91)	1953	25	Dual-capable, 1 x KT range	Germany, Greece, Turkey <sup>g</sup>						
ishing	72	1962	450	1 x KT range	Germany <sup>g</sup>						
oton	32	1974	75	1 x 15-25 KT	France						
ncc	(54)	1976	70	1 x KT range	Belgium, Britain, Germany, Italy, Netherlands						
<b>Sea-launched</b>						<b>Sea-launched</b>					
M						SLBMs					
aris A3	64	1967	2,880	3 x 200 KT (MRV)	Britain						
BS M-20	64	1977	3,000	1 x 1 MT	France						
<b>Artillery</b>						<b>Artillery</b>					
110	n.a.	1962	10	Dual-capable, 1 x KT range	Belgium, Britain, Denmark, Germany, Greece, Italy, Netherlands, Turkey <sup>g</sup>						
03mm SP how	n.a.	1964	10	Dual-capable, 1 x 2 KT	Belgium, Britain, Canada, Denmark, Germany, Greece, Italy, Netherlands, Norway, Turkey <sup>g</sup>						

(i) Aircraft\*

Category <sup>a</sup> and type <sup>b</sup>	NATO (excluding USA)					Warsaw Pact (excluding USSR)							
	Number deployed (7/79)	First deployment	Max. range (mi) <sup>b</sup>	Max. speed (Mach)	Weapons load (000 lb)	Countries equipped	Category and type <sup>b</sup>	Number deployed (7/79)	First deployment	Max. range (mi) <sup>b</sup>	Max. speed (Mach)	Weapons load (000 lb)	Countries equipped
<b>Bombers</b>							<b>Bombers</b>						
<i>Medium-range</i>							<i>Medium-range</i>						
ican B2	48	1960	4,000	0.95	21	Britain							
<b>Strike Aircraft</b>							<b>Strike Aircraft</b>						
<i>Land-based (incl short-range bombers)</i>							<i>Land-based (incl short-range bombers)</i>						
04	n.a. <sup>f</sup>	1958	1,500	2.2	4	Belgium, Canada, Denmark, Germany, Greece, Italy, Netherlands, Norway, Turkey <sup>g</sup>	Su-7 Fitter A <sup>h</sup>	115	1959	900	1.7	5.5	Czechoslovakia, Poland
	n.a. <sup>f</sup>	1962	1,400	2.4	16	Britain, Germany, Greece, Turkey	Su-20 Fitter C <sup>h</sup>	35	1974	1,100	1.6	4	Poland
scaneer	50	1962	2,300	0.95	12	Britain							
rage IVA	33	1964	2,000	2.2	16	France							
uar	177	1974	1,000	1.4	10	Britain, France							

Figures in parentheses are estimated.  
 M=range of over 4,000 mi; IRBM=1,500-4,000 mi;  
 M=500-1,500 mi; SRBM=under 500 mi; LRCM=  
 <350 mi.  
 Statute miles. Use of maximum payload may reduce  
 operational range by up to 25% of these figures.  
 Max. weight is the weight of post-boost vehicle  
 (heads, guidance systems, penetration aids) that  
 can be delivered over a given range. At maximum  
 payload, throw-weight will be less than shown.  
 Max. yield varies greatly; figures given are  
 estimated maximum. KT range=under 1 MT; KT range=  
 1-10 MT. Yield figures for dual-capable weapons  
 can deliver conventional or nuclear warheads  
 to nuclear warheads only.

\* Figures for systems in Europe only.  
 † 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.  
 ‡ All the types listed are dual-capable, but some in the  
 strike categories are not presently configured for the  
 nuclear role.  
 § Long-range=over 6,000 mi; medium-range=3,500-  
 6,000 mi; bomber=aircraft primarily designed for  
 bombing missions.  
 ¶ Statute miles. Theoretical maximum range at opti-  
 mum altitude and speed. Higher speeds, lower alti-  
 tudes 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.  
 † Excluding aircraft in storage or reserve.  
 ‡ Excluding some 44 configured as tankers.  
 § Including Naval Air Force aircraft (some 295 Tu-16  
 Badger and 30 Tu-22M Backfire) but excluding Tu-16  
 Badger tankers.  
 ¶ Listed as a medium-range bomber on the basis of  
 reported range characteristics.  
 † All NATO missiles are of American origin, except  
 SSBS, Photon and MSBS, which are French. All  
 Warsaw Pact vehicles are of Soviet origin.  
 ‡ Nuclear warheads held in American custody. No  
 nuclear warheads held on Danish or Norwegian soil.  
 § In few of these cases is the M-109 likely to have a

nuclear role, and certainly not in the case of Canada.  
 ¶ Nuclear warheads held in Soviet custody. It is not  
 known how many are earmarked for a nuclear role.  
 † 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.  
 ‡ Falcon 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.  
 § It is uncertain how many of these aircraft have a  
 nuclear role. NATO (less US) deploys a total of about  
 500 F-104s and 180 F-4s in the ROA role.  
 ¶ Canadian aircraft have no nuclear role.

## 2. Comparative Strengths of Armed Forces, 1958-1979 (in thousands)

Year	USA	Japan	Germany	France	Britain <sup>a</sup>	USSR
1958	2,637	214	175	797	615	4,006
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
1979	2,022	241	495	509	323	3,658

<sup>a</sup> 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	18,900	324	18,500	216	16,500	4,500	108	4,800	54	12-24	
Soviet Union	11,000	325 <sup>a</sup>	13,000	266 <sup>a</sup>	7,000	1,300 <sup>b</sup>	95 <sup>b</sup>	2,300 <sup>b</sup>	40 <sup>b</sup>	10-14	
China	10,000	270	12,000 <sup>c</sup>	30 <sup>c</sup>	9,000	1,200 <sup>b</sup>	90 <sup>b</sup>	2,000	—	9-10	
Britain <sup>d</sup>	8,500	148	—	—	—	—	—	—	—	8-15	
Germany	17,000	300	17,500	250	8-9,000	4,500 <sup>e</sup>	108 <sup>e</sup>	5,000 <sup>e</sup>	54 <sup>e</sup>	15-21	
India	15,000	200	17,500 <sup>e</sup>	—	—	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	

<sup>a</sup> These tank strengths are for Soviet divisions in Eastern Europe; other Soviet divisions have fewer.

<sup>b</sup> 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*.)

<sup>c</sup> Infantry division.

<sup>d</sup> 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.

<sup>e</sup> Proposed new armoured brigades will have 3,026 men and 99 tanks, mechanized brigades 3,730 men and 66 tanks.

## 4. Indices of NATO Defence Expenditure, Current and Constant Prices<sup>a</sup>

(in local currency, 1970 = 100)

Country	1960	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 <sup>b</sup>	% Growth <sup>c</sup>	
													1960-70	1971-8
Belgium	57.9	87.1	90.4	100.0	105.8	117.7	130.5	153.0	186.5	217.8	239.3	264.8	6.4	12.94
	72.5	93.9	94.0	100.0	101.3	107.0	110.9	115.4	124.7	131.4	136.4	144.9	3.3	4.75
Britain	67.7	95.4	94.2	100.0	115.2	133.3	143.4	172.1	211.3	250.9	279.1	306.5	4.0	15.03
	100.6	106.9	100.2	100.0	105.2	113.7	112.0	115.9	114.6	116.8	112.1	113.7	0	1.62
Canada	80.3	93.5	92.1	100.0	103.4	108.6	116.7	138.9	151.7	174.1	200.1	233.0	2.2	10.55
	105.3	101.1	95.2	100.0	100.6	100.8	100.6	108.0	106.6	113.6	121.1	123.9	-0.5	2.72
Denmark	40.4	94.0	95.8	100.0	115.9	122.8	127.7	161.0	191.3	206.0	230.1	258.8	9.5	12.62
	71.4	103.7	102.0	100.0	109.4	108.9	103.6	113.2	122.9	121.3	122.1	124.7	1.4	2.80
France	57.7	91.0	95.5	100.0	103.4	110.8	121.2	147.4	171.3	195.6	225.1	255.3	5.6	13.43
	85.7	102.3	101.1	100.0	99.8	99.2	101.1	108.1	112.5	117.2	123.7	128.4	1.6	3.17
Germany	53.7	85.5	95.6	100.0	112.7	127.2	141.4	157.9	166.5	172.4	178.0	188.7	6.4	8.26
	70.2	91.1	99.2	100.0	107.2	114.6	119.0	124.2	123.6	122.4	121.7	125.8	3.6	2.91
Greece <sup>d</sup>	36.0	77.4	89.8	100.0	109.0	121.1	139.8	169.8	209.1	291.9	346.1	392.7	10.8	18.65
	44.2	81.7	92.6	100.0	105.8	112.6	112.9	108.1	172.6	144.1	152.1	153.3	8.5	5.49
Italy	45.5	89.8	90.4	100.0	118.6	138.4	153.1	182.6	198.7	231.0	290.2	324.4	8.2	16.29
	67.0	96.8	94.8	100.0	113.1	125.0	124.7	124.8	116.7	115.8	124.1	127.5	4.1	3.08
Luxembourg	63.2	89.9	94.0	100.0	106.3	124.3	144.5	170.7	201.0	230.3	247.4	278.8	4.7	13.67
	81.5	96.3	98.3	100.0	101.6	112.9	124.1	133.5	141.8	131.9	148.9	162.8	2.1	6.28
Netherlands	43.5	82.7	92.8	100.0	112.6	125.4	137.7	161.9	182.6	197.0	233.4	236.1	8.7	11.34
	65.6	92.0	96.1	100.0	104.7	108.2	110.0	117.9	120.7	119.7	133.2	129.5	4.3	3.28
Norway	38.1	82.9	90.2	100.0	108.9	116.8	126.4	142.0	171.0	192.2	213.9	243.5	10.1	11.77
	59.2	94.1	99.8	100.0	102.5	107.6	103.3	106.0	115.0	117.8	120.1	126.6	5.4	2.99
Portugal	24.1	85.1	86.0	100.0	117.2	128.0	133.5	160.3	158.0	150.0	176.1	208.3	15.3	9.61
	37.3	98.7	91.0	100.0	104.7	103.3	95.4	114.4	78.6	61.5	58.2	69.9	10.4	-6.01
Turkey <sup>d</sup>	38.6	82.7	86.3	100.0	136.1	159.7	195.5	253.8	271.4	421.3	681.4	811.6	10.0	29.92
	68.4	91.0	92.6	100.0	114.3	123.6	131.1	147.0	131.9	177.3	222.0	182.3	3.9	7.80
United States	58.3	103.7	104.6	100.0	96.2	99.7	100.8	110.3	116.8	116.9	129.6	135.0	5.5	3.82
	76.5	115.7	110.8	100.0	92.3	92.6	89.1	86.9	84.3	79.7	81.0	80.4	2.7	-2.69

<sup>a</sup> Constant price series defence expenditures (in italics) are deflated by consumer price indices. These reflect general (not defence sector) rates of inflation.

<sup>b</sup> 1978 figures are provisional; hence 1971-78 growth rates are approximate.

<sup>c</sup> Average annual compound growth rates over periods shown.

<sup>d</sup> Figures for Greece from 1976 and Turkey (from 1975) based on national, not NATO, definitions of defence expenditure.

### 5. Comparisons of Defence Expenditures 1976-1979

Country	\$ million				\$ Per head				% Government spending <sup>a</sup>				% of GNP <sup>b</sup>			
	1976	1977	1978	1979	1976	1977	1978	1979	1976	1977	1978	1979	1975	1976	1977	1978
<b>Warsaw Pact<sup>c</sup></b>																
Bulgaria	438	408	438	n.a.	50	46	66	n.a.	5.3	5.2	5.1	n.a.	2.7	2.4	2.5	n.a.
Czechoslovakia	1,805	2,437	2,324	2,424	121	162	153	159	7.0	7.3	7.1	7.1	3.8	3.9	4.1	3.8
Germany, East	2,729	4,038	4,238	4,447	158	241	253	266	7.8	8.9	8.9	8.8	5.5	5.7	5.8	5.8
Hungary	551	715	808	n.a.	52	67	76	n.a.	3.6	3.6	3.7	n.a.	2.4	2.5	2.4	2.4
Poland	2,252	3,098	3,335	3,496	66	89	95	99	7.4	6.5	7.1	6.1	3.1	3.0	2.8	3.0
Romania	759	1,123	1,263	1,259	35	52	58	57	4.0	4.0	3.9	3.5	1.7	1.7	1.7	1.7
Soviet Union <sup>d</sup>	127,000	133,000	148,000	n.a.	492	508	574	n.a.	n.a.	n.a.	n.a.	n.a.	11-13%		11-14%	
<b>NATO<sup>e</sup></b>																
Belgium	2,013	2,444	3,143	3,636	204	246	315	363	10.2	9.3	9.2	9.2	3.0	3.0	3.1	3.5
Britain	10,734	11,722	14,090	17,572	190	210	252	314	11.0	12.7	10.5	11.5	4.9	5.2	5.0	4.7
Canada <sup>f</sup>	3,231	3,617	3,692	3,751	140	155	156	157	10.0	8.8	8.8	8.6	2.2	1.8	1.8	1.8
Denmark	861	1,084	1,317	1,559	168	213	258	303	7.4	7.2	7.2	7.4	2.2	2.5	2.3	2.4 <sup>g</sup>
France	12,857	11,880	15,225	18,776	241	224	285	349	20.6	16.3	17.0	17.5	3.9	3.7	3.2	3.3
Germany*	15,220	16,814	21,366	24,391	242	274	347	396	23.5	23.5	22.9	22.3	3.7	3.5	3.4	3.4
Greece	1,249	1,100	1,523	n.a.	138	119	163	n.a.	26.0	20.2	18.3	n.a.	6.9	5.0	5.0	4.7
Italy	3,821	5,104	6,212	7,089	68	90	109	124	8.6	9.6	8.8	8.2	2.6	2.5	2.6	2.4
Luxembourg	23	29	37	42	68	80	102	116	2.9	2.7	2.9	2.9	1.1	1.0	1.0	1.1 <sup>g</sup>
Netherlands	2,825	3,719	4,323	4,767	205	269	309	338	9.8	11.0	9.6	9.1	3.6	3.3	3.6	3.3
Norway	902	1,132	1,254	1,421	223	280	308	347	7.6	9.2	9.1	9.3	3.1	3.2	3.1 <sup>g</sup>	3.2 <sup>g</sup>
Portugal <sup>f</sup>	748	470	540	587	85	48	55	60	n.a.	11.5	10.2	10.4	6.0	4.0	2.9	2.8 <sup>g</sup>
Turkey <sup>f</sup>	2,800	2,429	2,025	2,591	70	58	47	58	29.4	19.1	19.4	15.6	9.0	5.5	4.9	4.5
United States	91,000	100,928	105,135	114,503	423	465	481	520	23.8	22.7	23.0	21.5	5.9	5.4	5.2	5.0
<b>Other European</b>																
Austria	433	534	718	857	57	71	95	114	3.7	3.8	3.9	4.1	1.0	1.2	1.1	1.2
Ireland	134	149	192	n.a.	43	47	59	n.a.	3.5	3.6	3.5	n.a.	1.6	1.6	1.6	n.a.
Finland	364	475	452	524	77	100	95	110	5.1	5.1	5.1	4.8	1.4	1.5	1.5	1.5
Spain	1,766	2,154	2,363	3,370	49	59	64	90	14.9	15.3	13.2	n.a.	1.8	1.7	1.7	1.8
Sweden	2,418	2,833	2,946	3,328	294	343	355	400	12.5	8.7	8.5	8.4	3.4	3.4	3.4	3.4
Switzerland	1,221	1,135	1,552	1,842	184	180	275	292	18.8	18.5	18.1	18.8	1.8	2.0	1.9	1.9
Yugoslavia <sup>c</sup>	1,798	2,086	2,286	2,807	84	96	104	127	40.9	40.8	52.9	52.8	5.6 <sup>g</sup>	5.4	5.2	n.a.
<b>Middle East<sup>c</sup></b>																
Algeria	312	397	456	605	18	23	25	32	n.a.	5.9	5.7	6.3	2.2 <sup>g</sup>	3.4	3.9	3.0
Egypt	4,859	n.a.	n.a.	2,168	128	112	n.a.	54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Iran	9,500	7,894	9,942	n.a.	281	224	273	n.a.	28.9	23.5	23.8	n.a.	17.4 <sup>g</sup>	12.0	10.9	n.a.
Iraq	1,417	1,660	1,695	n.a.	123	141	133	n.a.	26.8	29.7	n.a.	n.a.	n.a.	9.6	10.2	n.a.
Israel	4,214	4,259	3,310	1,624	1,201	1,176	887	425	56.7	32.4	30.4	n.a.	35.9	36.3	29.9	24.5
Jordan	155	201	304	380	55	70	103	125	19.4	20.1	25.6	22.2	12.2	12.9	10.9	n.a.
Libya	229	338	448	n.a.	90	130	162	n.a.	n.a.	17.4	19.5	n.a.	1.7	n.a.	1.8	2.4
Morocco	258	346	681	917	15	19	37	47	6.0	7.8	11.6	16.8	2.8	3.3	3.6	n.a.
Saudi Arabia	9,038	7,539	13,170	14,184	1,506	1,005	1,344	1,404	29.0	24.0	35.1	29.9	18.0	17.7	13.5	15.0
Sudan	146	237	244	n.a.	8	12	12	n.a.	8.1	10.4	n.a.	n.a.	n.a.	3.6	3.9 <sup>g</sup>	n.a.
Syria	1,003	1,068	1,121	2,036	132	138	138	243	22.3	23.0	24.1	35.6	15.1 <sup>f</sup>	16.3	15.0 <sup>g</sup>	n.a.
<b>Africa</b>																
Ethiopia	103	149	165	550	4	5	6	18	n.a.	21.1	21.6	25.0	2.9	3.6	5.1	n.a.
Ghana	2,434	2,670	2,088	1,750	38	40	30	25	15.5	16.6	16.7	11.8	n.a.	7.7	7.8	n.a.
South Africa	1,619	1,955	1,840	2,118	62	73	67	76	17.0	18.0	15.9	16.1	5.3	4.9	5.2	n.a.
Zimbabwe Rhodesia	130	159	242	n.a.	21	24	35	n.a.	14.1	16.5	17.1	n.a.	3.0	5.2	7.7	n.a.
<b>Asia</b>																
Australia	2,803	2,723	2,968	2,956	204	194	209	n.a.	9.4	8.2	8.2	n.a.	3.2	3.0	2.9	2.7 <sup>g</sup>
China <sup>e</sup>	32,400	37,000	40,000	46,000	35	40	42	46	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	10.0	10.0
China (Taiwan)	1,597	1,672	1,800	n.a.	93	95	105	n.a.	54.7	48.3	n.a.	n.a.	n.a.	9.3	8.3	7.7
India	2,812	3,205	3,450	3,724	5	5	5	6	19.6	24.8	25.5	26.9	3.0	3.1	3.4	3.2
Indonesia	1,024	1,513	1,691	1,467	8	11	12	10	12.1	18.7	14.6	13.3	3.8	3.5	3.4	n.a.
Japan	5,058	6,090	8,567	10,083	45	53	75	87	6.2	5.9	5.5	5.4	0.9	0.9	0.9	0.9
Korea, North <sup>c</sup>	n.a.	1,000	1,200	1,231	n.a.	60	70	70	16.7	15.4	n.a.	n.a.	n.a.	11.2	10.5	11.4
Korea, South	1,500	2,033	2,586	3,219	42	58	70	85	34.6	34.3	36.0	34.4	5.1	6.2	6.5	5.6
Malaysia	353	542	693	n.a.	27	43	54	n.a.	16.9	12.5	13.4	n.a.	4.0	3.8	4.4	4.7
New Zealand	217	240	312	n.a.	69	77	99	n.a.	4.2	4.1	4.4	n.a.	1.8	1.7	1.8	1.9
Pakistan	807	960	1,050	n.a.	11	13	14	n.a.	17.2	47.3	42.3	n.a.	7.2	5.5	6.3	5.7
Philippines	410	680	793	753	9	15	17	16	n.a.	18.3	18.6	16.0	2.6	3.0	3.4	3.4
Singapore	315	411	411	n.a.	138	178	175	n.a.	15.3	18.5	16.6	n.a.	5.3	5.4	6.4	5.5
Thailand	601	746	806	940	14	17	18	20	18.0	25.2	20.3	20.7	3.7	3.7	4.0	3.7
<b>Latin America</b>																
Argentina	1,287	1,415	1,659	1,500	49	54	63	56	11.7	14.7	14.9	n.a.	0.9	2.8	1.9	3.3
Brazil	1,780	2,071	2,039	2,088	16	18	18	18	9.7	9.4	8.6	8.9	1.3	1.2	1.1	1.0 <sup>g</sup>
Colombia	133	118	147	215	5	5	5	8	9.2	7.0	6.4	7.8	0.8	1.1	0.6	1.0
Cuba <sup>c</sup>	n.a.	n.a.	1,032	1,168	n.a.	n.a.	106	118	n.a.	n.a.	8.6	8.9	n.a.	n.a.	n.a.	8.3
Mexico	591	351	418	519	9	5	6	7	4.4	5.5	1.0	1.1	0.7 <sup>f</sup>	0.8	0.5 <sup>g</sup>	0.5
Puerto Rico	n.a.	406	n.a.	n.a.	n.a.	24	n.a.	n.a.	n.a.	13.5	n.a.	n.a.	3.1	2.4	3.1	n.a.
Venezuela	423	512	615	706	34	40	48	52	5.5	6.1	6.5	6.5	1.7	1.4	1.4	n.a.
<b>UN aid to W. Berlin</b>																
	18,758	20,840	26,388	30,544	299	339	429	496	28.9	29.1	28.3	27.9	4.4	4.3	4.2	4.2

This series is designed to show national trends only; differences in the scope of government sector invalidate international comparisons.  
 \* based on local currency. GNP estimated where official figures unavailable.  
 † The difficulty of calculating suitable exchange rates makes conversion to dollars imprecise.

<sup>a</sup> See p. 70

<sup>b</sup> Defence expenditures based on NATO definition. Figures from 1978 are provisional.

<sup>c</sup> Figures estimated from nationally-defined data.

<sup>d</sup> Gross domestic product at market prices, not GNP.

### 6. Comparisons of Military Manpower 1975-1979 (in thousands)

Country	1975-79					1979						
	Numbers in armed forces					Armed forces			Forces as % of men 18-45	Estimated reservists <sup>a</sup>	Para-military forces	
	1975	1976	1977	1978	1979	Army	Navy	Air				
<b>Warsaw Pact</b>												
Bulgaria	152.0	164.5	148.5	150.0	150.0	115.0	10.0	25.0	8.4	240.0	189.0	
Czechoslovakia	200.0	180.0	181.0	186.0	194.0	140.0	—	54.0	6.4	350.0	132.5	
Germany, East	143.0	157.0	157.0	157.0	159.0	107.0	16.0	36.0	4.7	305.0	571.5	
Hungary	105.0	100.0	103.0	114.0	104.0	80.0	—	24.0	4.8	143.0	75.0	
Poland	293.0	290.0	307.0	306.5	317.5	210.0	22.5	85.0	4.2	605.0	445.0	
Romania	171.0	181.0	180.0	180.5	180.5	140.0	10.5	30.0	4.1	502.0	737.0	
Soviet Union	3,575.0	3,650.0	3,675.0	3,638.0	3,658.0	1,825.0 <sup>b</sup>	433.0 <sup>b</sup>	475.0 <sup>b</sup>	6.6	5,000.0	460.0	
<b>NATO</b>												
Belgium	87.0	88.3	85.7	87.1	86.8	62.3	4.4	20.1	4.5	54.4	16.3	
Britain <sup>c</sup>	345.1	344.2	339.2	313.3	322.9	163.7	72.9	86.3	3.0	257.6	—	
Canada	77.0	77.9	80.0	80.0	80.0	29.3	14.2	36.5	1.5	19.1	—	
Denmark	34.4	34.7	34.7	34.0	34.7	21.4	6.1	7.2	3.3	154.3	—	
France	502.5	512.9	502.1	502.8	509.3	326.8	70.3	103.7	4.7	350.0	85.4	
Germany	495.0	495.0	489.0	489.9	495.0	335.2	36.5	106.0	3.9	755.0	20.0	
Greece	161.2	199.5	200.0	190.1	184.6	145.0	17.0	22.6	10.6	290.0	129.0	
Italy	421.0	352.0	330.0	362.0	365.0	254.0	42.0	69.0	3.3	738.0	196.5	
Luxembourg	0.6	0.6	0.6	0.7	0.7	0.7	—	—	0.9	—	0.4	
Netherlands	112.5	112.2	109.7	109.7	114.8	75.0	16.9	19.0	3.8	171.0	8.2	
Norway	35.0	39.0	39.0	39.0	39.0	20.0	9.0	10.0	5.0	245.0	—	
Portugal	217.0	59.8	58.8	63.5	60.5	37.0	14.0	9.5	3.7	—	31.9	
Turkey	453.0	460.0	465.0	485.0	566.0	470.0	45.0	51.0	6.7	425.0	120.0	
United States	2,130.0	2,086.7	2,088.0	2,068.8	2,022.0	750.8	708.2	563.0	4.5	818.7	—	
<b>Other European</b>												
Austria	38.0	37.3	37.3	37.0	38.0	34.0	—	4.0	2.6	117.0	—	
Eire	12.1	14.0	14.7	14.6	13.9	12.5	0.7	0.7	2.3	20.1	—	
Finland	36.3	35.8	39.9	39.9	39.9	34.4	2.5	3.0	3.8	690.0	4.0	
Spain	302.3	302.3	309.0	315.5	321.0	240.0	40.0	41.0	4.8	1,085.0	100.0	
Sweden	69.8	65.4	68.6	65.7	65.9	44.5	11.8	9.6	4.1	500.0	—	
Switzerland	18.5	18.5	18.5	18.5	18.5	18.5	—	—	1.4	621.5	—	
Yugoslavia	230.0	250.0	260.0	267.0	259.0	190.0	25.0	44.0	5.5	500.0	1,016.0	
<b>Middle East</b>												
Algeria	63.0	69.3	75.8	78.8	88.8	78.0	3.8	7.0	2.7	100.0	10.0	
Egypt	322.5	342.5	345.0	395.0	395.0	350.0	20.0	25.0	5.6	515.0	49.0	
Iran	250.0	300.0	342.0	413.0	n.a.	285.0	30.0	100.0	5.9	300.0	74.0	
Iraq	135.0	158.0	188.0	212.0	222.0	190.0	4.0	28.0	10.1	250.0	79.8	
Israel	156.0	158.5	164.0	164.0	165.6	138.0	6.6	21.0	22.8	460.0	9.5	
Jordan	80.2	67.9	67.8	67.9	67.2	60.0	0.2	7.0	12.0	30.0	10.0	
Libya	32.0	29.7	29.2	37.0	42.0	35.0	3.0	4.0	8.5	n.a.	n.a.	
Morocco	61.0	73.0	84.7	89.0	98.0	90.0	2.0	6.0	2.9	n.a.	30.0	
Saudi Arabia	47.0	51.5	61.5	58.5	44.5	35.0	1.5	8.0	2.6	—	26.0	
Syria	177.5	227.0	227.5	227.5	227.5	200.0	2.5	25.0	15.5	102.5	9.0	
<b>Africa</b>												
Ethiopia	44.8	50.8	53.5	93.5	221.6	215.0	2.0	4.6	3.6	2.0	169.0	
Nigeria	208.0	230.0	230.5	231.5	193.0	180.0	6.0	7.0	1.3	2.0	—	
South Africa	50.5	51.5	55.0	65.5	63.3	48.5	4.8	10.0	1.2	135.0	145.0	
Zimbabwe-Rhodesia	5.7	9.2	9.6	10.8	21.5	20.0	—	1.5	1.6	n.a.	52.0	
<b>Asia</b>												
Australia	69.1	69.4	69.7	70.1	70.3	31.9	16.5	21.8	2.4	25.1	—	
China	3,250.0	3,525.0	3,950.0	4,325.0	4,360.0	3,600.0	360.0	400.0	2.1	n.a.	12,000.0	
China (Taiwan)	494.0	470.0	460.0	474.0	539.0	400.0	74.0	65.0	14.3	1,170.0	100.0	
India	956.0	1,055.5	1,096.0	1,096.0	1,096.0	950.0	46.0	100.0	0.8	240.0	300.0	
Indonesia	266.0	246.0	247.0	247.0	239.0	180.0	39.0	20.0	0.9	n.a.	112.0	
Japan	236.0	235.0	238.0	240.0	241.0	155.0	42.0	44.0	0.9	39.6	—	
Korea, North	467.0	495.0	500.0	512.0	672.0 <sup>d</sup>	600.0	27.0	45.0	17.7	26.0	2,540.0	
Korea, South	625.0	595.0	635.0	642.0	619.0	520.0	67.0	32.0	7.6	1,240.0	2,800.0	
Malaysia	61.1	62.3	64.0	64.5	64.5	52.5	6.0	6.0	2.5	27.0	213.0	
New Zealand	12.7	12.5	12.5	12.6	12.7	5.7	2.8	4.2	1.9	10.9	—	
Pakistan	392.0	428.0	428.0	429.0	429.0	400.0	12.0	17.0	3.6	513.0	109.0	
Philippines	67.0	78.0	99.0	99.0	103.0	65.0	22.0	16.0	1.1	124.0	82.0	
Singapore	30.0	31.0	36.0	36.0	36.0	30.0	3.0	3.0	6.4	45.0	37.5	
Thailand	204.0	210.0	211.0	212.0	216.0	145.0	28.0	43.0	2.5	500.0	66.0	
Vietnam	700.0	615.0	615.0	615.0	1,023.0	1,000.0	3.0	20.0	10.8	n.a.	1,570.0	
<b>Latin America</b>												
Argentina	133.5	132.8	129.9	132.9	132.9	80.0	32.9	20.0	2.5	250.0	42.0	
Brazil	254.5	257.2	271.8	273.8	281.0	182.0	49.0	50.0	1.2	n.a.	200.0	
Colombia	64.3	54.3	56.5	75.5	67.5	55.0	8.0	4.5	1.5	500.0	50.0	
Cuba	117.0	175.0	189.0	159.0	189.0	160.0	9.0	20.0	8.1	90.0	113.0	
Mexico	82.5	89.5	95.5	97.0	100.0	80.0	15.0	5.0	0.8	250.0	n.a.	
Peru	56.0	63.0	70.0	89.0	92.0	70.0	12.0	10.0	2.7	n.a.	20.0	
Venezuela	44.0	42.0	44.0	44.0	41.5	28.0	8.0	5.5	1.6	n.a.	10.0	

<sup>a</sup> Reservists with recent training. <sup>b</sup> Excludes PVO-Strany and Strategic Rocket Forces. <sup>c</sup> Includes men listed outside Britain. <sup>d</sup> Revised estimate.



## 7. Characteristics of US and USSR Military Helicopters in Common Use

Country Manufacturer	Model No.	Name and designation <sup>a</sup>		Date in service	No. of engines	Weight (kg)		Range <sup>b</sup> (km)	Crew + passengers	Primary roles	Armament <sup>c,d</sup>	License-built in <sup>e</sup>
						Empty	Gross					
USA/ Bell	47 G/J			1946	1	858	1,338	397	1+2	recce, ASW	1 Mk 44 torp	D, J (AB-47G), K (KH-47)
Sikorsky	H-13	<i>Sioux</i>	OH-13	1946	1	845	1,338	507	1+2/3	recce	2 7.62mm MG	
	S-55	<i>Chicasaw</i>	UH-19	1953	1	2,296	3,583	580	1+10	GP		D (Whirlwind)
	S-58	<i>Seahorse</i>	UH-34/D/E	1955	1	3,789	5,896	511	1+14	GP		D (Wessex), F D (Wessex), F
	S-58	<i>Seabat</i>	SH-34 G/J	1955	1	3,437	5,896	447	2+10/16	ASW, GP	torp or DC	D (Wessex), F
Hiller Bell	UH-12	<i>Raven</i>	OH-23D/F/G	1957	1	748	1,405	565	1+3	recce	2 7.62mm MG	
Bell	204	<i>Iroquois</i>	UH-1B	1959	1	2,116	4,309	511	1+14	GP		J, K
Kaman Sikorsky	S-61 A/B/F	<i>Huskie</i> <i>Sea King</i>	OH-43D/G SH-3A/D/G/H	1960 1961	1 2	2,003 5,382	4,150 8,449	811 1,005	4 4	recce ASW	ASW torp, DC; 4 AS-12 ASM; 2 <i>Sea Killer</i> Mk 2 or <i>Exocet</i> ASM	D (Sea King), J, K
Boeing Vertol	107	<i>Sea Knight</i>	CH-46E	1962	2	4,868	8,618	175	2+25	tpt, GP		K (KV-107)
	114	<i>Chinook</i>	CH-47A/B/C	1962-78	2	9,736	20,865	185	2+44	tpt	2 7.62mm MG	J
Kaman Bell	205	<i>Seasprite</i> <i>Iroquois</i>	UH-2A/B/C UH-1D/H	1962-67 1963/67	2 1	3,193 2,116	5,805 4,309	679 511	3 1+14	GP GP		G, F (AB-205), K
Sikorsky	S-61R	<i>Jolly Green</i> <i>Giant</i>	CH-3, HH-3	1963	2	6,010	10,000	748	2/3+30	tpt, assault, SAR		B, J, K, L
	S-64	<i>Skycrane</i>	CH-54A	1964	2	8,724	19,050	370	3+45	hy lift		
	S-61 A/B/F	<i>Sea King</i>	RH-3A	1965	2	5,382	8,449	1,005	4	MCM	MCM eqpt	
Airchild Hiller Sikorsky Bell	FH-1100 S-65A 209	<i>Sea Stallion</i> <i>Huey Cobra</i>	OH-5A CH-53A/D AH-1G	1966 1966 1967	1 2 1	n.a. 10,653 2,630	1,247 19,050 4,309	560 413 574	1+4 3+55 2	GP hy assault armed	2 <i>Miniguns</i> , 40mm grenade launchers, 2.75-in rockets or 20mm cannon	G
Hughes Bell	500C/M 206 209	<i>Cayuse</i> <i>Kiowa</i> <i>Sea Cobra</i>	OH-6 OH-58A/C AH-1J	1968 1969 1970	1 1 2	557 660 2,994	1,090 1,451 4,536	611 624 577	2+4 1+4 2	recce, ASW recce armed	<i>Minigun</i> , 2 Mk 44 torp <i>Minigun</i> 3 barrel 20mm cannon, 4 attachments for <i>Minigun</i> or 2.75 in rockets	J, K C, J (AB-206)
	212	<i>Twin two twelve</i>	UH-1N	1970	2	2,753	5,080	420	1+14	GP		J (AB-212)
Kaman Sikorsky Bell	S-65 (MCM) 209	<i>Seasprite</i> <i>Sea Stallion</i> <i>Huey Cobra</i>	SH-2D/F RH-53D AH-1Q	1971 1973 1975	2 2 1	3,193 10,181 2,830	5,805 22,680 4,309	679 413 507	3 3 2	ASW MCM ATK	1 or 2 Mk 44/46 torp 2 x 0.5-in MG, MCM eqpt 2 <i>Miniguns</i> ; 8 <i>TOW</i> ATGW	
	214A/C 209	<i>Improved Cobra</i>	AH-1T	1975 1976	1 2	3,380 3,855	6,260 6,342	481 577	2+14 2	GP armed	3 barrel 20mm cannon, stores pods	J (AB-214)
Hughes	500 MD	<i>Defender</i>		1976	1	598	1,360	539	2+4/6	armed	<i>Minigun</i> or 30mm chain gun; 4 <i>TOW</i> ATGW	B, J, K, L
Bell	209	<i>Cobra</i>	AH-1S	1977	1	2,930	4,536	507	2	ATK	20mm cannon, 8 <i>TOW</i> ATGW	
Sikorsky	S-70	<i>Black Hawk</i>	UH-60A	1978	2	4,944	9,185	600	3+11	UTTAS <sup>f</sup>	1 or 2 M-60 MG	
	S-76			1978/79	2	2,241	4,399	742	2+12	GP		
Hughes	77		AH-64A	(1981)	2	4,309	7,896	578	2	advanced attack	30mm chain gun, 16 <i>Hellfire</i> ATGW or 76 2.75-in rockets	
Sikorsky	S-70		SH-60B	(1983)	2	6,156	8,816	n.a.	3	LAMPS <sup>g</sup>	2 Mk 46 torp	
USSR												
Mil		<i>Hare</i> <i>Hound</i>	Mi-1 Mi-4	1950 1953	1 1	1,074 4,400	2,250 7,800	380 250	1+3 2+14	lt GP tpt, GP, ASW	12.7mm MG, 4 pods of 16 57mm rockets	O (SM-1) E
		<i>Hook</i>	Mi-6	1957	2	27,240	42,500	650	5+65	hy tpt	12.7mm MG or 13.2mm gun	
		<i>Harke</i>	Mi-10	1961	2	27,300	43,700	250	3+28	flying crane, GP		
Amov Amov Mil		<i>Hormone A</i> <i>Hoodlum</i> <i>Hip</i>	Ka-25 Ka-26 Mi-8	1961 1965 1967	2 2 2	4,400 1,950 7,261	7,300 3,250 12,000	650 400 480	3/4+14 1+7 3+28	ASW, GP GP GP, assault	1/2 400mm torp, nuc DC various, incl 4 bombs or 4 rocket pods or <i>Sagger</i> ATGW	
		<i>Hind A</i>	Mi-24	1972	2	n.a.	10,000	500	4+8	armed assault	12.7mm MG, 4 <i>Swatter</i> ATGW; 128 57mm rockets	
		<i>Hind C</i>	Mi-24							armed assault	4 weapons pylons	
		<i>Hind D</i>	Mi-24							armed assault	4 barrel 23mm cannon, 4 <i>Swatter</i> ATGW, 4 pylons for 57mm rockets	
		<i>Haze</i>	Mi-14	1976	2	7,261	12,000	480	2	ASW	torp or DC	

A helicopter design may be built in different countries under different names (e.g., the Sikorsky S-58, a US design, license-built in Britain as Westland *Wessex*). Also, there may be variants of a design for different uses: American-built S-58 variants are CH-34 (army tpt), HH-34 (coastguard), LH-34 (naval cold-weather ops), SH-34 (naval ASW), I-34 (naval and marines utility/vip tpt); British-built *Wessex* variants are HAS Mk 1 and 3 (naval ASW), HC Mk 2 and HCC Mk 4 (air force tpt and vip tpt), HU Mk 5 (assault), HAS Mk 31B (ASW for Australian navy), HC Mk 5 (tpt for Bangladesh), S2 (for Iraq), S3 (for Ghana) and S4 (for Brunei).

<sup>b</sup> Range with max fuel in optimum conditions. Range is severely degraded as weapons load increases. For example the AH-1J with 20mm cannon and 750 rounds, 14 2.75-in M-229 rockets and 1,600 lb fuel (gross weight 4,453 kg) has a range of 596 km at 2,000 ft; with 20mm cannon and 155 rounds, 62 M-229 rockets and 375 lb fuel (gross weight 4,530 kg), range drops to 145 km.

<sup>c</sup> Equipments listed are those which may be carried. The mix actually carried will vary according to mission role.

<sup>d</sup> MG = machine gun; DC = depth charge; torp = torpedo.

<sup>e</sup> A = Arab Organization for Industry; B = Argentina; C = Australia; D = Britain; E = China (PRC); F = France; G = W.

Germany; H = India; I = Indonesia; J = Italy; K = Japan; L = S. Korea; M = Pakistan; N = Philippines; O = Poland; P = Romania; Q = Switzerland; R = Taiwan; S = Yugoslavia.

<sup>f</sup> Designations applied to US helicopters are: AH = armed hel; CH = tpt; HH = SAR; OH = observation; UH = utility; RH = MCM; SH = ASW.

<sup>g</sup> Utility Tactical Air Transport System.

<sup>h</sup> Light Airborne Multi-Purpose System.



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# JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

DECEMBER 1979



One of the initial batch of M.B. 339As delivered on 8 August 1979

**ERMACCHI**  
ERONAUTICA MACCHI SpA; Head Office:  
Corso Vittorio Emanuele 15, 20122 Milan, Italy

#### AERMACCHI M.B. 339A

The M.B. 339 tandem two-seat trainer/ground attack aircraft is based essentially upon the airframe and Viper 632 power plant of the M.B. 326K, but is a reshaped forward fuselage, an improved two-seat cockpit, uprated avionics and equipment, and other detail changes.

The first of two M.B. 339 flying prototypes (I-OVE) was flown for the first time on 12 August 1976. The second aircraft (I-NINE), which made its first flight on 20 May 1977, was built to pre-

production standard; the third airframe was used for static and fatigue testing.

They are being followed by 100 production M.B. 339As for the Italian Air Force, of which the first 15 were ordered in FY 1978 and the next 40 in FY 1979; the final 45 are to be ordered in FY 1980. The first production aircraft (I-NEUF) flew for the first time on 20 July 1978. The first examples were handed over to the Italian Air Force for pre-service trials on 8 August 1979, and the M.B. 339A was scheduled to enter service with the Scuola di Volo Baseo-Iniziale Aviogetti at Lecce-Galatina in southern Italy by the end of the year.

**TYPE:** Two-seat basic and advanced trainer and ground attack aircraft.

**AIRFRAME:** Structural design criteria based on MIL-A-008860A; 8g limit load factor in 'clean' configuration. Cockpit designed for 40,000 pressurisation cycles. Service life requirement 10,000 flying hours and 20,000 landings in the training role. Entire structure specially treated to prevent corrosion.

**WINGS:** Cantilever low/mid-wing monoplane. Wing section NACA 64A-114 (mod) at centreline, NACA 64A-212 (mod) at tip. Leading-edge swept back 11° 18'. Sweepback at quarter-chord 8° 29'. All-metal stressed-skin structure, with single main spar and auxiliary rear spar, built in two portions and bolted to fuselage. Skin stiffened by spanwise stringers, closely spaced ribs, and false

ribs. Wingtip tanks permanently attached. Single fence on each wing at approx two-thirds span. Servo-powered ailerons embody 'Irving'-type aerodynamic balance provisions, and are statically balanced along their entire span. Electrically-actuated balance tabs facilitate reversion to manual operation in the event of servo failure. Hydraulically-actuated single-slotted flaps, operated by push/pull rods.

**FUSELAGE:** All-metal semi-monocoque structure, built in two main portions: forward (nose to engine mounting bulkhead), and rear (engine bulkhead to tailcone). Forward portion built of C-section frames, four C-section spars, longitudinal L-section stringers, and skin panels. Rear section fabricated entirely from aluminium alloy except for firewall and most of tailcone, which are of stainless steel; four-bolt attachment to forward fuselage to facilitate access to engine. Hydraulically actuated, electrically controlled airbrake under centre of fuselage, just forward of CG.

**TAIL UNIT:** Cantilever all-metal structure, of similar construction to wings. Slightly sweptback vertical surfaces. Rudder and elevators are statically balanced, each having an electrically-actuated balance and trim tab. Two auxiliary fins under rear fuselage.

**LANDING GEAR:** Hydraulically-retractable tricycle type, with oleo-pneumatic shock-absorbers; suitable for operation from semi-prepared runways. Nosewheel retracts forward, main units outward into wings. Steerable nosewheel, fitted with shimmy damper. Low-pressure main-wheel tubeless tyres size 545 x 175-10 (12 ply rating); nosewheel tubeless tyre size 380 x 150-4 (6 ply rating). Emergency extension system. Hydraulic disc brakes with anti-skid system.

**POWER PLANT:** One Rolls-Royce Viper Mk 632-43 turbojet engine, rated at 17.8 kN (4,000 lb st). Engines built in Italy under Rolls-Royce/Fiat licence; final assembly by Piaggio. Fuel in two-cell rubber fuselage tank, capacity 781 litres (172 Imp gallons), and two integral wingtip tanks, combined capacity 632 litres (139 Imp gallons). Total internal capacity 1,413 litres (311 Imp gallons) usable. Single-point pressure refuelling receptacle in port side of fuselage, below wing trailing-edge. Gravity refuelling points on top of fuselage



First five production M.B. 339As for the Italian Air Force, plus one of the prototypes (nearest camera)

and each tip-tank. Provision for two drop-tanks, each of 325 litres (71.5 Imp gallons) capacity, on centre underwing stations. Anti-icing system for engine air intakes optional.

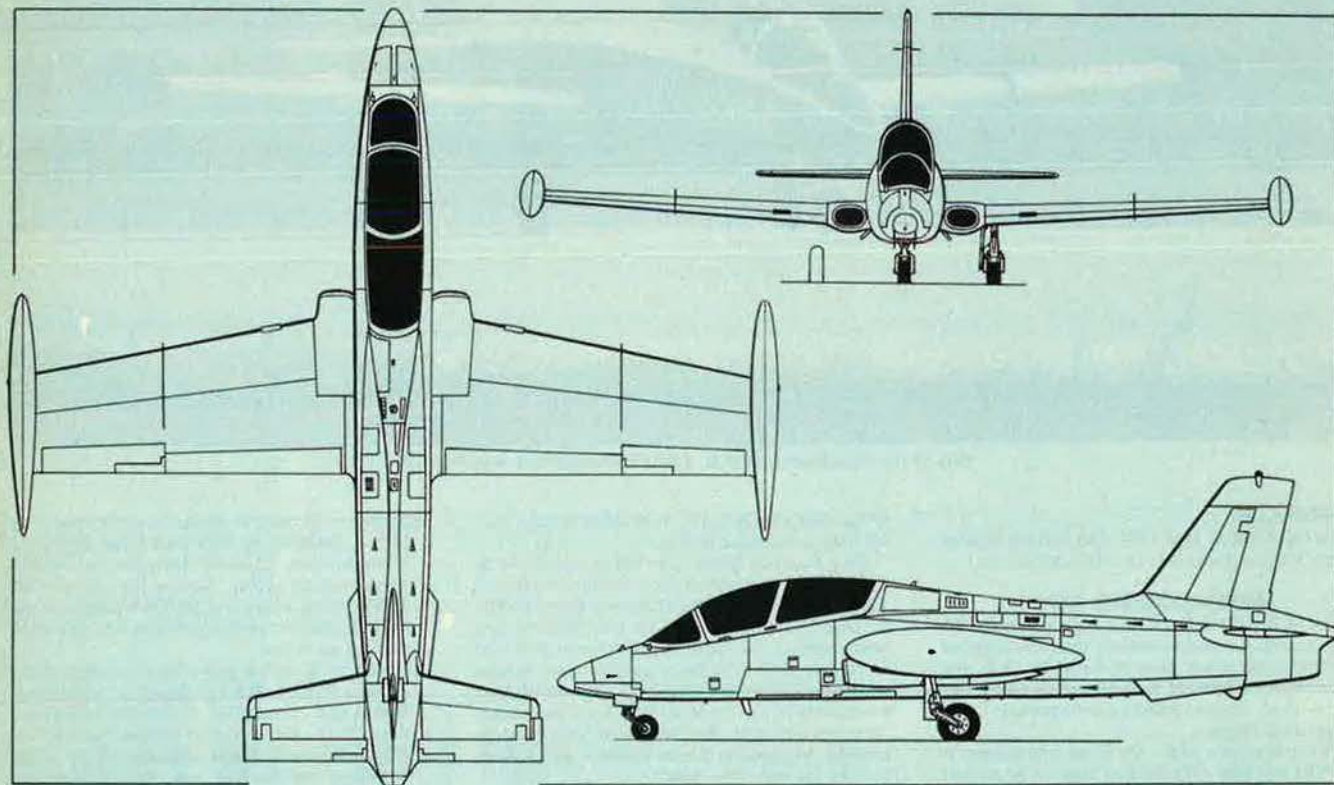
**ACCOMMODATION:** Crew of two in tandem, on Martin-Baker Mk IT-10F zero-zero ejection seats in pressurised cockpit. Rear seat elevated 32.5 cm (12 3/4 in). Rearview mirror for each occupant. Two-piece moulded transparent jettisonable canopy, opening sideways to starboard.

**SYSTEMS:** Hydraulic system, pressure 176 bars (2,600 lb/sq in), for actuation of flaps, aileron servos, airbrake, landing gear, wheel brakes, and nosewheel steering. Backup system for wheel brakes and emergency extension of landing gear. Main electrical DC power from one 28V 9kW engine-driven starter/generator and one 28V 6kW secondary generator. Two 24V 22Ah nickel-cadmium batteries for engine starting. Fixed-frequency 115/26V AC power from two 600VA single-phase static inverters. External power receptacle. Cockpit pressurised (differential 0.24 bars; 3.5 lb/sq in); bootstrap-type air-conditioning system, which also provides air for windscreen and canopy demisting. Low-pressure demand-type oxygen system, operating at 27.6 bars (400 lb/sq in).

**AVIONICS AND EQUIPMENT:** Typical avionics installation includes Elmer/Magnavox AN/ARC-150(V) UHF or Elmer/Magnavox SRT-194B VHF primary com transceiver; Collins 618M-3A VHF/AM or equivalent ARINC 566A, or Collins

AN/ARC-186(V) VHF/AM & FM secondary com transceiver; Collins IA-210 interphone; Collins AN/ARN-118(V)1 Tacan or Collins 860E-DME nav system; Fiat/Bendix AN/APX-100(V) IFF; Collins 51RV-4D VOR/ILS, including localiser and glideslope receivers; Collins MKI marker beacon; Collins ADF-60A ADF; or (M.B. 339A) Marconi Avionics AD-620C computerised area and dead reckoning navigation system. Standard instrumentation includes ARU-2B/A attitude director indicator, AQU-6/A HSI, Aeritalia-Sperry AS-339 attitude and heading reference system, AG-5 standby attitude indicator, and flight director system. Retractable landing light beneath port wing; taxiing light or nosewheel leg.

**ARMAMENT AND OPERATIONAL EQUIPMENT:** Up to 1,815 kg (4,000 lb) of external stores can be carried on six underwing hardpoints, the inner four of which are stressed for loads of up to 454 kg (1,000 lb) each and the outer two for up to 340 kg (750 lb) each. Provisions are made, on the two inner stations, for the installation of two Macchi gun pods, each containing either a 30 mm DEFA cannon with 120 rds or a 12.7 mm AN/M-3 machine-gun with 350 rds. Other typical loads can include two Matra 550 or AIM-9 Sidewinder air-to-air missiles on the two outer stations; four 1,000 lb or six 750 lb bombs; six SUU-11A/A 7.62 mm Minigun pods with 1,500 rds/pod; six Matra 155 launchers, each for eighteen 68 mm rockets; six Matra F-2 practice launchers, each for six 68



Aermacchi M.B. 339A two-seat jet trainer and light attack aircraft (Pilot Press)

mm rockets; six LAU-68/A or LAU-32G launchers, each for seven 2.75 in rockets; six Aerea AL-25-50 or AL-18-50 launchers, each with twenty-five or eighteen 50 mm rockets respectively; six Aerea AL-12-80, each with twelve 81 mm rockets; four LAU-10A launchers, each with four 5 in Zuni rockets; six Aerea BRD 1395 bomb/rocket dispensers; six Aermacchi 11B29-003 bomb/flare dispensers; or two 325 litre (71.5 Imp gallon) drop-tanks; or a photographic pod with four 70 mm Vinten cameras. Provision for Aeritalia 8.105.924 fixed reflector sight, Saab RGS 2 gunsight, or Thomson-CSF RD-21 self-contained gyroscopic sight; a gunsight can also be installed in rear cockpit, to enable instructor to evaluate manoeuvres performed by student pilot. All gunsights can be equipped with fully automatic Teledyne TSC 116-2 gun camera. Head-up display system under study. Provision for towing type A-6B (1.83 x 9.14 m; 6 x 30 ft) aerial banner target; tow attachment point on inner surface of ventral airbrake.

**DIMENSIONS, EXTERNAL:**

Wing span over tip-tanks 10.858 m (35 ft 7½ in)

Landing speed 89 knots (165 km/h; 102.5 mph) IAS  
 Stalling speed 80 knots (148.5 km/h; 92.5 mph)  
 Max rate of climb at S/L 2,010 m (6,595 ft)/min  
 Time to 9,150 m (30,000 ft) 7 min 6 s  
 Service ceiling (30.5 m; 100 ft/min rate of climb) 14,630 m (48,000 ft)  
 Min ground turning radius 8.45 m (27 ft 8¾ in)  
 T-O run at S/L:  
 'clean' T-O weight 465 m (1,525 ft)  
 max T-O weight 915 m (3,000 ft)  
 T-O to, and landing from, 15 m (50 ft) 700 m (2,296 ft)  
 Landing run at S/L:  
 'clean' landing weight 415 m (1,362 ft)  
 ground attack mission landing weight of 3,630 kg (8,000 lb) 427 m (1,400 ft)  
 Max range (internal fuel), 10% reserves 950 nm (1,760 km; 1,093 miles)  
 Max endurance at 9,150 m (30,000 ft) (internal fuel), 10% reserves 2 h 50 min  
 Max ferry range with two underwing drop-tanks, 10% reserves 1,140 nm (2,110 km; 1,310 miles)

D 320 nm (593 km; 368 miles)  
 E 212 nm (393 km; 244 miles)  
 F 275 nm (510 km; 317 miles)  
 G 305 nm (565 km; 351 miles)  
 H 165 nm (306 km; 190 miles)  
 Radius of action, lo-lo-lo (no run-in or run-out):  
 A 150 nm (278 km; 173 miles)  
 B 205 nm (380 km; 236 miles)  
 C 135 nm (250 km; 155 miles)  
 D 200 nm (371 km; 230 miles)  
 E 146 nm (271 km; 168 miles)  
 F 190 nm (352 km; 219 miles)  
 G 193 nm (358 km; 222 miles)  
 H 123 nm (228 km; 142 miles)  
 Radius of action, hi-lo-hi (30 nm; 56 km; 34.5 mile run-in and run-out):  
 A 150 nm (278 km; 173 miles)  
 B 260 nm (482 km; 299 miles)  
 C 122 nm (226 km; 140 miles)  
 D 240 nm (445 km; 276 miles)  
 E 138 nm (256 km; 159 miles)  
 F 218 nm (404 km; 251 miles)  
 G 230 nm (426 km; 265 miles)  
 H 112 nm (208 km; 129 miles)  
 Radius of action, lo-lo-lo (30 nm; 56 km; 34.5 mile run-in and run-out):  
 A 130 nm (241 km; 150 miles)  
 B 188 nm (348 km; 216 miles)  
 C 120 nm (222 km; 138 miles)  
 D 180 nm (334 km; 207 miles)  
 E 124 nm (230 km; 143 miles)  
 F 172 nm (319 km; 198 miles)  
 G 173 nm (321 km; 199 miles)  
 H 103 nm (191 km; 119 miles)



**Aermacchi M.B. 339A (Rolls-Royce Viper Mk 632-43 turbojet engine)**

Wing aspect ratio 5.26  
 Length overall 10.972 m (36 ft 0 in)  
 Height overall 3.600 m (11 ft 9¾ in)  
 Tailplane span 4.164 m (13 ft 8 in)  
 Wheel track 2.483 m (8 ft 1¾ in)  
 Wheelbase 4.369 m (14 ft 4 in)

**AREAS:**  
 Wings, gross 19.30 m² (207.74 sq ft)  
 Ailerons (total) 1.328 m² (14.29 sq ft)  
 Trailing-edge flaps (total) 2.552 m² (27.47 sq ft)  
 Airbrake 0.520 m² (5.60 sq ft)  
 Fin 2.370 m² (25.51 sq ft)  
 Rudder, incl tab 0.610 m² (6.57 sq ft)  
 Tailplane 3.380 m² (36.38 sq ft)  
 Elevators (total, incl tabs) 0.979 m² (10.54 sq ft)

**WEIGHTS:**  
 Weight empty 3,075 kg (6,780 lb)  
 Weight empty, equipped 3,125 kg (6,889 lb)  
 Fuel load (internal, usable) 1,100 kg (2,425 lb)  
 T-O weight, 'clean' 4,400 kg (9,700 lb)  
 Max T-O weight, with external stores 5,895 kg (13,000 lb)  
 Landing weight with 10% fuel reserves 3,425 kg (7,550 lb)

**PERFORMANCE (at 'clean' T-O weight, ISA, except where stated):**  
**EAS limit/Mach limit**  
 Mach 0.82 (500 knots; 926 km/h; 575 mph)  
**Max level speed at S/L**  
 485 knots (898 km/h; 558 mph)  
**Max level speed at 9,150 m (30,000 ft)**  
 Mach 0.77 (441 knots; 817 km/h; 508 mph)  
**Max speed for landing gear extension**  
 170 knots (315 km/h; 195 mph) IAS  
**Approach speed over 15 m (50 ft) obstacle**  
 98 knots (182 km/h; 113 mph) IAS

Max endurance at 7,620 m (25,000 ft) with two underwing drop-tanks, 10% reserves 3 h 45 min  
 g limits:  
 'clean' T-O weight +8.0; -4.0  
 max T-O weight +5.5; -2.0

**WEIGHTS (armed configuration):**  
 Typical T-O weights with crew of one and armament indicated:  
 A: two Macchi 30 mm gun pods 4,822 kg (10,630 lb)  
 B: two Macchi 30 mm gun pods and two drop-tanks 5,475 kg (12,070 lb)  
 C: two Macchi 30 mm gun pods and four Mk 82 bombs 5,881 kg (12,965 lb)  
 D: four Mk 82 bombs and two drop-tanks 5,897 kg (13,000 lb)  
 E: six Mk 82 bombs 5,897 kg (13,000 lb)  
 F: two Macchi 30 mm gun pods, two LR-25-0 rocket launchers, and two drop-tanks 5,808 kg (12,805 lb)  
 G: four LR-25-0 launchers and two drop-tanks 5,642 kg (12,440 lb)  
 H: six LR-25-0 launchers 5,323 kg (11,735 lb)

**PERFORMANCE (armed configuration, at T-O weights given above):**  
**Dash speed at S/L:**  
 A 440 knots (815 km/h; 507 mph)  
 B 400 knots (741 km/h; 461 mph)  
 C, D 390 knots (723 km/h; 449 mph)  
 E 395 knots (732 km/h; 455 mph)  
 F, G, H 365 knots (676 km/h; 420 mph)  
**Radius of action, hi-lo-hi (no run-in or run-out):**  
 A 223 nm (413 km; 257 miles)  
 B 323 nm (598 km; 372 miles)  
 C 176 nm (326 km; 203 miles)

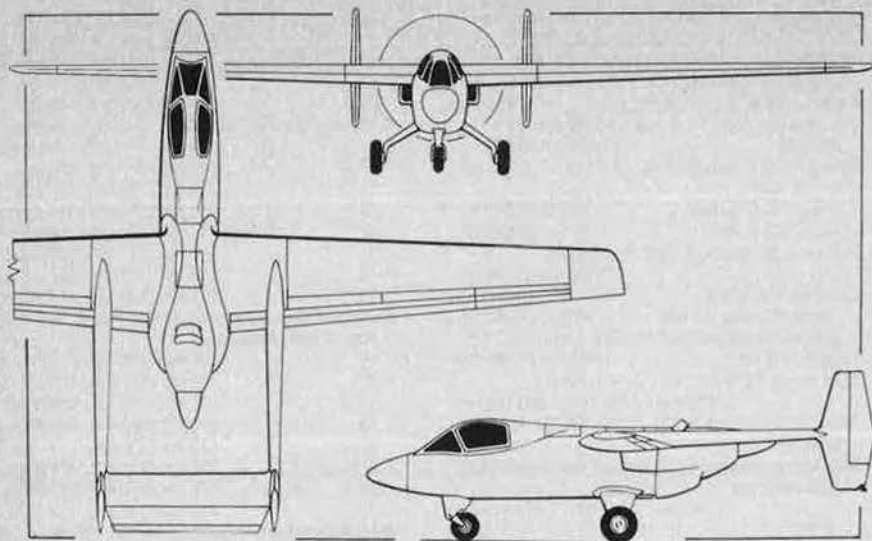
**SCHAPEL**

SCHAPEL AIRCRAFT COMPANY; Address: PO Box 60039, Reno, Nevada 89506, USA

**SCHAPEL S-525 SUPER SWAT**

Believing that recent developments in aerodynamics and composite structures should make possible major advances in the design of agricultural aircraft, Mr Rodney E. Schapel initiated in March 1977 studies that led to design of the Super Swat. Wind tunnel testing of a model had been completed by the Spring of 1979. Construction of a prototype began in July, and this aircraft is scheduled to fly for the first time in January 1980. TYPE: Advanced-design agricultural aircraft.

**WINGS:** Cantilever shoulder-wing monoplane. Aerofoil section NASA (Whitcomb) GAW-1. Thickness/chord ratio 17%. Dihedral 1° 30'. Incidence 3°. No sweepback. Fail-safe plate stringer structure of carbon fibre/epoxy. Slot-lip ailerons of glassfibre, Kevlar 49 (R), and honeycomb/epoxy sandwich. Full-span electrically-actuated Fowler-type trailing-edge flaps of similar construction. Trim tab in starboard aileron.  
**FUSELAGE:** Welded steel tube structure, with skins of composite materials. Tailbooms of carbon fibre/epoxy construction.  
**TAIL UNIT:** Twin endplate fins with rudders, mounted on tailbooms, with fixed-incidence tailplane between, forming a rigid box structure. One-piece elevator. Construction of glassfibre, Kevlar 49 (R), and honeycomb/epoxy sandwich. Trim tabs in elevator and rudder.  
**LANDING GEAR:** Non-retractable tricycle type, with single wheel on each unit. Main wheels carried on cantilever units. Shock-absorption by rubber in compression. Cleveland main wheels with tyres of 685 mm (27.00 in) diameter. Nosewheel tyre 585 mm (23.00 in) diameter. Cleveland brakes.  
**POWER PLANT:** One 507 kW (680 shp) Pratt & Whitney Aircraft of Canada PT6A-15AG turbo-prop engine, driving a Hartzell constant-speed three-blade metal pusher propeller. Fuel in two wing tanks with combined capacity of 378.5 litres (100 US gallons). Single-point pressure refuelling in side of fuselage. Gravity refuelling point on upper surface of each wing.  
**ACCOMMODATION:** Single seat for pilot. Cockpit canopy hinged at top, and openable upward on each side. Accommodation heated, ventilated, and air-conditioned.



Schapel S-525 Super Swat advanced-design agricultural aircraft (Michael A. Badrocke)

**SYSTEMS:** Air-conditioning and electrical systems.  
**EQUIPMENT:** Hopper in fuselage for liquid spray or dry chemicals, volume 1.93 m<sup>3</sup> (68 cu ft); capacity 1,893 litres (500 US gallons).

**DIMENSIONS, EXTERNAL:**

Wing span	16.46 m (54 ft 0 in)
Wing aspect ratio	10.33
Length overall	9.66 m (31 ft 8½ in)
Height overall	3.26 m (10 ft 8½ in)
Tailplane span	3.66 m (12 ft 0 in)
Wheel track	2.44 m (8 ft 0 in)
Wheelbase	2.96 m (9 ft 8½ in)
Propeller diameter	2.44 m (8 ft 0 in)
Propeller ground clearance	0.15 m (6 in)

**AREA:**

Wings, gross	26.48 m <sup>2</sup> (285 sq ft)
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**WEIGHTS AND LOADINGS (estimated):**

Weight empty	1,270 kg (2,800 lb)
Max T-O and landing weight	3,629 kg (8,000 lb)
Max zero-fuel weight	3,342 kg (7,367 lb)
Max wing loading	126.2 kg/m <sup>2</sup> (28.07 lb/sq ft)
Max power loading	6.59 kg/kW (11.76 lb/shp)

**PERFORMANCE (estimated, at max T-O weight):**

Never-exceed speed	250 knots (463 km/h; 288 mph)
Max level speed at S/L	177 knots (328 km/h; 204 mph)
Cruising speed at 7,620 m (25,000 ft)	175 knots (324 km/h; 202 mph)
Stalling speed, flaps up	74.9 knots (139 km/h; 86 mph)
Stalling speed, flaps down	50.4 knots (93 km/h; 58 mph)
Max rate of climb at S/L	503 m (1,650 ft)/min
Service ceiling	7,620 m (25,000 ft)
T-O run	238 m (780 ft)
T-O to 15 m (50 ft)	511 m (1,677 ft)
Landing from 15 m (50 ft)	233 m (765 ft)
Landing run	140 m (460 ft)
Range with max fuel, no payload	890 nm (1,649 km; 1,025 miles)

**WSK-PZL-MIELEC**

WYTWORKNIA SPRZETU KOMUNIKACYJNEGO-PZL-MIELEC (Transport Equipment Manufacturing Centre, Mielec); Head Office and Works: ul Ludowego Wojska Polskiego 3, 39-301 Mielec, Poland

Among newcomers at this year's Paris Air Show was the second pre-production example of the An-28, of which series production has been entrusted to PZL-Mielec. This decision was logical, as Mielec has delivered more than 8,000 of Antonov's earlier An-2 biplanes, including 3,800 of the An-2R agricultural version. More than 90% of these have been for export, chiefly to the USSR, and production is continuing at a rate of approx 250 a year. Details of the planned An-28 manufacturing programme have not yet been given.

**PZL-MIELEC (ANTONOV) An-28**  
**NATO reporting name: Cash**

Oleg Antonov first referred to planned development of an enlarged turboprop version of his piston-engined An-14 light general-purpose transport in the early 1960s, but until the Spring of 1972 there was no proof that such an aircraft had been built. Photographs of the prototype (CCCP-1968) were then published in the Polish press. It had flown for the first time in the USSR in September 1969, powered by two 604 kW (810 shp) Isotov TVD-850 turboprop engines, and was described in this form in the Soviet section of the 1974-75 and previous editions of *Jane's*.

Initially, the new aircraft was designated An-14M. Its official flight testing was completed in 1972, and during 1973 it was allocated the production designation An-28. The first pre-production An-28 (CCCP-19723) retained the original TVD-850 engines, but flight trials suggested that field performance and climb, in particular, could be improved by fitting more powerful engines. Thus, in

April 1975, the same development aircraft (registered CCCP-19753) flew for the first time with 716 kW (960 shp) Glushenkov TVD-10 turboprop engines, which were specified also for production An-28s. It won a subsequent competitive evaluation against the Beriev Be-30, in which the emphasis was placed by the evaluators on concept rather than detail design.

Announcement that production would be centred in Mielec followed Polish-Soviet talks in February 1978. At Paris, in June of this year, Mr Antonov stated that the aircraft was at the final stages of testing for certification prior to production, which is expected to begin in 1980-81. The second pre-production aircraft (originally CCCP-19754, now CCCP-48105) was displayed at the Air Show. A total of 1,700 development flights had been completed by that time, including tests with ski landing gear.

In general configuration the An-28 differs from the piston-engined An-14 in having a much enlarged fuselage to carry up to 20 passengers or equivalent alternative payloads. The original An-14M had a retractable landing gear, with small fairings on the sides of the fuselage into which the main units retracted. It was decided that retraction was unnecessary for flights over short distances at low speed and the pre-production An-28s have fixed gear. The shape of the vertical tail surfaces was also changed as a result of early flight testing.

The Antonov design bureau developed the An-28 for service on Aeroflot's shortest routes, particularly those operated by An-2 biplanes into places which are relatively inaccessible to other types of fixed-wing aircraft. The turboprop engines make possible full-payload operation under high-temperature conditions and in mountainous regions; and the An-28 is described as being suitable for carrying passengers, cargo, and mail, for scientific expeditions, geological surveying, forest fire patrol, firefighting, air ambulance or rescue operations, and parachute training. In agricultural form it can carry an 800 kg (1,764 lb) chemical payload for dusting and spraying operations.

Mr Antonov has stated that Aeroflot pilots will begin their flying careers on the An-28, which will not stall, even with the control column held in the extreme rearward position, because of the action of its automatic slats. If an engine fails, the upper-surface spoiler forward of the aileron on the opposite wing is opened automatically; as a result, the wing bearing the 'dead' engine drops only 12° in 5 s instead of the 30° that it would drop through loss of lift without the action of the Antonov-patented spoiler. The fixed tailplane slot, also patented, improves handling during a high angle of attack climb out. Under icing conditions, if the normal anti-icing system fails, ice collects on the slat rather than on the tailplane, which helps the pilot to retain control.

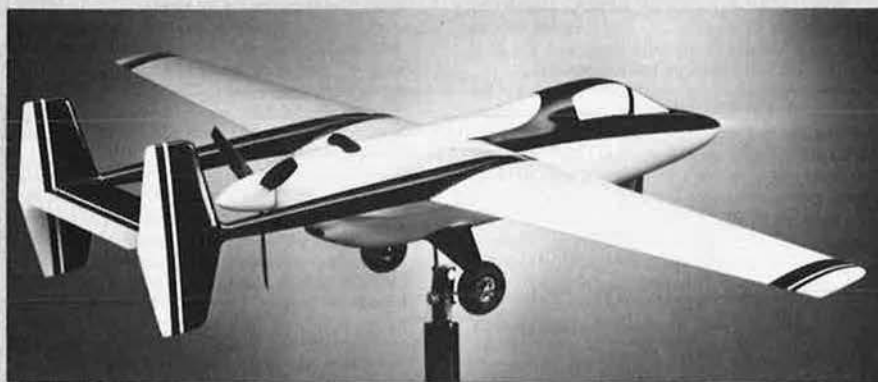
**TYPE:** Twin-turboprop light general-purpose transport.

**WINGS:** Braced high-wing monoplane, with single streamline-section bracing strut each side. Conventional two-spar structure. Automatic leading-edge slats. Entire trailing-edges hinge the single-slotted ailerons being designed to droop with the large flaps. No tabs. Spoiler forward of each aileron. Short stub-wing extensions from each side of the lower fuselage, carrying the main landing gear units, and providing lower attachments for the wing bracing struts. Anti-icing of wing leading-edges by engine bleed air.

**FUSELAGE:** Conventional all-metal semi-monocoque structure, longer, wider, and deeper than that of the piston-engined An-14. Underside of rear fuselage upswept and made up of clamshell doors.

**TAIL UNIT:** Cantilever all-metal structure. Twin fins and rudders mounted vertically on a tailplane that lacks the dihedral of that on the An-14. Fixed leading-edge slat under full span of tailplane leading-edge. Anti-icing of leading-edges by engine bleed air. Twin tabs in each rudder.

**LANDING GEAR:** Non-retractable tricycle type, with single wheel on each unit. Wide-tread balloon tyres, size 720 × 320, pressure 3.5 bars (5 lb/sq in), on main units. Steerable and self-centering nosewheel, with size 595 × 185 tyre.



Model of the Schapel S-525 Super Swat (P&WC PT6A-15AG turboprop engine)



Antonov An-28 light general-purpose transport (two Glushenkov TVD-10B turboprop engines)



Rear-loading ramp-door of An-28 in forward, underfuselage position

Brakes on main wheels. Provision for skis or floats.

**POWER PLANT:** Two 715 kW (960 shp) flat-rated Glushenkov TVD-10B turboprop engines, each driving an AW-24AN three-blade variable-pitch metal propeller. Two 310 litre (68 Imp gallon) centre-wing and two 670 litre (147 Imp gallon) outer-wing integral fuel tanks; total fuel capacity 1,960 litres (430 Imp gallons). Oil capacity 30 litres (6.5 Imp gallons) per engine. Electrical anti-icing of propellers and engine air intakes.

**ACCOMMODATION:** Crew of one or two on flight deck, which has bulged side windows. Crew door forward of cabin on port side. Cabin of passenger version contains 15 seats in five rows at 72 cm (28 in) pitch, or up to 20 seats in high-density configuration, with double units on starboard side of aisle. Seats fold back against walls when aircraft is operated as a freighter or in mixed passenger/cargo role. Provision for baggage and toilet compartments and wardrobe space. Electrically-actuated ramp-door under upswept rear fuselage can slide forward under cabin to facilitate direct loading from trucks on to cabin floor. Overhead winch on rails, capacity 250 kg (550 lb), for handling cargo. Emergency exit at rear on starboard side. Six/seven-passenger executive version has four folding tables, which can be joined together in pairs to give working tops measuring 160 x 55 cm (63 x 21.5 in). Ambulance version accommodates six stretchers, five seated patients, a medical attendant, and medical equipment. Can also be equipped to carry six parachutists and a despatcher.

**AVIONICS AND EQUIPMENT:** Flight and navigation equipment includes R-80W UHF, Karat short-wave, RSB-5 medium-wave, Landysz-5, and R-851 radios; Wint-2 navigation computer; DISS Maszt-FK and ARK-U2 'special installations'; ADF; emergency locator transmitter; DWS-8 airspeed indicator; AR-C7 turn indicator; MS-61 drift recorder; three-axis autopilot; and dual AK-59P astrocompasses. Landing light in nose. Current level of equipment is intended to permit operation in ICAO Category II conditions, with extension later to Category III.

**DIMENSIONS, EXTERNAL:**

Wing span	22.06 m (72 ft 4½ in)
Wing chord at root	2.20 m (7 ft 2½ in)
Wing area, gross	40.28 m² (433.5 sq ft)
Wing aspect ratio	12
Length overall	12.98 m (42 ft 7 in)
Height overall	4.60 m (15 ft 1 in)
Tailplane span	5.20 m (17 ft 0¾ in)
Wheel track	3.41 m (11 ft 2¼ in)
Wheelbase	4.35 m (14 ft 3¼ in)
Propeller diameter	2.80 m (9 ft 2¼ in)

**DIMENSIONS, INTERNAL:**

Cabin, excl flight deck: Length	5.26 m (17 ft 3 in)
Max width	1.66 m (5 ft 5 in)
Max height	1.70 m (5 ft 7 in)
Floor area	8.73 m² (93.97 sq ft)
Volume	14.84 m³ (524 cu ft)

**WEIGHTS AND LOADINGS:**

Weight empty (approx)	3,500 kg (7,716 lb)
Normal payload	1,550 kg (3,415 lb)
Max payload	1,700 kg (3,750 lb)
Normal T-O weight	5,800 kg (12,785 lb)

Max T-O weight	6,100 kg (13,450 lb)
Max wing loading	151.4 kg/m² (31.03 lb/sq ft)
Max power loading	4.22 kg/kW (6.93 lb/shp)
<b>PERFORMANCE (A: at normal T-O weight; B: at max T-O weight):</b>	
Max cruising speed:	
A, B	188 knots (350 km/h; 217 mph)
Econ cruising speed:	
A, B	162 knots (300 km/h; 186 mph)
Stalling speed, flaps up:	
A	70 knots (130 km/h; 81 mph)
B	73 knots (135 km/h; 84 mph)
Stalling speed, flaps down:	
A	65 knots (120 km/h; 75 mph)
B	67.5 knots (125 km/h; 78 mph)
Max rate of climb at S/L:	
A	750 m (2,460 ft)/min
B	708 m (2,320 ft)/min
Rate of climb at S/L, one engine out:	
A	192 m (630 ft)/min
B	174 m (570 ft)/min
T-O run:	
A	180 m (590 ft)
B	210 m (690 ft)
T-O to 15 m (50 ft):	
A	330 m (1,085 ft)
B	360 m (1,180 ft)
Landing from 15 m (50 ft):	
A	287 m (942 ft)
B	305 m (1,000 ft)
Landing run:	
A	150 m (492 ft)
B	170 m (558 ft)
Range at econ cruising speed at 3,000 m (9,850 ft), 30 min reserves:	
A, 15 passengers	356 nm (660 km; 410 miles)
A, 18 passengers	202 nm (375 km; 233 miles)
B, 18 passengers	372 nm (690 km; 428 miles)
B, 20 passengers	275 nm (510 km; 317 miles)
A, max fuel	702 nm (1,300 km; 807 miles)
B, max fuel	696 nm (1,290 km; 801 miles)

**AÉROSPATIALE**

**SOCIÉTÉ NATIONALE INDUSTRIELLE AÉROSPATIALE; Head Office: 37 boulevard de Montmorency, 75781, Paris Cédex 16, France**

**AÉROSPATIALE AS 365N DAUPHIN 2**

This version of the Dauphin 2 was first stated to be under development in mid-1977, but few details were released until June 1979, when the prototype (F-WZJD) was exhibited at the Paris Air Show. First flown on 31 March 1979, it introduced more refined external lines, a fully-retractable landing gear, uprated engines, and a considerably increased range, making this version particularly suitable for offshore commercial and naval applications.

It is hoped to obtain civil certification for VFR operation by October 1980, and for IFR operation



The prototype of Aerospatiale's new cleaned-up AS 365N Dauphin 2

by the end of the same year. Deliveries of the AS 365N would then start in early 1981. The AS 366G, with different power plant, is described separately.

**TYPE:** Twin-turbine military and commercial general-purpose helicopter.

**ROTOR SYSTEM:** Four-blade main rotor, with blades of glassfibre and carbon fibre, attached to Starflex glassfibre rotor head with quick-disconnect pins. Blades fold for stowage and a rotor brake is standard. Thirteen-blade 'fenestron' type of metal ducted-fan anti-torque tail rotor.

**FUSELAGE:** Conventional light alloy semi-monocoque structure.

**TAIL UNIT:** Horizontal stabiliser mid-set on tailboom, forward of 'fenestron', with endplate fins of different form to those on SA 365C.

**LANDING GEAR:** Retractable tricycle type, with twin-wheel self-centering nose unit and single wheel on each rearward-retracting main unit. Oleo-pneumatic shock-absorbers. Tyre pressure 7 bars (101 lb/sq in) for main wheels, 4 bars (58 lb/sq in) for nosewheels. Disc brakes.

**POWER PLANT:** Two Turbomeca Arriel IC free-turbine turboshaft engines, each rated at 546 kW (735 shp). Five fuel tanks divided in two groups under cabin floor, with total capacity of 1,100 litres (242 Imp gallons). Refuelling point on port side. Oil capacity 8.5 litres (1.85 Imp gallons).

**ACCOMMODATION:** Standard accommodation for one pilot and nine passengers in VFR configuration. Crew of two for IFR operation. High-density seating for one pilot and 13 passengers. VIP configurations for four to six persons in addition to pilot. Three forward-opening doors on each side. Freight hold aft of cabin rear bulkhead. Cabin heated and ventilated; optional air-conditioning.

**SYSTEMS:** SEMCA air-conditioning system optional. Duplicated hydraulic system. Electrical system includes two 4.5kW starter/generators, one 23Ah 24V battery, and two 250VA 115V 400Hz inverters. Provision for de-icing system.

**AVIONICS AND EQUIPMENT:** Optional avionics include VHF and HF com/nav, VOR, ILS, ADF, transponder, DME, radar, and self-contained nav system. Optional equipment includes a 1,500 kg (3,300 lb) capacity cargo sling, and 275 kg (605 lb) capacity hoist with 80 m (260 ft) cable length.

**ARMAMENT AND OPERATIONAL EQUIPMENT:** Provision for complete ASW and ASV weapon system, including omnidirectional radar with target designation capability.

**DIMENSIONS, EXTERNAL:**

Diameter of main rotor	11.68 m (38 ft 4 in)
Diameter of tail rotor	0.90 m (2 ft 11 7/8 in)
Blade chord, main rotor	0.385 m (1 ft 3 3/4 in)
Length overall	13.29 m (43 ft 7 3/4 in)

Length overall, rotor blades folded	11.40 m (37 ft 4 3/4 in)
Width, rotor blades folded	3.21 m (10 ft 6 1/2 in)
Height to top of rotor hub	3.30 m (10 ft 10 in)
Height overall	3.81 m (12 ft 6 in)
Wheel track	2.03 m (6 ft 8 in)
Wheelbase	3.61 m (11 ft 10 1/4 in)
Main cabin door (fwd, each side):	
Height	1.16 m (3 ft 9 1/2 in)
Width	1.14 m (3 ft 9 in)
Main cabin door (rear, each side):	
Height	1.16 m (3 ft 9 1/2 in)
Width	0.87 m (2 ft 10 1/4 in)
Baggage compartment door (stbd):	
Height	0.51 m (1 ft 8 in)
Width	0.73 m (2 ft 4 3/8 in)

**DIMENSIONS, INTERNAL:**

Cabin: Length	2.30 m (7 ft 6 1/2 in)
Max width	1.92 m (6 ft 3 1/2 in)
Max height	1.40 m (4 ft 7 in)
Floor area	4.20 m <sup>2</sup> (45.20 sq ft)
Volume	5.00 m <sup>3</sup> (176 cu ft)
Baggage compartment volume	2.20 m <sup>3</sup> (77.7 cu ft)

**WEIGHTS:**

Weight empty, standard aircraft	1,888 kg (4,163 lb)
Max T-O weight	3,600 kg (7,936 lb)

**PERFORMANCE (estimated, at max T-O weight):**

Never-exceed speed at S/L	170 knots (315 km/h; 196 mph)
Max cruising speed at S/L	149 knots (277 km/h; 172 mph)
Econ cruising speed at S/L	135 knots (250 km/h; 155 mph)



Beechcraft Super King Air F90 seven/ten-seat twin-turboprop business aircraft

Max rate of climb at S/L	630 m (2,065 ft)/min
Service ceiling (60 m; 200 ft/min climb)	5,000 m (16,400 ft)
Service ceiling, one engine out	1,750 m (5,740 ft)
Hovering ceiling IGE	2,050 m (6,725 ft)
Hovering ceiling OGE	1,250 m (4,100 ft)
Range with max fuel	470 nm (870 km; 540 miles)

## AÉROSPATIALE AS 366G DAUPHIN 2

At the 1979 Paris Air Show, Aerospatiale announced that it had won with this aircraft the competition for a helicopter to perform SRR (Short Range Recovery) duties with the US Coast Guard. The initial contract is for 90 AS 366Gs, basically similar to the AS 365N but with engines and equipment of US manufacture accounting for about 60% of the total cost of each aircraft.

The AS 366G will be powered by two Avco Lycoming LTS 101-750 turboshafts; Rockwell Collins is prime contractor for the advanced communications, navigation, and all-weather search equipment. Flight testing is expected to begin in August 1980, to permit civil certification in October 1981, and deliveries to the Coast Guard between the early months of 1982 and 1986.

## BEECHCRAFT

**BEECH AIRCRAFT CORPORATION; Head Office and Main Works: Wichita, Kansas 67201, USA**

### BEECHCRAFT SUPER KING AIR MODEL F90

Deliveries of the Super King Air F90 began in mid-1979, shortly after FAA certification of this sixth member of the King Air range of corporate transport aircraft. Basically, it combines the pressurised fuselage of the King Air 90 with reduced-span wings similar to those of the King Air 100, and a T tail assembly similar to that of the Super King Air 200.

New Beechcraft assemblies and technology are utilised throughout its construction, and the PT6A-135 turboprop engines drive slow-turning four-blade propellers to reduce airport and in-flight noise. Cabin pressurisation is increased to 0.34 bars (5.0 lb/sq in) to give a sea level environment at 3,350 m (11,000 ft), a 1,525 m (5,000 ft) environment at 5,595 m (18,360 ft), and a 3,050 m (10,000 ft) environment at an altitude of 8,075 m (26,500 ft).

**TYPE:** Seven/ten-seat twin-turboprop business aircraft.

**WINGS:** Similar to King Air 100. De-icing system standard.

**FUSELAGE:** Similar to King Air 90.

**TAIL UNIT:** Similar to Super King Air 200. Tailplane de-icing standard.

**LANDING GEAR:** Retractable tricycle type, with twin-wheel main units and single steerable nosewheel.

**POWER PLANT:** Two 559 kW (750 shp) Pratt & Whitney Aircraft of Canada PT6A-135 turboprop engines, each driving a Hartzell FT 101 73 four-





The first British Aerospace Nimrod MR.Mk 2, as delivered to the RAF on 23 August 1979

blade propeller with optional reverse pitch. Automatic fuel transfer system, engine anti-icing, propeller de-icing, and ice-free fuel venting system, are standard.

**ACCOMMODATION:** Two seats side by side on flight deck. Seats for five to eight persons in main cabin, in deep-cushioned chairs. Passengers screened from flight deck and toilet by partitions at front and rear of cabin. Space for 183 kg (403 lb) of baggage. Windscreen anti-icing standard.

**SYSTEM:** Pressurisation system differential 0.34 bars (5.0 lb/sq in).

**AVIONICS:** Standard avionics package includes dual nav/com, marker beacon, glideslope, DME, and transponder.

**DIMENSIONS, EXTERNAL:**

Wing span 13.99 m (45 ft 10¾ in)  
 Wing area, gross 25.98 m<sup>2</sup> (279.7 sq ft)  
 Length overall 12.13 m (39 ft 9½ in)  
 Height overall 4.60 m (15 ft 1¼ in)  
 Tailplane span 5.61 m (18 ft 4¾ in)  
 Propeller diameter 2.34 m (7 ft 8 in)  
 Passenger door: Height 1.31 m (4 ft 3¾ in)  
 Width 0.69 m (2 ft 3 in)

**DIMENSIONS, INTERNAL:**

Cabin, excl flight deck: Length 3.89 m (12 ft 9 in)  
 Width 1.37 m (4 ft 6 in)  
 Height 1.45 m (4 ft 9 in)

Avionics compartment volume 0.45 m<sup>3</sup> (16 cu ft)

**WEIGHTS AND LOADINGS:**

Weight empty 3,003 kg (6,622 lb)  
 Max T-O and landing weight 4,966 kg (10,950 lb)  
 Max ramp weight 5,003 kg (11,030 lb)  
 Max wing loading 190.8 kg/m<sup>2</sup> (39.1 lb/sq ft)  
 Max power loading 4.4 kg/kW (7.3 lb/shp)

**PERFORMANCE (A:** at max T-O weight; B: at 4,309 kg/9,500 lb A UW; C: at 4,082 kg/9,000 lb A UW):

Max cruising speed (B):  
 at 3,660 m (12,000 ft) 267 knots (495 km/h; 307 mph)  
 at 5,490 m (18,000 ft) 260 knots (482 km/h; 299 mph)  
 at 7,925 m (26,000 ft) 251 knots (465 km/h; 289 mph)  
 Take-off speed (A) 107 knots (198 km/h; 123 mph)  
 Accelerate/stop decision speed (A) 107 knots (198 km/h; 123 mph)  
 Approach speed (A) 105 knots (195 km/h; 121 mph)  
 Stalling speed (A), power off:  
 flaps up 94 knots (175 km/h; 109 mph)

32.5% flap 84 knots (156 km/h; 97 mph)  
 100% flap 77 knots (143 km/h; 89 mph)

Max rate of climb at S/L:

A 725 m (2,380 ft)/min  
 C 947 m (3,108 ft)/min

Rate of climb at S/L, one engine out:

A 183 m (599 ft)/min  
 C 289 m (947 ft)/min

Service ceiling:

A 9,084 m (29,802 ft)  
 C above 9,450 m (31,000 ft)

Service ceiling, one engine out:

A 4,395 m (14,419 ft)  
 C 5,919 m (19,420 ft)

T-O run (A), flaps up 637 m (2,090 ft)

T-O to 15 m (50 ft) (A), flaps up 871 m (2,856 ft)

Landing from 15 m (50 ft) (A), without propeller reversal 907 m (2,977 ft)

Landing run (A), without propeller reversal 578 m (1,895 ft)

Cruising range at max cruise power, with reserves:

at 3,660 m (12,000 ft) 960 nm (1,779 km; 1,105 miles)

at 5,490 m (18,000 ft) 1,160 nm (2,149 km; 1,335 miles)

at 7,925 m (26,000 ft) 1,440 nm (2,669 km; 1,658 miles)

Cruising range at max range power, with reserves:

at 3,660 m (12,000 ft) 1,179 nm (2,185 km; 1,357 miles)

at 5,490 m (18,000 ft) 1,369 nm (2,537 km; 1,576 miles)

at 7,925 m (26,000 ft) 1,576 nm (2,920 km; 1,814 miles)

**BAe**

**BRITISH AEROSPACE AIRCRAFT GROUP, MANCHESTER DIVISION; Address: Greengate, Middleton, Manchester M24 1SA, England**

**BRITISH AEROSPACE NIMROD MR.Mk 2**

On 23 August 1979 the first of 32 Nimrod MR.Mk 2 aircraft (XV236) for the RAF was handed over on schedule at BAe's Woodford, Cheshire, airfield. Air Chief Marshal Sir David Evans, GCB, CBE, Air Officer Commanding-in-Chief, Strike Command, accepted the aircraft on behalf of the RAF, and shortly after the handing-over ceremony the Nim-

rod was flown by an RAF crew to No. 201 Squadron at RAF Kinloss, Moray.

The programme to carry out a comprehensive update of the RAF's Nimrod Mk 1s began in September 1977, when the first aircraft was received from RAF Kinloss, and all 32 are scheduled for completion by mid-1984. Because of the new and advanced avionics equipment which is being installed, the Nimrod Mk 2 is regarded as being the world's most advanced long-range maritime patrol aircraft. As such, it represents an important addition to NATO strength at a time when the maritime threat has never been greater.

Externally similar to the Nimrod Mk 1, future Mk 2s will be distinguishable by the addition of Early Warning Support Measures (EWSM) pods at each wingtip, of the type to be installed on the Nimrod AEW. Mk 3 which is scheduled to begin flight testing in May 1980. In addition, all aircraft commencing with the third off the conversion line are to be given a new NATO-approved low-visibility camouflage finish, intended to limit the likelihood of aircraft so protected from being tracked by reconnaissance satellites.

The new avionics equipment which has been installed provides the Nimrod Mk 2 with a vastly enhanced detection capability, and it is anticipated that the ASW/maritime patrol Nimrod will remain operationally viable until the end of the century. Its equipment includes EMI Electronics Searchwater radar, a computer-assisted system which has unrivalled target acquisition capability, being able to detect and classify surface vessels and other contacts such as submarine 'snorks', periscopes, or fast patrol boats in high sea states, at ranges far in excess of any other current airborne maritime radar, and with multi-tracking capability. Significant data acquired by Searchwater can be transferred instantly, when required, to the tactical navigator's display.

A Marconi AQS-901 dual-operator acoustics system, which is based on a compact and versatile digital processor, analyses and classifies contacts made by both active and passive sonobuoys. It provides target range and bearing information which can also be transferred to the central tactical system for display to the navigators. The system is compatible with the Australian-developed Barra, Canadian Tandem, and US SSQ-41 and SSQ-53 sonobuoys, as well as the new generation of Command Active 'buoys under development or in production. In a complex tactical situation the acoustic system will present on cathode ray tubes sonobuoy management data, in addition to sonobuoy acoustic data.

This information will aid the acoustics operator in avoiding mutual radio and acoustic interference between sonobuoys in pattern. Simultaneous monitoring of a large number of sonobuoys is possible, and all data can be recorded on a multi-track tape for subsequent analysis.

A new Central Tactical System, with a dedicated digital computer, processes the information from the sensors, and handles navigational problems and their presentation to the tactical navigator on a display system which has been extensively redesigned. As a result of the new acoustics and tactical systems, the Nimrod Mk 2 has more computing and display capability than that available to the crew of any other maritime patrol aircraft; it is 60 times greater than the capability of the Nimrod Mk 1. Other new equipment includes a Ferranti inertial navigation system capable of plotting accurately the position of the aircraft and its targets; and a new communications system comprising dual Marconi AD470 HF transceivers, each having a power output of 1,000W, and which embody a radio-teletype terminal and an on-line encryption system.

The Nimrod's long, heated weapons bay can accommodate a variety of weapons, including the new Stingray homing torpedo, and/or additional fuel tanks.

Details of the Nimrod's basic structure and systems can be found in the 1978-79 *Jane's*.

#### **SWEARINGEN**

**SWEARINGEN AVIATION CORPORATION** (a subsidiary of Fairchild Industries); Address: PO Box 32486, San Antonio, Texas 78284, USA

#### **SWEARINGEN MERLIN MARITIME SURVEILLANCE AIRCRAFT**

Swearingen announced on 6 August 1979 the availability of a new multi-mission aircraft, configured specifically for maritime surveillance, which has been developed from the 19/20-seat Metro II commuter airliner. FAA certification in the Restricted category for operation of the Metro II or Merlin IV A as special mission aircraft, at a max T-O weight of 6,350 kg (14,000 lb), was announced as long ago as 9 March 1978, and since that time the company has been developing this maritime surveillance version. Its basic structure is generally similar to that of the Metro II, but is identifiable externally by the addition of a rotatable searchlight in the fuselage nose, a radome housing the search radar antenna beneath the centre fuselage, and a large observer's bubble window mounted on the starboard side of the rear fuselage.

The pressurised cabin of this aircraft provides ample accommodation for a crew of seven and all avionics/surveillance equipment essential for the



**All Nimrod MR. Mk 2s will eventually be given a new NATO-approved low-visibility camouflage finish as shown on this Mk 1 aircraft**

maritime surveillance mission; it is designed also for quick conversion for passenger, cargo, or other roles. All equipment can be removed or exchanged when the aircraft is used for other applications.

The basic description of the Metro II in the 1978-79 *Jane's* applies also to this aircraft, except as detailed below:

**TYPE:** Twin-turboprop multi-mission aircraft.

**WINGS:** As for Metro II.

**FUSELAGE:** As for Metro II, except rotatable searchlight mounted in nose.

**TAIL UNIT, LANDING GEAR, POWER PLANT:** As for Metro II.

**ACCOMMODATION:** Crew of seven, comprising pilot and co-pilot; navigator/flight co-ordinator, seated on starboard side of cabin, just forward of the wing; two observers, one on starboard side adjacent to bubble window, one at camera position on fuselage centreline, slightly forward of first observer; and two relief crew on port side, one seated overwing and one just aft of the wing. Dual controls standard. Navigator's console on port side, forward of wing. Scanner console and other avionics equipment on starboard side, aft of wing. Camera installation on fuselage centreline. Toilet compartment at rear of cabin on starboard side. Integral-step passenger door on port side of fuselage, immediately aft of pilot's position. Large outward-opening cargo door on port side of fuselage at rear of cabin, hinged at top, and with inward-opening drop door forming the centre of cargo door. Two emergency exits overwing, one each side. Cabin air-conditioned and pressurised. Electrical windscreen de-icing. Windscreen wipers.

**SYSTEMS:** Generally as for Metro II.

**EQUIPMENT:** Includes Wild NF-2, or Zeiss NT navigation sight; Zeiss RMKA 8.5/23 camera; Wild RC-10 camera, with 0.61 x 0.61 m (2 ft x ft) optical glass; Agiflite hand-held camera; Locator Model B, or Radiation Corporation rotatable searchlight; and 15-man droppable life raft.

**AVIONICS:** Include Litton AN/APS-504(V) search radar, with 1.07 x 0.46 m (3 ft 6 in x 1 ft 6 in) flip plate antenna; Bendix M2S modular multibeam scanner, or Daedalus DS-1220 infra-red scanner thermal reference unit, signal processing unit power supply, and stabilising gyro for M2S system, or film recorder, scanner control, tape machine, and power supply for DS-1220 system; Decca ground speed and drift meter; Decca TANS computer display; Decca Doppler 72; Collins VHF 20-B transceiver; Collins 718U-5 HF transceiver; Collins ARC-159-V-1 UHF transceiver; Global Navigation Inc GNS-500A-VLF/Omega navigation system, or Litton LTN-72 INS; ground stabilisation interface unit; control and display unit for VLF/Omega or INS; azimuth/range indicator; and radar control unit.

**DIMENSIONS, AREAS:** As for Metro II

**WEIGHT:**

Max T-O weight 6,350 kg (14,000 lb)

**PERFORMANCE (at max T-O weight):**

Max cruising speed 250 knots (463 km/h; 288 mph)

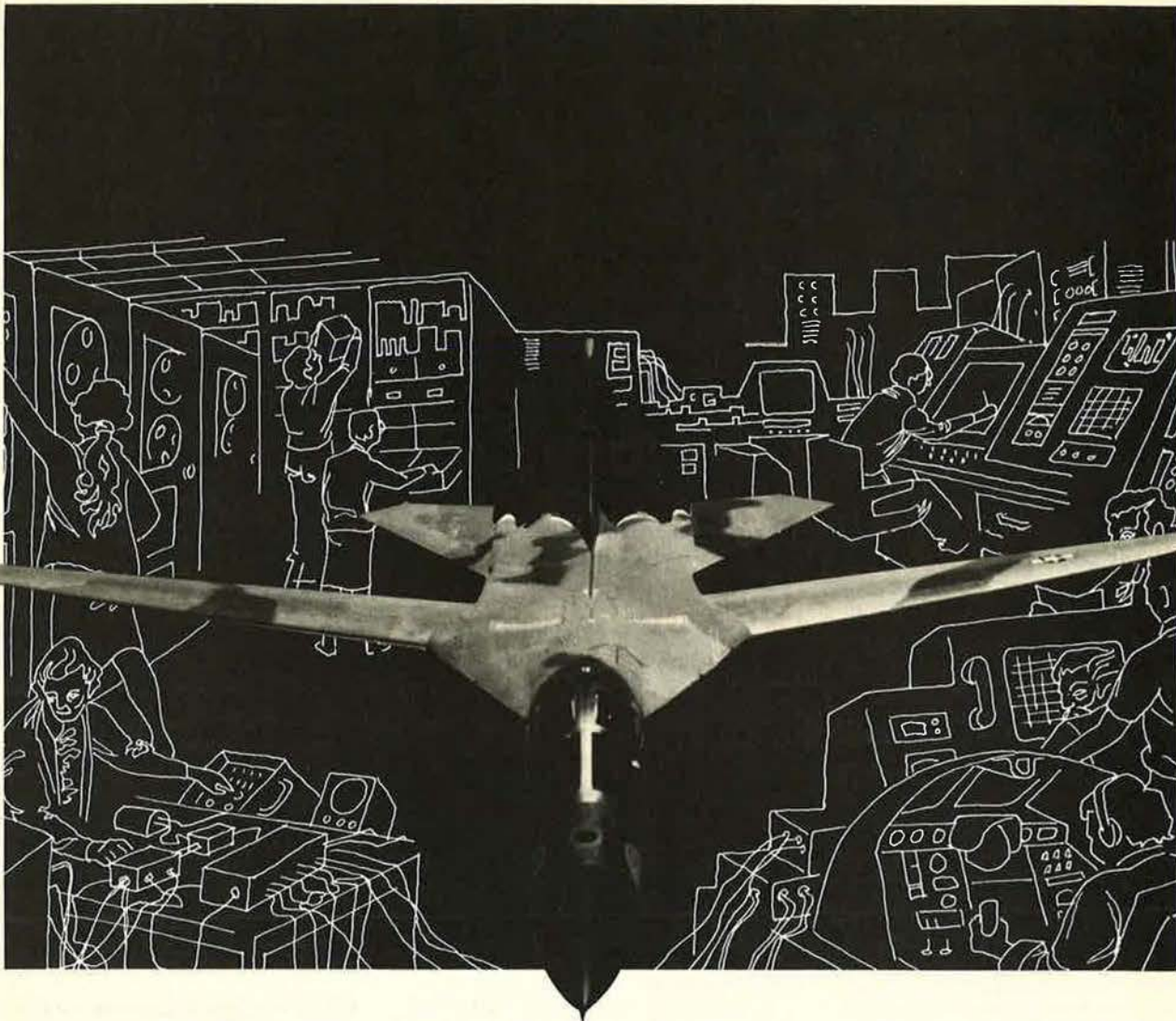
Low-altitude loiter speed 133 knots (246 km/h; 153 mph)

Range with max fuel 1,758 nm (3,257 km; 2,024 miles)



**Artist's impression of the maritime surveillance version of the Swearingen Merlin**

# 'DAIS' PUTS PILOTS ON TOP OF TECHNOLOGY



More and more military aircraft use complex computer architectures to handle the mass of information that pilots and aircrews in navigation, EW, fire control, and weapon delivery. In future, flight control and engine performance will also be computer-assisted.

DAIS (for Digital Avionics Information System) is the USAF program to demonstrate low-cost architectures, software, and support systems to meet these vital requirements in the 80s. TRW supports DAIS with sophisticated simulation technology, support software,

and avionics integration and analysis.

We're also helping Logistics Command to apply these technologies in developing flight software support systems. The next step is to provide using commands with mission-to-mission reprogramming capability. We're hard at work on that, too.

For more information, contact Richard A. Maher, TRW DSSC, One Space Park, 55/2586, Redondo Beach, CA 90278, (213) 536-3238.

## DIGITAL AVIONICS TECHNOLOGY

from a company called **TRW**

# The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

## USAF to DoD: Boost Pay \$1.5 Billion

A hard-hitting, no-nonsense Defense Department pay study group has hammered out a package of compensation increases worth \$815 million a year. While USAF endorses the basic recommendations, it has asked Defense to increase that figure to \$1.5 billion.

Even with that, the Air Force leadership considers the new proposals only the "first phase" in restoring military pay levels to those of the civilian sector. The new recommendations, now being reviewed by DoD and other high executive branch officials, call for two-step action.

**STEP ONE**—The Secretary of Defense, under existing law, would:

1. Immediately replace the inadequate PCS mileage rates with a "monetary allowance in lieu of transportation [MALT] plus per diem" system. Military members would get seven cents a mile plus \$35 per diem instead of only ten cents a mile, as is now the case. (Dependents would continue to receive the current seven cents per mile for those over twelve and 3.5 cents for children two to twelve, until new legislation [see STEP TWO below] could be enacted.) The estimated annual DoD-wide cost is \$111 million.

2. Reinstate the dual meal rate in government dining halls so that members on separate rations won't have to pay more for meals than their BAS. Cost: \$5 million.

**STEP TWO**—"Systematically progress toward general compensation adequacy" by securing legislation to authorize:

1. A variable housing allowance (VHA) for members living in "certain" high-cost CONUS areas. First-year funding of \$300 million is sought, followed by \$600 million in the second or third year.

2. A "realistic" PCS move reim-

bursement system. The family mileage rate would be 18.5 cents a mile, coupled with a per diem of \$45 per member and \$15 for each dependent. The cost estimate is \$114 million, additive to the MALT \$111 million proposed in STEP ONE above.

3. A temporary lodging entitlement (up to four days) of \$45 military/\$15 each dependent per day, to cover pre- and post-move food/lodging costs for those on PCS orders. Cost: \$123 million.

4. Basic pay increases. The study group, in trying to hold down new outlays, recommended small "selective" boosts of from one and one-half to five percent in basic pay, mostly for enlisteds with little service and for officers in the middle-year groups. E-1s would get a five percent raise. Officers with prior enlisted service would receive an increased longevity step raise. The price tag is a modest \$162 million, which—when added to the other proposals cited above—comes to only \$815 million. That won't stretch very far.

Accordingly, USAF has called on Defense to support a 3.4 percent across-the-board hike in basic pay, BAQ, and BAS, "to close the comparability gap." This would cost \$880 million. Assistant Air Force Secretary (Manpower, Reserve Forces and Logistics) Joe F. Meis, in a letter to his counterpart in the Defense Department, Robert B. Pirie, Jr., said that Air

## CORRECTION

An item in "The Bulletin Board" in the October '79 issue (p. 98) about jobs with AFJROTC for retirees contained an incorrect toll-free telephone number, AIR FORCE Magazine has learned. The correct number is (800) 633-8750, ext. 7741.

Force people "view the DoD study to be a major leadership initiative to correct the obvious pay deficiencies. . . .

"Failure to strive for anything less than full comparability would indicate an insensitivity on the part of leadership that could actually exacerbate morale and retention problems. . . . The \$880 million cost of the 3.4 percent proposal is a small price to pay to preserve the principle of comparability that is one of the keystones of the All-Volunteer Force concept," Secretary Meis concluded.

With the Air Force recommendation, the whole package would cost \$1.53 billion, undoubtedly more than the government will approve. But as the Meis letter to Secretary Pirie notes, if the heavy exodus from service continues, replacement training costs are likely to soar.

The recommendations, particularly the PCS move increases and the VHA dovetail with compensation proposals strongly backed by the Air Force Association.

Previously, military pay studies, usually headed by nonmilitary "experts" who lacked feel for the real issues, dragged on for months and years and were generally ignored. This new panel, headed by USAF Col. Leon Hirsh and composed of genuine in-service pay authorities, focused on essentials: the adverse impact of pay caps, the inadequacy of military pay, and their impact on recruitment and retention. In just six weeks, it documented the case for prompt action and wrote an easy-to-understand report. The ball now rests in the Defense Department's court.

## GAO: Assign Quarters to Needy

The General Accounting Office perhaps not fully understanding the implications, has called on the Defense Department to assign on-base quarters solely on the basis of need. In a new report, the congressional watchdog of federal spending notes that higher-ranking families, who can better afford suitable community housing, get the on-base housing while lower graders, who can least afford to live in town, are denied it.

There's another side of the story, however. Strictly applied, the GAO scheme would find middle-year and long-time members, who have put years of dedicated service often under trying conditions, and who have patiently waited their turn for on-base quarters, turned out by newly marrieds yet to demonstrate any career intentions. Adoption of the

BAO plan, which seems unlikely, would infuriate much of the career force, observers feel.

### New Star Cut Plan Denounced

The Air Force is fighting new proposals to further reduce general officer billets and change star tenure and retirement rules. The proposals are contained in the Senate Armed Services Committee's recent rewrite of the DOPMA bill.

Defense's original DOPMA does not apply to generals. The committee's version, however, slashes all the services' star slots (USAF's from the present 360 to 251) and then places 177 star billets under Defense Department control. The Air Force mightly fears its share of the 177 positions, when added to the 251, would come out well below the 345 general officer slots USAF has been slated to hold late next year. Headquarters staffers note that the Air Force has already suffered the highest percentage of flag officer cuts over the past sixteen years.

New tenure rules in the committee's rewrite of DOPMA would deny the services authority to selectively retire brigadier and major generals. Another revision drawing Air Force protests would require O-7s and O-8s to serve three years in grade in order to retire in such grade. Thus, an officer serving two years in each of those grades would retire voluntarily as a colonel.

The Senate Committee's DOPMA



*Emlyn I. Griffith, an AFA member and a trustee of the Aerospace Education Foundation, was recently elected president of the National Association of State Boards of Education. A lawyer and community leader in the Rome, N. Y., area, Mr. Griffith is also a former director of AFA's Colin P. Kelly Squadron, and has been active in community projects supporting Griffiss AFB, N. Y.*

contains other features highly objectionable to USAF, such as grade tables sharply reducing promotions to major and no automatic Regular commissions for Academy grads.

Once passed by the full Senate, the revised DOPMA will move to the House Armed Services Committee, where USAF officials hope the objec-

tionable features will be removed or modified. That would set up a conference sometime next year. Meanwhile, present grade ceiling authority, permitting Air Force officer promotions to continue as scheduled, has been approved for another year.

### Tax Credits Sought for Lower Graders

Service families with annual incomes under \$10,000 who maintain households in the States receive a refundable tax credit—a cash hand-out—of up to \$500. Those stationed abroad do not. The Air Force, wanting to rectify the inequity, recently sent corrective legislation to Congress. AFA endorses it strongly. In a letter accompanying the proposal, Air Force said that "tens of thousands" of low-income families overseas would benefit. Right now, the Air Force said, they view the bar on the rebates as "inequitable treatment." Overseas families earning \$5,000 to \$10,000 would receive payments of \$500 to \$100, even though they may not have paid that much in income tax.

### "Buddy Flights" Attract Recruits

USAF recruiters, constantly searching for innovative ways to beat the competition in the tough recruiting market, signed up 237 young men and women recently in a very special way. They were members of five groups of "buddy flights."

One such special enlistment group

## AFA Believes . . .

# The Technician Program Works

"If it ain't broke, don't fix it," the old maintenance saying goes. This, in effect, is what the Air Force is telling Congress about the Air Reserve Technician Program. And AFA believes that much can be said for this approach. As our current policy paper on Defense Manpower Issues says, "We support the Technician Program for the Air Reserve Forces."

As many of our readers know, Air Reserve Technicians are people with dual status as Reservists and civilian employees who man Reserve and Guard units full-time—that is, they keep the organization going during the times when the Reservists are not on duty.

A year ago, Congress directed the Army and Air Force components to conduct a test program converting a number of these positions to full-time military status. While the Air Force is complying with this request, there are serious doubts as to its continued effectiveness.

Air Force Chief of Staff Gen. Lew Allen, Jr., in commenting on this recently before Congress said:

The Technician Force has contributed magnificently to readiness in the ANG and AFR. We have had unparalleled success in attracting and retaining quality individuals to these positions and this program has

served the Air Force extremely well. . . . Were we to realize full implementation of this [test] concept, I believe that we would see a . . . stable force replaced by a transient force, and low readiness replacing our existing high readiness status. . . . Implementation of such a program presents us with an opportunity to lose much and gain little.

AFA cannot assess the effect of this program, if implemented, on the other services' Reserve programs. However, recognizing that much of the combat capability of the United States is in the hands of Air Force Reserve and Air National Guard units—standing air defense alert or flying refueling missions, for example—and that the success of these missions has been due in large part to the effectiveness of the Technician Program, we fail to see how a change could be for the better.

The Air Force has requested that the test program not be extended beyond next year and that no action be taken prematurely that could be construed as implementing a permanent military program—at least pending a thorough evaluation of the test results.

That seems eminently fair. Let's not change a program that works.

—JAMES A. McDONNELL, JR.

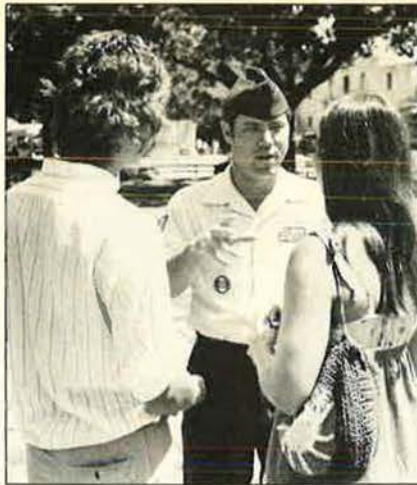
# The Bulletin Board

of sixty-two youths from Albany, N. Y., dubbed itself the Olympiad Flight, to draw attention to the upcoming Winter Olympics at Lake Placid, not far from Albany. Air Force Recruiting Service chief Brig. Gen. Keith D. McCartney swore them in on the steps of the Albany federal building.

Another recent buddy flight, from Arkansas, is appropriately called the Razorbacks. A similar group from St. Louis, eighty-one strong, participated in a reenactment of their enlistment oath before a crowd of 20,000 at a St. Louis Cardinals ball game.

In Parkersburg, W. Va., meanwhile, TSgt. James B. Mamone continued a remarkable five-year recruiting performance by enlisting all thirty-one members of a buddy flight he created. General McCartney, who also swore in this group, called Sergeant Mamone "one of the five top recruiters in the nation."

Also drawing kudos was TSgt. Robert Jacques who, from his recruiting post at Hancock Field, N. Y., formed a buddy flight, Thoroughbred I, in 1977, then repeated with Thor-



Telling young people about the Air Force is a daily activity for TSgt. Robert Jacques of the 3513th Air Force Recruiting Squadron, Hancock Field, N. Y. He has created two special enlistment groups, or buddy flights, since 1977.

oughbred II this past summer. Like other special enlistment groups, it was feted at local functions and received considerable media coverage, before its members reported to Lackland AFB, Tex., to begin their basic training.

USAF advertising and publicity staffs also get deeply involved in such projects as the service seeks to tell the country's youth that "Air Force is a great way of life."

Unfortunately, not enough youths are listening to sales pitches from all four services. New Pentagon figures show the combined services recruited only 338,800 young people in FY '79, just ninety-three percent of the 362,400 needed to fill the ranks. The Air Force for the first time missed its recruiting goal, signing up 67,800 of the 69,200 sought.

Why are youths shying away from service in increasing numbers? Defense's top personnel executive, Assistant Secretary Robert B. Pirie gives multiple reasons:

"Youth unemployment . . . has been declining. The military offering has become relatively less attractive. . . . Post-service educational benefits . . . are not as valuable today. . . . Military pay has failed to keep pace with wages for civilian employment. . . . Such things as the discussion of a possible return to conscription, negative feedback from dissatisfied servicemen and women, recruiter malpractice investigations, overseas military living conditions, and military drug use have all affected our image negatively. . . ."

Despite the recruiting problems, Secretary Pirie insists there is no need for conscription. He cited the new DoD pay study (see lead item above) as one of the steps the Pentagon is taking to ease manning problems.

Ed Gates . . . Speaking of People

## Judicial Review for VA Decisions?

In 1933, during the Great Depression, Congress passed a harsh measure giving the President authority to slash veterans' pension and compensation payments. Shortly thereafter, Franklin D. Roosevelt issued an executive order cutting FY '34 funds for those two programs from \$593 million to \$232 million.

Those actions said a mouthful about how the public, by permitting the legislative and executive branches to lay on those devastating reductions, then regarded Americans who served the country in uniform and their survivors. The cuts also cemented the general viewpoint that veterans' benefits were not really benefits, but merely gifts or gratuities, to be given or taken away.

While the contempt for veterans demonstrated in that legislation has pretty much disappeared, a statutory bar codified in the 1933 law prevents veterans and their survivors from contesting adverse decisions on benefits. It remains in effect to this day.

It means that vets or survivors who apply to the Veterans Administration for any benefit, a reconsideration of a previous ruling, or for other reasons, but are rejected cannot take their cases to court. The VA decision is final. Despite numerous challenges to this arbitrary policy, there is no "judicial review" of adverse VA decisions outside the agency.

Naturally many people—members of Congress, lawyers, veterans organizations, and others—believe it is way past time to rectify the situation. Proponents of judicial review hold that an agency that drafts regulations, bases its decisions on them, and then conducts

the final review of these decisions is too powerful; without checks and balances serious abuses may surface.

For most executive agencies, the statutes provide for outside review. Supporters of judicial review for veterans note particularly that the functions of the Social Security Administration, in the area of claims for pensions and disability benefits, are similar to those of the Veterans Administration. Yet, SSA decisions are reviewable by the courts, while those of the VA are not.

The absence of court review authority for veterans is no insignificant matter. Some 36,000 appeals each year come before VA, final decision-making body, the Board of Veterans Appeals. It rejects most of them. In FY '78, for example, 36,655 claims worked their way through the agency to this final arbiter, which approved just 12.5 percent of them.

Most of the BVA's rejections involve claims for disability compensation, an increase in a disability rating, and VA pension. They are generally routine, easily and equitably decided. Indeed the Veterans Administration has a reputation of leaning over backward to honor veterans' claims.

The problem is that a few obviously justifiable claims have been ignored, and without judicial review the individuals can suffer severe injustices. The Senate Veterans Affairs Committee, the quarterback in the long drive to secure a judicial review law, has unearthed some horror stories. Here are some examples from a committee report:

## Allen Lauds Air Guard—and Guardswomen

The Air Force's top officer is more than pleased with the Air National Guard. Chief of Staff Gen. Lew Allen, Jr., told the National Guard Association of the United States recently that it is encouraging to see the Air Guard at more than programmed strength; to note a strenuous Guard effort to recruit minority officers; and to hear the term 'Guardswoman' become part of our vocabulary.

"I am especially gratified by innovative state laws providing tuition assistance, bonuses, and public recognition for Guard personnel. These efforts, in conjunction with top-notch leadership, have helped the Air National Guard achieve an unprecedented sixty-five percent retention rate, and I congratulate them on this remarkable record."

Air Guard strength stood at 93,375 on September 30, nearly 500 above authorized strength.

The Air Force Reserve membership on the same day stood at 53,900, exceeding authorized strength by 2,761.

## VA Shakes Up Hospital System

The Veterans Administration has carved its hospital system, the nation's largest, into six divisions, or regions, in what the agency calls "a major management shift to enhance

the efficiency of medical care" for ex-service members.

The move surfaced as the House and Senate Veterans Affairs Committees held a joint hearing to air mounting complaints about the adequacy of VA medical care. Veterans groups again testified, as they have in the past, that VA hospital beds have been reduced, care staffs have been cut, and many veterans face long delays in getting into VA facilities. Most of the latter reportedly come from vets with nonservice-connected disabilities.

Committee officials said they intend to button down the deficiencies and determine if the record demand for VA health care is outrunning the supply of treatment available.

The VA regionalization announcement also cited improved communications between VA headquarters and the field and better use of VA resources as major goals. The six regional directors each previously managed one of VA's 172 hospitals. They will report to VA's Chief Medical Director, Dr. James C. Crutcher. The agency's health-care system also includes 228 outpatient clinics and sixteen domiciliaries.

## Short Bursts

Those parking fees that took hold November 1 at the Pentagon, Bolling AFB, D. C., and three other USAF sites have infuriated those low-paid mem-

bers who are affected and angered high-ranking officials. The latter see the "victory" achieved in the recent seven percent pay increase (in lieu of the 5.5 percent proposal) eroded by the parking charge decision. The per month charges affecting USAF personnel are as follows:

Pentagon; Los Angeles AFS, Calif.; Air Force Plant 29, Lynn, Mass.; and Air Force Plant 83, Albuquerque, N. M., \$10. At Bolling AFB, \$12.50. The rates will be doubled a year from now. Federal and military employees at 290 other government sites also now pay monthly parking fees. But the members of Congress, who recently voted themselves a \$3,100 annual pay raise, and their staffs continue to park free in the thousands of spaces Congress controls on Capitol Hill.

The Air Force is encouraging airmen in their early thirties to seek commissions through the AFROTC program. Some, apparently, haven't been aware this is possible. The route, for airmen who will be under thirty-five when commissioned, starts with an early release to enter college and an AFROTC unit, graduation within two years, and return to active duty as second lieutenants. No AFROTC scholarships are provided, though applicants normally would have GI Bill entitlement. Those interested in additional information

• A VA employee advised a veteran that he could delay enrolling in college for three months without losing GI Bill entitlements. The vet relied on the advice—and lost his entitlement. He went to court, but it held that judicial review was barred.

• The VA acknowledged making an error in the original assignment of a service-connected disability rating of a former POW; yet the error was not corrected for more than twenty years. When the rating finally was doubled, from thirty to sixty percent, the VA refused to award retroactive benefits.

• A widow was advised by the VA that she was ineligible for a survivor's pension, so she did not apply. Later, learning that the advice was erroneous, she applied for the pension retroactive to a time of initial inquiry. VA then granted the pension, prospectively only. Judicial review of the decision was refused.

The Senate committee, chaired by Sen. Alan Cranston (D-Calif.), conducted exhaustive hearings on the judicial review question in 1978 and again early this year. It heard testimony from veterans organizations, the VA, the American Bar Association, and other groups. Last May, the committee approved S. 330 to overturn the current rule that bars veterans from going to court for relief from adverse VA benefits rulings. The full Senate approved the measure late September.

S. 330, in addition to approving judicial review, would also strengthen VA adjudication procedures, open VA rule-making proposals to public scrutiny, and authorize reasonable fees for attorneys representing veterans before the VA board or before a court. This is important in that the current permissible fee remains the \$10 ceiling imposed by a 1924 law. The idea was to protect vets against unscrupulous lawyers.

Not surprisingly, very few veterans appealing adverse benefits decisions to the Board of Veterans Appeals today are represented by attorneys. That isn't cause for concern, however, because such

veterans organizations as the American Legion and the Veterans of Foreign Wars provide vets free expert representation throughout the entire claims process. So there is no need for individuals to hire attorneys under present conditions.

But if judicial review by the courts were approved, veterans would definitely need legal representation. And lawyers are expensive. The American Bar Association is one of several prominent organizations supporting removal of the fee limitations.

S. 330 would place a \$500 ceiling—in certain unusual cases \$750—on the fees for attorneys representing vet claimants in court.

The principal opposition to judicial review comes from the Legion, which feels that the present system is working well and assures veterans extremely fair treatment. Legion executive John F. Sommer, Jr., in testimony before the Cranston committee, said the Board of Veterans Appeals does "all it can to help the veteran."

However, he continued, "if judicial review were enacted, the court would be sort of looking over the shoulder of the Board members, and they would start possibly tightening up on their procedures and not looking toward the veterans' side of the question, as they do at the present time."

The VFW also testified against the judicial review measure. But the Disabled American Veterans, AMVETS, Paralyzed Veterans of America, and other organizations support the legislation. And the Veterans Administration? For years it strongly opposed invoking judicial review, but it now gives the proposition limited support.

"We could live with it," one VA source said of the measure.

But whether or not the agency will have to live with it remains unclear. S. 330 passed the Senate September 17, 1979, and now rests with the House Veterans Affairs Committee, where there is a noticeable lack of enthusiasm for it. At press time, there were "no plans to take it up," an informed committee source said. ■

# The Bulletin Board

may contact AFROTC/PA, Maxwell AFB, Ala., 36112, or call (205) 293-2825.

The textbook allowance for airmen attending college under the Airman Education and Commissioning Program has been raised from \$25 to \$60 per quarter.

Rep. Robin Beard (R-Tenn.), concerned about government largess for the underserving, has been distributing a letter that reads:

## FREE LUNCH

Join the Military; serve at least 90 days; quit, and collect unemployment compensation. Over the last five years, 216,000 ex-service individuals have received \$256 million in this manner.

It looks like "administrative duty pay" for commanders of Reserve and National Guard units will be continued for one more year, then dropped. Long under fire, the small sums paid such commanders for per-

forming administrative functions have been retained for one year by a House-Senate conference committee on the FY '80 military authorization bill.

USAF's clubs have bettered their financial position, membership is up, service has improved, and customer satisfaction is on the rise. That's the word from Maj. Gen. Leroy W. Svendsen, Jr., the Military Manpower & Personnel Center chief, in recent testimony before a House Armed Services subcommittee investigating military clubs. The lawmakers, however, seemed more interested in why most of the clubs' package store profits are plowed back into club operation rather than distributed among all morale-welfare-recreation (MWR) activities.

## Senior Staff Changes

**PROMOTIONS:** To Major General: Irwin P. Graham; Patrick J. Halloran; Robert E. Kelley; Larry D. Welch.

To Brigadier General: Clarence R. Autery; Lyman E. Buzard; William M. Charles, Jr.

**RETIREMENT:** Gen. James E. Hill.

**CHANGES:** B/G Kenneth H. Bell, from Dep. for KC-10 Adv. Tanker

Cargo Aircraft, AFALD, AFLO Wright-Patterson AFB, Ohio, to Dep. for Comm. & Info. Sys., ESD, AFSC Hanscom AFB, Mass., replacing B/G William E. Thurman . . . M/G (L/G selectee) Kelly H. Burke, from Dir. of Operational Requirements, DCS RD&A, Hq. USAF, Washington, D. C., to DCS/RD&A, Hq. USAF, Washington, D. C., replacing retiring L/G Thomas P. Stafford . . . M/G Philip C. Gast, from Ch., MAAG, Tehran, Iran, to Asst. for Readiness, TAC, Langley AFB, Va. . . . M/G Leighton R. Palmerton, from Dep. Dir. for NATO AWACS Matters, DCS/OP&R, Hq. USAF, Washington, D. C., to Cmdr. NATO AEW Force, Hq. SHAPE, Casseau, Belgium.

M/G Cuthbert A. Pattillo, from Dir. J-5, USREDCOM, MacDill AFB, Fla., to Dept. CINC/Chief of Staff, USREDCOM, MacDill AFB, Fla., replacing L/G Charles C. Pattillo . . . B/G Robert D. Russ, from Asst. DCS/Ops. for Cont. & Spt., TAC, Langley AFB, Va., to Dir. of Operational Requirements, DCS/RD&A, Hq. USAF, Washington, D. C., replacing M/G (L/G selectee) Kelly H. Burke . . . B/G Clifton D. Wright, from Cmdr., AF Engrg. & Svcs. Center, Tyndall AFB, Fla., to Dep. Dir., Engrg. & Svcs., DCS/L&E Hq. USAF, Washington, D. C.

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- B-24 Liberator
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- WW I Fokker Dr.1 Triplane
- Loening Amphibian
- F-16
- T-6 Texan trainer
- B-47 Stratojet
- Navy F-8 Crusader

Keith Ferris, son of an Air Force career officer, grew up around airplanes. He has been painting them for more than 25 years and is one of the best known aviation artists. He is a member of the Union-Morris (New Jersey) Chapter of the Air Force Association. Renowned for technical accuracy and attention to detail, Ferris has a unique ability to portray his subject as if seen through the eyes of a pilot.

In addition to many one-man shows, Ferris has more than 20 paintings in the permanent Air Force Art Program collection. He painted a dramatic mural of a B-17 in the World War II gallery of the National Air and Space Museum, Washington, D.C.

The full-color calendar reproductions measure 12" x 9" and are appropriate for framing. His unique calendar is certain to become a collector's item. It will make a thoughtful gift to aviation enthusiasts everywhere.

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# AFA News

By Vic Powell, AFA AFFAIRS EDITOR



SMSgt. Donald Adams, Wisconsin Air National Guard, newly elected President of the Billy Mitchell Chapter, presents a commemorative wreath at General Mitchell's grave, assisted by Lt. Gen. Thomas P. Stafford, Deputy Chief of Staff for Research, Development and Acquisition, Hq. USAF, and by Mrs. George F. Kasten, a niece of General Mitchell. The ceremony was part of a week-long tribute to General Mitchell held recently in Wisconsin and sponsored by the Chapter.



Col. Ted Giddings, center, Commander, 12th Flying Training Wing, received the Texas State AFA General John D. Ryan Membership Trophy at the recent state meeting. At left is Gen. B. L. Davis, Commander, Air Training Command. At right is Texas State AFA President Frank Manupelli.



Guest speaker at the recent Oregon State AFA Convention was Brig. Gen. Davis C. Rohr, Commander of the 388th Tactical Fighter Wing, Hill AFB, Utah; the initial F-16 operating and training unit for the new air-superiority fighter. Left to right: Martin T. Bergen, newly elected President of the Oregon State AFA; Clay Myers, Treasurer; Maj. Gen. Richard A. Miller, Adjutant General of the Oregon National Guard; General Rohr; Sherman W. Wilkins, AFA National Director; Margaret A. Reed, AFA Northwest Region Vice President; and John G. Nelson, Past President of the Oregon State AFA and master of ceremonies for the evening.

## COMING EVENTS

**AFA Board of Directors Meeting**, March 1, 1980, Fort Walton Beach, Fla. . . . **AFA Midwest Symposium**, "The Crisis of the 80s . . . A Time for Decision," March 1, 1980, O'Hare Inn, Park Ridge, Ill. . . . **Iron Gate Chapter's 17th National Air Force Salute**, Sheraton Center, New York, N. Y., March 22, 1980 . . . **AFA Golf and Tennis Tournaments**, May 23, 1980, The Broadmoor, Colorado Springs, Colo. . . . **AFA Nominating Committee and Board of Directors Meetings**, May 24, 1980, The Broadmoor, Colorado Springs, Colo. . . . **Twenty-first Annual Dinner Honoring the Air Force Academy's Outstanding Squadron**, May 24, 1980, The Broadmoor's International Center, Colorado Springs, Colo.

# chapter and state photo gallery



Brig. Gen. William T. Brooksher, Chief, Security Police, USAF, was guest speaker at a recent meeting of the Albuquerque, N. M., Chapter. V. R. Woodward, Chapter President, discusses the speech with General Brooksher at the Kirtland AFB meeting.



Al Cyr, President of the Spudland, Me., Chapter, presents a \$100 check to Lt. Col. Edward H. Martin, Commander, 42d Security Police Squadron, Loring AFB. The funds will be used for the Security Police Museum at Lackland AFB, Tex.



The Middle Tennessee Chapter of AFA has elected new officers. Left to right: Nancy Campbell, Treasurer; J. R. Roberts, First Vice President; John J. Gallagher, Second Vice President; Al Knott, Secretary; and Gilbert G. Smith, Jr., President. At the meeting Chapter members were informed of the Tennessee Air National Guard's preparedness and the Tennessee civil defense program.

# AFA News



William T. Coleman, right, producer of the Jack Webb TV series, "Project UFO," spoke to the Jerry Waterman, Fla., Chapter of AFA regarding his experiences with the show. With Coleman at the MacDill AFB meeting was Florida State AFA President Jack Rose, left.



At a recent meeting of the Central Indiana Chapter, Col. Donald Ellis, commander of the Midwest Recruiting Group, spoke about USAF recruiting and the need for AFA support. Colonel Ellis presented the Air Force Recruiting Services Outstanding Public Service Support Award to Indiana State AFA President Roy P. Whitton.



The Pennsylvania State AFA's Terry Frye Memorial Award was presented recently to Civil Air Patrol Cadet Lt. Col. Thomas A. Manley. The presentation was made by Robert Miller, Past President of AFA's Olmstead Chapter. Assisting in the presentation is Merritt E. Derr, left, Pennsylvania State AFA Secretary, and CAP Maj. Betty J. Crawford, public relations officer of the Olmstead Chapter. The award is presented annually to the CAP cadet who most typifies the ideals of patriotism, community service, and sense of duty to the CAP program.



Three members of AFA's Silver and Gold Chapter, Gold received Excellence in Government Awards from the Denver Federal Executive Board. Brig. Gen. George C. Lynch, Commander of the Air Force Accounting and Finance Center and Vice Chairman of the Denver Federal Executive Board, congratulates, from left, Darwin Koehlar, Civilian Personnel Officer at Lowry AFB; John K. Scott, Director, Plans and Systems, AFAPC; and Capt. Daniel L. Novak, Directorate of Personnel Systems, ARPC.

# photo gallery



*TSgt. Oscar K. Pierce, right, served as AFA membership drive coordinator for Det. 3, 7th Weather Squadron, in Heidelberg, Germany, during their recent campaign. Sergeant Pierce, an AFA Life Member, signed up two new Life Members, TSgt. Donald G. Farrington, left, and SSgt. Richard A. Fiske.*



*Brig. Gen. Guy Hecker, center, was the featured speaker at a recent joint meeting of the Rome, N. Y., Area Chamber of Commerce and the Griffiss AFB Military Affairs Committee. General Hecker, Special Assistant for MX Matters, described the \$33 billion MX program. At left is James Kane, President of the Colin P. Kelly Chapter. Henry Newcomer, New York State AFA President, is on the right.*



*Brig. Gen. Ralph S. Saunders, Commander of the Aerospace Rescue and Recovery Service, Scott AFB, Ill., receives AFA Certificate of Appreciation from Robert D. Eisenhart, President of the Scott Memorial Chapter, acknowledging General Saunders's outstanding support of AFA and Chapter activities.*

Shown is Master Navigator tie.



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# AFA State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

**ALABAMA** (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Frank M. Lugo**, 5 S. Springbank Rd., Mobile, Ala. 36608 (phone 205-344-9234).

**ALASKA** (Anchorage, Fairbanks): **David W. Robinson**, P. O. Box 1120, Anchorage, Alaska 99510 (phone 907-274-3561).

**ARIZONA** (Phoenix, Tucson): **R. C. Olson**, 8313 E. Encanto, Scottsdale, Ariz. 85258 (phone 602-991-4208).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): **Arthur R. Brannen**, 605 N. Hospital Dr., Jacksonville, Ark. 72076 (phone 501-982-2585).

**CALIFORNIA** (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Edward A. Stearn**, P. O. Box 5867, San Bernardino, Calif. 92412 (phone 714-889-0696).

**COLORADO** (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Stephen L. Brantley**, 1089 S. Buchanan St., Aurora, Colo. 80010 (phone 303-320-7153).

**CONNECTICUT** (East Hartford, North Haven, Storrs, Stratford, Windsor Locks): **Joseph R. Falcone**, 14 High Ridge Rd., Rockville, Conn. 06066 (phone 203-565-6994).

**DELAWARE** (Dover, Wilmington): **John E. Strickland**, 8 Holly Cove Lane, Dover, Del. 19901 (phone 302-678-6070).

**DISTRICT OF COLUMBIA** (Washington, D. C.): **Jack Reiter**, 881 17th St., N. W., Washington, D. C. 20006 (phone 202-298-8660).

**FLORIDA** (Bartow, Broward, Cape Coral, Fort Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa): **John G. Rose**, 5723 Imperial Key, Tampa, Fla. 33615 (phone 813-855-4046).

**GEORGIA** (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Lee C. Lingelbach**, 217 Ridgeland Dr., Warner Robins, Ga. 31093 (phone 912-922-7615).

**HAWAII** (Honolulu): **William B. Taylor**, 233 Keawe St., #630, Honolulu, Hawaii 96813 (phone 808-531-5035).

**IDAHO** (Boise, Twin Falls): **Ronald R. Galloway**, Box 45, Boise, Idaho 83707 (phone 208-385-5247).

**ILLINOIS** (Belleville, Champaign, Chicago, Elmhurst, Peoria): **Kurt Schmidt**, 2009 Vawter St., Urbana, Ill. 61801 (phone 217-367-6633).

**INDIANA** (Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **Roy P. Whitton**, 916 Oak Blvd., Greenfield, Ind. 46140 (phone 317-636-6406).

**IOWA** (Des Moines): **Ric Jorgensen**, 4005 Kingman, Des Moines, Iowa 50311 (phone 515-255-7656).

**KANSAS** (Topeka, Wichita): **Cletus J. Pottebaum**, 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-683-3963).

**KENTUCKY** (Louisville): **Bill Dotson, Jr.**, 3736 Mamaroneck, Louisville, Ky. 40218.

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **John H. Allen**, 10064 Heritage Dr., Shreveport, La. 71115 (phone 318-797-3306).

**MAINE** (Limestone): **Alban E. Cyr**, P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

**MARYLAND** (Andrews AFB, Baltimore): **Robert J. Beatson**, 7813 Locris Ct., Upper Marlboro, Md. 20870 (phone 301-336-5400).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Mary Anne Gavin**, 24 Cherrywood Dr., Stoughton, Mass. 02072 (phone 617-223-5630).

**MICHIGAN** (Battle Creek, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Howard C. Strand**, 15515 A Dr., N., Marshall, Mich. 49068 (phone 616-963-1596).

**MINNESOTA** (Duluth, Minneapolis, St. Paul): **David J. Little**, 1888 Princeton Ave., St. Paul, Minn. 55105 (phone 612-699-3600).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Kenneth M. Holloway**, 13 Hermosa Dr., Ocean Springs, Miss. 39564 (phone 601-857-8382).

**MISSOURI** (Kansas City, Knob Noster, Springfield, St. Louis): **Stuart E. Popp**, 5605 Hancock, St. Louis, Mo. 63139 (phone 314-351-8902).

**MONTANA** (Great Falls): **Luclen E. Bourcier**, P. O. Box 685, Great Falls, Mont. 59403 (phone 406-453-1351).

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde**, 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

**NEVADA** (Las Vegas, Reno): **James L. Murphy**, 2370 Skyline Dr., Reno, Nev. 89509 (phone 702-786-2475).

**NEW HAMPSHIRE** (Manchester, Pease AFB): **Charles J. Sattan**, 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

**NEW JERSEY** (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Edison, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Leonard Wilf**, 203 Cranford Rd., Cherry Hill, N. J. 08003 (phone 609-429-4245).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **Joseph H. Turner**, P. O. Drawer 1946, Clovis, N. M. 88101 (phone 505-762-4557).

**NEW YORK** (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Henry C. Newcomer**, 30 Brompton Circle, Williamsville, N. Y. 14221 (phone 716-633-9615).

**NORTH CAROLINA** (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **William M. Bowden**, 509 Greenbriar Dr., Goldsboro, N. C. 27530 (phone 919-735-4716).

**NORTH DAKOTA** (Concrete, Fargo, Grand Forks, Minot): **Warren L. Sands**, 7 Spruce CC Village, Minot, N. D. 58701 (phone 701-852-1061).

**OHIO** (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Edward H. Nett**, 1449 Ambridge Rd., Centerville, Ohio 45459 (phone 419-683-2283).

**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): **William N. Webb**, 404 W. Douglas Dr., Midwest City, Okla. 73110 (phone 405-734-2658).

**OREGON** (Corvallis, Eugene, Portland): **Martin T. Bergan**, 12868 SE Ridgecrest, Portland, Ore. 97236.

**PENNSYLVANIA** (Allentown, Be Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Lewistown, Philadelphia, Pittsburgh, State College, Washington, Willow Grove, York): **John B. Flaig**, P. O. Box 375, Lehigh, Pa. 16851 (phone 717-233-0357).

**RHODE ISLAND** (Warwick): **Charles H. Collins**, 143d TAG (RIANG), Warwick, R. I. 02886 (phone 401-2100).

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**UTAH** (Brigham City, Clearfield, Denver, Provo, Salt Lake City): **William A. Athas**, 2916 Willow Creek Rd., Lake City, Utah 84070 (phone 435-973-4300).

**VERMONT** (Burlington): **John Nease**, 134th DSES, ANG, Burlington IAP, VT 05401 (phone 802-658-0770).

**VIRGINIA** (Arlington, Danville, Fairfax, Fryingpan, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **H. B. Henderson**, 10 Dr., Seaford, Va. 23696 (phone 804-838-1300).

**WASHINGTON** (Seattle, Spokane, Tacoma): **Jack Gamble**, 7010 Quoiise Dr., SW, Tacoma, Wash. 98506 (phone 206-584-1610).

**WEST VIRGINIA** (Huntington): **John Hazelrigg**, Rt. 2, Box 32, Barboursville, W. Va. 25504 (phone 304-755-2100).

**WISCONSIN** (Madison, Milwaukee, Wausau): **Charles W. Marotske**, 7945 S. V. Dr., Oak Creek, Wis. 53154 (phone 414-762-4383).

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30-34	65,000	97,500	130,000
35-39	50,000	75,000	100,000
40-44	35,000	52,500	70,000
45-49	20,000	30,000	40,000
50-54	12,500	18,750	25,000
55-59	10,000	15,000	20,000
60-64	7,500	11,250	15,000
65-69	4,000	6,000	8,000
70-74	2,500	3,750	5,000
<b>Aviation Death Benefit*</b>			
Non-war related	\$25,000	\$37,500	\$50,000
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\*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.

## 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.

**FULL CHOICE OF SETTLEMENT OPTIONS.** All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

**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 in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on six separate occasions.

## 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 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 members of the Air Force Association are eligible to apply for this coverage provided they are under age 60 at the time application for coverage is made.

\*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in either New York or Ohio. Non-active duty members residing in Ohio, however, may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

## OPTIONAL FAMILY COVERAGE (may be added to any of the above Plans) 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.

## Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operate 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 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 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 insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.



# ALL AFA MEMBERS (under age 60)



## APPLICATION FOR AFA GROUP LIFE INSURANCE



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 \_\_\_\_\_ Height \_\_\_\_\_ Weight \_\_\_\_\_ Social Security Number \_\_\_\_\_  
Mo. \_\_\_\_\_ Day \_\_\_\_\_ Yr. \_\_\_\_\_

This insurance is available only to AFA members  
 I enclose \$13 for annual AFA membership dues (includes subscription (\$9) to AIR FORCE Magazine). Please send membership application.  
 I am an AFA member.

Name and relationship of primary beneficiary \_\_\_\_\_  
Name and relationship of contingent beneficiary \_\_\_\_\_

Please indicate below the Mode of Payment and the Plan you elect:

Mode of Payment	Standard Plan		Plan of Insurance High Option Plan		High Option PLUS Plan	
	Member Only	Member And Dependents	Member Only	Member And Dependents	Member Only	Member And Dependents
<b>Monthly</b> government allotment (only for military personnel). I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	<input type="checkbox"/> \$ 10.00	<input type="checkbox"/> \$ 12.50	<input type="checkbox"/> \$ 15.00	<input type="checkbox"/> \$ 17.50	<input type="checkbox"/> \$ 20.00	<input type="checkbox"/> \$ 22.50
<b>Quarterly.</b> I enclose amount checked.	<input type="checkbox"/> \$ 30.00	<input type="checkbox"/> \$ 37.50	<input type="checkbox"/> \$ 45.00	<input type="checkbox"/> \$ 52.50	<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 67.50
<b>Semi-Annually.</b> I enclose amount checked.	<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 75.00	<input type="checkbox"/> \$ 90.00	<input type="checkbox"/> \$105.00	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$135.00
<b>Annually.</b> I enclose amount checked.	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$150.00	<input type="checkbox"/> \$180.00	<input type="checkbox"/> \$210.00	<input type="checkbox"/> \$240.00	<input type="checkbox"/> \$270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth			Height	Weight
		Mo.	Day	Yr.		

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, sanatorium, 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 \_\_\_\_\_

Application must be accompanied by a check or money order. Send remittance to:  
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D. C. 20006 12/79

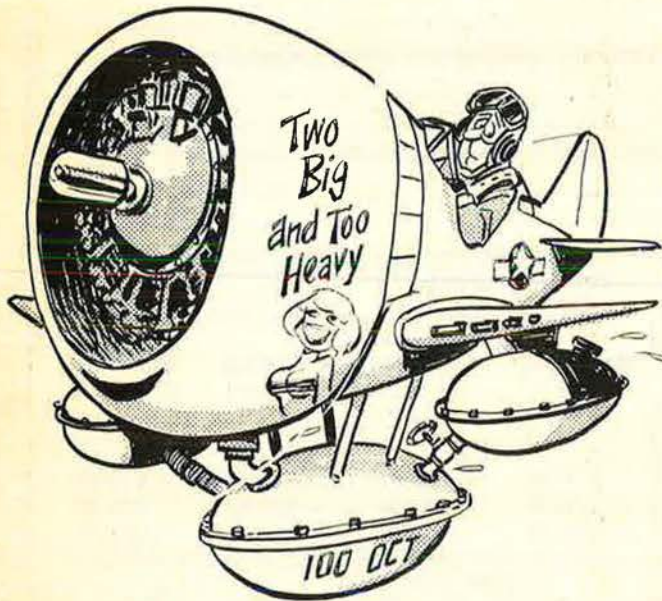


Bob Stevens'

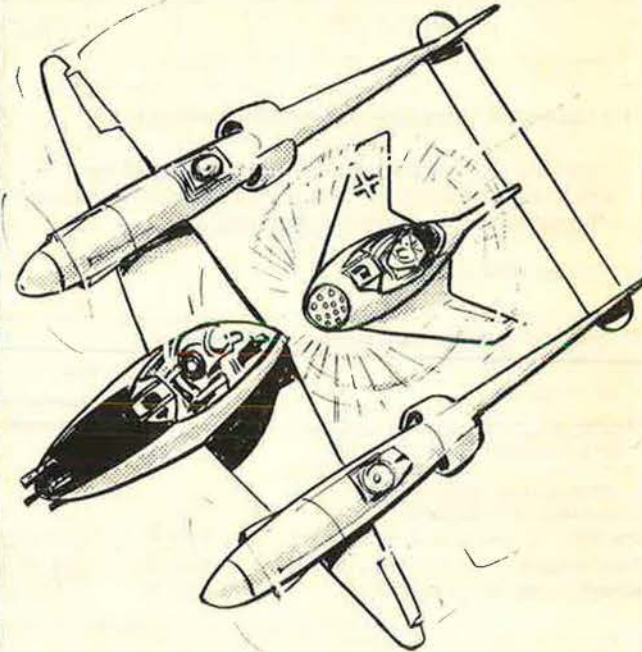
# "There I was..."

"LOVE IS BLIND" THE OLD SAYING GOES. PILOTS OF WWII FIGHTERS VIEWED THEIR BRETHERN STUCK IN MACHINES OTHER THAN THEIR PARTICULAR STEED OF THE MOMENT AS POOR SOULS CONDEMNED TO PERDITION!

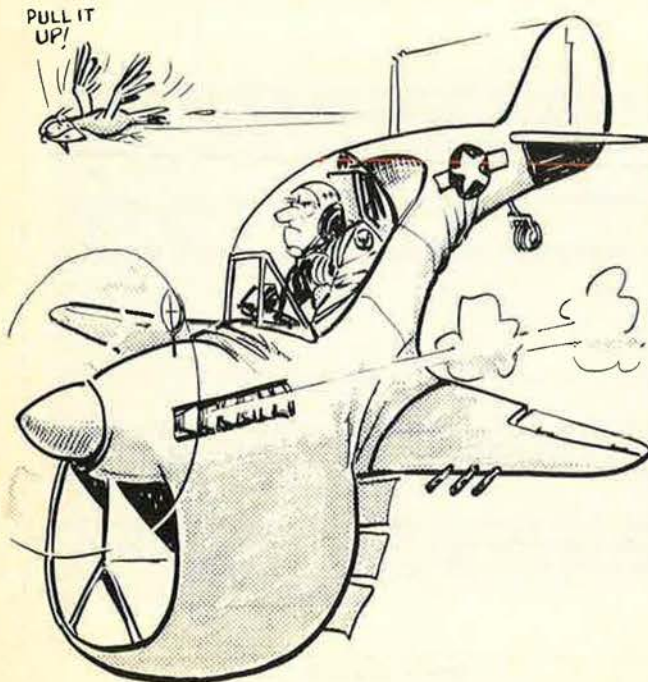
P-47 "THUNDERBOLT" (ALIAS "THE JUG")



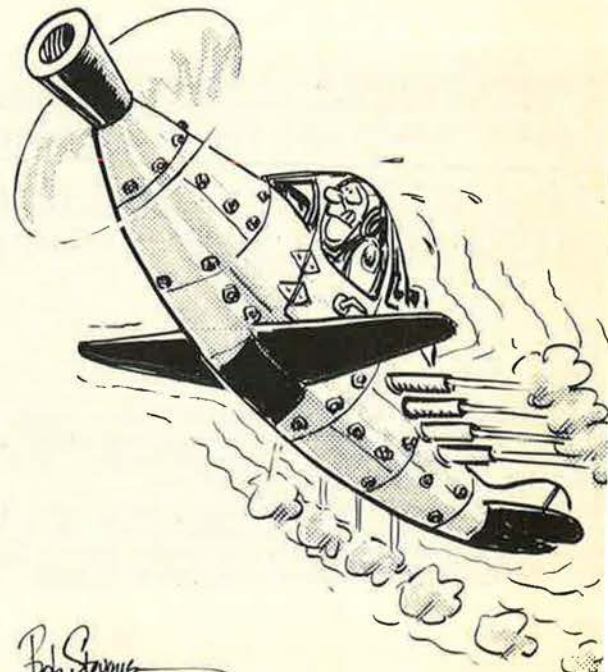
P-38 "LIGHTNING" (FAST, EXCEPT IN RATE-OF-ROLL)



P-40 "WARHAWK" (WITH BUILT-IN HEADWIND)



P-39 "AIRACOBRA" (REAL SNAKY WITH A FULL LOAD)



Bob Stevens

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niques in the design of these completely solid-state receivers. Maximum use of integrated and hybrid circuitry has resulted in minimum size, weight, and power consumption.

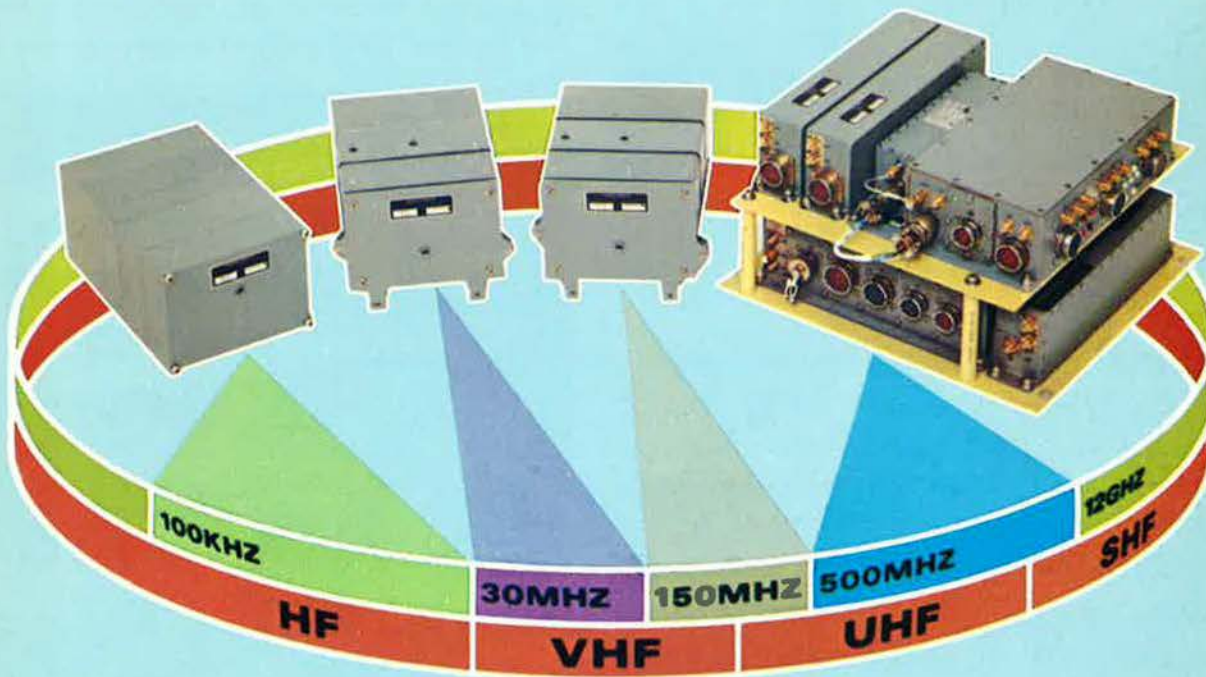
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