


OCTOBER 1995/\$3

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

**Heavyweights for the  
New Strategy**







*Dot Hensel, Senior Engineering Specialist, Lockheed Martin Tactical Aircraft Systems.*

## **"THE LAST TIME AMERICA LAUNCHED A NEW AIR SUPERIORITY FIGHTER WAS 7 PRESIDENTS AGO."**

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# AIR FORCE MAGAZINE

October 1995, Vol. 78, No. 10

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**About the cover:** The B-2A "Spirit of California" from the 509th Bomb Wing flies high over Whiteman AFB, Mo. See "Heavyweights for the New Strategy," p. 24. Photo by Randy Jolly.

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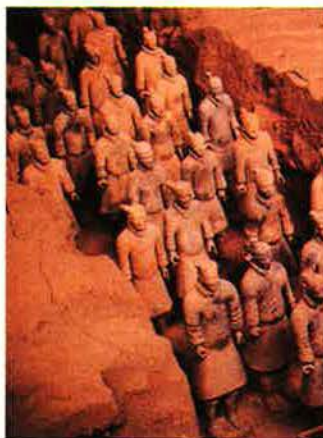
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By John T. Correll, Editor in Chief

## High One Is a Low Blow

WASHINGTON, D. C., SEPT. 5  
**I**MAGINE that you are a senior master sergeant about to complete twenty-six years of service. You had your papers in to retire next February. Suddenly, because of a congressional curveball known as "High One," your retirement pay is going to be \$161 a month less than you had expected, a reduction of 8.4 percent.

Multiply the bad news by some 653,000 military people—more than seventy percent of them enlisted members—who would be affected by retirement pay cuts ranging from three percent to nine percent if High One goes into law as planned. It has already created a morale problem of epic proportions. Defense officials, military leaders, and veterans' groups have tried without success to persuade Congress to back off.

The idea grew out of an estimate by the Congressional Budget Office that \$649 million might be saved over seven years by changing the formula for computing military retirement pay for people with more than fifteen years of service. The change would be to base it on an average of basic pay during the last twelve months (the member's *high one*-year average) rather than, as now, on final pay.

High One was included as a cost-reduction measure in the budget resolution adopted in June by the House of Representatives. The House National Security Committee endorsed it in August. It touches 334,000 active-duty and 319,000 Guard and Reserve members who entered service prior to September 8, 1980.

The "worst case" examples are individuals who retire the month after receiving a longevity increase—which occurs every other year up to twenty-six years of service—and an annual pay raise. Monthly retired pay for the twenty-six-year senior master sergeant in the example above would be \$1,753 rather than \$1,914. High One does not apply to those presently retired. Neither does it affect those who joined the armed forces after September 8, 1980. The retire-

ment program for those members, adopted before they began service, is based on a high three-year average.

In a letter to Rep. John R. Kasich (R-Ohio), chairman of the House Budget Committee, asking that High One be reconsidered, Secretary of Defense William J. Perry said that "While the Congress has made significant reductions to retirement benefits for new military service members who

**As Congress moves toward cutting the retirement system for people who joined before 1980, the force sees it as a break of faith.**

enlisted over the past fifteen years, at no time in that period has the Congress broken faith by changing the retirement benefits of current members."

The reaction will extend beyond those (about twenty-eight percent of the force) directly hurt. CMSAF David J. Campanale believes that "people with four to eight years of service will look at this and say, 'Gee, do I stay twelve more years? What have I got to look forward to?'"

The Joint Chiefs of Staff sent Rep. Floyd D. Spence (R-S.C.), chairman of the House National Security Committee, a strongly worded letter on August 2, saying that "the most compelling reason to dismiss this proposal is its break of faith with people who have been serving this country since before 1980." At the same time, the Chiefs said, High One is predicated on "flawed cost assumptions," and, as a result, "this proposal will result in much lower savings than projected (in fact, it could cost us money)."

The Congressional Budget Office estimate does not take into account the obvious probability that military members will modify their retirement plans to avoid times that penalize them several hundred dollars a month. "As people delay their retirements to protect retirement earnings, we will experience an unanticipated increase to the programmed military personnel accounts," the Joint Chiefs said.

"The Services have not finished personnel drawdowns and absolutely do not need anything in place that would encourage people to delay retirement," they added. "Doing this requires that we increase involuntary retirements in order to meet strength controls. This is a prospect we find abhorrent. Additionally, almost all of the people who desire to retire in [FY 1996] have already submitted their retirement date requests, based on the law as it exists today. To change the rules at this stage of the process is blatantly unfair and unwarranted."

In a speech on August 11, Secretary Perry said that changing the formula to reduce retirement pay "is a bad idea that keeps coming back to life, even when we think we have killed it. I call it the Dracula Proposal." He drew applause with a promise "to do everything I can to drive a stake through the heart of this idea once and for all."

On top of everything else, High One is awkwardly timed. Congress had just indicated that it will correct an earlier inequity, created by the 1993 budget bill, that delays cost-of-living increases for military retirees for six to nine months beyond the dates they go into effect for other federal retirees. Now this.

Secretary of the Air Force Sheila E. Widnall said it exactly right: "If our people perceive their government will abandon long-standing promises, even after they have served more than twenty years in good faith, we'll certainly have a difficult time attracting and retaining the quality airman upon which our military readiness depends." ■





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# Letters

## In the Lurch

"Health Care in the Lurch" [July 1995 "Editorial," p. 3] confirms exactly what I have been saying since retiring in 1967. I spent twenty-seven years in the military, having joined voluntarily in 1940. Not once during those twenty-seven years did I hear anyone say that I would not be entitled to free medical care for my spouse and me if I remained long enough to retire. Nor did they say, "At age sixty-five, you will get dumped on Medicare and be responsible for twenty percent of the charges that Medicare will not pay." Now we keep hearing that Medicare will become insolvent and we will be left on our own.

Ask those in Congress who were in the service which entitlements they were told to expect if they stayed in for twenty years. They must agree that they were told they would receive full medical care for the rest of their lives. Every member of Congress should read "Health Care in the Lurch." It may not change their thinking, but it will give them something to think about.

The government needs to make a decision on this subject now. Veterans need to know what their liability is with regard to health care. Tell us now so we can plan for catastrophic illness or other expensive ailments. If Medicare fails, do we turn to a military medical facility? Or do we join those without the income to pay astronomical medical bills?

If this question remains unanswered, what should the current members of the military think? Should they take a gamble and stay in the service, or should they leave now and seek employment that leaves no doubt about their entitlements after retirement? Directions should be given to recruiters on what they can promise to new recruits. Do not wait twenty-five to thirty years to tell retirees that the recruiter had no authority to make those promises. . . .

Maj. Les Davis,  
USAF (Ret.)  
Fort Pierce, Fla.

In reference to "Health Care in the Lurch," I feel victimized by the "big

lie" asserted by the Congressional Research Service in its report on base closures. My confidence factor in our present government is at absolute zero, and your "Letters" space is insufficient to articulate my dismay and anger at being told, "You're of no value to us now, once retired and past sixty-five, so forget the 'contingent benefits' we promised in exchange for your service."

What can we do? I offer the following suggestions.

Any person considering entry into military service should demand, and be required by law to receive, a contract signed by that service's Secretary, stating the law and benefits to be rendered during and upon completion of the contract. The contract should have an immediate escape clause in case it is changed without an agreement signature by the individual. Otherwise, the recruit should take a walk because recruiters will lie. . . .

MSgt. Edwin M. Matthews,  
USAF (Ret.)  
Forest, Miss.

Anyone who has spent a recent career in the service of our country can add many examples to "Health Care in the Lurch." While the article focuses on the Congressional Research Service's declaration that medical care for military dependents and retirees is a "contingent benefit," as opposed to an entitlement, Editor in Chief John T. Correll could have made similar remarks concerning commissary and exchange benefits,

**Do you have a comment about a current issue? Write to "Letters," Air Force Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be concise, timely, and preferably typed. We cannot acknowledge receipt of letters. We reserve the right to condense letters as necessary. Unsigned letters are not acceptable. Photographs cannot be used or returned.—THE EDITORS**

tying pay of active-duty and retired alike to cost of living, and so forth.

Perhaps the task that should be given the service is to define the entitlements that one should expect for spending a career in the military rather than searching for benefits that can legally be taken away. It may be too late for those of us who have already served, but it would be interesting to see what would happen to the All-Volunteer Force if the government's obligation to the military member was as clear and enforceable as the member's is to the government.

Lt. Col. Harry R. Allen, Jr.,  
USAF (Ret.)  
Palo Alto, Calif.

## The Devoted 125th

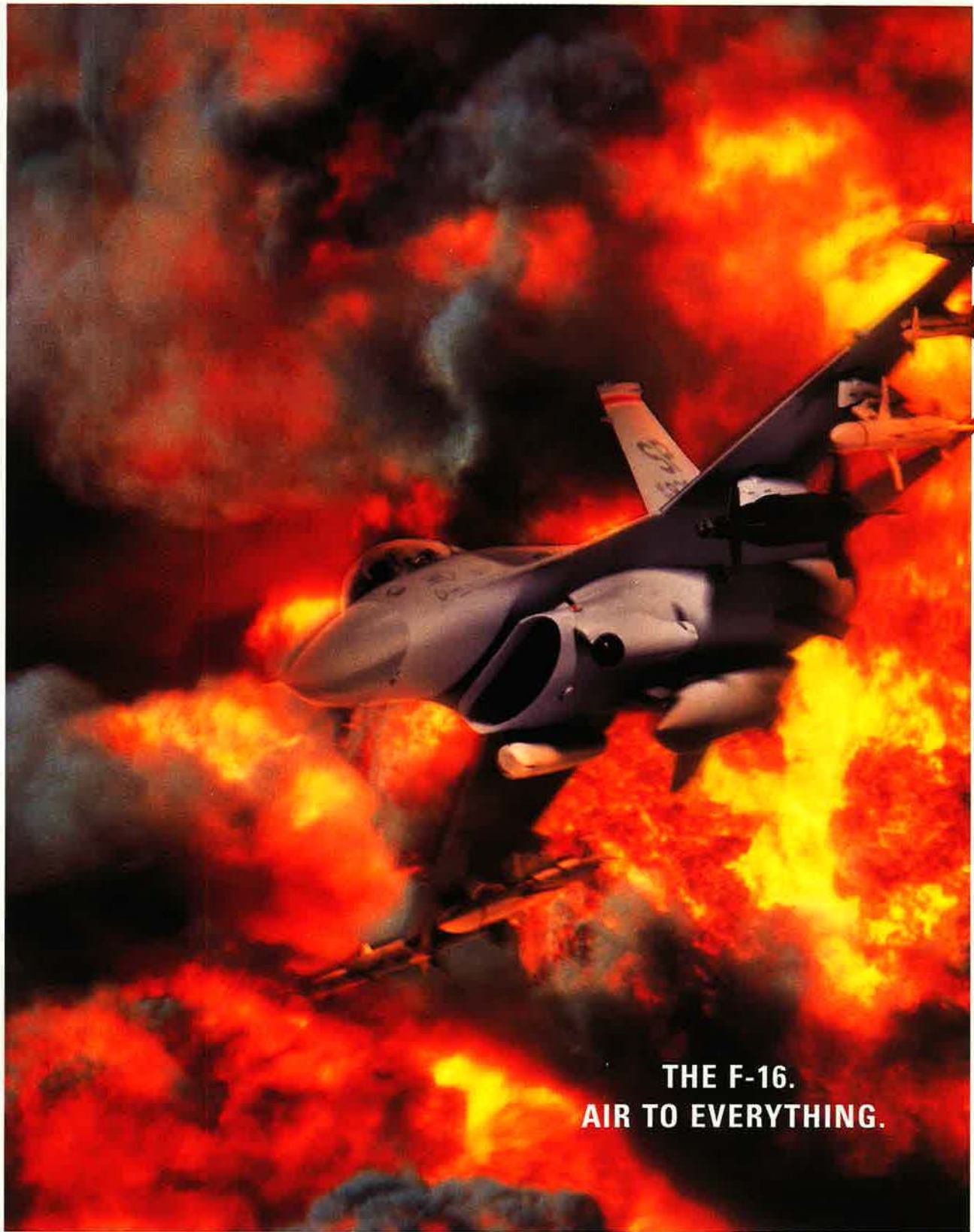
I can't tell you how proud I felt when I received the August 1995 issue and saw two members of the Florida ANG's 125th Fighter Group gracing your cover ["Instant Replay," p. 58].

Through the years, your magazine has done a wonderful job covering the Air National Guard and our contributions to the Total Force. We in the 125th FG are proud of and devoted to our NORAD mission, and we are dedicated to providing a well-trained unit if and when the nation needs us. We are honored to contribute our part to the national military strategy.

On June 30, 1995, it was announced that we would be converting to F-15s and will remain in the air defense mission. Our aircrews are in the process of training in the F-15 at Tyndall AFB, Fla., and we are scheduled to be flying missions out of Jacksonville by September 1995. Also, plans call for our detachment to move back to Homestead ARB in early 1996. We have been on twenty-four-hour alert at NAS Key West since 1994 after Hurricane Andrew swept through Homestead in 1992 and destroyed our facility.

Col. Craig R. McKinley  
Commander, 125th Fighter  
Group (ANG)  
Jacksonville, Fla.





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## Advertising

### Advertising Director

Patricia Teevan

1501 Lee Highway

Arlington, Va. 22209-1198

Tel: 703/247-5800

Telefax: 703/247-5855

### Industry Relations Manager

Elizabeth B. Smith • 703/247-5800

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## Letters

### A Gaping Hole in Defense

"The Pentagon Declines More B-2s" [July 1995 "Washington Watch," p. 13] describes DoD's move toward precision guided munitions (PGMs) and cites weapons currently under development or deployment. This is a continuing process begun in the mid-1970s and encouraged by the deployment of these weapons during the Persian Gulf War. PGMs are needed and significantly increase our capabilities while decreasing the need for additional expensive platforms.

In the 1970s, the Defense Science Board (under Chairman Eugene G. Fubini) identified PGM defense as a gaping hole in US military preparedness. Since that time, PGMs have advanced dramatically in performance—and proliferation. During the Gulf War, we had little defense against random incoming projectiles and used expensive Patriots to impede the less expensive Scuds. The gaping hole has maintained its dimensions.

We will be the recipients of serious PGM deployments in future conflicts. Perhaps it would be wise to revisit the now-ancient call of the DSB and put some increased emphasis into a practical, field-deployed, low-cost PGM defense. With a little imagination (very little), one might even picture some SDI pieces suitable to the task.

Ernest C. Guerri  
Melbourne, Fla.

### "Replacing" the F-111

I write to make a couple of points about some misleading statements in the July issue.

First, in "Washington Watch" on p. 14 is a sidebar titled "Precision Weapons." However, the weapons listed aren't precision but "accurate" weapons, which hit very close to a set of geographic coordinates provided to the weapon prior to release. Precision weapons are such munitions as laser-guided bombs (LGBs), GEU-15s, AGM-130s, and AGM-142s, as well as the Navy's AGM-62 Walleye and SLAM (Standoff Land-Attack Missile)—all of which allow the bomb to be manually guided to impact. Accurate weapons allow you to hit the building; precision weapons allow you to enter through the door or window of your choice.

In "The Force Heads for a Stable Landing" [July 1995, p. 32] is a second erroneous statement, "The F-111s that retire will be replaced by F-16s." While the "Lawn Darts" may eventually occupy the same ramp

space, they will never replace the F-111s. To say so is extremely insulting to F-111 aircrews and maintainers. The F-111 is an offensive weapon, capable of delivering heavy payloads of precision weapons deep into the enemy's heartland at high speed and low level in almost any weather. It excels at the kind of wars America fights—the ones on the other guy's soil.

Sixty-six F-111Fs delivered half of the LGBs dropped by the US during Operation Desert Storm, while flying only five percent of the coalition's 41,000 strike sorties. In addition to LGBs, they delivered all seventy GBU-15s (the bombs that stopped the Iraqi oil slick). They dropped only 5,600 bombs to destroy 2,200 targets, including confirmed direct hits on 920 tanks and armored personnel carriers, one-seventh of the total destroyed during the war. F-111s also destroyed 245 hardened aircraft shelters. It is believed that 141 aircraft were destroyed in these shelters. So guess which aircraft destroyed the greatest number of Iraqi aircraft?

The F-16 is basically a defensive fighter that suffers from a serious lack of range with a combat payload. More than once during the Gulf War, tankers had to venture into Iraq to prevent F-16s from running out of gas. Once, at Cannon AFB, N. M., we ran a flight plan for an F-16 on our shortest low-level route. Even with two external fuel tanks, it ran out of gas before reaching the bombing range. I've flown the same low-level routes in an F-111—twice on the same sortie—and spent a half-hour on the range, all on internal fuel.

Just because the bean counters at the Puzzle Palace want to throw away a huge, irreplaceable part of America's offensive might, doesn't mean it's a good idea. "Lawn Darts" may cost less, but you get what you pay for. One can only hope the Pentagon keeps the phone number of Australia's F-111C wing close at hand—they just may need it. At least the F-15s and F-16s won't have to worry about being upstaged in combat anymore.

Maj. James E. Rotramel,  
USAF (Ret.)  
California, Md.

### Starcatchers Before 1969

"The Starcatchers" [June 1995, p. 74] needs some clarification. I was the Air Force Space Division Project Officer in 1963-64 at Los Angeles AFS, Calif., for Project Sirocco, a classified JC-130B night-recovery effort. There were twenty-five suc-





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## Letters

cessful aerial recoveries in twenty-five attempts in 1964 (not 1969)—all flown out of Edwards AFB, Calif., over a three- to six-month period, and I was the only person who flew on each and every mission (with different aircrews). I transferred to the Pentagon in December 1964, to Force Plans.

The contractor was Aerojet General, and we spent considerable time in fall 1963 finding a dye that would not affect the parachute and still reflect sufficient light from a strobe light on the recovery vehicle to illuminate the parachute. These efforts were to support the then covert program known as Corona (just publicly recognized at the Smithsonian on May 24, 1995). [See "Corona Comes in From the Cold," September 1995, p. 82.]

Col. Robert H. Krumpke,  
USAF (Ret.)  
Torrance, Calif.

■ Author Col. Philip A. Rowe, Jr., USAF (Ret.), replies:

*I was surprised and pleased to discover that others ahead of me tested night parachute recovery methods. To the best of my knowledge, the 1969 tests were conducted without any awareness of earlier tests. But kudos are due to those who preceded us, and I tip my hat to them.*

### A Freight Train's Bombsight

As a retired Air Force officer, a historian who wrote a master's thesis on the formative years of the Air National Guard, and a former instructor in the AFROTC program and at the Air War College, I am compelled to weigh in on the ANG controversy taking place in the pages of *Air Force Magazine* ["Why the Air National Guard?" March 1995 "Letters," p. 7]. To put it as succinctly as possible: SMSgt. Noel A. Sivertson, USAF (Ret.), has it exactly right, and Maj. Gen. Raymond L. Pendergrass and Maj. David C. Snakenberg, ANG ["ANG's State Missions," July 1995 "Letters," p. 6], have it exactly wrong.

The arguments advanced by Air Guardsmen for ANG's existence as a state force are the same tired, spurious, disingenuous, and silly ones that have been around for almost fifty years. Why is there an Air National Guard? Because it performs its only real mission (being a combat-ready force to augment and assist USAF) very well. There's no gainsaying that. State missions? They have to be invented.

Why are members of fighter outfits, refueling units, or tactical control

groups needed to clean up after a storm in Hawaii or to fill sandbags in Missouri? The answer, for any rational person, is that they are not. Why would ANG be any less skilled or combat ready if it were melded into the Air Force Reserve, as it should be? It would not. There are compelling reasons for the existence of the Army National Guard, but the concept of an "aerial militia" is ridiculous on its face—unless one believes that governors need more patronage opportunities and there's a crying need for fifty or so more general officers.

In January 1949, no less an Air Force hero than Tom Lanphier (then a lieutenant colonel in the Idaho ANG) wrote in *Air Force Magazine*—in "48 Air Forces Too Many"—"An air arm is about as useful to the governor of a sovereign state as a bombsight to a freight train." It was right then, and it's right today.

Lt. Col. Frank Howe,  
USAF (Ret.)  
Denver, Colo.

### "Valor" Stories Needed

Since February 1983, "Valor" stories recounting exceptional heroism of Air Force individuals or crews have been published in *Air Force Magazine*. Hundreds of incidents have not been recognized.

Many books on Air Force history include accounts of heroism, but often the information cannot be verified or is lacking in detail. Official sources can be of little help.

Nominations of "Valor" subjects by readers are welcome. All nominations will be acknowledged. If a subject is accepted for publication, the source will be cited in the story. Send your nominations to P. O. Box 1137, Lynchburg, VA 24505-1137.

John L. Frisbee  
Lynchburg, Va.

## Errata

The list of AFA's National Presidents [*AFA Almanac*, September 1995, p. 132] contains several errors with regard to the presidents' terms of office. A corrected list will appear in the February 1996 issue. In "An Elite Eight" [September 1995, p. 116], we incorrectly reported that the crew receiving the Tunner Award had transported President Clinton to Jakarta, Indonesia, aboard its C-5. The C-5 and its crew flew in support of this mission, while the President flew on Air Force One. We regret the errors.





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By Brian Green, Congressional Editor

## The Civil Air Patrol Connection

Senator McCain proposed the transfer of CAP from the Air Force to another agency. CAP, the Air Force, and AFA blocked the move—for now.

**C**ONGRESS called into question the Civil Air Patrol's continued existence as an Air Force auxiliary. Sen. John McCain (R-Ariz.), a senior member of the Senate Armed Services Committee (SASC), led an effort to cut CAP funding in 1996 and strike it from USAF's budget altogether over several years. His moves suggested the start of long-term difficulties for the air agency.

Senator McCain emphasized that he strongly supports the CAP's mission and that its work should continue. His measure, he explained, "does not mean that the Senate will eliminate the Civil Air Patrol."

However, claimed the Senator, CAP's work is a low-priority program and should not be financed out of "an already inadequate military budget." In its budget request for Fiscal 1996, the Air Force proposed to fund CAP at \$27.5 million. The Senator sought to cut that amount by \$5 million and find another sponsor.

The Air Force and the Civil Air Patrol opposed the Senator, arguing for maintaining their current relationship. The Air Force Association also opposed his measure.

In a September 1 statement, CAP officials announced the Senator had relented for this year, agreeing to a compromise restoring the \$5 million cut. However, SASC's defense authorization report, though it recognized "the value of the Civil Air Patrol in providing for civilian search-and-rescue missions and disaster relief operations," contended that "these operations are more appropriately funded by another agency or by state governments."

The report went on to say, "Programs not directly related to warfighting consume billions of dollars of the defense budget each year. While such programs may be well intentioned,

the declining defense budget makes it difficult to sustain their continued funding with DoD resources."

CAP was formed in 1941 primarily to perform civil-defense functions in response to the threat of German aggression. By act of Congress, it became a formal auxiliary of the Air Force in 1948. USAF provides technical services, advice, and facilities. In return, CAP—now with 51,000 members—performs three basic missions: aerospace education, emergency services, and youth cadet training.

CAP is best known for its search-and-rescue (SAR) operation. CAP performs this service for the Air Force, using a fleet of more than 5,000 aircraft. In 1994, CAP conducted nearly ninety percent of all SAR missions in the US involving civilian aircraft. On infrequent occasions, the CAP performs SAR missions for Air Force military aircraft.

CAP is involved in USAF training and communications planning. Its pilots fly thousands of hours in counterdrug reconnaissance missions for the Air Force and other federal agencies.

Ironically, Senator McCain's efforts emerged at a time when USAF and CAP are exploring ways to expand cooperation to reduce USAF costs. Using the Coast Guard as an example, USAF is studying the possibility of giving CAP a variety of new tasks.

CAP "is one of the several components of our total force," argued Bryan E. Sharratt, deputy assistant secretary of the Air Force (Reserve Affairs). Echoing his view was the Air Force's top leadership, including Secretary Sheila E. Widnall and Chief of Staff Gen. Ronald R. Fogleman.

Some in Congress said that USAF could be replaced as CAP's patron by the Department of Transportation (DoT). CAP advocates, however, maintain that transferring the organization to DoT would destroy it.

Gen. Russell E. Dougherty, USAF (Ret.), former commander of Strategic Air Command and former AFA Executive Director who serves as chairman of the CAP Consultation Committee, warned, "If you move the Civil Air Patrol to DoT, it won't be the

Civil Air Patrol when it gets there." He predicted that such a shift would cause CAP to lose "its charter, purpose, character, and much of its mission."

CAP National Commander Brig. Gen. Richard L. Anderson claimed that "CAP cannot function under any other federal agency due to its history and legislative structure."

Congressional interest in cutting CAP's funding was fueled by a report from the General Accounting Office critical of the apparent failure of a reorganization plan expected to save \$2 million to \$3 million annually. Senator McCain also found fault with CAP's overhead and administrative costs, which he pegged at \$20 million of the \$27.5 million requested.

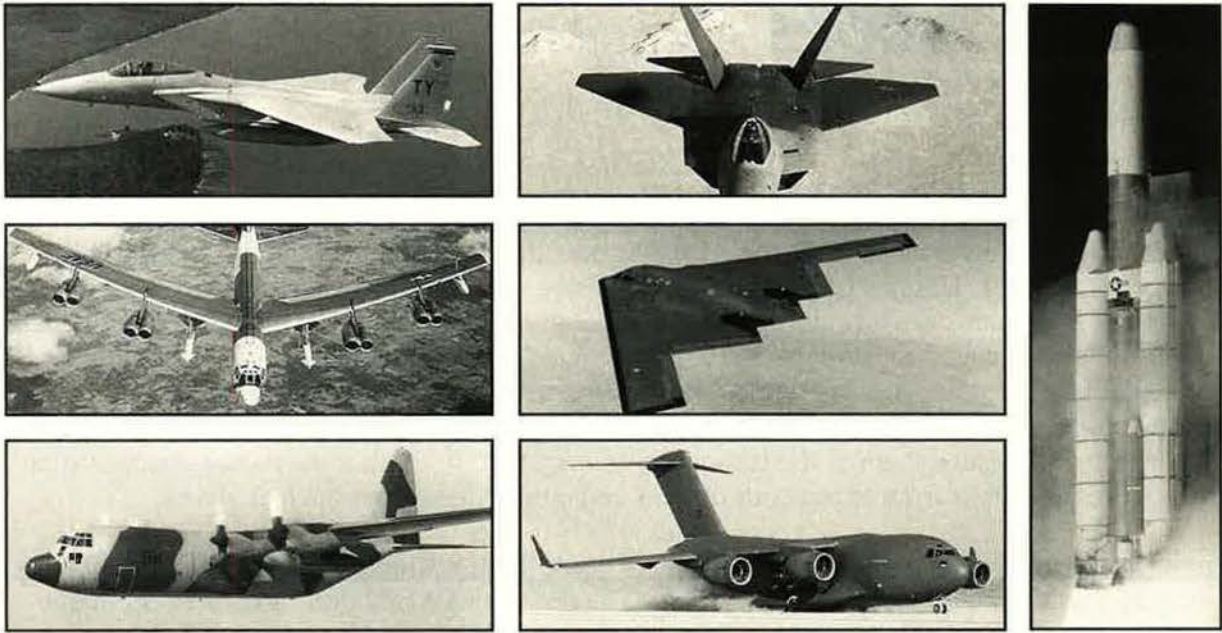
CAP representatives noted that the reorganization, designed to reduce the number of active-duty Air Force personnel supporting CAP, was in midstream and will now be speeded up to achieve savings earlier than previously planned. They pointed out that forty percent of its funding goes to USAF for operation and oversight of CAP functions, meaning that it performs all of its assigned missions and administers 1,600 units with only about sixty percent of the budget.

CAP maintains that those lawmakers who wish to reduce funding or move the organization to DoT do not sufficiently recognize the savings CAP generates for the Air Force. CAP aircraft are small and light, and flying costs are low compared to Air Force aircraft. When that difference is multiplied over thousands of hours flying counterdrug and SAR missions, CAP argues, the savings are several times larger than CAP's budget.

Many in CAP and the Air Force are concerned that this year's struggle will be played out again and again.

The SASC, House National Security Committee, and House and Senate Appropriations Committees share legislative responsibility for CAP funding and organization. Only SASC pursued CAP initiatives this year. Still, according to its report, it "intends to explore other funding sources for this program in the future to further reduce its reliance on DoD." ■





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**U.S. Navy and Air Force pilots will enjoy even greater advantages in close combat**, with a new generation Sidewinder missile, the AIM-9X, now in development and expected to equip U.S. aircraft by 2002. Hughes Electronics is one of two companies participating in an 18-month demonstration/validation effort, defining the tactical design and demonstrating the performance of the missile's advanced focal plane array infrared guidance system — the "eyes" of the AIM-9X. Sidewinder has been the world's premier short-range, air-to-air missile for 40 years. Demonstration/validation tests include ground-to-air flyover tests, captive flight tests, hardware in the loop testing, and design of the tactical missile system. In these tests, the guidance system sorts out the real target from extraneous objects and countermeasures, such as flares.

**A new, long-range radar system from Hughes could help nations detect military build-ups** by hostile neighbors prior to possible invasion. The new HISAR (Hughes Integrated Synthetic Aperture Radar) is a commercial derivative of technology Hughes pioneered for the latest generation of military aircraft, including F-15 and F/A-18 fighters, the B-2 stealth bomber, and the U-2 tactical reconnaissance aircraft. It uses off-the-shelf hardware to minimize life cycle costs. The system has both surveillance and reconnaissance applications, and can detect moving targets and display images in real time, from ranges in excess of 60 miles. Hughes has received licenses to offer the new HISAR system to more than 60 countries throughout the world, in Europe, the Middle East, Latin America, and the Asia Pacific region.

**An ozone-friendly, precision cleaning technology, developed by Hughes** and used for the past eleven years on space-age infrared sensor optics, is now commercially available for a broad range of industrial cleaning applications. The Hughes product line, trademarked Eco-Snow™, is a family of CO<sub>2</sub> jet spray cleaning products that eliminate the need for CFCs typically used to meet rigid federal and industrial cleaning specifications. Customized nozzles, designed to provide a strong solvating action, quickly and effectively remove sub micron particles as well as organic contamination. The unique product design provides users with a wide range of CO<sub>2</sub> snow sizes and velocities to suit their cleaning needs. This proven technology is ideal for cleaning optics, electronics, precision mechanical devices, semiconductors, disc drives and computer peripherals.

**In December, a Hughes-built probe will be the first spacecraft** to enter an outer planet's atmosphere. Called the Galileo Probe, it will soon complete the final leg of its six-year mission to Jupiter. The probe is 49 inches in diameter and 34 inches high, and weighs 747 pounds. It will penetrate Jupiter's hot, gaseous atmosphere and, with its six onboard sensors, gather data on temperature, pressure, and chemical composition before succumbing to the elements.

**GM's top of the line 1996 model cars will be equipped with a new high-security**, anti-theft system based on radio frequency data encryption developed for advanced military systems. With this new, remote keyless entry system, a driver can lock and unlock doors from a distance, turn on exterior or interior lights, open the trunk, or sound a panic alarm. The system, designed by Delco Electronics, will also disengage the engine's start function, shutting down starter and fuel delivery circuits. The chance of a thief duplicating the code for the security system is one in 1.1 trillion.

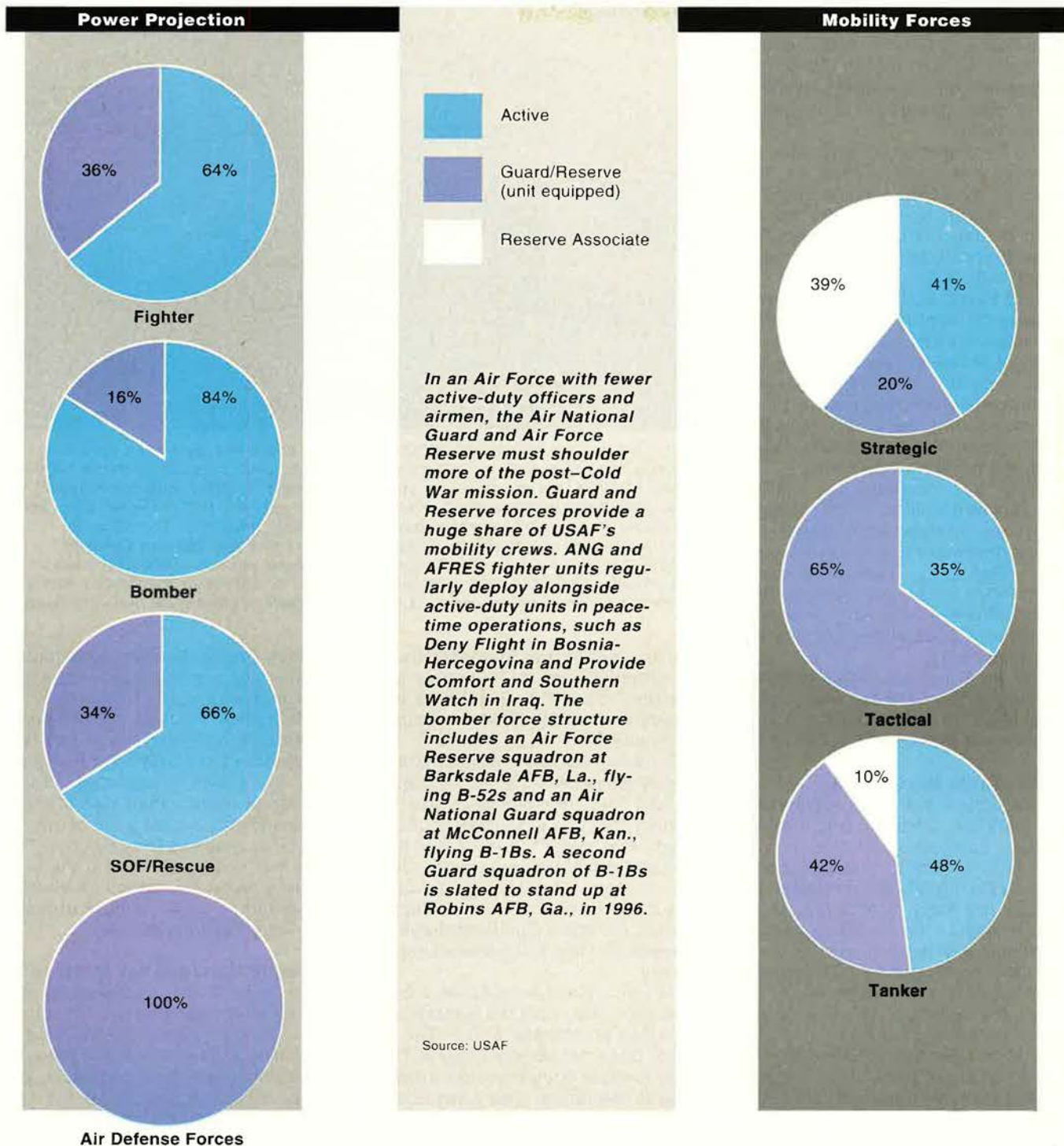
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# The Chart Page

By Tamar A. Mehuron, Associate Editor

## A Changing Force Mix Active-Duty, Air National Guard, and Air Force Reserve Crews





# Aerospace World

By Suzann Chapman, Associate Editor

## Wanted: Recruiters and Recruits

Through the third quarter of Fiscal 1995, the Navy and Marine Corps had met their interim recruiting goals, but the Army and the Air Force had lagged, reaching only ninety-nine and ninety-eight percent of their goals, respectively.

The Pentagon said it expected all services eventually to meet the targets for Fiscal 1995, ending September 30, though doing so may require them to use recruits from the Delayed Entry Program. The Air Force target is 31,000.

Fred Pang, assistant secretary of defense for Force Management Policy, expressed concern that the increased accession requirements for 1996 and 1997, coupled with declining propensity of young men to enlist, will make it harder to attract sufficient numbers of high-quality young men and women to the force.

USAF has increased the number of recruiting positions, which had been cut as part of the overall drawdown, to help deal with this growing problem. [See "Recruiting Worries Emerge," September 1995 "Aerospace World," p. 27.] However, the Air Force says not enough people are volunteering to be recruiters.

The Air Force has 1,000 recruiter positions, only 850 of which have been filled. Next year, the authorized number will increase to 1,200.

## Army Wants More C-17s

Favorable experiences with the new C-17 airlifter, combined with the successful completion of the month-long C-17 reliability, maintainability, and availability evaluation (RM&AE), caused the Army to redouble its efforts to ensure the Air Force gets an additional eighty Globemaster IIIs.

Procuring at least 120 C-17s (forty have already been approved) provides the optimum solution to the Army's airlift requirements, which are crucial to a Stateside-based power-projection Army, said Lt. Gen. Johnnie E. Wilson, Army deputy chief of staff for Logistics.

General Wilson added, "It will allow us, in concert with other mobility



September 15—On August 30, NATO warplanes and warships began pounding Bosnian Serb targets in a sustained attack. USAF aircraft, such as these F-16Cs of the 31st FW, Aviano AB, Italy, struck air defense, artillery, and communications positions, as did aircraft of other Western nations. NATO aircraft also flew surveillance, electronic warfare, and air-superiority missions. The Alliance mounted the air operation—its biggest ever—to force the Bosnian Serbs to remove heavy guns from the Sarajevo area and get serious about peace talks. The attacks marked at least a temporary change of course in the Clinton Administration's Balkans policy, which is widely criticized as ineffectual and confusing.

enablers [ships and Stateside mobility infrastructure], to move five and one-third divisions of soldiers and equipment in a short time anywhere in the world."

Soldiers who have flown on the C-17 commented favorably on its ability to take their equipment to austere landing sites and passenger improvements that make life more comfortable and safer for paratroopers. General Wilson, a master parachutist, called the C-17 a combat multiplier that will provide a significant edge for power projection to the airborne community.

Air Force Maj. Lance Acree, a C-17 instructor pilot, said the aircraft was designed just for the Army. "The Air Force does not have a need to haul large, outsize equipment to a forward airfield," he noted. "The Army does."

Major Acree added, "We've sized the cargo compartment for all Army outsize equipment—the Multiple-

Launch Rocket System, main battle tanks, huge communication vans that can be driven right off the plane."

McDonnell Douglas Corp., the prime contractor, delivered the twenty-first production C-17 to the Air Force on July 31, ahead of schedule. Some published reports indicated that the company may cut the price of new C-17s by as much as forty percent. The Defense Acquisition Board plans to make a recommendation in November whether USAF should proceed with additional purchases.

## A Key to Boost-Phase Intercept

Air Force Chief of Staff Gen. Ronald R. Fogleman said that when it comes to defending against missiles, the US should be a hitter as well as a catcher.

Developing a theater missile defense is a high priority for the Defense Department. However, said General Fogleman, the bulk of the Pentagon's TMD money is going to



the Army and Navy to develop several different systems for terminal defenses. He called this a "catcher's mitt approach" to theater defenses.

In contrast, he said, the Air Force will capitalize on "unique capabilities of air and space forces to help negate enemy missiles," General Fogleman told a group of industry executives and military members on June 16. One of those key areas involves USAF's airborne laser (ABL) program, which currently is the "most promising option for boost-phase intercept."

The General reported that recent live-fire tests demonstrated that an ABL could score speed-of-light catastrophic kills of theater missiles in boost phase, when they are most vulnerable. The Air Force believes the ABL will be able to engage at least three theater ballistic missiles—launched nearly simultaneously—before booster burnout. The ABL would have an added capability to intercept enemy cruise missiles and high-value airborne assets, such as enemy sensor platforms and command-and-control aircraft.

The General said developing a BPI capability does not eliminate the need for terminal defenses but offers a way to keep terminal defense tasks manageable. USAF says total system cost for the ABL program (seven aircraft) will be about \$5 billion with an additional \$1 billion for twenty-year operations and maintenance costs.

#### **DoD Sees No B-2 Show-Stoppers**

The Defense Department, rebutting a critical report, has maintained that the B-2 bomber testing program is on schedule, is about fifty percent complete, and has turned up no show-stoppers for continued production and deployment of the stealth bomber.

Paul G. Kaminski, under secretary of defense for Acquisition and Technology, made the claim in a statement issued in July. He stated, "Testing to date has not identified any areas that will prevent the B-2 from meeting its operational requirements."

Mr. Kaminski was responding to conclusions contained in a General Accounting Office draft report, "B-2 Bomber: Status of Cost, Development, and Production." The congressional watchdog agency said that concurrent completion of B-2 bomber flight tests and modification actions may create a potential problem because deficiencies that are "operationally important or costly to correct could be identified before the test program is completed." The report questions the B-2's ability to achieve mission effectiveness goals.

Mr. Kaminski disagreed, adding that



USAF photo by SrA. Mary Johnson

*The 2d Bomb Wing, Barksdale AFB, La., received the Omaha Trophy as best aircraft unit in US Strategic Command. Walter Scott (left), chairman, STRATCOM Consultation Committee, and Adm. Henry Chiles, CINCSTRATCOM (right), presented the award to 2d BW Commander Brig. Gen. David Young.*

the DoD decision to forgo additional B-2s does not reflect dissatisfaction with the aircraft's performance.

#### **Award Honors "Red" Erwin**

To recognize outstanding enlisted aircrew members—active-duty or reserve—the Air Force has instituted a new annual award, named after Medal of Honor recipient SSgt. Henry E. "Red" Erwin.

The first winners are: MSgt. Francis R. Williams, Jr., an Air Force Materiel Command flight engineer with the Joint Surveillance and Target Attack Radar System Joint Test Force at Melbourne, Fla.; TSgt. Thomas A. Kenny, an Air Mobility Command loadmaster with the 13th Airlift Squadron at McGuire AFB, N. J.; and SrA. Randall E. Marques, a Pacific Air Forces computer display maintenance technician with the 961st Airborne Air Control Squadron at Kadena AB, Japan.

Under an initiative generated by CMSAF David J. Campanale, the Air Force plans to name all awards presented to enlisted members after an enlisted person.

The Erwin Award honors the former B-29 radio operator and gunner who saved eleven other crew members April 12, 1945, over Koriyama, Japan. Sergeant Erwin was launching phosphorus bombs during a raid on a gasoline production plant when one bomb exploded inside the bomber. Knocked to the floor and burned, the Sergeant managed to pick up the bomb with his bare hands and throw it out the copilot's window.

After two years and dozens of reconstructive operations, he was discharged as a master sergeant. Now seventy-five, Mr. Erwin expressed pleasure with the Air Force's plan but said, "There are lots of other men who are just as deserving but have never been recognized."

#### **USAF Strives to Erase Insult to Premier Air Group**

It took fifty years, but the Air Force finally vindicated the actions of 104 Tuskegee Airmen who received permanent letters of reprimand for attempting to enter the Freeman Field, Ind., Officers' Club on April 5, 1945.

The Air Force might never have reviewed the incident because individuals normally must apply within three years to have items in their military personnel records removed. However, the service waived that rule when retired Air Force Lt. Col. James C. Warren asked that it consider correcting the records of everyone involved in the Freeman Field incident.

After the records correction board investigated the circumstances, the Air Force decided to remove the permanent letters of reprimand and to set aside a court-martial conviction against former Army Air Forces 2d Lt. Roger C. Terry.

In announcing the decision, Rodney A. Coleman, assistant secretary of the Air Force for Manpower, Reserve Affairs, Installations, and Environment said that "a terrible wrong in the annals of US Air Force and US military history has been righted."

Mr. Coleman referred to the fact



## Seven Careers Damaged in Black Hawk Review Action

The "friendly fire" incident that claimed the lives of fifteen Americans and eleven foreign nationals over northern Iraq eighteen months ago has probably claimed the careers of seven Air Force officers. That may not be the end of the affair; Congress and the GAO last month began their own reviews.

Just when most people thought the final decision had been rendered in the April 14, 1994, shutdown of two Army UH-60 Black Hawk helicopters by two F-15 pilots under the command and control of an Airborne Warning and Control System (AWACS) aircraft, Air Force Chief of Staff Gen. Ronald R. Fogleman personally chastised not only the seven officers involved but also their commanders and supervisors.

One week after a general court-martial exonerated AWACS Capt. James Wang—the only participant in the incident to stand trial—General Fogleman began his own review of the entire process. According to the top Air Force legal officer, Maj. Gen. Nolan Sklute, that was the first opportunity for senior leaders to freely examine all actions "without raising the specter of command influence" throughout the investigation and Uniform Code of Military Justice (UCMJ) process.

General Fogleman found inconsistencies when he compared adverse administrative actions and performance evaluations of the officers in question. He sent a message to commanders on July 11 criticizing evaluators who appear "to condemn inappropriate conduct one moment, condone it the next, or, even worse, reward it."

That was an informal assessment, soon followed by a formal oversight statement. On July 24, the Pentagon instructed the Army, Air Force, and Joint Staff to review all actions taken as a result of the Black Hawk shutdown. In turn, Secretary of the Air Force Sheila E. Widnall named General Fogleman to officially examine USAF actions. His conclusions, announced August 15, were as follows:

- The military justice system worked.
- The administrative punishments were within the limits set for commanders.
- The personnel evaluation process broke down.

Essentially, the General found that supervisors and commanders making performance evaluations had not held the seven officers accountable for their failures to meet Air Force standards. In his report to Secretary Widnall, General Fogleman said, "The fact that the conduct of some individuals did not give rise to criminal prosecution should not end the inquiry into the appropriateness of their actions." He added, "Air Force standards require far more than mere compliance with the law."

Consequently, the General personally wrote letters of evaluation (LOE) that spelled out the breach of duty performance and standards. The LOEs became permanent parts of the officers' personnel records, subject to consideration by promotion boards—effectively ending the careers of the seven Air Force officers in grades ranging from first lieutenant to brigadier general.

The Air Force also grounded the two F-15 pilots—Lt. Col. Randy W. May and Capt. Eric Wickson—for three years. Three AWACS officers—Captain Wang, Capt. Joseph M. Halcli, and 1st Lt. Ricky L. Wilson—were disqualified from controlling aircraft for three years.

Brig. Gen. Jeffrey S. Pilkington, who commanded Operation Provide Comfort, and Brig. Gen. Curtis H. Emery II, who as a colonel headed the air component, were the other two officers to receive LOEs from the Chief of Staff. Colonel Emery had been selected for promotion prior to the shutdown.

To help ensure similar inconsistencies do not occur, the Air Force also began an assessment of administrative and personnel actions. Specifically the service plans to address current procedures for:

- Documenting adverse actions in performance evaluations, selection records, and unfavorable information files.
- Bringing adverse information to the attention of raters and reviewers.
- Correlating flying evaluation boards to actions involving deficiencies in judgment.

As early as October 1994, following completion of the accident investigation, the Air Force had already changed some operational procedures. USAF identified twelve areas covering revisions to publications, operations orders, training, certification, and more. They included:

- Reducing the average annual temporary duty rates for AWACS crew members (from 162 days per year to 120).

■ Formalizing training and certification for an Airborne Command Element on board AWACS. (A three-week course, the Joint Air Operations Staff Course, is now taught at Hurlburt Field, Fla.)

■ Consolidating fundamental policies and procedures into the "Standing Rules of Engagement for US Forces," to familiarize troops with long-standing ROE before operations begin. Then, implementing real-time ROE to better reflect changing political and military policies, threats, and missions in a particular theater.

■ Developing a standard training program on theater orientation, specifying requirements for theater training and certification prior to deployment, and revising aircrew employment and training publications, especially relating to slow-moving targets.

■ Defining and fielding a computer-based aircrew visual identification training system, using cockpit-perspective videos and slides showing aircraft at varying aspects and distances. (USAF field tested a personal computer-based prototype in October 1994; all combat air forces received an updated system early this year.)

Responding to a question about whether these actions would prevent future similar incidents, General Sklute said such fire has occurred throughout history. He said, "While we have taken actions that will significantly minimize the chance that an incident such as this can occur, no one can say with any degree of absoluteness that we will never have another fratricide incident."

The Air Force actions, presumably, are complete. The Army and Joint Staff had not finished their reviews at press time. The Congress and GAO just began their assessments in September.

Here are the actions taken previously against the seven:

General Pilkington, as Combined Task Force commander for Operation Provide Comfort, received a letter of admonition, which goes in a senior officer unfavorable information file (UIF) and is seen by promotion boards. He was also relieved of command from Provide Comfort. He is currently vice commander of Air Intelligence Agency.

General Emery, as Combined Forces Air Component commander, received a letter of admonition, to be placed in a UIF. Colonel Emery had been selected for promotion in 1993 and pinned on his star July 15, 1994. He is serving in the Pentagon.

Colonel May, one of the F-15 pilots, was grounded immediately following the incident and has not been on flying status since. He faced an Article 32 investigation, the equivalent of a grand jury, under the UCMJ and preparatory to a court-martial, but charges were dismissed. He received a letter of reprimand (LOR), which will remain in his UIF for two years but will not be seen by promotion boards.

Captain Wickson, as lead F-15 pilot, was also grounded immediately, then returned to the US to attend instructor pilot school, which he just completed. In return for his testimony, he did not undergo Article 32 investigation. He received an LOR.

Captain Wang, senior director on the E-3 AWACS, was court-martialed, following an Article 32 investigation. Ten Air Force jurors found him not guilty on June 20, 1995. He had received an LOR.

Captain Halcli, then a first lieutenant and AWACS en route controller, faced an Article 32 investigation, which was dismissed. He received an Article 15, a nonjudicial punishment, amounting to a reprimand for dereliction in duty performance.

Lieutenant Wilson, then a second lieutenant and AWACS tactical area of responsibility controller, also faced an Article 32 investigation, which was dismissed. He received an LOR.



## High One "Breaks Faith" With Troops

One cost-cutting proposal endorsed by the House National Security Committee was expected to save \$649 million over seven years. It also would lower expected retirement paychecks for nearly 653,000 active-duty, Guard, and Reserve members who entered service before September 8, 1980.

Now infamously known as "High One," the plan called for retroactively changing rules of retirement. Under current rules, these service members receive retirement paychecks based on base pay in the final month of duty. In the new scheme, retirement pay for the pertinent service members would be based on the average of base pay in the final twelve months, the "high one year" (High One).

For example, an E-8 retiring at twenty-six years under the current system would receive \$1,914 monthly. Under High One, that same member would receive only \$1,753—an 8.4 percent reduction, according to DoD officials.

The issue, say defense officials, is not whether the military retirement system needs revision but whether Congress should change the rules of the game after the fact. In most instances where pay or retirement plans get changed, current employees usually are "grandfathered," or exempted.

In fact, in the past, Congress has grandfathered changes to military retirement plans. One change, which based retirement pay on an average of the three highest earning years, applied only to service members who joined after September 8, 1980, and before July 31, 1986. A similar plan exists for those who entered after 1986.

Congressional leaders expected to dispose of the issue in floor action scheduled for October.

In letters to the House and Senate, Defense Secretary William J. Perry called the change "unprecedented." He said that while Congress has made significant reductions to retirement benefits for new military members who enlisted during the past fifteen years, "at no time in that period has the Congress broken faith by changing the retirement benefits of current members."

Moreover, said Secretary Perry, High One might undermine recruiting and long-term retention.

All six members of the Joint Chiefs of Staff not only opposed the "break-faith alteration" but also refuted the claim of savings. In a letter to both houses of Congress, the Chiefs showed, for example, that an E-8 could simply stay an extra year on active duty to get the next longevity pay increase, known as a "fogey," and thereby earn a monthly retirement paycheck of \$1,988, which would surpass the expected High One pay, effectively undermining the presumed savings.

The Chiefs also noted that any delayed retirements would jeopardize the ongoing personnel drawdown.

In her own letter to Congress, Air Force Secretary Sheila E. Widnall echoed Secretary Perry's concern about recruiting and retention. She noted that the High One proposal would affect about twenty-eight percent of the active-duty force—enlisted members and officers who currently form the service's core leadership and who help "inspire the young troops to stick with the Air Force."

Secretary Widnall called the retirement system "the Air Force's single most effective career retention incentive." She warned that the perception that long-standing promises may be broken could have a devastating impact on military readiness.

that the Freeman Field commander attempted to reverse a War Department policy integrating officers' clubs by issuing a letter that distinguished trainees from base officers. At the time, all Freeman Field permanent officers were white, while all the flying trainees were black officers. When the trainees tried to enter the club, military police barred their way. Then Lieutenant Terry brushed against a superior officer to gain entrance. He was later charged and convicted by a general court-martial of assault.

Those given letters of reprimand were charged with "conduct unbecoming an officer, failure to obey a lawful order, and breach of good order and discipline." At that time, the

letter of reprimand was one of the strongest administrative actions a commander could impose, according to Air Force legal officials.

Besides Colonel Warren, author of *Freeman Field Mutiny*, another fourteen Tuskegee Airmen involved in the incident have already had the LORs removed. Mr. Coleman said that the Air Force will remove the letters from the remaining eighty-nine when it receives their written requests.

### F-16s Flying AFAC Missions

As the conflict in Bosnia-Herzegovina continues to evolve, the roles of US aircrews flying Operation Deny Flight missions have also changed. From Aviano AB, Italy, F-16s once

flying close air support are now also flying airborne forward air control missions.

Typically, USAF A-10s and Marine F/A-18s have flown AFAC sorties, but as the Deny Flight role expanded—moving away from the early-on pre-planned attack positions to cover United Nations troops, refugees, and mobile targets—the need for forward air control sorties increased. Some fifteen AFAC-qualified F-16 pilots from Aviano's 31st Fighter Wing now share around-the-clock AFAC duties with A-10 and F/A-18 counterparts.

Instead of being bomb-droppers, Lt. Col. Gary C. West, the 31st FW's 510th Fighter Squadron commander, said that F-16 pilots flying forward air control missions now must sit back and guide other fighters to "an important piece of real estate." He noted that the biggest drawback of using the F-16 is that it can't loiter in a target area as long as an A-10. However, he added that aerial refuelers in the Adriatic handle that obstacle.

### Sharing the Ops Tempo Burden

Although the level of the operations tempo in the Air Force may not decrease in the near future, the service has spread the burden of that work load, according to Gen. Joseph W. Ralston, Air Combat Command commander.

The General said that F-15s from Pacific Air Forces are now in Turkey conducting missions formerly flown by ACC and US European Command forces.

That action marks the removal of traditional operational boundaries that kept theater forces within their own theater and was one of the initiatives proposed by General Fogleman late last year. He also said that continued and greater use of Reserve and Guard units would help relieve active-duty forces supporting the heavy work load of European theater operations.

General Ralston noted in early August that twelve OA-10s from the Pennsylvania Air National Guard were deployed to southwest Asia. He added that this month, aircraft from Guard and Reserve units in Idaho, Virginia, Iowa, Missouri, Hawaii, Louisiana, Connecticut, and Massachusetts will deploy to support Operations Provide Comfort and Deny Flight.

### Empowered NCOs Excel

It may seem like simple arithmetic, but it took a group of junior enlisted aircraft maintainers to point out that it would be cheaper to replace a



\$79.66 check valve than an entire \$58,337.82 gearbox on an F-15.

The seventeen-member phase dock inspection crew at the 19th Fighter Squadron, Elmendorf AFB, Alaska, knew that when an F-15 gearbox overheats, the problem is usually a faulty check valve. They decided to run secondary power inspections on the aircraft every 400 hours—a new approach—and inspect six major engine components not routinely inspected.

As a result, the squadron cut in half the time Elmendorf's 3d Wing fighters are grounded because of engine failures or secondary power system problems, according to MSgt. Rob Wright, 19th FS inspection section chief. The program also reduced the work load for the wing's engine repair unit and the 19th FS's maintainers. Other Air Force units are now following the squadron's preventive maintenance program.

Sergeant Wright credited senior leaders with empowering the airmen and junior NCOs "to do whatever's necessary to keep the mission in the air."

**Improving a Valuable Asset**

As the Pentagon looks to employ Global Positioning System guidance

systems on next-generation precision guided weapons, such as the Joint Direct Attack Munition (JDAM) and the Joint Standoff Weapon (JSOW), it is now investigating means to guard against the jamming of GPS signals.

Air Force Materiel Command units have requested industry proposals to "identify, evaluate, develop, demonstrate, and deliver innovative GPS antijam filters." According to the solicitation released July 18 by the Air Force's Wright Laboratory, Wright-Patterson AFB, Ohio, and the GPS Joint Program Office, Los Angeles AFB, Calif., USAF expects to make multiple awards at \$1.5 million each.

While pursuing antijam capabilities, the Air Force has also been working on increasing accuracy of current GPS satellites. A combined effort by industry and Air Force Space Command personnel has demonstrated the potential for a fifty percent increase in signal accuracy.

According to Capt. Peter Bernstein of the Special Projects Office, 50th Space Wing, at Falcon AFB, Colo., two senior engineering analysts with National Systems and Research Co., Brian Brottlund and Cliff Harris, have designed software based on an idea

prompted by Jim Butts of bd Systems, Inc., to calculate corrections for errors that can occur in the GPS signal. The corrections modify the GPS navigation signal, using previously unused portions of the navigation message.

The result is an even more enhanced signal that would be available only to authorized users able to get the GPS precision signal on specially modified receivers. The improved system is still in testing for the next three to five months, according to Captain Bernstein.

At the same time, the Air Force has been testing a combination of GPS receivers and inertial navigation systems on 2,000-pound GBU-15 glide bombs at Eglin AFB, Fla., to improve their accuracy without the expense of adding aircraft targeting systems or terminal guidance units.

AFMC officials reported successful results, including one bomb that came within two meters of its target. The goal was to reduce the circular error of probability from thirteen meters to less than five meters. The Air Force will also apply the test data to JDAM, JSOW, and other precision guided weapons.

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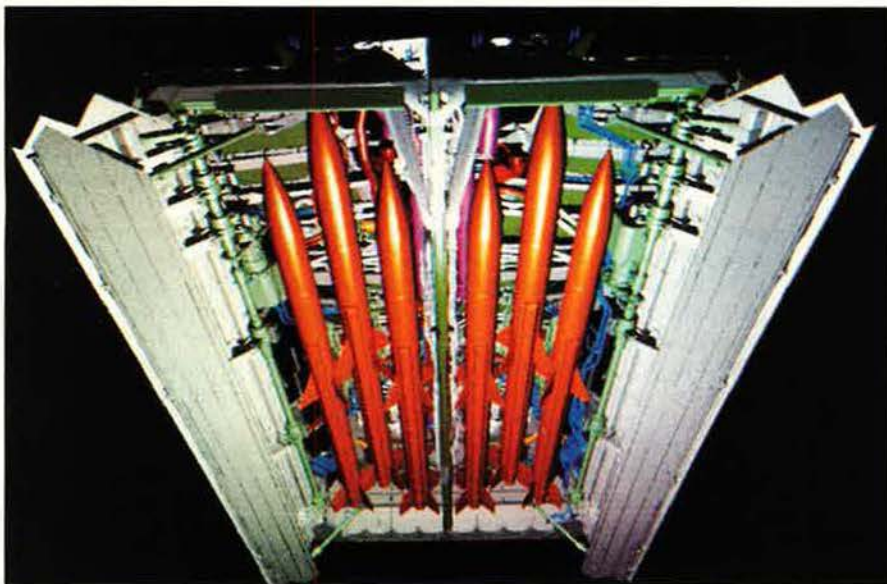


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*An IBM-Dassault computer application generates 3-D renderings like this one, showing an F-22's main weapons bay, loaded with six radar-guided AIM-120C Advanced Medium-Range Air-to-Air Missiles. Computer design tools allow engineers to verify the fit of and produce exact specifications for F-22 parts.*

### NCOs Gain New Responsibility

A technical sergeant in the Defense Meteorological Satellite Program Office at Los Angeles AFB, Calif., became the first enlisted person at the Space and Missile Systems Center to become acquisition certified.

TSgt. Tom Miller is one of a handful of AFMC enlisted personnel who have completed the Acquisition Professional Development Program, a formal certification process developed for officers and civilians in procurement career fields.

Sergeant Miller is site-preparation manager for the Mark IVB weather tactical terminal systems, which receive and transmit data to DMSP satellites.

The Boone, N. C., native spearheaded site preparation and installation of the systems around the world. According to Col. Michael A. Spatola, DMSP system program director, those operational systems have been delivered up to five weeks in advance, even in the most typhoon-intense regions.

### Post-Cold War Maneuvers

Fort Polk, La., where 400,000 soldiers trained for World War II in what was known as the "Louisiana Maneuvers," became the site for the first peacekeeping exercise on US soil August 8 when troops from three NATO and fourteen eastern European countries came together for Cooperative Nugget 1995.

Now the home of the Joint Readiness Training Center, which trains

light infantry and special operations forces, Fort Polk hosted more than 4,000 troops, including 518 Air Force members, throughout August. US Atlantic Command managed Cooperative Nugget '95, the sixth Partnership for Peace exercise—exercises designed to encourage closer relationships between NATO and former Warsaw Pact countries.

Defense Secretary William J. Perry said that the exercise goal is simple: "By being partners in peacekeeping, we can be true partners in peace."

Exercise participants practiced combined peacekeeping and humanitarian aid operations, including working with a civilian population and non-government agencies, such as the Red Cross.

Participating nations in this PFP exercise were Canada, the UK, and the US (NATO members); Albania, Bulgaria, the Czech Republic, Estonia, Hungary, Kyrgyzstan, Latvia, Lithuania, Poland, Romania, the Slovak Republic, Slovenia, Ukraine, and Uzbekistan (PFP members).

### Cope Thunder Broadens Horizons

Demonstrating the Total Force concept in real-time, the Air National Guard took the lead during the Air Force's July Cope Thunder exercise, a first in the exercise's twenty-year history.

ANG Col. Gene McVay, of the 188th Fighter Group, Fort Smith, Ark., was the provisional wing commander, controlling ANG and active-duty Navy and Air Force units during ten days of aerial combat training over Alaska. The exercise featured ANG, USAF, Navy, and Canadian aircraft.

The previous Cope Thunder also established another first when members of the Japan Self-Defense Force trained alongside USAF Security Police forces in the use of the FIM-92A Stinger antiaircraft missile system. Officials for the June exercise said the Stinger training also enabled pilots to recognize and react to emerging threats from the missiles. This exercise included a variety of aircraft



*With wings that flew thirty World War II combat missions, Col. Ron Turner (left), commander of the 138th Fighter Group (ANG) in Tulsa, Okla., and Brig. Gen. Joseph W. Turner, USAF (Ret.) (right), mark the specialized undergraduate pilot training graduation of their family's newest pilot, 2d Lt. Joseph T. Turner.*

USAF photo by Carlos Cardenas, Jr.



and units from USAF, the Marines, Navy, Army, and Royal Air Force.

### Facelift For a Rocket Stand

The Air Force selected a thirty-nine-year-old rocket test facility, the first ever built to hold an entire ICBM during static engine firings, as the site for propulsion tests for the new Evolved Expendable Launch Vehicle (EELV).

Bringing Test Stand 1A out of mothballs and upgrading the facility will cost \$6.7 million. However, Air Force officials said, the cost represents a small fraction of new construction costs. Once refurbished, the old stand will handle potential EELV propulsion systems with up to 1.7 million pounds of thrust.

USAF originally built the thirteen-story stand in 1956 for \$11 million to test the Atlas ICBM. A 1959 mishap destroyed the stand's superstructure, but the service rebuilt it the next year to test the F-1 rocket engine, which developed 1.5 million pounds of thrust and propelled Apollo spacecraft to the moon. The stand continued as the test site for the Saturn and Apollo programs through 1968.

The stand is part of the Phillips Laboratory's Propulsion Directorate facilities at Edwards AFB, Calif. The

Air Force propulsion facilities cover sixty-five square miles and contain two-thirds of the nation's liquid and solid rocket high-thrust test stands and research facilities.

### News Notes

■ Capt. Nathan Hill ejected safely before his F-16 crashed in a remote section of Yavapai County, forty miles southwest of Prescott, Ariz., on August 21. The Captain, from the 308th Fighter Squadron at Luke AFB, Ariz., was on a routine training mission.

■ An F-15C from Kadena AB, Japan, crashed August 3 in the Yukon-Charley Rivers National Preserve in Alaska after the pilot, Capt. Garth Doty, ejected safely. The Alaska Air National Guard's 210th Rescue Squadron picked up the pilot, who was participating in a Cope Thunder exercise out of Elmendorf AFB, Alaska.

■ A B-52H from the 2d Bomb Wing at Barksdale AFB, La., lost two of its eight engines August 8 when an engine pod fell off the venerable aircraft and landed in a soybean field about twelve miles south of Bossier City, La. The eight-member bomber crew circled for about six hours to reduce the B-52's fuel load before landing.

■ Randolph AFB, Tex., will receive the first of the new Joint Primary

Aircraft Training System aircraft when the first trainers roll off the line in 1999. Laughlin AFB, Tex., Vance AFB, Okla., and Columbus AFB, Miss., will follow Randolph in the schedule announced by AETC in August. The Air Force will get final delivery of its 372 JPATS aircraft by mid-2011.

■ Nellis AFB, Nev., is now home to USAF's first unmanned aerial vehicle (UAV) squadron, which took the reactivated unit designation of 11th Reconnaissance Squadron. The new 11th RS will have 108 people and will receive the first of ten \$3 million Predator UAVs in July 1996.

■ Applications under the Air Force's Fiscal 1996 voluntary early retirement program totaled 1,398 as of August 23. The total includes 909 enlisted members and 489 officers. The goals are 1,200 enlisted and 1,000 officers. Personnel officials said they would review other options late this month if the service does not meet its goals but added that the Air Force would not resort to nonvoluntary means.

■ Preliminary reports listed the total numerical active-duty strength of the Air Force on June 30, 1995, as 408,657, a drop of 24,434 from June 30, 1994. The overall DoD decrease was 94,323—from 1,641,608 in June 1994 to 1,547,285.

■ During the Fiscal 1995 cycle, USAF selected 11,548 out of 63,374 eligible senior airmen for promotion to staff sergeant for an overall selection rate of 18.22 percent. The selection rate in 1994 was 16.59 percent.

■ The catch in the Air Force's move to give overseas credit to compensate for frequent short deployments is that service members must ensure the temporary duty gets recorded in their military personnel file. They must notify their orderly rooms about TDYs and, upon return, provide them with a paid travel voucher. The personnel system will then automatically adjust the overseas duty selection date, as needed.

■ July's Combined Rescue '95 was the first exercise between US and Hungarian troops. It was also the first exercise held outside NATO territory but under the framework of the NATO Status of Forces Agreement. Two MH-53J Pave Low III helicopters from the 352d Special Operations Group, RAF Mildenhall, UK, and two C-130s from the 913th Airlift Wing, Willow Grove ARS, Pa., participated in the seven-day airborne search-and-rescue exercise in western Hungary.

■ More than 300 Reservists from aerial port squadrons converged at

## Senior Staff Changes

**RETIREMENTS:** M/G Phillip E. Bracher, M/G Kenneth L. Hagemann, Sr.

**CHANGES:** M/G Hiram H. Burr, Jr., from Ass't Dep. Under Sec'y (International Affairs), Office of the Under Sec'y, OSAF, Washington, D. C., to Principal Ass't Dep. Under Sec'y (International Affairs), Office of the Under Sec'y, OSAF, Washington, D. C. . . . B/G Donald G. Cook, from Cmdr., 45th SPW, and Dir., Eastern Range, AFSPC, Patrick AFB, Fla., to Dir., Ops., Hq. AFSPC, Peterson AFB, Colo., replacing M/G John A. Gordon . . . B/G Thomas O. Fleming, Jr., from Cmdr., 12th FTW, Hq. AETC, Randolph AFB, Tex., to Dep. Dir., Plans & Policy, J-5, Hq. USFACOM, Camp H. M. Smith, Hawaii.

M/G John A. Gordon, from Dir., Ops., Hq. AFSPC, Peterson AFB, Colo., to Spec. Ass't for Long-Range Plans, Hq. USAF, Washington, D. C. . . . B/G Paul V. Hester, from JCS Representative, Conference on Security and Cooperation in Europe, J-5, Jt. Staff, Washington D. C., to Cmdr., 35th FW, PACAF, Misawa AB, Japan, replacing M/G George W. Norwood . . . Col. (B/G selectee) Robert C. Hinson, from Cmdr., 28th BW, ACC, Ellsworth AFB, S. D., to Cmdr., 45th SPW, and Dir., Eastern Range, AFSPC, Patrick AFB, Fla., replacing B/G Donald G. Cook . . . B/G James D. Latham, from Cmdr., 20th FW, ACC, Shaw AFB, S. C., to Ass't Dep. Under Sec'y (International Affairs), Office of the Under Sec'y, OSAF, Washington, D. C., replacing M/G Hiram H. Burr, Jr.

M/G George W. Norwood, from Cmdr., 35th FW, PACAF, Misawa AB, Japan, to DCS, Hq. UN Command Korea, and DCS, US Forces Korea, US Army Garrison, Yongsan, South Korea, replacing M/G Ronald N. Running . . . M/G Ronald N. Running, from DCS, Hq. UN Command Korea, and DCS, US Forces Korea, US Army Garrison, Yongsan, South Korea, to Vice Cmdr., 12th AF, ACC; Vice Cmdr., USSOUTHCOM Air Forces; and AF Component Vice Cmdr., USSTRATCOM, Davis-Monthan AFB, Ariz., replacing M/G James F. Record . . . B/G John W. Rutledge, from Cmdr., 9th RW, ACC, Beale AFB, Calif., to Dep. Dir., Central Imagery Office, Ass't Sec'y of Defense for C<sup>3</sup>I, OSD, Vienna, Va. . . . Brig. Gen. (M/G selectee) Ervin C. Sharpe, Jr., from Dep. Dir., Ops., J-3, Hq. PACOM, Camp H. M. Smith, Hawaii, to Dir., P&P, Hq. ACC, Langley AFB, Va., replacing M/G James M. Hurley. ■



Westover ARB, Mass., during Patriot Tiger in July and August to practice bare-base operations from a forward operating base. Tiger also included Patriot Medstar, an aeromedical evacuation exercise.

■ US Transportation Command sponsored its first Worldwide Air Mobility Conference in Oklahoma City in August, bringing together members of each service to coordinate all DoD airlift and air refueling missions for the next fiscal quarter. In past years, schedulers attended twelve conferences per year. The new quarterly meetings also feature a data automation program that provides a finished schedule the same day, rather than weeks later.

■ A B-52H successfully fired an AGM-84D Harpoon missile July 25 off the coast of Puerto Rico in the Atlantic Fleet Weapons Training Facility range. The launch validated the interim modification made to the latest edition of the heavy bomber as the Harpoon makes the transition from the B-52G to the newer model.

■ The Federal Aviation Administration will now include the Office of Commercial Space Transportation, responsible for licensing commercial space launches. Secretary of Transportation Federico F. Peña announced

the change as a means to help streamline the Department of Transportation. DoT established the OCST in 1984.

■ A Lockheed Martin Atlas IIA expendable launch vehicle boosted a Defense Satellite Communications System III satellite into orbit July 31 from Cape Canaveral AS, Fla.

■ Of the 255 candidates in the latest class of the Air Force Academy Preparatory School, seventy-one are former enlisted members, compared to thirteen in 1994. The Air Force appointed another thirteen enlisted members directly to the Academy from active duty.

■ The Air Force Reserve has capitalized on the astounding lure of Internet surfing by including a "Want to Join" icon on its home page. It netted a former F-16 crew chief, SSgt. Stephen Hudson, within minutes after a Reserve recruiter received his electronic "lead." Sergeant Hudson is now back with his old unit, the 457th Fighter Squadron at NAS/JRB Fort Worth, Tex.

■ McConnell AFB, Kan., received nearly eight inches of rain in a nine-hour period in mid-August, suffering the most damage in its mobility processing center, which had chest-high water throughout its lower floor. Offi-

cialists said they had just issued most of the stored mobility equipment, leaving a few hundred mobility bags, rather than the normal thousands.

■ Capt. Brad J. Robert won the Koren Kolligian, Jr., Trophy, a top USAF safety award, for his airmanship in bringing not only himself but his F-15E back safely after suffering a birdstrike at 500 mph that shattered the canopy and ripped the visor off the weapon systems officer, who bailed out, thinking Captain Robert no longer had control of the aircraft.

■ Winners of the 1994 Bioenvironmental Engineering Enlisted Awards were SMSgt. Stephen G. Newell, Nellis AFB, Nev., SSgt. Christine Harris, Hanscom AFB, Mass., and SrA. Wendy S. Worley, March AFB, Calif.

■ Air Mobility Command has reached zero—zero notices of violation, that is. Federal, state, or local regulatory agencies may inspect Air Force bases at any time and issue notices for violating environmental rules or regulations. AMC had thirty-five violations in 1992.

■ According to personnel officials, the previously announced winner of the 1994 Mackay Trophy, Air Force Rescue 206, 56th Rescue Squadron, NAS Keflavik, Iceland, will share the

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award with Rescue 208, which helped Rescue 206 recover six Icelandic seamen.

■ USAF National Defense Transportation Association awards for 1994 went to the 38th Aerial Port Squadron, Charleston AFB, S. C., in the Air Force Reserve category and to Leo Chamberland, 436th Transportation Squadron, Dover AFB, Del., for instructor of the year.

■ Air Force Reserve Lt. Col. Hays C. Kirby received the Airman's Medal for his heroism in October 1994 when he helped remove a US civilian translator from a crowd of armed Haitians who were attempting to overrun a police headquarters in Port-au-Prince.

■ USAF Productivity Enhancement Awards for 1994 were won by Capt. Edward J. Kulas, Jr., Scott AFB, Ill.; MSgt. Richard A. Wagner, McClellan AFB, Calif.; Charles B. Kruse III, Langley AFB, Va.; and the major command, Pacific Air Forces. The Air Force also named MSgt. Dewayne R. Blair, Dyess AFB, Tex., suggester of the year.

■ During 1994, Air Force people submitted more than 26,000 suggestions that saved \$162 million, according to Kathy Nealy, Air Force Suggestion Program manager. In twenty-one years, nearly two million suggestions, earning suggesters about \$58 million, have saved the Air Force more than \$3.3 billion.

#### Obituaries

**Dr. Joseph J. Kruzal**, deputy assistant secretary of defense for European and NATO Affairs, Ambassa-

dor Robert C. Frasure, and Air Force Col. Samuel Nelson Drew, a National Security Council aide, were killed August 19 when the French armored personnel carrier in which they were traveling slid off the treacherous Mount Igman Road outside of Sarajevo in Bosnia-Herzegovina. The vehicle plunged 300 feet into a ravine, then exploded.

The three were key participants in diplomatic efforts to bring peace to Bosnia.

Dr. Kruzal was a 1967 Air Force Academy distinguished graduate, who served as an intelligence officer in Vietnam and as a member of the US delegation to the Strategic Arms Limitation Talks. As a civilian, he served as assistant to Defense Secretary Harold Brown and as legislative assistant for defense and foreign policy for Sen. Edward M. Kennedy. He also taught at Harvard, Duke, and Ohio State Universities. Defense Secretary Perry credited Dr. Kruzal with creating NATO's Partnership for Peace program, extending help to former Warsaw Pact countries.

**John T. Bohn**, the first Strategic Air Command historian, died August 6 in Bellevue, Neb., at seventy-seven. After his discharge in December 1945, he started work as a civilian historian with Continental Air Forces in January 1946. He became command historian in February 1948, just before SAC headquarters moved from Bolling AFB, D. C., to Offutt AFB, Neb. Air Force historians call him an architect of the Air Force history program for championing its practical value. ■

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**Bomber operations have shifted to an emphasis on conventional missions.**

# Heavyweights for the New Strategy

*The stealthy B-2 was designed first for the nuclear mission, but its talents are well-suited to the conventional role. New precision weapons will give it full capability around 2002.*

Photo by Randy Jolly





by John A. Tirpak, Senior Editor

**F**UTURE historians seeking a specific date for the end of the Cold War might select the day the Berlin Wall fell or the Soviet Union dissolved; both make sense as the benchmark. For Air Force bomber crews, however, it happened on September 27, 1991, the day they officially stood down from their decades-long, round-the-clock readiness for nuclear war.

Over nearly forty years, bomber crews rehearsed to get airborne within seconds of hearing the Klaxon in alert facilities around the country. Their mission: If deterrence failed, make single-ship penetrations of the Soviet heartland to strike critical targets. Their grim preparations for this task were intended to leave no doubt that there could be no possible gain in starting a nuclear war with the United States.

Throughout the Cold War, bombers participated in other conflicts—Linebacker and Arc Light bombing campaigns in Vietnam and “battle-field preparation” and strikes against Republican Guard units in Iraq. For the most part, though, bombers in Strategic Air Command retained a unique mission and culture, setting them apart from the rest of the service.

No more.

Bombers are now fully integrated in the conventional force, demonstrating their versatility and relevance in a world seemingly no longer on the edge of the nuclear abyss. Bomber and fighter crews alike wear the Air Combat Command patch, constantly flying and training together, in what may be the closest coordination between them since World War II.





**A B-52 from the 2d Bomb Wing at Barksdale AFB, La., blasts off. "BUFFs" belong to ACC and don't routinely practice for nuclear war, as they once did, but USSTRATCOM can reclaim them to reconstitute the nuclear force.**

While the Single Integrated Operational Plan—SIOP, or nuclear war plan—still exists in a much-modified form, and bomber crews maintain their ability to carry it out, their emphasis has shifted almost entirely to the conventional mission.

"I think the transition has been successful," Lt. Gen. Stephen B. Croker, commander of 8th Air Force, Barksdale AFB, La., told *Air Force Magazine* in a recent interview.

### No Single-Ship Mentality

"Before, we did principally the SIOP and had some secondary capability in the conventional area," General Croker said. Now, "we have very successfully trained the crews to operate not in the single-ship mentality but in . . . composite packages, where many times the bomber people are the . . . package commanders."

The bombers of 8th Air Force belong to Air Combat Command and not to US Strategic Command, which now has responsibility for the nation's nuclear forces. At need, however, USSTRATCOM can pull them back.

The command responsibilities for bombers were transferred to the joint-service US Atlantic Command, of which ACC is a part, in October 1993 because "it was our perception that we were more likely to need bombers in a conventional crisis over the next . . . decade than we were to need them for nuclear war," said STRATCOM Commander in Chief Adm. Henry G. Chiles, Jr.

If the Secretary of Defense so orders, STRATCOM would again assume control over the bombers, "but I see that as only being necessary . . . in the case of very dire circumstances facing the United States, in which case we would want to reconstitute our full nuclear capability," Admiral Chiles said.

Exercises are routinely run "to verify that we still know how to do that regeneration," but they are mostly of the command-post variety, he continued. "Occasionally we will actually go through with the formality . . . of practicing with actual units."

General Croker said he believes that, despite reduced emphasis on the SIOP role, his crews are actually better prepared to carry it out because they get more varied training than they once did.

During the bulk of the Cold War, he noted, bomber crews rarely deployed outside the United States because of the political sensitivities of other countries to hosting a nuclear-dedicated platform. And, because their mission was usually separate from that of the fighters and other type aircraft, bombers typically did not play in Red Flag or other large-scale exercises.

When he was a bomb wing commander in the mid-1980s, General Croker said, "my crews' proficiency on overwater and long-endurance navigation probably wasn't very good" because most training for the SIOP had to be done within the US.

Now, however, "every wing in Air Combat Command, at least once a quarter, has a long-endurance, global power mission of twenty to thirty hours," he said. "Crews are regularly deploying off-station, involved in exercises," and even deploying outside the country. General Croker had, just a few days before, "landed the first B-52 that's ever been in Iceland," he reported. There, crews practiced low-level missions, went on to bombing ranges in the UK, and returned to the continental US. Meanwhile, B-52s from Minot AFB, N. D., had recently deployed to Thailand for cooperative exercises there.

"They never got that type of training before," General Croker said. He added that, in his opinion, bomber crews "are better prepared to handle the multiplicity of tasks they have today" than before the stand-down from nuclear alert.

### Simulated SIOP

The nuclear mission is still a feature of the academic training that new bomber crews receive, but it is no longer part of their initial flying training. In 1988, only two of fourteen sorties on the syllabus of new bomber pilots were dedicated to conventional missions. Today, fourteen of fourteen sorties are focused on conventional missions; SIOP training is given in the simulator only.

Both Admiral Chiles and General Croker said that despite the conventional focus, they are not concerned that nuclear readiness has suffered because the skills practiced by bomber crews overlap the two missions considerably. There has been "no degradation" in nuclear mission proficiency test scores, General Croker said.

The capability for reconstitution is maintained because "no one can predict" whether the Cold War will remain over, Admiral Chiles added.

And, despite several years of conventional indoctrination, crews have not forgotten that fact, either. The best-selling item at the 8th Air Force Museum at Barksdale is a T-shirt with the Strategic Air Command emblem and the simple phrase, "SAC will be back."

"One of the challenges that Air Combat Command had early on . . . was not just merging two cultures but creating a new culture," General Croker observed. "I think that worked



out really well. I think we have a better-balanced warfighting focus today that doesn't put undue emphasis on any one platform or weapon system."

There is now a Bomber Weapons School, to match the long-established Fighter Weapons School, which underlines the equanimity of platforms, he noted.

General Croker also said that the new culture of ACC has created an upward flow of ideas that "wouldn't have happened in the old days."

"The crews at McConnell, the 384th Bomb Wing, came up with the idea of global power missions," he said. "That wasn't a Steve Croker idea or a Gen. [John Michael] Loh idea. That was Brig. Gen. [Charles] Ron Henderson's crews. . . . They ran the concept up the flagpole, flew the first mission. That was a bottom-up type issue. . . . We adopted it command-wide, and we've been doing it ever since. . . . I feel pretty good about that."

### Swing Time

The 1993 Bottom-Up Review, which recast the forces and strategy of the US military, viewed bombers as the first wave of response in a no-warning conventional conflict. In the early hours of such a crisis, bombers are to launch from US bases and strike at "time-sensitive" targets in the area of hostilities. The targets would range from air de-



Photo by Randy Jolly

*B-1Bs like this one from the 28th Bomb Wing, Ellsworth AFB, S. D., have proven that they can hold up under wartime conditions if properly funded, and they are maturing as the backbone of the bomber force.*

fenses and power grids to armored vehicles on the march.

The idea is that bombers will buy time for the bulk of US forces to get to the theater and begin conducting operations from closer sites. This part of the strategy is known as "the halt phase," during which an aggressor is stopped or greatly slowed.

The critical nature of this new role set the stage for intense debates on the utility of bombers when compared to other, forward-deployed forces, such as carrier-based aircraft; whether the Bottom-Up Review level

of 100 deployable bombers is enough; and whether the US requires more than twenty B-2s.

Acknowledging that two near-simultaneous conflicts would greatly tax the existing bomber force, the Defense Department has developed plans to employ the airplanes with a "swing" strategy. Under this scenario, the bomber force would halt aggression in one theater first and then "swing" to the second conflict. Once the second crisis eased, the bombers would be divided among the two theaters as necessary.

Former Air Combat Command chief General Loh, at this year's AFA air warfare symposium in Orlando, Fla., said he has some "concerns" about the swing strategy, mainly because "it is untested" and poses "a certain amount of risk." He repeated his concerns to a number of congressional defense panels in the months that followed and advocated preserving the capability to build additional bombers.

However, General Loh's successor, Gen. Joseph W. Ralston, said he is not worried about the swing strategy and doesn't think that its application will pose big problems for the Air Force.

General Ralston said that the swing strategy is "very easy if you're doing it from CONUS"—that is, operating strictly from US bases. In such a case, the Air Force would only need to change the destination of bombers from one theater to another.

Staff photo by Guy Aceto



*As the most "mature" element of the bomber force, the B-52 can use a large variety of weapons. Cruise missiles, precision guided munitions, antiship weapons, iron bombs, and these cluster munitions are in its repertoire.*





**The B-1's capability will grow significantly with such new precision weapons as JDAM, but speed and load make it a formidable conventional platform today. It can deliver eighty-four 500-pounders anywhere within twenty hours.**

The preference would be to move them as far forward as possible, though, to achieve faster sortie generation.

"If we've deployed the bombers forward and it's time to swing, then we redeploy them," he said. "My personal view is it's not all that big a deal. . . . We routinely practice mobilization and we train to deploy. We do it all the time with F-15s and F-16s, on twenty-four-hour notice, . . . and there's no reason to use bombers any differently."

#### "More Interesting"

In the B-52H—at thirty-two-plus years of age one of the oldest platforms in the Air Force—the "multiplicity" of missions is apparent in the form of an ever-increasing variety of weaponry. In the nuclear role, the B-52H can carry both the AGM-86B Air-Launched Cruise Missile and AGM-129 Advanced Cruise Missile, as well as nuclear gravity bombs. In the conventional mission, it can carry the AGM-86C Conventional ALCM [see "The Secret Squirrels," April 1994, p. 56], the AGM-142 TV and imaging infrared-guided Have Nap precision bomb, laser-guided bombs, cluster munitions, unguided iron bombs, and the AGM-84 Harpoon antiship missile, as well as sea mines.

"It's definitely a more interesting mission," said Capt. Bob Morris, a B-52 tactics officer at the 2d Bomb Wing at Barksdale.

Captain Morris, old enough to have

"done his time" in alert facilities, said that, with the shift in mission, it's now possible to "mix it up with the good guys and bad guys" in training, rather than practicing the set-piece, one-ship "duck and evade" missions of a decade ago. Barksdale B-52s can test their mettle against Army antiaircraft artillery at White Sands, N. M., and partner with the F-15Es of Seymour Johnson AFB off the North Carolina coast for other types of joint training.

When the B-52 was dedicated almost entirely to the SIOP mission,

crews flew "the same seven routes," on rather unrealistic two- to four-hour missions, and invariably alone, Captain Morris said.

"We never flew in formation and never worked with any other asset . . . except aerial refueling," he noted.

"Now we go anywhere; . . . it's more up to us . . . where we train."

Formation flying receives greater emphasis now because, by sticking together, more bombers can depend on fewer jamming planes with less fighter protection. The bombers will also be able to strike several targets in a finite area simultaneously, such as various buildings in the same industrial complex.

In addition, "going in with a package . . . all at once" tends to saturate enemy defenses, Capt. Jeff Stogsdill of the 96th Bomb Squadron pointed out. This was a tactic proven in Operation Desert Storm, he said.

Not all B-52s can use all the weapons certified for the type because of hardware- or software-unique configurations. Only ten planes can carry Have Nap, for example, and those planes can't carry Harpoon, so there is "some degree of specialization," Captain Morris noted. Work is proceeding on a Heavy Stores Adaptor that will make a universal fit for any weapon.

Asked which modification has affected the B-52 most in its transition to the mainly conventional role, Capt. Greg Bell, a 2d Bomb Wing naviga-



Staff photo by Guy Aceto

**Bombers are now entering the Guard and Reserve. Here, a 2d BW B-52H shares ramp space with a 17th Operations Group (AFRES) bomber (background). The Reserve unit can do everything in wartime—except the nuclear mission.**



tor, answered, "the GPS/INS [Global Positioning System/inertial navigation system]. . . . You don't have to sit on the runway for an hour doing an alignment; . . . you're rolling."

Captain Morris added that the new weaponry for the most part diminishes the "amount of time you're vulnerable" to enemy weapons. "Once you release" most of the guided weaponry, "you can maneuver freely" while transmitting information to the munition as it homes in on its target, he said.

Barksdale is unique in having capability for all weapons available to the B-52 and has become the center for all training, weapons integration, and tests related to it.

### Out in Front

The B-52 is out in front in terms of conventional weaponry because its age and huge radar signature had begun to relegate it increasingly to the standoff role well before the Cold War ended. The B-1B and B-2 were to supplant it in the role of a penetrating strategic nuclear bomber.

Now, with the shift to the conventional mission, the B-1B is slated to shed its nuclear responsibilities entirely; but that hasn't happened just yet.

"In the next year or so, we ought to be out of the SIOP mission with the B-1," General Croker said. The 28th Bomb Wing at Ellsworth AFB, S. D., will be the first "pure conventional" B-1B wing, followed "eventually" by the 7th Wing at Dyess AFB, Tex., he said.

The B-1B can carry iron bombs on its internal racks and has now been certified for cluster munitions and is increasingly involved in joint exercises and overseas deployments. The B-1B has deployed to South Korea and has begun to do routine, non-stop, round-the-world power-projection missions.

"The B-1 schoolhouse has converted to conventional training," noted Col. John Mangels, 608th Air Operations Group commander at Barksdale and a former B-1 squadron commander. Though some time is given over to SIOP training, much of it overlaps the conventional missions. "The bomb run is very similar," he said.

The B-1B is more agile than the B-52, has a synthetic aperture radar, and can fly at near-Mach speeds,



Staff photo by Guy Aceto

*Practice for the SIOP mission happens mostly in simulators like this one for offensive and defensive system operators. Because of high retraining costs, crews can expect to spend most of their careers in one type of aircraft.*

meaning it can go with a fast-moving package of fighters and jammers well into enemy territory, Colonel Mangels explained. The full book on "just what this airplane can do" in the conventional role is being written every day, he said.

But unlike the B-52, whose crew compartment is by comparison quite spacious and able to carry "augmented" crews to take the controls during a lengthy power-projection mission, the entire B-1B crew sits on ejection seats, and there's no room for extra personnel. For rest, one crew member can stretch out along the access door, but that's about it.

Colonel Mangels said the staff at Brooks AFB, Tex., is studying ways to fight crew fatigue on the B-1B and B-2, which has a two-crew cockpit and even less "space available" for additional flyers.

For years the B-1B suffered from maintenance difficulties and problems with an electronic warfare system that just wouldn't work right. Last year, however, the airplane got a chance to prove it could be a dependable performer if given an adequate supply of spare parts, crews, and maintainers, which had consistently been denied by Congress. The B-1B Operational Readiness Assessment silenced many critics and showed that the airplane itself was not to blame for all its problems.

"I think the Operational Readiness Assessment at Ellsworth was a real success," General Croker said.

"We proved with the right spares funding the MC [mission capable] rate could be above seventy-five percent—it was eighty-four percent for the test, very successful—and I think it had a very significant input on the congressional decision to support the [B-1B] conventional upgrade."

### Changes On the Line

The mission of the B-2 was changing while the plane was still in development. Making its public debut as the Cold War was ending, changes were—and are—being made right on the assembly line to optimize the plane for the conventional role.

The B-2 initially can carry only iron bombs but will soon receive the GPS-Aided Targeting System/GPS-Aided Munition (GATS/GAM), recently proved successful in testing, and will eventually receive many of the same precision strike weapons destined for the B-1B and B-52. (*See box, p. 30.*)

It will be several years, however, before the B-2 gets a chance to live up to its billing as a star conventional bomber. Only a couple of weapons have been test-dropped from the airplane's capacious bomb bay, and it will not be fully ready for conventional duty until several block upgrades have been put in place.

"It's going to take some time until we get the mods into the airplane to get it full-up" for the conventional role, General Ralston noted.



In the meantime, ground crews and flight crews are operating with the B-2 and "writing the book" on it, so that, as it receives capability for new munitions, they can be swiftly integrated, tested, and added to the airplane's repertoire.

General Croker said he sees no reason to doubt that the B-52 can continue in service into the 2040s, as currently envisioned by Defense Department planners. Stress-induced fatigue is "mathematically predictable," he said, and with good attention and routine upgrades, the B-52's airframe should be able to hold out.

"Most B-52s average around 11,000 to 14,000 hours. Airlines are flying 747s with over 70,000 hours," Captain Stogsdill pointed out. "There's a lot of life left in these planes." The low "mileage," given its age, is a result of the B-52s' having sat on alert rather than flying very much over the last few decades.

General Croker noted, though, that one thing that cannot be predicted is corrosion fatigue, and making reasonable guesses about it is more difficult because many of the alloys used in B-52 construction are no longer made and there are few parallels to study in other type aircraft.

"We have lead-the-fleet airplanes," and these are being watched for problems like those that have afflicted the C-141 StarLifter in recent years, he reported. So far, "cost of ownership" on the B-52 has turned out to be manageable. It was the cost-of-ownership problem with the G model—increasingly scarce parts and obsolete systems—that forced the type into "the boneyard" in the last few years. Costs were cut on the H model by eliminating the tail-gunner position and the need to support the associated 1960s-vintage hardware.

Reengining the B-52s, proposed many times during their service life, does not look necessary, General Croker added. "The [turbo]fans have been very reliable and very cost-effective," he said. But if there were to be a dramatic breakthrough in engine technology that would sharply lower operating cost and maintenance, "then we might be faced with a reengining decision like we did on the KC-135," he said.

Overall, "I don't see any dramatic threats to the functionality or the life

## Upgrading the Bomber Fleet

The bomber fleet is in the process of receiving extensive modifications to make it more capable in the conventional role.

### B-1B Lancer

The B-1B Conventional Mission Upgrade Program includes three phases. Phase I, now under way, will give the B-1B capability for the CBU-87 and CBU-89 cluster munitions, as well as the CBU-97 Sensor-Fuzed Weapon—an antiarmor munition that permits multiple kills per weapon per pass. Thirty CBUs will be accommodated in each of the B-1B's weapons bays. Phase I is to be completed in the third quarter of Fiscal 1996.

Phase II will provide the B-1B with capability for the Joint Direct Attack Munition (JDAM), a GPS/INS-guided bomb with either a 1,000-pound or a 2,000-pound warhead. The B-1B will be able to carry up to twenty-four JDAMs, eight each on three modified bomb bay rotary launchers. JDAM is expected to be integrated by the second quarter of FY 2000. Phase II also involves adding GPS capability and an antijam radio to the B-1B, which should be in the airplane by the last quarter of FY 1999.

In Phase III, the stealthy Joint Standoff Weapon (JSOW) glide bomb will be added, expected by the first quarter of FY 2003, as well as the Joint Air-to-Surface Standoff Missile (JASSM), the successor to the canceled Triservice Standoff Attack Missile.

During all three phases, there will be software and electronic countermeasures improvements. Though capability for dropping laser-guided bombs using an off-board designator has been demonstrated, there are no plans yet to give the B-1B its own laser designator.

### B-2A Spirit

The B-2A is still in production; conventional improvements are being made on the assembly line and will be retrofitted to earlier models.

Block 10 is the first configuration of the B-2, which permits carriage of up to sixteen Mk. 84 2,000-pound bombs on the bomb bay rotary launcher. It also has capability for the B83 nuclear weapon. The B-2s now on duty at Whiteman AFB, Mo., are of Block 10 configuration.

Block 20 adds the B61 nuclear gravity bomb and the GPS-Aided Targeting System/GPS-Aided Munition (GATS/GAM) to permit an "early, near-precision" strike capability. Up to sixteen GAMs can be carried on the Rotary Launcher Assembly.

The Block 30 aircraft will have a Bomb Release Assembly capable of carrying Mk. 82 bombs, cluster munitions (including Sensor-Fuzed Weapons), mines, JDAM, JSOW, and JASSM.

Other improvements include full in-flight mission replanning capability, threat detection and identification system, enhancements to the Defensive Management System, and various electronic countermeasures, avionics, and software.

The B-2 has provision for a third ejection seat, and ACC is considering installing it as part of a "Block 40" configuration still being defined. The additional crew member would relieve the fatigue problem on extremely long power-projection missions and bring, as one programmer explained it, "a fresh mind to the cockpit" just before the weapons-release phase of a mission.

### B-52H Stratofortress

The B-52 fleet is being upgraded to standardize the aircraft so that all planes can carry all munitions certified for the B-52. Main efforts include Heavy Stores Adapter Beams, which will permit carriage of all current precision guided munitions, nearly all bombs and Navy mines, and the Harpoon missile; the Universal Bomb Bay Adapter, which improves speed and safety of changing out Common Strategic Rotary Launchers, ARC-210/DAMA radio, electronic countermeasures improvements; and integration of advanced weapons, such as JDAM, JSOW, and Wind-Corrected Munitions Dispenser, and possibly JASSM.

Other improvements, which will change out older systems for newer, easier-to-maintain ones, such as the forward-looking infrared, are being studied.



of the B-52," General Croker concluded. He acknowledged that the B-52 is already heavily dependent on defense suppression and electronic warfare to operate in enemy airspace and will increasingly be forced to fly standoff attack missions rather than penetrator missions.

Both the B-1B and the B-2 were designed to have 10,000 hours of service life, meaning they will probably be structurally sound for the next twenty to thirty years, perhaps longer.

### Grayer—and More Experienced

Bomber crews are more experienced now than they were eight years ago, in large part because of the big drawdown of the force and the consequent constriction of opportunities to move up. The 96th Bomb Squadron seems to be made up almost exclusively of captains, and they generally appeared to be older and more experienced than their Cold War predecessors.

"I think we have a second lieutenant around here somewhere," joked one pilot. "I know we have a major, but I haven't seen him lately."

The drawdown has accelerated a trend that General Croker said has been gaining momentum for the last ten years: a narrowing of opportunities to fly different kinds of aircraft.

Though "a very small number . . . of special opportunities" exist for pilots and navigators to go on an



Photo by John Tirpak

*Despite its age, the B-52 is expected to soldier on into the 2030s, when the fleet will be about seventy years old. Corrosion and stress fatigue will pose a major challenge. Reengining has been discussed but was ruled out.*

exchange program with fighters or other services, or B-52 and B-1B pilots who go to the B-2, the day of the pilot with experience in many types—like General Croker himself, who has been checked out on eleven different planes—is fading, he said.

"A large driver is cost," he observed. "The training cost to requalify someone on a new system is quite high. . . . The reality is that people will spend a much greater percentage of their career in one particular aircraft type."

One of the most significant changes

to the bomber mission in the post-Cold War era is that the Guard and Reserve are starting to get bombers of their own.

The first unit equipped was the 17th Operations Group at Barksdale, which gave up some of its A-10s to adopt the B-52. It became "combat ready" July 1.

Col. Jim Mills, who commands the 17th, said most of his personnel "just came down the street" from the regular Barksdale B-52 units, and so his crews and maintenance people are "extremely experienced." The unit has nine aircraft, eight of which are "tasked." The ninth is a "floater" that fills in when a plane is absent for depot maintenance, a "spare tire that you rotate every day."

The Guard and Reserve units that fly bombers are not "coded" for the nuclear mission, but, in a national crisis, the aircraft could be ceded back to STRATCOM. Regular crews would fly the planes in such circumstances.

The Reserve B-52s—the Guard is getting B-1Bs at McConnell AFB, Kan., and Robins AFB, Ga.—will fly aircraft that are as "close in configuration as possible" to the ones flown by the active force. There will be "some specialization," Colonel Mills said, just as there is in the regular force.

### Bombers In Reserve

ACC's 8th Air Force has a number of aircraft that are in what is called



Photo by John Tirpak

*Among the developments that extended the B-52's functional life were the cruise missile, seen here on the bomb-bay Common Strategic Rotary Launcher, and the GPS antenna. B-52s released some of the first weapons of the Gulf War.*





**For a few years, the bomber force will be smaller than that called for in the Bottom-Up Review. The savings are being used to develop the precision weapons that will make the bombers more potent in the long term.**

“attrition reserve” status, meaning that they occasionally fly but, technically, are not funded and do not count against mission capable rates or aircraft available rates. The money saved by keeping these aircraft in limbo is being used to offset the cost of conventional weapons upgrades for the bomber fleet.

“What we decided . . . was that it didn’t make sense to keep all the bombers flying day-to-day until the conventional weapons upgrade was complete . . . at the turn of the century,” General Croker said.

“We’ve put a number of B-1s into this status where they’re still modified and maintained. We fly them periodically, but we’ve retained the option to buy back some of them when the upgrade is complete,” he said.

Although the Bottom-Up Review level of 100 deployable bombers was predicated on the availability of the F-111, which is now being phased out early to save money, General Croker doesn’t see that as a reason to bring some bombers “back” early.

“I don’t see anything in the calculus to change” the bomber plan, he said, and “I see no move on the part of the Defense Department to add more bombers sooner.” The departure of the F-111s is a loss, but until the precision weapons capability that will arrive with the conventional upgrades, “I don’t think it makes sense . . . to backfill bombers just to backfill bombers,” he added.



Photos by Randy Jolly

“We’re satisfied in Air Combat Command with the number of bombers we have today, in the program and on the books.”

Admiral Chiles said he is not concerned that in the age of missile proliferation, the bomber—either as a conventional or a nuclear weapons platform—is in its sunset years.

“We would be wrong, in my judgment, to withdraw the bomber entirely from the strategic force,” he said. “It just plain has utility and flexibility that is appropriate for . . . as far as I can see . . . into the future.”

“What other part of our strategic forces can be used conventionally

with ease or in a nuclear role with equal ease?” he asked. “And the skills of the folks that make that happen are ideally suited to both.”

USAF tends to modernize in cycles. Fighters saw a big wave of replacement in the 1970s. In the 1980s, it was strategic forces, including bombers. In the 1990s, airlift is getting most of the attention, and in the next decade, fighters will again be the focus. On this timetable, by around 2010, “it may be time to start looking at bombers again,” General Ralston said. “At some point, we’re going to have to look at a replacement for the B-52.”

He cautioned that the B-52’s replacement “may not be another big bomber,” however. The chief advantage of bombers has always been their ability “to carry a big payload a long way,” General Ralston said.

“But large payloads are less important now than they were in the past.”

With the advent of precision weapons, a small airplane with a highly accurate munition can “accomplish the same thing” that used to be done simply by saturating an area with explosives.

“One F-15E today can accomplish more than a whole squadron of B-17s” fifty years ago, he pointed out.

“Our most significant shortfall in ACC is precision weapons for our bombers,” he said. Getting those munitions—and on the planned schedule—is “absolutely our top priority.” ■



## Betty's Last Bow

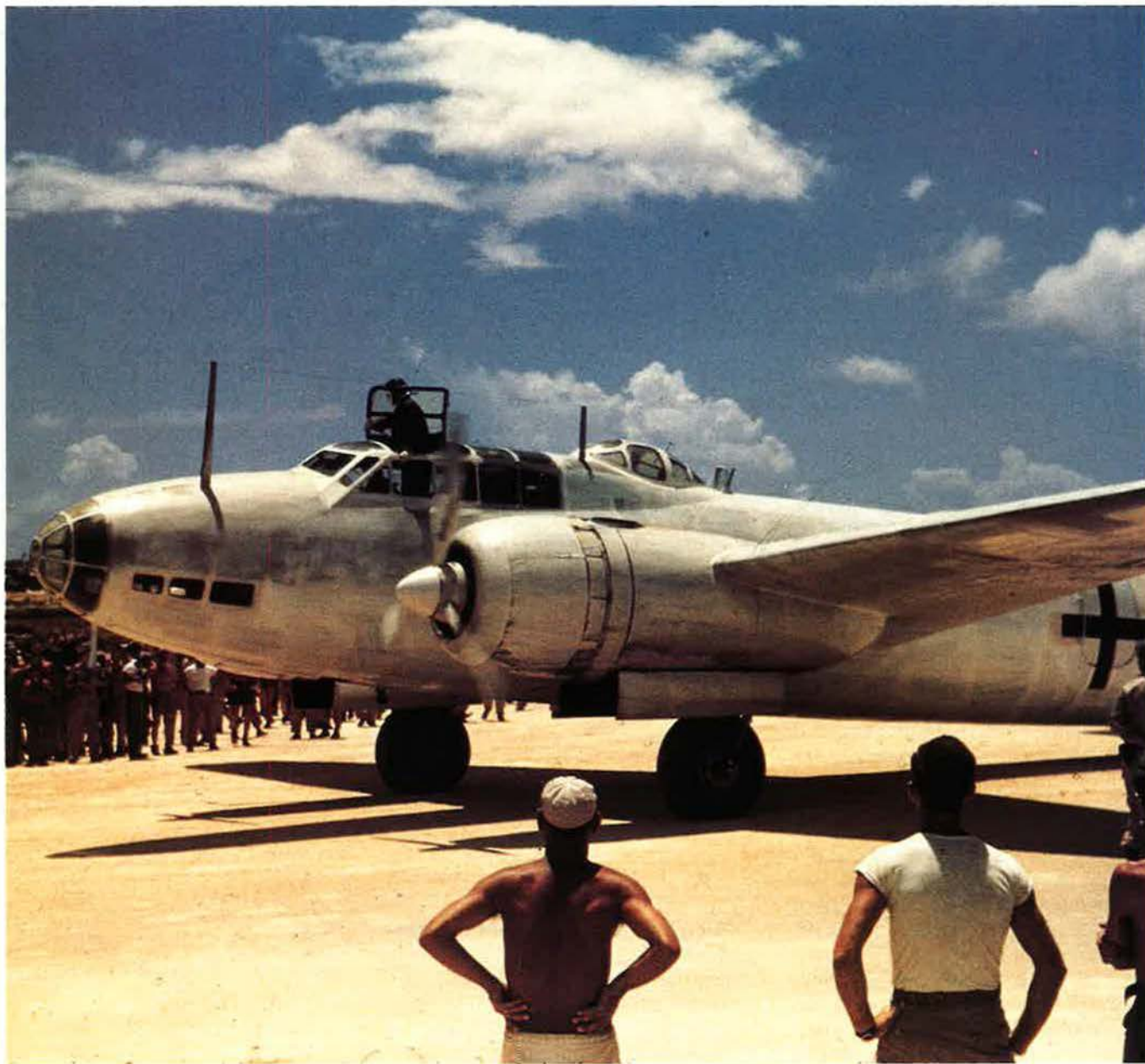


Photo courtesy Jeffrey Eibell via F. Hill

*Named "Betty" by the Allies, Japanese G4M1 bombers were a common, deadly sight during World War II. After Japan announced its surrender in August 1945, two of the bombers were converted to transport Japanese peace envoys to the Philippines and back to Tokyo. A rare color photograph of this Betty, with its striking white finish and dark green crosses*

*covering its wartime camouflage and red hinomaru insignias, captures the transport making a preliminary stop on Ie Shima—quite a spectacle for GIs gathered to catch a glimpse of the enemy they had fought so hard to defeat.*



**To improve its officer-to-airman ratio, USAF will eliminate another 4,000 officer jobs, and many will be handed over to NCOs.**

# Officer Jobs for Enlisted Troops

By Bruce D. Callander



**T**HE AIR Force has begun to take another 4,000 officer jobs off the books, but it is not a normal kind of force reduction. The immediate aim is not a thinning of the ranks; it is to reduce the number of officer positions and thereby improve the service's officer-to-enlisted ratio.

One by-product will be that more NCOs and civilian employees will occupy jobs formerly reserved for commissioned officers.

The change stems from the Air Force's latest review of officer requirements. That study looked at positions throughout the force and recommended three major actions, all of them approved by the Chief of Staff.

First, about 1,400 officer slots will be converted to NCO billets. Second, another 1,600 officer positions will transfer to civilian employees. Third, some 1,000 positions will be deleted from the manning tables altogether.

Not all of the changes will be made on a one-for-one basis, however. In some cases, the duties of a given position will be redistributed to other members. The position will disappear, but most of the tasks will remain.

Whichever course is followed for a given position, the effect will bring down the officer side of the officer-enlisted ratio, which Air Force critics claim has gotten out of hand.

Compared to the other services, the Air Force always has had more officers, as a percentage of the overall force, in large part because, unlike the other services, Air Force officers fill most of the front-line combat positions. In recent years, the officer portion of the force has grown. Before the most recent cuts, for example, the Air Force main-



**USAF has always had a higher percentage of officers in the overall force because, unlike the other services, it uses officers to fill most of its front-line combat positions.**

tained approximately one officer for every five airmen. By 1995, the ratio had fallen to one officer for every 4.26 airmen.

### **The Officer Share**

Without some attention, the problem promised to get worse. With the drawdown still underway, officials were forecasting that the Air Force would have only about 4.1 enlisted members per officer in 1996, meaning that almost one-fifth of the total strength would be in the commissioned ranks.

Much of the increase had resulted from the force drawdown. Despite USAF efforts to spread the cuts equally among the grades, the enlisted force was shrinking faster than the officer force. One reason was that the Air Force had exempted rated officers from most of the reduction in force (RIF) actions and made special efforts to keep them from leaving voluntarily.

In effect, a substantial percentage of the officer force was untouchable. Some other specialties, such as medics, also were protected.

The service not only cut strength but also overhauled its forces and its

infrastructure. It eliminated some units, downsized others, and closed or realigned bases. Such actions inevitably took the enlisted population down at a faster rate than the officer population.

Also contributing to the imbalance was the march of technology. Over the years, technological advances reduced the work force disproportionately as aircraft became more reliable and easier to maintain. At the same time, aircrews shrank and increasingly were made up of officers only. As a result, the number of enlisted personnel in operational units dropped at a faster rate than did the number of officers.

With more cuts and base closings still to come, the Air Force saw no immediate prospects of improvement in the officer-enlisted ratio. Maintaining a larger-than-necessary officer force was expensive, particularly at a time when an economy-minded Congress was pressing the services to shave costs.

In 1994, Gen. Merrill A. McPeak, Air Force Chief of Staff, ordered Deputy Chief of Staff for Personnel Lt. Gen. Billy J. Boles to take a hard look at the officer requirements

through the turn of the century to see if they could be reduced.

The deputy chief of staff's Manpower Requirements Division had prime responsibility for the review. Its chief, Col. Daniel DeDona, described the mandate this way: "The Chief said, 'As long as the force is coming down, let's make sure we don't have any lost patrols out there. Let's be certain that we know what we need and why we need the number of officers we have.'"

In a force of some 80,000 officers, "making sure" involved more than taking a fast head count. The task required examination of thousands of positions, deciding whether they still were needed and, if so, whether they necessarily had to be filled by commissioned officers.

Fortunately, Air University, Maxwell AFB, Ala., had devised a helpful measuring stick, a matrix on which planners could plot the characteristics of the positions they were examining. Key elements were degrees of risk and accountability for a given position. The options were to leave that position as an officer job, convert it to an enlisted billet, assign it to civilians, or cut it.

One rule of thumb was that, if a position involved a high degree of physical risk, it should be assigned to a uniformed member of the military. Another general rule was that, if that particular position had a high level of accountability, the military member should be an officer.

### **No Review of the Rated**

Some positions were excluded from the study. Because the Air Force is committed to using only officers as pilots and navigators, rated slots were not reviewed. The chaplain field also was not on the table because of its unique requirements. However, virtually all other officer jobs were tested against the risk-accountability formula as well as other factors.

The review was far more than a mechanical process. In addition to plotting the positions against the graph, officials considered what Colonel DeDona termed "the wartime floor."

He explained, "We did not want to have fewer officers than were called for in our assessments of our future employment/deployment requirements."

Such assessments were compli-





cated not only by the fact that the force was shrinking but also because it was reorganizing. As the Cold War ended, emphasis shifted from preparing for global war to responding quickly to regional conflicts. At the same time, the service was being called on increasingly for peacekeeping and humanitarian missions.

This bigger picture had to be factored into the predictions of what positions would be needed and who should fill them.

Nor did Air Force headquarters want simply to earmark a given number of positions for change and pass orders down the chain of command. Rather, it wanted to sketch the broad outlines of the conversion plan and leave the application to the major commands and the USAF functional managers for the skill areas involved.

This meant that, within the guidelines, officers in the field would have to identify specific positions within their own organizations. Then, subject to headquarters approval, they had authority to decide how they should be assigned. In some cases, the logical action might be to convert them to enlisted or civilian billets. In others, it might be to redistribute the duties of an officer job to other members of the organization and simply eliminate the slot from the charts.

In a few cases, Colonel DeDonna said, field units offered different ways to accomplish the same thing and a negotiated solution was worked out.

While the review identified non-rated officer positions across all specialties, the Colonel said, a major portion of the actions affected the "systems" area. These are skills associated with the C<sup>4</sup> operations—command, control, communications, and computers.

The air weapons director job is an example. It involves monitoring scopes aboard the E-3 Airborne Warning and Control System aircraft and directing fire. Traditionally, it has been an officer slot, but now it is being converted to an enlisted position. This change has posed an additional problem because officers in the director position were eligible for hazardous-duty incentive pay but enlisted members were not. The Air Force had to ask that HDIP be extended to airmen in the billet.

### **Specific but Flexible**

Though headquarters guidelines



were specific in terms of functional areas, they did not require that an enlisted member moving into an officer slot be in any particular grade. This, like other mechanics of the conversion, was left largely to commands.

As a practical matter, many of the slots probably will go to senior NCOs but not necessarily to E-8s and E-9s. The Air Force's use of "supergrade" NCOs also is limited by ratio constraints. By law, no service may have more than one percent of its enlisted strength in grade E-9 or more than two percent in E-8. In a force of 300,000 enlisted members, this means that only 9,000 may be E-9s and E-8s.

The Air Force already has requirements for most of its supergraders, so it would be difficult to farm out another 1,400 positions to these NCOs. Commands probably will prefer to dip into the lower NCO ranks to make some conversions.

Another consideration in the process was the impact it would have on the careers of officers in general.

Officials did not want to cut so deeply into the positions that officer career paths would be affected. For that and other reasons, the conver-

sions were scheduled to take place over an extended period.

Conversions of officer positions to civilian employees were given a long lead time for yet another reason. The Air Force has been taking major cuts in its civilian work force as well as in its military ranks. At the moment, Colonel DeDonna said, it does not have enough civilian authorizations to make all of the planned conversions, so they will be phased in as resources become available.

Although the officer-to-enlisted conversions will occur faster, the enlisted-officer ratio will not drop dramatically until it is translated into actual strength cuts. From a 4.1-to-one mix in 1996, it will inch up to 4.16 to one the following year and rise to about 4.18 to one by 2001, Colonel DeDonna said. Mathematically, the fractions do not look large, but again in a force with 300,000 enlisted members, the difference between 4.1 and 4.16 amounts to a reduction of more than 1,000 officers.

Colonel DeDonna conceded that the desire to rationalize the officer-enlisted ratio helped define the targets for the review, but he insisted that the object was not simply to

**The high quality of the enlisted force has allowed USAF to convert many officer slots to enlisted positions with minimal objections from the commands affected.**



make the numbers look better. It just made sense, he said, to make better use of an officer resource that costs money and takes time to train, particularly when the service had a strong NCO population that could absorb some of the work load.

That capable NCO population is the result of decades of evolution. Almost from the beginning, USAF's use of the enlisted troops challenged the Old Army's sharp distinction between the rank groupings. The nature of flying and maintaining aircraft called for a closer association of officers and enlisted members and a greater sharing of work loads.

### Enlisted Troops Step Up

In the view of CMSAF David J. Campanale, the most significant change to the enlisted force came in the early 1970s, when the draft ended and the All-Volunteer Force began. "When we went all-volunteer," Chief Campanale said, "we improved some of the pays and incentives, but more importantly we improved the opportunities for enlisted members to educate themselves, improve their horizons, and do more than just the menial tasks that had been associated with the enlisted ranks."

The whole philosophy changed, he continued. "With the advent of professional military education, enlisted people became more focused on professional development. The Community College of the Air Force gave them credit toward technical degrees and encouraged them to fill in the other blocks and become more professional minded. Then, people began looking around and said, 'Hey, these people can do better things. They can do more.'"

Long before the recent officer system review, Chief Campanale pointed out, NCOs were moving into jobs that officers had held. "At the Senior NCO Academy [at Maxwell AFB]," he said, "the commandant used to be a colonel. Now he is a chief master sergeant. Command NCO academies, once headed by lieutenant colonels, now have chief master sergeants as commandants, and leadership schools are run by master and tech sergeants."

Nor is it only the most senior NCOs who have moved into more responsible positions. "If you visit a place like Space Command's center at Cheyenne Mountain" AS, Colo., the Chief said, "you see two- and three-

stripers doing things that officers used to do. We have looked more at a person's ability than at rank structure. We want the best person, not just the one with the most stripes."

The decisions of the officer review imply that Air Force officials agreed that the enlisted force is ready to take on additional responsibilities. The force cuts and reorganization efforts of recent years already have required enlisted troops to shoulder a greater share of the burden. Some already have moved into jobs that the Army, in the pre-USAF days, never would have considered suitable for enlisted members. Many have not only technical skills but experience in supervision and management.

The Air Force also has launched new efforts to see that experienced enlisted personnel keep their edge. Two years ago, it reviewed its training programs and decided that NCOs should be returned to tech schools at the seven skill levels. Chief Campanale said that USAF recently looked at the program and found that the feedback is positive. Commands have found it hard to give up key NCOs to send them to school, he admitted, but seem to have accepted the fact that the investment is worth it in the long run.

### Few Grumbles

If commands have had any difficulty adjusting to the new round of conversions, Colonel DeDonna said, the objections have been minimal. If the high-quality NCO force had not been in place, clearly, it might have been otherwise.

The enlisted force also has accepted recent challenges well, Chief Campanale said. "I'm very comfortable with it," he said. "The mission is more demanding because it is less predictable. But the Air Force has never been in better shape. Morale is high in the enlisted force. The people are smart, motivated, and dedicated."

There are a few clouds in the picture, he admitted. The increased number of TDYs and deployments has fallen heavily on a relatively small number of enlisted members, he said, and the strain is beginning

to show. He also is concerned about the impact of some congressional cost-cutting measures, particularly the effort to change the retired pay formula for members who already have as many as fifteen years of service. [See "High One 'Breaks Faith' With Troops," *Aerospace World*, p. 17.] It is a bad signal to send, the Chief said, at a time when the service is calling on its senior enlisted members to take on a heavier load.

Whether the new round of conversions will be a one-time exercise or will set a pattern for future changes remains an open question. Colonel DeDonna said that there is no prospect of another formal review, but he conceded that other changes could occur as functional areas are examined and reshaped.

Chief Campanale seemed confident that the enlisted force could take on whatever challenges it may be given. "The levels of education and the learning objectives now are higher than they have ever been," he said. "I credit a lot of that to the ability of our people to do the job."

One thing unlikely to change is USAF's basic rank structure. A recent RAND Corp. study suggested that the service could save money by returning to a warrant officer program or adopting a limited-duty officer system. Such ideas are popular with some enlisted groups, but the Air Force has consistently rejected them.

Since it stopped making warrant officer appointments in the late 1950s, the service has been reluctant even to talk about adding another rank layer to the force. With the growth and maturation of the NCO force since then, officials argue, there is no longer any room or need for an additional group of ranks.

The officer review seemed to confirm that position. The Air Force may not be ready to return to the days of the sergeant pilots, but with the exception of the rated billets it clearly is willing to reexamine any officer position and at least to consider whether it could be held as well by a qualified noncom. ■

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*Bruce D. Callander, a regular contributor to Air Force Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, becoming editor in 1972. His most recent article for Air Force Magazine, "The New Way of Officer Assignments," appeared in the September 1995 issue.*



The Air Force's newest airlifter knocked the socks off its wartime surge test.

# The C-17 Makes Its Point

by Peter Grier

**T**HIS summer, Air Force Capt. Bill "Goose" Changose of the 437th Airlift Wing flew C-17 transports into some pretty tight places. Flying in a simulated wartime surge exercise, the Captain delivered Army Humvees, tanks, and deuce-and-a-half trucks to such austere sites as Barstow-Daggett Airfield, a county-run facility deep in California's Mojave Desert.

The aircraft worked "like a champ," he said. Unloading, refueling, and preparing for takeoff invariably took less time than the goal of two hours and fifteen minutes. C-17s proved their ability to back down runways and turn in a tight radius—useful characteristics for airplanes operating in Barstow-Daggett's relatively cramped spaces.

"The C-17 behaves like it's a four-wheel drive, practically," said Captain Changose. "We call 'em 'four-wheel-drive airlifters.'"

In fact, the long-embattled C-17 does appear to have delivered a spectacular performance during the crucial Air Force reliability, maintainability, and availability evaluation (RM&AE) in which Captain Changose participated. For thirty days,

twelve of the new C-17 Globemaster IIIs flew an intense schedule of missions that took them from their home base of Charleston AFB, S. C., to RAF Mildenhall, UK, and such smaller fields as Barstow-Daggett and the Bicycle Lake Airfield at the National Training Center, Fort Irwin, Calif.

The exercise was designed to simulate the kinds of use C-17s will receive over the course of expected thirty-year life spans. Regular peacetime missions were thus supplemented by periods of simulated wartime intensity.

During the war surge portion of the test, observers determined the C-17s departure reliability to be ninety-nine percent. Utilization rates topped sixteen hours a day, well beyond the exercise target of 15.2 hours per day. The airlifter on one day even went beyond the seventeen-hour mark.

## Weighing the Impact

No one can foresee the effect such success will have on the future of the C-17, however. The Defense Department in 1994 capped the authorized purchase at forty aircraft, with a proviso that Pentagon officials would review the program once again over

*A C-17 from the 437th AW, Charleston AFB, S. C., kicks up dust as it takes off from the rough strip at the National Training Center, Fort Irwin, Calif., during a successful, thirty-day reliability, maintainability, and availability evaluation.*





the course of 1995 and decide whether to continue buying more. The Defense Acquisition Board, DoD's supreme weapon procurement review body, meets in November to determine whether the current forty-aircraft cap will be removed. The results of the RM&AE are critical but not necessarily decisive. The board will also be looking at cost, requirements, quality, and alternatives.

Air Force officials worry, half-jokingly, that the DAB might not entirely believe the dazzling results of the exercise, considering the C-17's controversial history.

"We've probably done too well," said Lt. Col. Dale Shrader, the 14th Airlift Squadron's director of planning for the RM&AE. "The airplane has done an amazing job."

The RM&AE ran from July 7 through August 5 and was carried out by crews and airplanes of Air Mobility Command's 437th Airlift Wing and 315th Airlift Wing (Reserve). It was not just a plane-and-pony show put on to impress congressional doubters. The test was a contractual obligation for manufacturer McDonnell Douglas, pointed out Colonel Shrader.

McDonnell Douglas's C-17 contract contains warranty-like clauses that call for the airplane to meet a number of system specifications. There are at least nine such goals, or "metrics," including figures for mean time between maintenance, maintenance man-hours per flying hour, and mission completion success probability.

The Air Force thus designed the RM&AE to make sure the government and the US taxpayers are getting their money's worth. The airplane was tested in all its projected uses, from training and long-haul missions to airdrops.

The test was not a strict "pass/fail" event for McDonnell Douglas. If for some reason a metric was not met, the company would have been required only to fix the problem—at no cost to the taxpayer.

Twenty-three days of the exercise were carried out at a normal peacetime pace. Seven days were meant to duplicate a wartime situation, with deployments to Mildenhall for a mock major regional conflict east of the US and to rough fields in California for a simulated contingency to the west.

Two of the days (July 17–18) during the wartime week were designated highest-tempo surge days. Eleven of the airlifters (the twelfth was held in reserve) flew sixty-one sorties on those two days, for a total of 465 hours in the air.

### Maxed Out

The sixteen-hour-a-day utilization rate during surge contrasts with a four-hour utilization rate during the peacetime portion of the exercise. "We literally stretched the system as far as it goes," said Colonel Shrader.

The Army provided representative "force packages" for cargo purposes. For instance, C-17s delivered an airfield seizure package to Barstow during the wartime portion of the exercise. It included Humvees, a scattering of big trucks, and recoilless rifles. Prepackaged pallets were carried throughout the exercise, as well.

The C-17 can carry up to ten Humvees, but "you have to chain them down. A tank is much easier," said Colonel Shrader, because the airplane takes only one. An M1A1 Abrams tank weighs 134,000 pounds. The C-17's maximum payload is 169,000 pounds.



## Scorecard on the C-17

Total sorties .....	513
Total flying hours .....	2,252.5
Overall launch reliability (target 100%) .....	99%
Fully mission capable rate (target 72.9%) .....	84%
Mission capable rate (target 80.7%) .....	90%
Surge utilization rate (target 15.2 hrs/day/aircraft)	
Day 1 .....	16.6
Day 2 .....	17.1
Total paratroopers dropped .....	more than 3,000
Total passengers transported .....	more than 2,800
Total cargo moved (tons) .....	more than 5,500
Total cargo airdropped (tons) .....	more than 345
Tanker support sorties .....	162
Total fuel transferred (gallons) .....	943,077

Source: Air Mobility Command

During its week of simulated war, the C-17 fleet delivered six MIAs to an austere forward operating base in the Mojave. Landing with a tank on board, a C-17 typically came down in less than 2,800 feet of runway. The airplane also demonstrated its ability to land on a semiprepared dirt field, unload while keeping engines running, and take off—all within thirty minutes.

Without a load as heavy as a tank, the landings typically took around 2,000 feet, said Air Force officials. Takeoffs took about 500 to 1,000 feet longer. The ability to take off and land in relatively short distances, as well as back up and turn in cramped spots, has long been considered crucial to the C-17's future.

"It demonstrates that the airplane can land, maneuver, and operate on an airfield that to this date only a C-130 could operate on," said Colonel Shrader.

Strategic airlifters, such as the C-5, are intended to deliver cargo to a main operating base, such as Mildenhall. Loads are then broken down and either trucked to the front lines or flown in on C-130s. The C-17, however, can cut out that intermediate stop by flying into forward bases. "It's a hybrid—halfway between a strategic and tactical airlifter," said Colonel Shrader.

Throughout the RM&AE, C-17 equipment breakdowns were kept to a bare minimum. Little in the way of repairs was required to keep the twelve-plane fleet going, according

to Air Force officials. The Air Force goal was to expend no more than twenty-eight maintenance man-hours per flying hour; actual results were around three maintenance man-hours per flying hour.

During the wartime surge, one C-17 developed a problem in an engine bleed valve. Another had minor computer problems. Some tires had to be changed sooner than predicted. Nothing occurred that the on-site maintenance crews from the 437th could not handle.

There was no special contractor support during the RM&AE, accord-

ing to the Air Force. McDonnell Douglas personnel are present at Charleston to provide depot-level support, however, because the Air Force has yet to develop that capability.

### No Ringers Here

Nor were the RM&AE crews full of specially trained ringers. "These are not golden people by any means," Colonel Shrader said, referring to the crews who maintained the aircraft. "These are three-stripers, guys just out of tech school."

Similarly, the airplanes themselves were not handpicked stars of the fleet. With only sixteen C-17s on hand, and twelve airplanes needed for the exercise, the Air Force had little choice but to fly with the models on hand.

Wing officials would have had little chance to fudge on the RM&AE in any event. Representatives from the General Accounting Office, the congressional watchdog agency, which has been critical of the C-17 program in the past, scrutinized every aspect of the exercise. Personnel from the C-17 System Program Office, McDonnell Douglas, and the Air Force Operational Test and Evaluation Center were also on hand to evaluate all aspects of the workout.

Will a ninety-nine percent exercise reliability rate actually boost the future of the C-17 program? That will not be known until later in the



*During the RM&AE, a week at wartime tempo included two surge days during which eleven of the twelve C-17s used in the evaluation flew sixty-one sorties. The sixteen-hour utilization rate contrasted with the four-hour peacetime rate.*

USAF photo by 1st Lt. Laurel Scherer



year, after the DAB meets for its Milestone III decision on future C-17 purchases.

In 1993, then Deputy Secretary of Defense John M. Deutch capped the C-17 program in order to give the contractor breathing space to get the program on track and prove that the airplane had overcome its technical problems. The Air Force still wants to buy the planned program—120 aircraft—at a minimum.

Congressional opponents continue to snipe at the C-17's cost, however—through this year, the US has spent almost \$18 billion on the program. Some say that significant political support has developed in Washington for what they see as a more cost-effective answer to US airlift needs: a mix of C-17s and commercial wide-body cargo jets, dubbed Nondevelopmental Airlift Aircraft [see "Off-the-Shelf Airlift," *February 1995*, p. 32]. Though the Lockheed C-5D remains in the running, the Boeing 747-400F freighter is the one much-discussed NDAA choice. "It's huge," notes a defense firm analyst who studies airlift allocation issues.

Indeed, NDAA backers note that the vast majority of military airlift cargoes are prepacked pallets traveling to routine locations, not tanks carried to remote fields to help defend the front lines. The 747 also has a much greater range than the C-17. The Boeing jet can fly from Washington state to Saudi Arabia, unload, and then leave for Cairo—all on one fueling. To do the same thing, a C-17 would likely have to refuel three times.

A proven commercial product, 747s would be available quickly to fill US airlift needs. And they are cheap, relatively speaking—about \$150 million apiece, compared to some \$240 million for a C-17. According to the GAO, a mixed fleet of forty C-17s and sixty-four commercial wide-body aircraft could meet the Pentagon's projected airlift needs, while saving some \$4 billion a year.

Air Force officials pin their hopes for another eighty C-17s on the new airlifter's military utility. That is a major reason why they emphasize



USAF photo by 1st Lt. Laurel Scherer

*The Air Force made certain the test was fair. It used twelve of its sixteen C-17s for the test, so there were no handicapped stars and no specially trained crews or special contractor support.*

the "four-wheel drive" stuff the C-17 showed during the remote airfield portion of the RM&AE.

### Good Until the War Starts

Military version 747s carrying pallets are all well and good, said Air Force officials. However, they added, if the US has to move quickly into Bosnia-Herzegovina, or if there is ever another Persian Gulf War, Pentagon planners will be desperate to move as much outsize military equipment as they can, and as fast as possible.

C-5s can do much of this job, but they are big airplanes and need big runways and ramps to maneuver.

In addition, the price of the C-17 may be dropping soon, said USAF officials. As part of the settlement it reached with the Department of Defense in 1994, McDonnell Douglas has poured \$100 million into improving its C-17 manufacturing ability. The result has been faster and smoother work—rework and repair costs have reportedly been slashed almost in half. This may allow McDonnell Douglas to price a new batch of C-17s at \$190 million apiece, according to industry sources.

The results of the RM&AE are expected to count for about twenty-

five percent in the DAB decision-making process. One result that is unlikely is a decision to do nothing.

Meanwhile, the RM&AE experience has helped the personnel of the 437th and 315th Airlift Wings grow better acquainted with the characteristics of their new airlifter. Though still an immature weapon system, the C-17 is slowly shedding its prototype image among crews. The Air Force hopes that the public and Congress will similarly begin to see the airplane as something other than an aircraft dogged in the past by failures in wing flaps and landing gear design as well as \$1 billion in cost overruns.

"We're at a bridge point where the thing is finally going to become a fully integrated weapon in the Air Mobility Command structure," said Colonel Shrader.

Pilots appear to genuinely love the aircraft. They insist that now it really is performing as advertised. Captain Changose said that all his RM&AE missions went so smoothly that they were almost boring.

At one point, he said, Air Force public affairs officials out of Charleston picked a mission to Barstow-Daggett to ride along and observe. They could not believe that the turnaround went so smoothly, he said. They kept looking for little glitches to describe to journalists later, for the sake of realism.

"They just had nothing to observe," he said. ■

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*Peter Grier, the Washington bureau chief of the Christian Science Monitor, is a longtime defense correspondent and regular contributor to Air Force Magazine. His most recent article, "Requirements Are the Key," appeared in the September 1995 issue.*



# Gallery of Middle East Airpower

By John W. R. Taylor and Kenneth Munson



Alpha Jets, Qatar Emiri Air Force (Peter Steinemann)

## Bombers

### Su-24MK ("Fencer")

Iran, Libya, and Syria operate this Russian counterpart of NATO's Tornado IDS and F-111. The first 24 Su-24MKs ("Fencer-Ds") to bear Iranian insignia were delivered originally to Iraq and were flown to intended sanctuary in Iran during Operation Desert Storm in 1991. Instead, they have been retained as an unintended contribution to reparations for the Iran-Iraq war (1980-88). Twelve more, ordered directly by Iran, each have 54 chaff/flares in wing fence dispensers, in addition to the usual 24 on the sides of the rear fuselage. Some of the 18 ordered for the Libyan Air Force had been delivered in the spring of 1989, as a final supply of weapons from the former Soviet Union before the United Nations embargo on military equipment for Libya ended such imports. Syria is believed to have received 42, and Algeria has 10.

Export Su-24MKs are generally similar to variable-geometry Su-24Ms of CIS air forces. They are supersonic at both high and low level. Standard equipment includes two superimposed radar scanners in the nose, for nav/attack and automatic terrain following/ranging to airborne targets, a TV sighting system and laser ranger/designator, active and passive ECM, and missile warning receivers. An in-flight refueling probe and buddy refueling capability are optional.

**Contractor:** Sukhoi OKB, Russia.

**Power Plant:** two Saturn/Lyulka AL-21F-3A turbojets; each 24,690 lb thrust with afterburning.

**Dimensions:** span 57 ft 10½ in (16° min sweep), 34 ft 0 in (69° max sweep), length 80 ft 8¼ in, height 20 ft 3¾ in.

**Weights:** empty 49,163 lb, gross 79,300-87,235 lb.

**Performance:** max speed at height Mach 1.35, at S/L Mach 1.08, ceiling 57,400 ft, T-O run 4,265 ft, landing run 3,120 ft, combat radius 200-650 miles.

**Accommodation:** pilot and weapon systems officer side by side, on zero/zero ejection seats.

**Armament:** one GSh-6-23M six-barrel 23-mm Gatling-type gun on starboard side of belly; no internal weapon bay; nine pylons under fuselage, wingroot gloves, and outer wings (pivoting) for 17,857 lb of weapons, including up to four TV- or laser-guided bombs, conventional bombs (typically 38 x 220-lb FAB-100), 57-mm to 330-mm rockets, 23-mm gun pods, and such missiles as Kh-23 ("Kerry"), Kh-25ML ("Karen"), Kh-58 ("Killer"), Kh-25MP ("Kegler"), Kh-59 ("Kingbolt"), Kh-29 ("Kedge"), and Kh-31 ("Krypton"). Two R-60 ("Aphid") AAMs can be carried for self-defense.



CM 170 Magister/Tzukit, Israeli Air Force (Peter R. Foster)



F-4 Phantom 2000, Israeli Air Force

### Tu-22 ("Blinder")

Around ten of Tupolev's first supersonic bombers may remain available in the Middle East/North Africa region. Six in Libyan service are now deployed primarily for maritime surveillance over the Mediterranean. Four of those delivered to Iraq may have survived the 1991 Persian Gulf War, including Tu-22Ks ("Blinder-Bs") able to carry a Kh-22 ("Kitchen") ASM with a speed of Mach 4.6 and range of 185 miles at low altitude or 285 miles at height. The Kh-22 can have either a 2,200-lb high-explosive warhead for antiship use or an antiradiation warhead.

**Contractor:** Tupolev OKB, Russia.

**Power Plant:** two Dobrynin RD-7M-2 turbojets in pods above rear fuselage, on each side of tailfin; each 36,375 lb thrust with afterburning. Provision for four JATO rockets.

**Dimensions:** span 77 ft 1¼ in, length 139 ft 9 in, height 32 ft 9¾ in.

**Weight:** gross 187,390-207,230 lb.

**Performance:** max speed at 40,000 ft Mach 1.52, ceiling, supersonic 43,635 ft, T-O run 7,385 ft, landing run 5,415-7,120 ft, combat radius 807-1,365 miles.

**Accommodation:** crew of three, in tandem, on ejection seats.

**Armament:** one 23-mm NR-23 gun in radar-directed tail mounting; conventional bombs in weapons bay (typically 24 FAB-500 or one FAB-9000) or Kh-22 ("Kitchen") ASM recessed in bay. Max weapon load 26,455 lb.

## Fighters and Attack Aircraft

### A-4 Skyhawk

Reequipment of Kuwait's Skyhawk squadrons with F/A-18 Hornets in 1992-93 leaves Israel as the only Middle East operator of the veteran A-4. Several hundred, of various models, were acquired over the years, of which about 75 remain in three active squadrons (Nos. 102, 115, and 116) with a further 90 or so stored for reserve squadron emergency use. The latter are mostly early A-4Es or Hs, dating from the 1960s. Characterized by its saddleback hump (for avionics and extra fuel), the A-4H also featured a zero/zero ejection seat, underwing spoilers to reduce landing run, and nosewheel steering. To these, the A-4N, which equips the front-line squadrons, added a tail braking parachute, square-tipped vertical fin, and other detail improvements, but since their original delivery virtually all Israeli Skyhawks have been life-extended, rewired, and upgraded by Israeli Aircraft Industries. Improvements have included 30-mm (replacing 20-mm) guns, an extra underwing station on each side (making six), lengthened nose and jetpipe, a chaff/flare dispenser just ahead of the brake-chute fairing, and an Elta WDNS (weapon delivery and navigation system), which includes provision for launching Gabriel ASMs. Newly received F-16s are expected to reequip Nos. 115 and 116 Squadrons, whose A-4Ns would then replace the remaining A-4Es in the reserve. (Data for original A-4N.)

**Contractor:** Douglas Aircraft Company, USA.

**Power Plant:** one Pratt & Whitney J52-P-408A turbojet; 11,200 lb thrust.

**Dimensions:** span 27 ft 6 in, length 40 ft 3¾ in, height 15 ft 0 in.

**Weights:** empty 10,465 lb, gross 24,500 lb.

**Performance:** max speed at S/L 670 mph clean, 646 mph with 4,000-lb weapons load, ceiling approx 40,000 ft, T-O run 2,730 ft, combat radius (hi-lo-hi) with 4,000-lb weapon load 340 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one 20-mm Mk 12 gun (30-mm DEFA in Israeli refit) in each wingroot; one centerline and four underwing stations (six in Israeli refit) for AAMs, ASMs, bombs, rockets, or gun pods; max (five-station) external load 9,195 lb.

### Alpha Jet

In addition to the 351 Alpha Jets built for France and Germany, 75 were produced for Egypt (45), Morocco (24), and Qatar (6). All three employ them for both advanced/weapons training and close-support duties. Egypt still has about 40 and Morocco 23; the six of the Qatar Emiri Air Force equip No. 11 Squadron at Doha.

Most of Egypt's aircraft were license-assembled in that country by AOI (Arab Organization for Industrialization). The first 30, designated MS1, were generally similar to the standard trainer, but the final 15 were optimized for attack. Known as MS2, this version is equipped with a SAGEM Uliss 81 inertial nav/attack system, Thomson-CSF HUD and nose-mounted laser rangefinder, and a Thomson-TRT radio altimeter, all



managed by a Dassault Electronique digital data bus, enabling the MS2 to designate targets automatically, fire guns or rockets in a dive, release retarded bombs in level flight, and toss-release free-fall bombs automatically.

**Contractors:** Dassault Aviation, France, and Dornier GmbH, Germany.

**Power Plant:** two SNECMA/Turbomeca Larzac 04-C6 turbofans; each 2,976 lb thrust.

**Dimensions:** span 29 ft 10 $\frac{1}{4}$  in, length 43 ft 5 in, height 13 ft 9 in.

**Weights:** empty 7,749 lb, gross 17,637 lb.

**Performance:** max speed (clean) at 32,800 ft Mach 0.85, at S/L 621 mph, ceiling 48,000 ft, T-O run 1,215 ft, landing run 1,640 ft, close support combat radius (hi-lo-hi) 363 miles on internal fuel, 668 miles with two 119-gallon drop tanks.

**Accommodation:** crew of two, in tandem, on zero/zero ejection seats.

**Armament:** hardpoint under fuselage and two under each wing for 5,510 lb of stores, including centerline 27-mm or 30-mm gun pack; four free-fall, retarded, or cluster bombs; gun or rocket pods; and two 82- or 119-gallon drop tanks.

### CM 170 Magister

The Magister was the most successful European-designed first-generation jet trainer. About 45 of those license-built in Israel, and known locally as *Tzukits*, are still in service, but a replacement is being sought; Algeria has about 20 and Lebanon five. Designed for advanced (including weapons) training, the Magister is also eminently suitable for light ground-attack duties, and the Royal Moroccan Air Force uses some of its approximately 22 Magisters in the counterinsurgency role.

**Contractor:** Aerospatiale (originally Fouga), France.  
**Power Plant:** two Turbomeca Marboré IIA turbojets; each 880 lb thrust.

**Dimensions:** span over tip tanks 39 ft 10 in, length 33 ft 9 $\frac{1}{2}$  in, height 9 ft 2 $\frac{1}{4}$  in.

**Weights:** empty 4,268 lb, gross 6,978 lb.

**Performance:** max speed at 30,000 ft 443 mph, ceiling 30,000 ft, T-O run 1,800 ft, range 576 miles.

**Accommodation:** crew of two, in tandem.

**Armament:** provision for two nose-mounted 7.62-mm machine guns, plus hardpoint under each wing for two 110-lb bombs, four 55-lb rockets, or a Nord SS.11 wire-guided missile.

### F-4 Phantom II

Known to Israeli pilots as the *Kurnass* ("heavy hammer"), the F-4E Phantom has been a mainstay of that country's air force since the first of an initial 44 were delivered in September 1969. Subsequent deliveries increased that total to nearly 210 by late 1976, in a mixture of new-build and former USAF aircraft. They have suffered considerable attrition in Israel's several wars, but about 112 remain in active service with two squadrons at Hatzetim (Nos. 69 and 107) and two at Tel Nov (Nos. 119 and 201). Some others are in store.

Improvements made over the years—though not necessarily to every aircraft—include addition of slats, TISEO (target-identification system electro-optical) sensors, radar warning receivers, a Litton LW-33 inertial nav/attack system, Elbit/Singer-Kearfoot Jason weapon delivery system, and night attack capability. Between April 1989 and April 1994, 50 were redelivered after upgrading to *Phantom 2000* standard to extend operational life and improve maintainability and safety. New avionics include an Elbit mission computer, Kaiser-licensed wide-angle HUD, dual MIL-1553B data buses, multifunction electronic displays in both cockpits, HOTAS (hands on throttle and stick), and improved ECM and self-protection systems. Airframe changes include reinforced skins and fuel cells in the fuselage and wings, new one-piece canopy, all-new electrical wiring and hydraulic lines, improved crew comfort, and small strakes added to the engine air intake trunks to enhance maneuverability and stability.

Iran received 32 F-4Ds and 177 F-4Es between September 1968 and August 1979. Originally they were equipped more than a dozen squadrons, but, because of spare embargoes and attrition, estimates of those still operable vary from 40 to as few as 20. Egypt, which received the first of 35 early-model former USAF F-4Es in 1979, still has about 25 with two squadrons at Cairo West, but they are reported to be in poor condition. (Data for F-4E.)

**Contractor:** McDonnell Aircraft Company, USA.

**Power Plant:** two General Electric J79-GE-17A turbojets; each 17,900 lb thrust with afterburning.

**Dimensions:** span 38 ft 7 $\frac{1}{2}$  in, length 63 ft 0 in, height 16 ft 5 $\frac{1}{2}$  in.

**Weights:** empty 31,853 lb, gross 41,487–61,795 lb.

**Performance:** max speed at height above Mach 2, ceiling 54,400 ft, T-O run 3,180–4,390 ft, landing run 3,040–3,780 ft, combat radius 494–786 miles.

**Accommodation:** crew of two, on tandem ejection seats.  
**Armament:** one M61A1 20-mm multibarrel gun under

nose; four semisubmerged underbelly mounts and four underwing pylons for AAMs, ASMs, laser-guided or cluster bombs, rocket packs, gun pods, or ECM pods, totaling about 16,000 lb. Alternative weapons adapted to Israeli F-4s include AGM-45 Shrike and AGM-78 Standard ARMs, AGM-65 Maverick and AGM-142 Popeye ASMs, Luz TV-guided ASMs, and Gabriel antiship missiles. Although assigned almost exclusively to air-to-ground attack, provision is retained for Shafir, Python, Sidewinder, or Sparrow AAMs for self-defense.

### F-5E/F Tiger II

Seven Middle East/North African air forces operate the single-seat F-5E *Tiger II* and its combat-capable two-seat counterpart, the F-5F. These versions, cho-



**F-5E Tiger II, Royal Jordanian Air Force (Peter R. Foster)**



**F-6, Egyptian Air Force (Denis Hughes)**

sen in 1970 as America's IFA (international fighter aircraft) for export to friendly nations, have the Dash 21A/B version of the J85 engine, providing 22.5 percent more thrust than the F-5A's J85-GE-13; wings of 10 percent greater area, with full-span leading-edge maneuvering flaps; increased internal fuel tankage; a two-position nosewheel leg, enabling angle of attack to be increased to shorten the takeoff run; and a runway arrester hook. Options included INS and a flight refueling probe. The first production F-5E flew August 11, 1972. Morocco has 16 F-5Es and four F-5Fs; Bahrain eight Es and four Fs; Iran about 45 of the 169 E/Fs originally received; Saudi Arabia about 45 Es and 14 B/Fs; and Tunisia 15 Es and Fs. Some of Yemen's 10 F-5Es (plus a few As and Bs) were almost certainly among the 25 unidentified fighters lost during 1994's civil war. Jordan has recently sold seven E/Fs to Singapore Aerospace to pay for an upgrade of the remaining 40 or so of Nos. 6, 9, and 17 Squadrons that will include a lookdown-shootdown pulse-Doppler radar and other avionics. (Data for F-5E.)

**Contractor:** Northrop Corporation, USA.

**Power Plant:** two General Electric J85-GE-21B turbojets; each 5,000 lb thrust with afterburning.

**Dimensions:** span 26 ft 8 in (27 ft 11 $\frac{1}{2}$  in over wingtip AAMs), length 47 ft 4 $\frac{1}{4}$  in, height 13 ft 4 $\frac{1}{4}$  in.

**Weights:** empty 9,723 lb, gross 24,722 lb.

**Performance:** max speed at 36,000 ft at 13,350-lb combat weight Mach 1.64, ceiling 51,800 ft, T-O run 2,000–5,700 ft, landing run with brake-chute 2,500 ft, typical hi-lo-hi combat radius with max internal fuel, two 530-lb bombs, and two Sidewinder AAMs 553 miles.

**Accommodation:** pilot only, on ejection seat.

**Armament:** two 20-mm M39A2 guns in nose (one in F-5F); AIM-9 Sidewinder AAM at each wingtip; one underfuselage and four underwing stations for up to 7,000 lb of bombs (incl one 2,000-lb), cluster bombs, rocket launchers, napalm tanks, or auxiliary fuel tanks; provision for AGM-65 Maverick ASMs or laser-guided bombs.

### F-6

As a result of large-scale procurement of US F-16s, Egypt has progressively reduced its fleet of the F-6

Chinese version of the Russian MiG-19 ("Farmer") supersonic fighter-bomber. Its Air Force began receiving 40 Shenyang-built F-6s in 1979, prior to the assembly of others at the Helwan factory, near Cairo. Around 40 of these are believed to remain in service, plus a few FT-6 tandem two-seat trainers. The current status of 16 F-6s once flown by Iran's Revolutionary Guard pilots is unknown. (Data for F-6 day fighter.)

**Contractor:** Shenyang Aircraft Corporation, People's Republic of China.

**Power Plant:** two Shenyang/Chengdu WP6 turbojets; each 7,165 lb thrust with afterburning.

**Dimensions:** span 30 ft 2 $\frac{1}{4}$  in, length incl probe 48 ft 10 $\frac{1}{2}$  in, height 12 ft 8 $\frac{1}{4}$  in.

**Weights:** empty 12,700 lb, gross 19,764–22,045 lb.

**Performance:** max speed at 36,000 ft Mach 1.45, at S/L Mach 1.09, ceiling 58,725 ft, T-O run 2,200–2,953 ft, landing run 1,970–2,920 ft, range 1,366 miles.

**Accommodation:** pilot only, on ejection seat.

**Armament:** three 30-mm NR-30 guns, in nose and each wingroot; two pylons under each wing, inboard of hardpoint for external fuel tank, to carry packs of eight air-to-air rockets, AAMs, two 550-lb bombs, or air-to-surface rockets of up to 212-mm caliber.

### F-14A Tomcat

Poor serviceability, due to shortage of trained maintenance engineers and spares, persuaded the Iranian Islamic Air Force to use F-14As primarily in a mini-AWACS role during the war with Iraq. Seventy-nine of the 80 Tomcats ordered in 1974–75 had been delivered to the Shah's air force, along with 284 Phoenix AAMs plus Sparrows and Sidewinders. With the overthrow of the Shah, their effectiveness soon diminished under the Khomeini regime. However, there are reports that the situation is much improved, with at least two squadrons deployed in the intended intercept role.

**Contractor:** Grumman Aircraft Systems Division, USA.

**Power Plant:** two Pratt & Whitney TF30-P-412A turbofans; each 20,900 lb thrust with afterburning.

**Dimensions:** span 64 ft 1 $\frac{1}{2}$  in (min 20° sweep), 38 ft 2 $\frac{1}{2}$  in (max 68° sweep), length 62 ft 8 in, height 16 ft 0 in.

**Weights:** empty 40,104 lb, gross 58,715–74,349 lb.

**Performance:** max speed at high altitude Mach 2.34, at low altitude Mach 1.2, ceiling above 50,000 ft, T-O run 1,400 ft, landing run 2,900 ft, max range with external fuel 2,000 miles.

**Accommodation:** crew of two, in tandem, on zero/zero ejection seats.

**Armament:** one 20-mm M61A1 gun in port side of forward fuselage; four AIM-7 Sparrow or AIM-54 Phoenix AAMs semirecessed under fuselage; pylon under each inboard (fixed) wing portion for additional Phoenix/Sparrows, and/or Sidewinder AAMs, or various missile/bomb combinations.

### F-15 Eagle

Since 1976, the US has supplied nearly 200 F-15s, of all four basic single- and two-seat versions, to the air forces of Israel and Saudi Arabia. Both have used the aircraft in combat, with considerable success, under the control of E-2C Hawkeye and E-3A Sentry AEW&C aircraft, respectively.

The Israeli Air Force has an estimated 36 F-15As and 22 F-15Cs, plus nine two-seat F-15B/Ds, in Nos. 106, 133, and 148 Squadrons, at Tel Nov AB. The Royal Saudi Air Force has four squadrons (Nos. 5, 6, 13, and 42) of F-15Cs and Ds. Initial deliveries comprised 46 Cs and 16 Ds. These were augmented during the 1990–91 Persian Gulf campaign by a further 20 Cs and four Ds and by nine more Cs and three Ds delivered from August 1991 as attrition replacements. About 80 of these remain in service, and twelve more have been ordered. Since Operation Desert Storm, in which two of the 38 Iraqi aircraft to fall to F-15s in air combat were claimed by an RSAF pilot, they have taken part with other coalition forces in Operation Southern Watch patrols over southern Iraq.

Between 1995 and 1998, the RSAF will receive a further 72 Eagles, 24 optimized for an air-superiority role and 48 for air-to-air and ground attack. Designated F-15S, these aircraft will be generally similar to USAF's dual-role F-15E, but their AN/APG-70 radars will be "detuned" to the performance level of the APG-63, some of the F-15E's ECM will be omitted, and a Lockheed Martin Sharpshooter system will replace the AN/AAQ-14 LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) targeting pod. Like other Saudi Eagles, the F-15Ss are not intended to have stores-carrying CFTs (conformal fuel tanks), but the contract includes supply of 900 AGM-65D/G Maverick ASMs, 600 AIM-9M/S Sidewinders, and 1,300 CBU-87 bomblet dispensers and GBU-10/12 Paveway laser-guided bombs. The F-15S is powered by two 29,100 lb thrust F100-PW-229 afterburning turbofans.

A similar dual-role model, designated F-15I, is on order for Israel (21, with four more on option) and will be delivered from 1997. Powered by F100 engines,









**She spends her  
nights wondering.**

**Is he alive?**

**Is he safe?**

**Is he afraid?**

**Is he still the little  
boy who asked me  
to protect him from  
the monsters under  
his bed?**

**And not until he is  
safely in her arms  
again, does she dare  
whisper,**

**Welcome home,  
my baby.**

As long as there are loved ones to protect, we think national defense should be a top priority. Raytheon. Commercial and defense electronics, engineering and construction, aircraft, and appliances.

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**EXPECT GREAT THINGS**



these will have fully capable APG-70 radar, an Israeli EW system, and LANTIRN pods. (Data for F-15C.)

**Contractor:** McDonnell Aircraft Company, USA.  
**Power Plant:** two Pratt & Whitney F100-PW-100 or F100-PW-220 turbofans; each approx 23,450 lb thrust with afterburning.

**Dimensions:** span 42 ft 9 3/4 in, length 63 ft 9 in, height 18 ft 5 1/2 in.

**Weights:** empty 28,600 lb, gross 44,630-68,000 lb.  
**Performance:** max speed Mach 2.5, ceiling 60,000 ft, T-O run (interceptor) 900 ft, landing run without brake-chute 3,500 ft, ferry range with external tanks more than 2,878 miles, with CFTs 3,570 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.  
**Armament:** one M61A1 20-mm multibarrel gun in starboard wingroot; four AIM-7 Sparrow and four AIM-9 Sidewinder AAMs (Rafael Shafir and/or Python 3 on Israeli F-15s); provision for up to 23,600 lb of bombs, rockets, or additional ECM.

### F-16 Fighting Falcon

Nearly 450 F-16s have been delivered to or ordered by three Middle Eastern air forces, with Israel (260) and Egypt (175) the major customers. The first 42 for Egypt, comprising 34 F-16As and eight F-16Bs, were delivered from March 1982 with Pratt & Whitney F100-PW-200 engines and AIM-9L Sidewinder AAMs, as MiG-21MF replacements. Thirty-four F-16Cs and six F-16Ds, with F100-PW-220 engines, followed from August 1986. The next 35 Cs and 12 Ds, for 1991-94 delivery, had F110-GE-100 engines. Sparrow AAMs and Egyptian IFF introduced on these aircraft were also retrofitted to early models, and Mavericks became available for air-to-ground missions. The 46 additional F-16C/Ds (34 + 12), for delivery from spring 1994, are from license production by TAI of Turkey.

Eight of the 67 F-16As and eight Bs with F100-PW-200 engines supplied to Israel from January 1980 became the first Fighting Falcons (Israeli name **Netz**: "falcon") used in combat when they destroyed Iraq's Osirak nuclear reactor June 7, 1981. In 1982 they shot down 44 Syrian MiG-21s and MiG-23s over the Bekaa Valley in Lebanon. In late 1986, they were followed by the first of 51 F-16Cs (**Barak**: "lightning") and 24 Ds (**Brakeet**: "thunderbolt"), with F110-GE-100 engines. Some of these Ds have deep spines housing equipment for "Wild Weasel" defense-suppression roles, including Elisra SPS 3000 self-protection ECM; locally modified F110-GE-100A engines give much increased thrust at low level. A further engine change, to F110-GE-200s, was made in the third batch of 30 F-16Cs and 30 Ds, together with Elta ECM instead of the usual Loral Rapoport. Deliveries began in July 1991. In August 1994, Israel began receiving 50 surplus USAF F-16A/Bs and has plans to order another 60 C/Ds (30 + 30) for mid-1997 delivery. Eight IDF/AF squadrons (three with A/Bs, five with C/Ds) fly the F-16.

No. 1 Squadron of the Bahrain Emiri Air Force began equipping with eight F-16Cs and four F-16Ds in March 1990. These have F110-GE-100 engines, Sparrows, Sidewinders, Mavericks, Mk 20 Rockeyes, GBU-10/12s, ALQ-131 ECM and laser designator pods, and ALE-40 chaff/flare dispensers. (Data for F-16C with F110-GE-100 engine.)

**Contractor:** General Dynamics Corporation (now Lockheed Martin Corporation), USA.

**Power Plant:** one General Electric F110-GE-100 turbofan; 28,984 lb thrust with afterburning.

**Dimensions:** span over missiles 32 ft 9 3/4 in, length 49 ft 4 in, height 16 ft 8 1/2 in.

**Weights:** empty 19,020 lb, gross 27,185-42,300 lb.  
**Performance:** max speed at height above Mach 2, ceiling above 50,000 ft, typical T-O and landing distance 2,500 ft, typical combat radius 392-852 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one M61A1 20-mm multibarrel gun in port wing/body fairing; up to 12,000 lb of stores on wingtip AAM mounts, centerline hardpoint, and six underwing pylons. Standard armament of Israeli F-16s includes Sidewinder, Sparrow, and Python 3 AAMs, Maverick ASMs, GBU-10/12 laser-guided bombs, and Rockeye cluster bombs. LANTIRN pods are being made available for the latest aircraft, and Rafael Litening IR targeting pods are being evaluated.

### F/A-18C/D Hornet

In September 1988, Kuwait placed an order for 32 single-seat F/A-18Cs and eight two-seat F/A-18D combat-capable trainers, in a multimillion-dollar package that also included AGM-65G Maverick, AGM-84 Harpoon, AIM-7F Sparrow and AIM-9L Sidewinder missiles. The first three two-seaters were accepted by No. 25 Squadron of the Kuwaiti Air Force in January 1992; it was fully equipped by 1993, together with No. 9 Squadron. Kuwait's Hornets were the first to be powered by the Dash 402 version of the F404 engine, which produces some 1,600 lb more thrust than the

original Dash 400. A small follow-on order, possibly for 10, is believed likely.

**Contractor:** McDonnell Aircraft Company, USA.

**Power Plant:** two General Electric F404-GE-402 turbofans; each approx 17,600 lb thrust with afterburning.  
**Dimensions:** span 37 ft 6 in, length 56 ft 0 in, height 15 ft 3 1/2 in.

**Weights:** empty 23,832 lb, gross 36,710 lb (fighter), 56,000 lb (attack).

**Performance:** (F404-GE-402-engines): max speed at high altitude above Mach 1.8, ceiling approx 50,000 ft, T-O run less than 1,400 ft, typical combat radius (interdiction) 340 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one 20-mm six-barrel M61A1 gun in nose; nine external stations (wingtips, four underwing, two nacelle, and one centerline). Weapons can include AIM-9 Sidewinder AAMs at wingtips; Sidewinders, AIM-7 Sparrows, AIM-120 AMRAAMs, AGM-84 Harpoons, or AGM-65 Mavericks underwing; Sparrows or sensor pods (nacelles). Centerline and inboard underwing stations suitable for drop fuel tanks.

### Hawk

Beginning life as an advanced flying and weapons trainer for the UK's Royal Air Force, the Hawk has grown into an increasingly aggressive dual-role trainer/ground-attack aircraft (50/60/100 series) and single-seat multirole combat aircraft (200 series). In the



**F-16C Fighting Falcon, Bahrain Emiri Air Force (Peter Steinemann)**



**F/A-18C Hornet, Kuwaiti Air Force (Peter R. Foster)**



**Hawk Mk 103, Royal Air Force of Oman**

United Arab Emirates, Dubai contributes seven Mk 61s (5,700 lb thrust Adour 861 turbofan) to what is designated a fighter squadron, while Abu Dhabi's 15 similar Mk 63s have been upgraded to Mk 63A, with an Adour 871 and new "combat wing" with four stores pylons and wingtip AAMs. Deliveries began this year of an undisclosed number of further-modified Mk 63Cs. The UAEAF also has 18 Mk 102s in Abu Dhabi, with Adour 871, combat wing, MIL-1553B data bus, HOTAS controls, HUD, color multipurpose CRT in each cockpit, radar warning receiver, and provision for an ECM pod, plus laser ranging and FLIR in the extended nose.

Five or six of the Kuwaiti Air Force's 12 Mk 64s (No. 12 Squadron) remained airworthy after escaping to Bahrain during the August 1990 Iraqi invasion. Four others were returned by Iraq after the war but were in very poor condition and may be replaced. The Royal Saudi Air Force bought 30 Hawk Mk 65s for its own Nos. 21 and 37 Squadrons for light attack missions, and under its Al Yamamah II program it is expected to purchase a further 60 Hawks, beginning with 20 series 100s. Most of the rest will be single-seat Mk 205s, with Westinghouse APG-66H multimode radar, but some 100 series may be included. Oman is another customer for these latest versions, with deliveries of four Mk 103s and 12 Mk 203s starting in December 1993 and December 1994, respectively. The two-seaters have a radar warning receiver and wingtip AIM-9 Sidewinders; the single-seaters have a fixed in-flight refueling probe and 6,614-lb weapons load. (Data for 100 series.)

**Contractor:** British Aerospace Defence Ltd, UK.

**Power Plant:** one Rolls-Royce Turbomeca Adour 871 turbofan; 5,845 lb thrust.

**Dimensions:** span 29 ft 9 1/2 in, length 40 ft 9 1/4 in, height 13 ft 0 1/4 in.

**Weights:** empty 9,700 lb, gross 20,061 lb.

**Performance:** never-exceed speed at height Mach 1.2, max speed at S/L 622 mph, ceiling 44,500 ft, T-O run 2,100 ft, landing run 1,980 ft, combat radius 620-900 miles.

**Accommodation:** basically, crew of two in tandem, on zero/zero ejection seats. Pilot only in combat role.

**Armament:** one 30-mm Aden Mk 4 gun pack on centerline; four underwing pylons for packs of 18 x 68-mm or 12 x 81-mm rockets, bombs up to 1,000 lb, cluster bombs, Maverick ASMs, or Sidewinder/Magic AAMs. Optional AAM on each wingtip. Max stores load 6,614 lb.

### Jaguar International

The only Middle Eastern operator of the export Jaguar International attack aircraft is Oman, which ordered two batches of 12 (20 single-seat and four two-seat) in the late 1970s. The 21 that survive equip Nos. 8 and 20 Squadrons, based at Masirah, and were upgraded at the end of the 1980s with a Ferranti FIN 1064 inertial navigation system. They are employed in the air defense role as well as ground attack, in the former configuration carrying a pair of underwing AIM-9P Sidewinder AAMs. (Data for single-seater.)

**Contractor:** SEPECAT, a Franco-British company.

**Power Plant:** two Rolls-Royce Turbomeca Adour Mk 811 turbofans; each 8,400 lb thrust with afterburning (8,040 lb Mk 804s in first 12 Omani aircraft).

**Dimensions:** span 28 ft 6 in, length 55 ft 2 1/2 in, height 16 ft 0 1/2 in.

**Weights:** empty 15,432 lb, gross 24,149-34,612 lb.

**Performance:** max speed at 36,000 ft Mach 1.6, at S/L Mach 1.1, ceiling approx 50,000 ft, T-O run with typical tactical load 4,100 ft, landing run without brake-chute 2,200 ft, typical hi-lo-hi combat radius 530 miles on internal fuel, 875 miles with auxiliary fuel.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** two ventral internal 30-mm Aden guns (one in trainer); one centerline and four underwing stations for mixed loads including free-fall, retarded, cluster, or laser-guided bombs, or air-to-surface rockets; provision for one wing-mounted AIM-9 Sidewinder, Matra Magic, or similar AAM each side. Max external stores load 10,500 lb.

### Kfir

The Kfir was the second stage in Israel's development of the Mirage 5, in which the original Atar 9C turbojet was replaced by the larger US J79; airframe changes included a shorter and fatter rear fuselage, a large dorsal air scoop for afterburner cooling, strengthened landing gear, and a lengthened nose. Only 27 of the initial Kfir C1 were built; the major version was the C2, which featured fixed canards, small nose strakes, and dogtooth wing leading-edges for improved maneuverability and shorter runway requirements. IAI produced 185 C2s (including some combat-capable TC2 tandem-seat trainers with longer noses), later upgrading many to C7/TC7 standard with more advanced avionics, notably HOTAS controls, an improved weapon delivery and navigation system, two additional external weapon stations, and a "combat plus" engine power reserve giving an extra 890 lb of optional thrust in afterburner mode.

C7 Kfirs still equip two front-line IDF/AF squadrons (No. 111 at Ovdia and No. 144 at Hatzor), but enough C2/C7s are in store to equip four or five reserve squadrons in an emergency. Meanwhile IAI is offering potential export customers a C10 version, incorporating in-flight refueling and the radar and other avionics of the abandoned Lavi multirole fighter. (Data for Kfir C7.)

**Contractor:** Israel Aircraft Industries Ltd, Israel.

**Power Plant:** one General Electric J79-J1E (Israeli modified J79-GE-17) turbojet; 17,860 lb thrust with



afterburning (18,750 lb with "combat plus" reserve).  
**Dimensions:** span 26 ft 11½ in, length 51 ft 4¼ in, height 14 ft 11¼ in.

**Weights:** empty 16,060 lb, gross 22,961–36,376 lb.  
**Performance:** max speed (clean) at 36,000 ft more than Mach 2.3, at S/L Mach 1.13, ceiling 58,000 ft, T-O run 4,750 ft, landing run 4,200 ft, combat radius 482 miles (high-altitude interception), 737 miles (hi-lo ground attack).

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one 30-mm DEFA 552 gun in lower lip of each air intake duct; five underfuselage and four underwing stations for weapons, ECM or other sensor pods, or drop tanks, to max weight of 13,415 lb, Python 3, Shafrir 2, or Sidewinder AAM on each outer wing station as interceptor; bombs (standard, smart, cluster, or other), Shrike or Maverick ASMs, napalm tanks, or rocket launchers for ground attack.

### L-39/L-59 Albatros

The L-39 advanced jet trainer/light attack aircraft has been in production since 1971, with 2,833 built by December 1994. Most of these (2,094) were trainer-only L-39Cs for the former USSR, but 393 were supplied to Iraq (81), Libya (181), Syria (99), and Algeria (32). The first three all had the L-3920 version (Syria 55), which has increased stores-carrying ability on four (instead of two) underwing pylons and a reinforced airframe. Syria's fleet remains at nearly full strength, but that of Iraq may have dwindled to as few as 20 through attrition in its long war with Iran, and their airworthiness is uncertain. Libya, too, has lost more than a few in its border conflicts with neighboring Chad, and in 1990 donated 10 of its L-39s to Egypt, but about 150 probably remain. Secondhand purchases have since increased Egypt's total to about 48. Syria (44) and Algeria (now down to about 10) operate the L-39ZA specialized ground-attack/reconnaissance version, which has an underfuselage gun as standard in addition to the four underwing weapon stations.

The L-59 is an improved Albatros, first flown (as the L-39MS) on September 30, 1986. It has a more powerful turbofan, strengthened airframe, and upgraded Western avionics that include head-up/head-down displays, IFF, and a radar altimeter. The Egyptian Air Force placed a \$204 million order for 48 L-59Es, deliveries of which were made in 1993–94. Tunisia has 12 L-59s on order. (Data for L-59E.)

**Contractor:** Aero Vodochody Ltd, Czech Republic.  
**Power Plant:** one Progress (Lotarev/ZVL) DV-2 turbofan; 4,850 lb thrust.

**Dimensions:** span over tip tanks 31 ft 3½ in, length 40 ft 0¼ in, height 15 ft 7¾ in.

**Weights:** empty 8,885 lb, gross 11,883–15,432 lb.  
**Performance:** max speed at 16,400 ft 537 mph, ceiling 38,725 ft, T-O run 1,936 ft, landing run 2,527 ft, range (unarmed) with max internal/external fuel 1,243 miles.

**Accommodation:** crew of two, on tandem zero/zero ejection seats, but normally flown solo in attack role.

**Armament:** underfuselage pod for 23-mm twin-barrel GSh-23 gun, with up to 150 rds; four underwing stations for up to 3,307 lb of external stores, including bombs of up to 1,102 lb, UB-16-57M rocket pods (16 x 57-mm), infrared AAMs (outer stations only), daytime reconnaissance pod (port inner only), or drop fuel tanks (inboard stations only).

### MiG-21 ("Fishbed")/F-7

The first MiG-21 prototype flew in 1957, when its Mach 2 performance exceeded the then-current world airspeed record. Although fast disappearing from eastern Europe, more than 700 MiG-21s, including Chinese-built F-7s, continue to be flown by seven air forces in the Middle East and North Africa. The Egyptian Air Force operates about 110 Soviet-built MiG-21s of some half-dozen versions, from MiG-21F to MF, and up to 60 Chinese F-7Bs. Most of the latter have been updated with a GEC-Marconi HUD, air data computer, RWR, ECM jamming, and Sidewinder or Magic AAMs. A few MiG-21Rs have a locally designed underfuselage pack of three reconnaissance cameras. Syria still has about 225 MiG-21s, including PFs, MFs, and late-model MiG-21bis.

With so many Iraqi MiG-29s lost in the Persian Gulf War, the survivors of some 70 prewar MiG-21s and 80 F-7Bs are likely to have extended service lives. Iran ordered 100 of Chengdu's much-refined F-7M Airguard, with a GEC-Marconi HUDWAC (head-up display and weapon-aiming computer), new ranging radar, IFF, more secure radio communications, air data computer, two additional underwing pylons, provision for PL-7 infrared AAMs, birdstrike-resistant windshield, strengthened landing gear, zero-height/81-mph ejection seat, and 13,448 lb thrust WP7B(BM) turbojet. Those remaining are now flown by the Revolutionary Guard. Libya has around 70 MiG-21s operational, while three of Algeria's four interceptor squadrons have early-model MiG-21F/MFs (mostly the former), of which about

95 remain in service. Before the northern and southern parts of Yemen fought a civil war, the theoretically united air force had about 40 MiG-21Fs and 30 PFs, which were supplemented by 16 more acquired by the south during the fighting. The number still serviceable is unknown. (Data for MiG-21MF.)

**Contractor:** Mikoyan OKB, Russia.

**Power Plant:** one Soyuz/Gavrilov R-13-300 turbojet; 14,550 lb thrust with afterburning.

**Dimensions:** span 23 ft 5¾ in, length 51 ft 8½ in, height 14 ft 9 in.

**Weight:** gross 18,078–20,725 lb.

**Performance:** max speed at height Mach 2.1, ceiling 50,000 ft, T-O run 2,625 ft, landing run 1,805 ft, combat radius (internal fuel and four underwing 550-lb bombs) 230 miles, range with three drop tanks 1,118 miles.



**Kfir, Israeli Air Force  
(Press-Office Sturzenegger)**



**L-59E Albatros, Egyptian Air Force**

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one GSh-23L twin-barrel 20-mm gun, with 200 rds, under fuselage; four underwing hardpoints for K-13 ("Atoll"), Matra Magic, or AIM-9 Sidewinder AAMs, pods of 24 x 57-mm rockets, four 240-mm rockets, or bombs of up to 1,100 lb.

### MiG-23 ("Flogger")

There are two distinct families of MiG-23 variable-geometry combat aircraft, tailored specifically for interception and ground attack, respectively. The MiG-23MS interceptor ("Flogger-E") is single-seat, with a 22,045 lb thrust Tumansky R-27F2M-300 afterburning turbojet, Sapfir-21 ("Jay Bird") radar with an 18-mile search range and 12-mile tracking range, and armament of R-3S ("Atoll") or R-60 ("Aphid") AAMs and a 23-mm GSh-23 gun. The lighter-weight MiG-23ML ("Flogger-G"), identified by a smaller dorsal fin, has a 28,660 lb thrust R-35-300 afterburning turbojet, no rear fuselage fuel tank, Sapfir-23ML ("High Lark 2") radar with search range of 43 miles and tracking range of 34 miles, undernose pod for TP-23M IRST, and basic armament of R-23R/T ("Apex") and R-60T AAMs.

The single-seat light attack MiG-23BM and BN ("Flogger-F") differ from the interceptors in having the front fuselage tapered in side elevation to house a nav/attack system (slaved to a computer in the BM), a 25,350 lb thrust Soyuz/Khachaturov R-29B-300 afterburning turbojet, armored cockpit sides, low-pressure tires, explosion-resistant fuel tanks, active and passive ECM, and six pylons under the wings and fuselage for R-3S or R-13M AAMs, Kh-23 ("Kerry") or Kh-29 ("Kedge") ASMs, up to 6,600 lb of bombs, or napalm. The MiG-23BK ("Flogger-H") has equipment changes, including RWR fairings on the bottom of the fuselage.

Libya has an estimated 75 MiG-23MS interceptors, 40 MiG-23BN light attack aircraft, and 15 MiG-23UB tandem two-seat trainers. Syrian Air Force squadrons have up to 90 MiG-23ML interceptors, 60 MiG-23BNs, and a few trainers. Of 20 MiG-23MSs and 70 BKs (some with in-flight refueling capability) equipping the Iraqi Air Force before Desert Storm, eight were shot down by F-15Cs, 12 fled to Iran (including a two-

seater), and others were destroyed on the ground. They made little use of available weapons, including French Magic AAMs and Russian Kh-29 ASMs guided by French Altis laser-designation pods. Other operators are the Algerian Air Force, with about 60 MiG-23MS/BMs, and the Republic of Yemen Air Force, with around 25 MiG-23BMs. (Data for MiG-23ML.)

**Contractor:** Mikoyan OKB, Russia.

**Power Plant:** one Soyuz/Khachaturov R-35-300 turbojet; 28,660 lb thrust with afterburning.

**Dimensions:** span 45 ft 10 in (18° 40' min sweep), 25 ft 6¼ in (74° 40' max sweep), length incl probe 54 ft 10 in, height 15 ft 9¼ in.

**Weights:** empty 22,485 lb, gross 32,405–39,250 lb.

**Performance:** max speed at height Mach 2.35, at S/L Mach 1.1, ceiling 60,700 ft, T-O run 1,640 ft, landing run 2,460 ft, combat radius 435–715 miles.

**Accommodation:** pilot only, on zero-height/80–775 mph ejection seat.

**Armament:** one 23-mm GSh-23L twin-barrel gun in belly pack; two pylons under fuselage, one under each engine duct and two under fixed wing panels for R-23R/T ("Apex"), or R-60T ("Aphid") AAMs. For other roles, packs of 20 x 80-mm or 32 x 57-mm rockets, bombs, container weapons, 23-mm gun pods, or 240-mm S-24 rockets.

### MiG-25 ("Foxbat")

A quarter of a century after this Mach 2.83 combat aircraft became operational, there is still no faster weapon-carrying type in service. It has been delivered to four nations in North Africa and the Middle East. Libya began with about five MiG-25R reconnaissance-bombers, followed by 60 MiG-25P/PD single-seat interceptors. The MiG-25P ("Foxbat-A") had Smertch-A ("Fox Fire") radar, with a search range of 62 miles and tracking range of 31 miles; its 22,500 lb thrust R-15B-300 afterburning turbojets had a service life of only 150 hours. The MiG-25PD ("Foxbat-E"), built in 1978–82, switched to updated (24,700 lb thrust) R-15BD-300 engines with a 1,000-hour life, an IRST, and Sapfir-25 radar providing lockdown-shootdown capability comparable with early MiG-23 interceptors.

MiG-25Rs were observed in Algeria in 1979, supplemented later by enough MiG-25Ps and MiG-25PU ("Foxbat-C") two-seat trainers to equip a single squadron. About 20 Iraqi Air Force interceptors may have survived the Persian Gulf War. The fourth operator in the region is the Syrian Air Force, with about 30 MiG-25P/PDs and eight MiG-25Rs. (Data for MiG-25P.)

**Contractor:** Mikoyan OKB, Russia.  
**Power Plant:** two Soyuz/Tumansky R-15B-300 turbojets, each 22,500 lb thrust with afterburning.

**Dimensions:** span 45 ft 11¾ in, length 78 ft 1¾ in, height 20 ft 0¼ in.

**Weight:** gross 76,985–80,950 lb.  
**Performance:** max speed at height Mach 2.83, ceiling 67,900 ft, T-O run 4,100 ft, landing run with brake-chute 2,625 ft, range 776 miles supersonic, 1,075 miles subsonic.

**Accommodation:** pilot only, on zero-height/80–775 mph ejection seat.

**Armament:** four underwing pylons for R-40R/T ("Acrid"), R-23 ("Apex"), R-60T ("Aphid"), or R-73A ("Archer") AAMs; no gun.

### MiG-29 ("Fulcrum")

Fifteen of Iraq's 35 single-seat counterair MiG-29s ("Fulcrum-A") and six MiG-29UB ("Fulcrum-B") combat trainers that were in service before Desert Storm may be serviceable. The four that sought refuge in Iran during the campaign were repainted in Iranian Air Force markings to join the 30 or more MiG-29s acquired directly by Tehran. Syria is believed to have a single three-squadron regiment with 12 aircraft per squadron; Yemen has at least two survivors of its civil war, when a variety of surplus combat aircraft was obtained from Moldova.

The MiG-29 is one of the outstanding fighters of its time. Its integrated weapon system includes an N019 Sapfir-29 coherent pulse-Doppler lookdown-shootdown radar ("Slot Back") with a search range of 62 miles and tracking range of 43 miles, collimated with a laser rangefinder, and an IRST with a fighter detection range of 9¼ miles. It operates in conjunction with the pilot's helmet-mounted target designator for off-axis aiming of AAMs. "Fences" forward of the dorsal tailfins house flare dispensers.

**Contractor:** Mikoyan OKB, Russia.

**Power Plant:** two Klimov/Sarkisov RD-33 turbofans; each 18,300 lb thrust with afterburning.

**Dimensions:** span 37 ft 3¼ in, length 56 ft 10 in, height 15 ft 6¼ in.

**Weights:** empty 24,030 lb, gross 33,600–40,785 lb.

**Performance:** max speed at height Mach 2.3, at S/L Mach 1.225, ceiling 55,775 ft, T-O run 820 ft, landing run with brake-chute 1,970 ft, range 932–1,305 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one 30-mm GSh-301 gun in port wing-root extension; six underwing pylons for R-27R1



("Alamo-A"), R-60T or R-60MK ("Aphid"), or R-73A/E ("Archer") AAMs. Able to carry bombs, submunitions dispensers, napalm tanks, and 80-mm, 130-mm, and 240-mm rockets in attack role. Max weapon load 6,615 lb.

#### Mirage F1

The main single-seat variants of this aircraft are the Mirage F1-C all-weather, all-altitude interceptor with capability for VFR ground attack, and the F1-E multirole fighter/ground-attack/reconnaissance version; tandem-seat, combat-capable trainer equivalents are the F1-B and F1-D, respectively. The large Iraqi fleet of 110 F1-EQs and 18 BQ trainers, equipped with Thomson-CSF Agave fire-control radar and Exocet ASMs, suffered heavy losses during the Persian Gulf War and now



**Mirage F1-EQ, Iraqi Air Force (Press-Office Sturzenegger)**



**Mirage 2000EAD, UAE (Abu Dhabi) Air Force (Press-Office Sturzenegger)**

totals only about 35-40, possibly including three Kuwaiti CKs and five BKs, which Kuwait claims were not returned after the war. Since that war, Kuwait's surviving 14 Mirages (13 F1-CKs and a BK) have been refurbished by Dassault and put up for sale, and the Qatar Emiri Air Force has sold its 12 F1-EDAs and one DDA to Spain. Jordan still has one squadron (No. 25) of 16 F1-CJs and one (No. 1) of 17 EJs, plus a pair of BJ trainers.

In North Africa, Libya still has about 14 early F1-AD interceptors, 12 ED multiroles, and half a dozen BD trainers; Morocco has about 15 F1-CHs (down from an original 30 due to frequent clashes with Polisario guerrillas) and 14 (from 20) F1-EHs, plus a pair of F1-Bs. They are being refurbished by Dassault. Most export Mirage F1s, except those of Iraq, have one or another version of the French Cyrano fire-control radar. Some Moroccan aircraft have chaff/flare dispensers, and Iraq is reported to have adapted the Kh-29 "Kedge" ASM for carriage by its remaining F1s. (Data for F1-C.)

**Contractor:** Dassault Aviation, France.

**Power Plant:** one SNECMA Atar 9K50 turbojet; 15,873 lb thrust with afterburning.

**Dimensions:** span 27 ft 6 3/4 in, length 49 ft 11 1/2 in, height 14 ft 9 in.

**Weights:** empty 16,314 lb, gross 24,030-35,715 lb.

**Performance:** max speed at high altitude Mach 2.2, at low altitude Mach 1.2, ceiling 65,600 ft, T-O run 1,970 ft, landing run 2,200 ft, combat radius 265-435 miles.

**Accommodation:** pilot only, on ejection seat.

**Armament:** two ventral internal 30-mm DEFA guns; one centerline, four underwing, and two wingtip stations for typical practical max load of 8,818 lb, including Matra Super 530 AAMs, single Armat ARM or Exocet antiship missile, ASMs, conventional or antirunway bombs, rocket launchers, Atlas laser designator pod with laser-guided bombs or AS-30L missiles, alternative sensor pods, drop fuel tanks, and (at wingtips) Magic or Sidewinder AAMs.

#### Mirage 5

Dassault originally developed the Mirage 5 as a clear-weather, low-level, ground-attack derivative of its Mirage III interceptor, to meet the requirements of the Israeli Air Force. It featured a slimmer nose, accommodating both a range-only radar and the transfer of some avionics equipment from a bay behind the cockpit, the latter space being taken up by an additional fuel tank that increased internal capacity by 15 percent. After Israel's order for 50 was embargoed (leading IAI to develop the Kfir, which see), three Arab states became Mirage 5 operators.



**AS 532UL Cougar, Royal Jordanian Air Force (Peter R. Foster)**

Initial Middle Eastern orders, including batches of two-seat trainers, were placed by Libya (53 5Ds and 15 two-seat 5DDs) and Abu Dhabi (12 5ADs and three 5DADs). Both later ordered the 5E strike version (Libya 32 5DEs, Abu Dhabi 14 5EADs), as did Egypt (51 5SDEs, plus six 5SDD trainers, with funding assistance from Saudi Arabia). Egypt's final batch of 16 was of an upgraded 5SDE2 version with the same inertial nav/attack system and laser rangefinder as those in its MS2 Alpha Jets; its earlier Mirage 5s have also undergone a midlife update program. Approximate numbers now in service are: Egypt 54 single-seat and five two-seat, Libya 44+6, Abu Dhabi 23+3. All three nations also operate small numbers of the Mirage 5R photo-reconnaissance version (which see). (Data for single-seater.)

**Contractor:** Avions Marcel Dassault-Breguet Aviation, France.

**Power Plant:** one SNECMA Atar 9C turbojet; 13,670 lb thrust with afterburning.

**Dimensions:** span 27 ft 0 in, length 51 ft 0 1/2 in, height 13 ft 11 1/2 in.

**Weights:** empty 15,212 lb, gross 20,500-29,760 lb.

**Performance:** max speed at 40,000 ft Mach 2.1, at S/L Mach 1.13, ceiling 55,775 ft, T-O run 2,625 ft clean, 5,250 ft at max gross weight, landing run 2,295 ft, combat radius with 2,000-lb weapon load 404 miles lo-lo-lo, 806 miles hi-lo-hi.

**Accommodation:** pilot only, on ejection seat.

**Armament:** one 30-mm DEFA 552A gun in lower lip of each air intake duct; one or three underfuselage and four underwing stations, with multiple launchers, for more than 8,818 lb of stores, including single or cluster bombs, rocket pods, ASMs, two self-defense AAMs, or two drop tanks.

#### Mirage 2000

The basic models of the Mirage 2000, and their primary differences, were outlined in some detail in the "Gallery of NATO Airpower" in the September 1994 issue of *Air Force Magazine*. In the Middle East, only the Mirage 2000E, essentially a single-seat multirole version of the 2000C interceptor, is currently operational. In December 1981, Egypt ordered 16 single-seat 2000EMs and four two-seat 2000BMs. These were delivered between 1986 and 1988; one of each is since believed to have been lost. Abu Dhabi's order for 22 single-seat 2000EADs, six tandem-seat 2000EDAD operational trainers, and eight examples of the 2000RAD reconnaissance model were delivered to Nos. 1 and 2 Squadrons between November 1989 and November 1990. The RAD aircraft are equipped as standard with a COR 2 multicamera pod but could be fitted instead with a SLAR 2000 side-looking airborne radar pod or a Harold long-range optical sensor pod. The EADs carry a 2,205-lb stand-off ground-attack weapon and are fitted with French Spirale chaff/flare dispensers and RDM radar; 18 of them each have an Italian Elettronica ELT/158 radar warning receiver and ELT/558 jamming equipment.

Deliveries are due in 1997 of 12 Mirage 2000-5s to Qatar (nine single-seat -SEADs and three tandem-seat -SDDAs). This version has an upgraded Thomson-CSF RDY radar, improved weapons capability, and the option of a 22,046 lb thrust M88-P20 engine. (Data for 2000C; 2000E generally similar.)

**Contractor:** Dassault Aviation, France.

**Power Plant:** one SNECMA M53-P2 turbofan; 21,385 lb thrust with afterburning.

**Dimensions:** span 29 ft 11 1/2 in, length 47 ft 1 1/4 in, height 17 ft 0 3/4 in.

**Weights:** empty 16,534 lb, gross 23,940-37,480 lb.

**Performance:** max speed at high altitude Mach 2.2, at low altitude 690 mph, ceiling 54,000 ft, range with four 550-lb bombs 920 miles.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** two 30-mm DEFA 554 guns, each with 125 rds. Five underfuselage and four underwing stations for up to 13,890 lb of external stores, which can include Matra Super 530D, Magic, or Magic 2 AAMs; free-fall, retarded, cluster, antirunway, or laser-guided bombs; 68-mm or 100-mm rocket launchers; Armat ARM or Exocet antiship missile(s); or a centerline 30-mm twin-gun pod.

#### Strikemaster

The 12 Strikemaster Mk 82/82As serving with No. 1 Squadron of the Royal Air Force of Oman are used mainly for training. They retain their attack potential, as do the 36 Mk 80/80As of the Royal Saudi Air Force, based at King Faisal Air Academy, Riyadh. First flown 28 years ago, the Strikemaster has docile handling qualities and an ability to fly from unprepared airstrips that originally made it an attractive low-cost ground-attack aircraft for the Middle East environment.

**Contractor:** British Aircraft Corporation, UK.

**Power Plant:** one Rolls-Royce Bristol Viper Mk 535 turbojet; 3,410 lb thrust.

**Dimensions:** span over tip tanks 36 ft 10 in, length 33 ft 8 1/2 in, height 10 ft 11 1/2 in.

**Weights:** empty 6,195 lb, gross 9,303-11,500 lb.

**Performance:** max speed at 18,000 ft 481 mph, ceiling 40,000 ft, T-O to 50 ft 3,500 ft, landing from 50 ft 2,400 ft, combat radius lo-lo-lo with 3,000-lb weapons load 145 miles, hi-lo-hi with 1,000-lb load 575 miles.

**Accommodation:** crew of two, side by side on zero-height/104 mph ejection seats (pilot only in ground-attack role).

**Armament:** one 7.62-mm FN Herstal machine gun in lower lip of each air intake duct; two weapon stations under each wing for maximum 3,000 lb (single-seat) of bombs, rocket pods, napalm tanks, or 7.62-mm or 20-mm gun pods.

#### Su-7/20/22 ("Fitter")

A single squadron of original fixed-wing Su-7BM ("Fitter-A") single-seat attack aircraft can still be seen in the insignia of the Algerian Air Force. Far more numerous, and effective, are variable-geometry derivatives of the Su-7 operated by six air forces in the region. First to enter service was the Su-20 ("Fitter-C"), with a 24,800 lb thrust Saturn/Lyulka AL-21F-3 afterburning turbojet. Algeria is believed to have received 32; others went to Syria and Iraq; four of the Iraqi Su-20s joined the exodus to Iran during Desert Storm and are still there.

When the Su-22M-3 ("Fitter-J") became available, with internal Doppler nav radar, a laser rangefinder in the intake centerbody, and a more powerful Tumansky engine, many were supplied to Iraq, 90 to Libya (about half of which remain in service), 40 to Syria, and 20 to Yemen, which were supplemented by others during the civil war. Forty of the Iraqi aircraft joined the Su-20s in Iran during Desert Storm, but up to 50 Su-20/22s could still be available to the Iraqi Air Force. Inevitably



for aircraft with an ancestry dating back to the first sighting of an Su-7 in 1956, their age shows, but 8,820 lb of external stores remains a useful weapon load. (Data for Su-22M-3.)

**Contractor:** Sukhoi OKB, Russia.

**Power Plant:** one Tumansky R-29BS-300 turbojet; 25,350 lb thrust with afterburning.

**Dimensions:** span 44 ft 10 1/2 in (30° min sweep), 32 ft 10 1/4 in (63° max sweep), length 62 ft 5 in, height 16 ft 0 1/2 in.

**Weight:** gross 36,155–42,990 lb.

**Performance:** max speed at height Mach 1.74, at S/L Mach 1.1, ceiling 46,585 ft, T-O run 2,955 ft, landing run 3,120 ft, range 870 miles at low altitude, 1,430 miles at high altitude.

**Accommodation:** pilot only, on ejection seat.

**Armament:** two 30-mm NR-30 guns in wingroots, each with 80 rds; nine pylons under wings and fuselage for bombs, rocket packs, SPPU-22 twin-barrel 23-mm gun pods, R-3 ("Atoll") AAMs, and Kh-23 ("Kerry") or Kh-25ML ("Karen") ASMs.

### Su-25 ("Frogfoot")

The Iraqi Air Force ordered 45 Sukhoi Su-25s. Seven of those delivered by 1991 were flown to Iran during Desert Storm; two others were shot down en route by F-15Cs. An estimated 22 remain in service.

Known to NATO as "Frogfoot-A," the Su-25 is Russia's counterpart to USAF's A-10A Thunderbolt II. The design emphasis was on survivability features that would enable it to attack ground targets at treetop height in the face of intense opposition. The pilot is seated high above the sharply sloping nose, in an all-welded cockpit of titanium armor. A total of 256 flares are packed into dispensers above the engine nacelles and tailcone for protection against ground-fired SAMs during eight attack runs. To enhance combat readiness, the turbojets will run on any fuel likely to be found in forward areas, including MT gasoline and diesel oil.

**Contractor:** Sukhoi OKB, Russia.

**Power Plant:** two Soyuz/Tumansky R-195 turbojets; each 9,921 lb thrust.

**Dimensions:** span 47 ft 1 1/2 in, length 50 ft 11 1/2 in, height 15 ft 9 in.

**Weights:** empty 20,950 lb, gross 32,187–38,800 lb.

**Performance:** max speed at S/L Mach 0.8, max attack speed, airbrakes open, 428 mph, ceiling 22,965 ft, T-O run 1,970–3,930 ft, landing run 1,312–1,970 ft, range 466 miles at S/L, 776 miles at height.

**Accommodation:** pilot only, on zero/zero ejection seat.

**Armament:** one twin-barrel 30-mm gun in port side of nose; eight underwing pylons for 9,700 lb of air-to-surface weapons, including SPPU-22 pods for 23-mm guns with twin barrels that pivot downward, 57-mm to 330-mm rockets, Kh-23 ("Kerry"), Kh-25 ("Karen"), and Kh-29 ("Kedge") ASMs, laser-guided rocket-boosted bombs up to 1,450 lb, and 1,100-lb incendiary, antipersonnel, and other cluster bombs; two small outboard pylons for R-3S ("Atoll") or R-60 ("Aphid") self-defense AAMs.

### Tornado

During the Persian Gulf War, Royal Air Force detachments of the Tornado IDS (interdictor/strike) version were supplemented by other Tornado IDS aircraft of No. 7 Squadron, Royal Saudi Air Force, and from the latter's No. 66 Squadron, then forming. Iraqi airfields were attacked with JP 233 cluster weapons from low altitude and later with Paveway laser-guided bombs from medium heights.

The original RSAF order for 48 Tornado IDSs was part of the Al Yamamah I agreement signed with the UK in 1985. One was lost in the war with Iraq, and two others were lost last year, but work has begun on another 48 ordered in June 1993 under the follow-up Al Yamamah II, for delivery from 1996. Equipment includes a Texas Instruments multimode terrain-following and ground-mapping radar, digital INS, electronic HUD, laser rangefinder and marked target seeker, IFF, RWR, and active ECM. Six aircraft, some with each Saudi squadron, are configured for reconnaissance, and 14 of the original batch have dual controls.

Under Al Yamamah I, the RSAF also ordered 24 Tornado ADV (air defense variant) interceptors, which currently equip Nos. 29 and 34 Squadrons. Generally similar to the IDS, the ADV has a slightly longer fuselage to house Foxhunter pulse-Doppler radar and to allow four Sky Flash AAMs to be carried in tandem underbelly pairs. The lengthening reduced drag, especially at supersonic speed, and provided a 10 percent increase in internal fuel capacity. The ADV's RB199 Mk 104 engines are each rated at 16,520 lb thrust. (Data for Tornado IDS.)

**Contractor:** Panavia Aircraft GmbH, a UK-German-Italian consortium.

**Power Plant:** two Turbo-Union RB199 Mk 103 turbofans; each 16,075 lb thrust with afterburning.

**Dimensions:** span 45 ft 7 1/2 in (25° min sweep), 28 ft 2 1/2 in (67° max sweep), length 54 ft 10 1/4 in, height 19 ft 6 1/4 in.

**Weights:** empty 31,065 lb, gross 45,000–61,620 lb.

**Performance:** max speed at height Mach 2.2, max speed with external stores Mach 0.92, balanced runway length 2,950 ft, combat radius 863 miles.

**Accommodation:** crew of two, on tandem zero/zero ejection seats.

**Armament:** two 27-mm IWKA-Mauser guns in fuselage, each with 180 rds; seven hardpoints under fuselage and wings for 19,840 lb of external stores, including Sidewinder AAMs; AGM-65 Maverick, AGM-88 HARM, ALARM, Kormoran, and Sea Eagle ASMs; cluster bombs; napalm; "smart," retarded, and conventional bombs up to 1,000 lb; rockets; incendiary and flare bombs.

## Helicopters

### AH-1 HueyCobra

In December 1971, Iran ordered 202 Bell AH-1J International gunship helicopters, each powered by a 1,673 shp Pratt & Whitney Canada T400-WV-402 Turbo Twin Pac unit. Generally similar to the US Marine Corps AH-1J SeaCobra, they also incorporated features of Bell's YAH-63 KingCobra (the AH-64 Apache's unsuccessful competitor) and an improved gun turret; most were adapted to carry the TOW antitank missile system. Perhaps 80–100 still remain, but many were lost in the long war with Iraq, and estimates of those still serviceable (and with enough TOWs to equip them) suggest that perhaps no more than a dozen still possess full operational capability. According to a 1992 report, Iran has regrouped its Army Cobras, Chinooks, and Bell 214 Isfahans into a new airmobile force under the operational control of the Revolutionary Guard.

The 24 single-engine Cobras received by Jordan's No. 10 and No. 12 Squadrons, and approximately 40 that equip No. 160 and No. 161 Squadrons in Israel, are believed to be similar to the US Army's AH-1F fully upgraded TOW version, with an IR jammer, hot metal and plume IR suppressor, RWR, low-air-speed sensor probe, 20-mm three-barrel gun in an electrically powered undernose turret, automatic compensation for off-axis firing, laser rangefinder and tracker, HUD, Doppler, and IFF transponder. Israeli HueyCobras also have a US-funded Rafael night targeting system. They have figured frequently in attacks on Hezbollah guerrilla forces based in southern Lebanon. Fourteen ex-US Army AH-1Es were purchased by Bahrain in 1994. (Data for AH-1F.)

**Contractor:** Bell Helicopter Textron, USA.

**Power Plant:** one AlliedSignal T53-L-703 turboshaft; 1,800 shp.

**Dimensions:** rotor diameter 44 ft 0 in, fuselage length 44 ft 7 in, height 13 ft 5 in.

**Weights:** empty 6,598 lb, gross 10,000 lb.  
**Performance:** max speed 141 mph, ceiling 12,200 ft, range 315 miles.

**Accommodation:** pilot and copilot/gunner in tandem armored cockpits.

**Armament:** one 20-mm three-barrel M197 gun, with 750 rds, in GE turret; outer of two weapon pylons under each stubwing can carry four TOW ASMs; inner pylon can carry a pack of 7–19 x 2.75-in rockets.

### AH-64 Apache

Since January 1984, more than 800 of these formidable attack helicopters have been delivered to the US Army and Army National Guard, achieving IOC (initial operational capability) in July 1986. Nearly 300 took part in Desert Shield and Desert Storm.

Exports of the AH-64A began in January 1990 with a joint offer to Israel and Egypt, Israel placing an order for 18 two months later. The first two were delivered that September. All are now in service with the IDF/AF's No. 113 Squadron. Eighteen more, of 24 pledged, went to No. 127 Squadron in September 1993. The Israeli name for the AH-64A is *Petan* ("cobra"). Delivery of Egypt's first 24 began in early 1994 and are to be followed by a further 12. They were preceded in April 1993 by 12, with Hellfire missiles, ordered for the Royal Saudi Land Forces in April 1991. In December 1991, Abu Dhabi of the UAE ordered 20, with Hellfires and Hydra-70 rocket armament, receiving the first six in October 1993 and the balance of 14 in 1994. Abu Dhabi is to receive a further 10 Apaches in 1996, and Saudi Arabia is expected to order up to 48 more.

**Contractor:** McDonnell Douglas Helicopter Systems, USA.

**Power Plant:** two General Electric T700-GE-701C turboshafts; each 1,890 shp.

**Dimensions:** rotor diameter 48 ft 0 in, fuselage length, tail rotor turning 51 ft 0 in, height 15 ft 3 1/2 in.

**Weights:** empty 11,387 lb, gross 14,445–22,283 lb.  
**Performance:** max speed at S/L 182 mph, ceiling 21,000 ft, max range (internal fuel, including reserves) 253

miles, typical mission endurance (no reserves) 2 h 40 min.

**Accommodation:** crew of two, in tandem (copilot/gunner in front seat).

**Armament:** turreted 30-mm M230 Chain Gun, with up to 1,200 rds, under front fuselage; four underwing stations, each for AGM-114 Hellfire antitank missiles and/or 2.75-in FFAR rockets in seven-rd M200 or 19-rd M260 launchers.

### AS 330 Puma and AS 332 Super Puma/AS 532 Cougar

More than 700 AS 330 Puma military assault and civilian transport helicopters were built in France, the UK, Indonesia, and Romania. Manufacture by IAR in Romania continues. The typical AS 330H military export Puma is powered by two 1,400 shp Turmo IVB engines and carries 16 fully equipped troops, six litter patients and six seated casualties, or internal or external freight. The AS 330L differs in having 1,575 shp Turmo IVCs. Current Middle East inventories include Abu Dhabi (a few early 330C/Fs with Turmo IVB/A engines and 10 AS 330Ls), Algeria (three), Iraq (15 330Gs, including two VIP transports), Kuwait (seven 330Hs), Lebanon (nine 330Ls), Morocco (27 330Fs) and Tunisia (one). Lebanon and Abu Dhabi's AS 330Ls are Romanian-built IAR-330s.

The AS 332 Super Puma (military designation AS 532 Cougar) differs in having a new power plant, uprated transmission, and airframe changes to improve crew survivability, payload, performance, and ease of maintenance. Suffixes C and L signify short (*court*) and long fuselage, for 21 or 25 passengers/troops, respectively. No. 9 Squadron of the Qatar Emiri Air Force has six AS 532SC Cougars for naval antiship/antisubmarine and SAR missions. This model has a folding tail rotor pylon, deck landing assist device, and mountings for Exocet missiles. The Royal Saudi Navy has 12 AS 532SCs, the Kuwait Air Force five, and Abu Dhabi Navy five. (The last named are to be upgraded with Exocets for ASW duties.) The basic transport version serves with Jordan's No. 7 Squadron (10 AS 532ULs, including three furnished as VIP transports) and Abu Dhabi (four AS 532ULs, including two VIP); Oman's Royal Flight has two AS 332Ls for VIP use. (Data for AS 532SC.)

**Contractor:** Eurocopter SA, a Franco-German company.

**Power Plant:** two Turbomeca Makila 1A1 turboshafts; each 1,877 shp.

**Dimensions:** rotor diameter 51 ft 2 1/4 in, fuselage length 50 ft 11 1/2 in, height 16 ft 1 1/4 in.

**Weights:** empty 9,920 lb, gross with internal load 19,841 lb, with slung load 20,615 lb.

**Performance:** cruising speed at S/L 149 mph, ceiling 13,450 ft, range 540 miles.

**Accommodation:** crew of two or three; optionally, 21 passengers, six litters and 11 seated persons, or freight.

**Armament:** options include two Exocet missiles or two lightweight torpedoes.

### AS 350 Ecureuil/AS 550 Fennec and AS 365 Dauphin/AS 565 Panther

Recent Middle Eastern customers for Eurocopter's single-engined Ecureuil/Fennec family (732 shp Turbomeca Arriel 1D1 turboshaft) are the air forces of Algeria (nine) and Tunisia (six). More common in the region, however, is their twin-engined stablemate, of which the major operator is Saudi Arabia, whose armed forces have 29. Six are AS 365ND Dauphins used as medevac helicopters by the Royal Saudi Land Forces, with outward-opening (instead of sliding) rear cabin doors permitting the side-loading of up to four casualty litters, accompanied by medical attendants. Four of the Royal Saudi Navy's 23 are AS 565MA Panthers, equipped for surveillance, search, and rescue; the rest are frigate-based AS 565SA Panthers, equipped with search radar and AS.15TT missiles for the antiship role. The UAE Navy has seven AS.15TT/Exocet-armed Panthers on order. Israel's No. 193 Squadron acquired two basically similar ex-US Coast Guard HH-65As (AS 366G) in 1985, which serve on board "Saar"-class fast attack boats in a search-and-rescue role; they are being followed by an undisclosed number of AS 565MAs ordered in 1994, which will have an Elbit navigation and search radar suite, Tunisia and Dubai each have a single AS 565, and Djibouti three. (Data for AS 565SA.)

**Contractor:** Eurocopter SA, a Franco-German company.

**Power Plant:** two Turbomeca Arriel 1M1 turboshafts; each 749 shp.

**Dimensions:** rotor diameter 39 ft 2 in, fuselage length 39 ft 8 1/4 in, height 13 ft 0 3/4 in.

**Weights:** empty 4,987 lb, gross 9,370 lb.

**Performance:** max cruising speed at S/L 170 mph, hovering ceiling IGE 8,530 ft, combat radius 155–173 miles, max range 543 miles.

**Accommodation:** crew of two, plus systems operators.



**Armament:** four Aerospatiale AS.15TT radar-guided antiship missiles or (in ASW role) two homing torpedoes, mounted on cabin sides.

#### Bell 205 and UH-1 Iroquois

About 180 examples of this workhorse helicopter are in service with the air arms of Middle Eastern and North African nations: Dubai (Air Force six), Iran (Army 23, Navy 4), Israel (42), Morocco (Air Force 27), Oman (Air Force 19), Saudi Arabia (Air Force 8), and Tunisia (Air Force 17). Most of these are Agusta-built 205/205A/205A-1s, although ex-US UH-1Hs account for two of the Tunisians and 10 of the Israeli total. Additional UH-1Hs, refurbished and upgraded by UNC, have recently been supplied to Jordan (18 for No. 8 Squadron) and Lebanon (20). They perform a broad range of utility and general transport duties. (Data for Agusta-Bell 205.)

**Contractors:** Bell Helicopter Textron, USA; Agusta SpA, Italy.

**Power Plant:** one AlliedSignal T53-L-13B turboshaft; 1,400 shp.

**Dimensions:** rotor diameter 48 ft 0 in, fuselage length 41 ft 10 $\frac{3}{4}$  in, height 14 ft 5 $\frac{1}{2}$  in.

**Weights:** empty 4,800 lb, gross 9,500 lb.

**Performance:** max speed at S/L 138 mph, max cruising speed 127 mph, ceiling 15,000 ft, max range 360 miles.

**Accommodation:** one pilot; up to 14 troops, six litters plus one medical attendant, or 3,880 lb of cargo.

**Armament:** normally none.

#### Bell 212 and 412

By changing to a compact twin-turbine PT6T-6 power plant, the Bell 212 was able to offer an increased payload of 4,000 lb internally or 4,500 lb externally and enhanced reliability, especially in hot and high environments, compared with the 205/UH-1 series. Current operators are Bahrain (12), Dubai (one), Iran (Army 11, Navy 19 ASW), Iraq (five ASW/SAR), Israel (54), Lebanon (six), Libya (three), Morocco (three), Oman (three), Saudi Arabia (27 SAR and VIP), Sharjah Emiri Guard Wing of the UAE (four), and Yemen (five, plus one VIP). Israel's aircraft, and two Tunisian UH-1Ns, came from US production, but most other 212s in the Middle East/North Africa region came from Bell's Italian licensee, Agusta, which also developed its own antisubmarine version, the AB 212 ASW. The Agusta ASW version is equipped with Tacan, ECM, and a Bendix AN/AQS-13 sonar; for antiship missions, the sonar can be replaced by a GEC-Ferranti Seaspray search radar. Dubai also has nine Agusta-Bell 412s, with four-blade (instead of two-blade) main rotor and increased performance. (Data for Agusta-Bell 212 ASW.)

**Contractor:** Agusta SpA, Italy.

**Power Plant:** one Pratt & Whitney Canada PT6T-6 Turbo Twin Pac turboshaft; 1,875 shp.

**Dimensions:** rotor diameter 48 ft 0 in, fuselage length 42 ft 4 $\frac{1}{4}$  in, height 14 ft 10 $\frac{1}{4}$  in.

**Weights:** empty 5,621 lb, gross 10,692 lb.

**Performance:** max speed at S/L 122 mph, max cruising speed 115 mph, ceiling 13,000 ft, search range with 10 percent fuel reserves 382 miles, max range with auxiliary fuel and 15 percent reserves 414 miles.

**Accommodation:** flight crew of one or two; one or two ASW/ASV systems operators, or seven/eight passengers, or four litters plus medical attendant.

**Armament:** two Motoflites 244 AS or Mk 44/46 homing torpedoes, or depth charges, for ASW; two Marte Mk 2, Sea Skua, or similar antiship missiles for ASV operations.

#### Bell 214

Like the Bell 212, the 214 was developed as a derivative of the Bell 205/UH-1 with increased power and payload. Iran ordered 287 Model 214As (Iranian name *Isfahan*), all of which were delivered in 1975. Further orders followed, for six more 214As and 39 of an SAR version designated 214C. Bell built a relatively small number of a basically commercial version of the 214A as the 214B *BigLifter* and continued with the stretched 214ST *SuperTransport*, which has two 1,625 shp General Electric CT7-2A turboshafts and an 8 ft longer fuselage, seating up to 18 passengers.

More than 300 of these various workhorse helicopters still operate in the Middle East, most of them with Iranian Islamic Army Aviation, plus nine 214Cs with the Air Force. Iraq is believed to retain most of an original 45 214STs, although their serviceability is unknown. Dubai has four 214Bs, and Oman about five Bs. (Data for Bell 214A.)

**Contractor:** Bell Helicopter Textron, USA.

**Power Plant:** one AlliedSignal LTC4B-8D turboshaft; 2,930 shp.

**Dimensions:** rotor diameter 52 ft 0 in, fuselage length 49 ft 3 $\frac{1}{2}$  in, height 15 ft 0 in.

**Weights:** empty 7,460 lb, gross 11,480 lb.

**Performance:** max cruising speed at S/L 161 mph, ceiling 20,000 ft, max range 215 miles.

**Accommodation:** crew of two; up to 14 passengers or equivalent cargo.

**Armament:** none.

#### Bell 406 CS Combat Scout and OH-58D

The *Combat Scout* was intended as a simplified scout/attack export version of the US Army's highly successful OH-58D *Kiowa Warrior*. The Royal Saudi Land Forces received 15 in 1990, with folding rotor blades and stabilizer, "squatting" skids, a roof-mounted Saab-Emerson Helitow sight, and a SFENA hybrid cockpit combining conventional instruments with electronic displays for TOW missile and communications control. Only five are configured currently to carry TOW.

Israel received the first four of an unspecified number of OH-58Ds in 1990, fitted with TV cameras, IR thermal imagers, and laser rangefinder/designators. (Data for *Combat Scout*.)

**Contractor:** Bell Helicopter Textron, USA.

**Power Plant:** one Allison 250-C30U turboshaft; 650 shp.

**Dimensions:** rotor diameter 35 ft 0 in, fuselage length 34 ft 4 $\frac{1}{4}$  in, height 12 ft 10 $\frac{1}{2}$  in.



**BO 105, Bahrain Emiri Air Force (Peter Steinemann)**



**CH-47C Chinook, Royal Air Force of Morocco (Press-Office Sturzenegger)**

**Weights:** empty 2,271 lb, gross 5,000 lb.

**Performance:** max speed at 4,000 ft 144 mph, max cruising speed 138 mph, range with max fuel 251 miles.

**Accommodation:** crew of two, side by side.

**Armament (RSLF version):** cabin-side outriggers optional for four TOW 2 antitank missiles, 0.30- and 0.50-in machine gun pods, and 2.75-in FFAR rocket pods.

#### BO 105 and BK 117

The BO 105 twin-turbine light helicopter is in service with Bahrain (Navy, four), Dubai (three), Jordan (two), and Sharjah (seven), primarily for VIP and communications duties. The major Middle Eastern operator is Iraq, with up to 30 estimated still in service following losses in the Persian Gulf War. The first 10 Iraqi BO 105s, of a much larger total ordered as HOT antitank missile carriers, were delivered from Germany in 1979. The next 10 were embargoed by the then Federal Republic but were allowed to go to Iraq, via Geneva, "after conversion for medevac duty." Others followed, many from production in Spain by CASA, to a total of at least 60, and were seen missile-armed during Desert Storm. Iraq also acquired 26 Eurocopter/Kawasaki BK 117s, with a similar configuration but with more powerful turbines and improved performance. Sharjah has two BK 117s. (Data for basic BO 105 CB.)

**Contractors:** initially MBB, Germany; now Eurocopter SA, a Franco-German company.

**Power Plant:** two Allison 250-C20B turboshafts; each 420 shp.

**Dimensions:** rotor diameter 32 ft 3 $\frac{1}{2}$  in, fuselage length 28 ft 1 in, height 9 ft 11 in.

**Weights:** empty 2,815 lb, gross 5,511 lb.

**Performance:** max cruising speed at S/L 149 mph, ceiling 10,000 ft, range 345-634 miles.

**Accommodation:** pilot and four other persons; rear clamshell doors for loading two stretchers or freight.

**Armament (optional):** TOW antitank missiles and associated sighting system.

#### CH-47C Chinook

Except for two Boeing-built Chinooks supplied to Iran, the CH-47Cs serving with air and land forces in the Middle East and North Africa were license-manufactured by Meridionali of Italy, an Agusta subsidiary. The Egyptian Air Force has 15, the Army of Iran about 45, Libya about 18 (Air Force six, Army 12), and the Royal Air Force of Morocco seven. In its standard transport role, the CH-47C carries troops, casualty litters, or internal or slung cargo. The cabin is loaded via a rear ramp/door. Typical loads include a complete artillery section, with personnel and ammunition. Optional equipment includes RWR, missile approach warning equipment, IR jammers, chaff/flare dispensers, and INS with GPS.

**Contractor:** Elicotteri Meridionali SpA, Italy.

**Power Plant:** two AlliedSignal T55-L-11A turboshafts; each 3,750 shp.

**Dimensions:** rotor diameter (each) 60 ft 0 in, fuselage length 51 ft 0 in, height 18 ft 7 $\frac{1}{4}$  in.

**Weights:** empty 21,464 lb, gross 33,000-46,000 lb.

**Performance:** max speed at S/L 189 mph, average cruising speed 131-160 mph, ceiling 15,000 ft, mission radius with 11,650-lb internal payload 115 miles, with 21,700-lb slung payload 23 miles.

**Accommodation:** crew of two or three; up to 44 troops, or 24 litter patients and two medical attendants, vehicles, or freight.

**Armament:** provision for one machine gun in forward hatchway.

#### CH/RH-53 Sea Stallion and Yasur 2000

The MATA Helicopters plant of Israeli Aircraft Industries, with Elbit as avionics integrator, has recently completed the upgrading of the 30 CH-53D-standard (S-65C-3) heavy-lift helicopters which equip Nos. 114 and 118 Squadrons of the Israeli Defense Force/Air Force. Named *Yasur* ("Albatross") 2000, their airframe life is now extended beyond 2000, including armored cockpits, crashworthy seats, external sponson fuel tanks, an in-flight refueling probe, rescue hoist, and an Elbit-led avionics suite that includes a mission computer, two multifunction displays, a moving map display, and new autopilot. The first flight of a Yasur 2000 took place June 4, 1992; redeliveries began in February 1993. These aircraft have been supplemented by 16 earlier-vintage CH-53As, with lower-rated T64 turboshafts and reduced performance and payload, from US surplus.

At least one of the six RH-53D mine-sweeping helicopters delivered to the Iranian Navy during the reign of the Shah is believed to be serviceable; that service is also thought to possess an ex-US Navy HH-53H. (Data for CH-53D.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two General Electric T64-GE-413 turboshafts; each 3,925 shp.

**Dimensions:** rotor diameter 72 ft 3 in, fuselage length 67 ft 2 in, height 24 ft 11 in.

**Weights:** empty 23,485 lb, gross 42,000 lb.

**Performance:** max speed at S/L 196 mph, max cruising speed 173 mph, ceiling 21,000 ft, max range at 173 mph, with reserves, 257 miles.

**Accommodation:** flight crew of three; up to 55 troops, 24 litters plus four medical personnel, or equivalent cargo.

**Armament:** none in CH-53D; RH-53D, provision for two 0.50-in machine guns to detonate surfaced mines.

#### McDonnell Douglas 500MD Defender

No. 5 Squadron of the Royal Jordanian Air Force at King Hussein Air College, Mafraq, has eight unarmed 500MDs for training, and a few are used by the Israeli Defense Force/Air Force in a liaison capacity. The only combat-equipped Defenders in the Middle East are Israel's antitank 500MD/TOWs, of which 30 were delivered from mid-1979. They carry a stabilized telescopic sight in a prominent turret on the port side of the nose. (Data for 500MD/TOW.)

**Contractor:** McDonnell Douglas Helicopter Systems, USA.

**Power Plant:** one Allison 250-C20B turboshaft; 375 shp.

**Dimensions:** rotor diameter 26 ft 4 in, fuselage length 25 ft 0 in, height 8 ft 10 $\frac{1}{4}$  in.

**Weights:** empty 1,976 lb, gross 3,000 lb.

**Performance:** max speed at S/L 150 mph, max cruising speed at 5,000 ft 132 mph, ceiling 13,800 ft, range with standard fuel 242 miles at S/L, 266 miles at 5,000 ft.

**Accommodation:** crew of two, side by side.

**Armament:** four Hughes TOW antitank missiles, in twin pod at each end of tubular beam through cabin.



### Mi-6 ("Hook")

Although seldom photographed, this large transport helicopter is thought to continue in service with three air forces in the Middle East/North Africa region. Algeria is reported to have four and Syria 10. Iraq received 15 to support construction and operation of its missile and radar sites, together with three Mi-10 ("Harke") heavy-lift flying cranes developed from the Mi-6. Some of these may still be available.

**Contractor:** Mil OKB, Russia.

**Power Plant:** two Aviadvigatel/Soloviev D-25V turboshafts; each 5,425 shp.

**Dimensions:** rotor diameter 114 ft 10 in, fuselage length 108 ft 10 1/2 in, height 32 ft 4 in.

**Weights:** empty 60,055 lb, gross 84,657-93,700 lb.

**Performance:** max speed 186 mph, max cruising speed 155 mph, ceiling 14,750 ft, range with 17,637-lb payload 385 miles, with 9,920-lb payload and external tanks 621 miles, ferry range 900 miles.

**Accommodation:** crew of five (two pilots, navigator, flight engineer, and radio operator); 70 combat-equipped troops, or 41 litter patients and two medical attendants; rear ramps; 1,765-lb capacity winch and pulley block system for handling max internal freight payload of 26,450 lb; sling for max external freight load of 17,637 lb (normally with stubwings removed).

**Armament:** provision for 12.7-mm machine gun in nose.

### Mi-8/17 ("Hip")

More than 10,000 Mi-8s and updated Mi-17 series helicopters have been supplied to military and commercial operators from plants in Kazan and Ulan-Ude. They can be seen in service in standard military armed transport form with the air forces of Algeria (95), Egypt (about 40), Iraq (possibly 70 following Desert Storm), Libya (34), Syria (at least 100), and Yemen (about 50). The Egyptian Navy has 10. These totals include veteran Mi-8s ("Hip-C" and "E"), Mi-17s ("Hip-H") and Mi-8s updated as Mi-8MT/MTV to Mi-17 standard, with 1,923 shp TV3-117MT engines in shorter nacelles and with the tail rotor transferred to the port side. Basic military tasks are assault, troop transport, and general-purpose duties, with a sliding, jettisonable passenger door at the front of the cabin on the port side, clamshell rear freight-loading doors, hook-on ramps for vehicle entry, cargo tie-downs in the floor, a 330-lb-capacity winch and pulley block system for cargo handling, and 6,614-lb-capacity cargo sling. All versions can be used for casualty evacuation. Ten of the Syrian aircraft are Mi-8SMVs ("Hip-J"), equipped for ECM, with small equipment boxes on each side of the cabin, and Mi-8PPA ("Hip-K") active communications jammers, with a large antenna array on each side. (Data for standard Mi-8.)

**Contractor:** Mil OKB, Russia.

**Power Plant:** two Klimov TV2-117A turboshafts; each 1,677 shp.

**Dimensions:** rotor diameter 69 ft 10 1/4 in, fuselage length 59 ft 7 1/2 in, height 18 ft 6 1/2 in.

**Weights:** empty 16,007 lb, gross 24,470-26,455 lb.

**Performance:** max speed at 3,280 ft 161 mph, max cruising speed 140 mph, ceiling 14,765 ft, range with 24 troops 264 miles, cargo version 286-596 miles.

**Accommodation:** crew of two or three; 24 combat-equipped troops on tip-up seats along cabin side walls; 8,820 lb of freight internally, 6,614 lb externally; or up to 12 litter patients and medical attendant.

**Armament:** provision for 12.7-mm machine gun in nose; twin rack each side for total of four 16-rd packs of 57-mm rockets or other stores ("Hip-C" standard), or triple stores rack each side for six 32-rd rocket packs, and four 9M17P Falanga M ("Swatter") antitank missiles on rails above packs ("Hip-E" standard).

### Mi-14PL ("Haze")

The Mi-14 shore-based amphibious helicopter has the same basic airframe, power plant, and dynamic components as the Mi-17. Differences include a boat-type planing bottom for operation on water, a sponson on each side carrying an inflatable flotation bag, a small float under the tail, and fully retractable wheel landing gear. Libya has 25 and Syria 12 of the Mi-14PL ("Haze-A") ASW version, with a large undernose radome, retractable sonar, sonobuoys and signal flares, a towed MAD bird stowed against the rear of the fuselage, and a life raft. An autopilot/autover system and autocontrol system are standard. The Libyan and Syrian Mi-14s are under Navy direction for coastal surveillance.

**Contractor:** Mil OKB, Russia.

**Power Plant:** two Klimov TV3-117MT turboshafts; each 1,923 shp.

**Dimensions:** rotor diameter 69 ft 10 1/4 in, fuselage length 60 ft 3 1/2 in, height 22 ft 9 in.

**Weights:** empty 25,900 lb, gross 30,865 lb.

**Performance:** max speed 143 mph, normal cruising speed 127 mph, ceiling 11,500 ft, range with max fuel 705 miles.

**Accommodation:** crew of four.

**Armament:** torpedoes, bombs, depth charges, and other stores in weapons bay in bottom of hull.

### Mi-24/25/35 ("Hind")

Most Mi-24 helicopter gunships delivered to the Middle East and North Africa are of the basic Mi-24D ("Hind-D") version, as described below, but Iraq is known to have some Mi-24Vs ("Hind-E"). These carry up to eight radio-guided, tube-launched 9M114 ("Spiral") antitank missiles in place of the less effective 9M17P Falanga Ps ("Swatters") on the Mi-24D. The Mi-24V also has a HUD instead of the D's reflector sight and can carry R-60 ("Aphid") AAMs for self-defense. Both models have a heavily armored airframe containing a cabin for eight troops or four litters in an assault transport role; an undernose missile guidance pod (port) and electro-optical sight (starboard); and pilot's Doppler-fed mechanical map display, IFF, RWR, IR jammer, and chaff/flare dispensers. Engine exhaust IR suppression mixer boxes are optional. Mi-25 and Mi-35 are export designations for the Mi-24D and Mi-24V, respectively.

Iraqi Mi-24s took little part in Desert Storm, and 20 are estimated to remain available. Algeria is believed to have about 38, Libya 40 plus 25 Mi-35s, Syria up to 60, including 35 Mi-35s, and Yemen 12. (Data for Mi-24D.)

**Contractor:** Mil OKB, Russia.

**Power Plant:** two Klimov TV3-117 turboshafts; each 2,190 shp.

**Dimensions:** rotor diameter 56 ft 9 1/4 in, fuselage length excl gun 57 ft 5 1/4 in, height 21 ft 4 in.

**Weights:** empty 18,520 lb, gross 24,250 lb.

**Performance:** max speed 192 mph, max cruising speed 183 mph, ceiling 14,750 ft, combat radius with max military load 99 miles, with four external fuel tanks 179 miles.

**Accommodation:** crew of two in tandem; flight mechanic, and provisions for eight troops or four litters in main cabin.

**Armament:** one YakB-12.7 four-barrel 12.7-mm machine gun in nose turret, slaved to electro-optical sight; four underwing hardpoints for 32-rd UB-32 packs of 57-mm rockets, 20-rd B-8V-20 packs of 80-mm rockets, UPK-23-250 twin-barrel 23-mm gun pods, GUV pods each containing one four-barrel 12.7-mm gun and two four-barrel 7.62-mm guns or a 30-mm grenade launcher, 3,300 lb of conventional bombs or mine dispensers. Provisions for firing AKMS guns from cabin windows.

### S-70/UH-60 Black Hawk

The S-70A basic export version of Sikorsky's infantry squad transport and general-purpose helicopter is essentially similar to the US Army's UH-60A and has been supplied to several Middle East customers.

The Royal Saudi Land Forces Army Aviation Command is the region's largest operator. In early 1990, it took delivery of 12 S-70A-1s in Desert Hawk configuration (15 troop seats, Jaguar 5 frequency-hopping radio, special rotor blade erosion protection, and provision for an external hoist, searchlights, and internal auxiliary fuel tanks). A 13th S-70A-1, with a VIP interior, was added in December 1990, followed a year later by the first of eight medevac S-70A-1Ls (signifying use of the updated UH-60L engine), each with fittings for six litters, air-conditioning, an IR-filtered searchlight, rescue hoist, and improved avionics. No. 8 Squadron of the Royal Jordanian Air Force, based at Amman, acquired three S-70A-11s in 1986-87 (one since reported lost); two S-70A-21s, outfitted as VIP transports, were acquired by the Egyptian Air Force in 1990; Morocco received one S-70A-25 and one A-26 in late 1992. Earlier this year, Kuwait expressed interest in purchasing a mix of up to 16 UH/SH-60 Black Hawks and Seahawks.

In 1994, Israel began to replace its aging Bell 212s with 10 ex-US Army UH-60As, to which it has given the name **Nammer** ("tiger"); two UH-60Ls were transferred to Bahrain in early 1991. (Data for current production standard UH-60L.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two General Electric T700-GE-701C turboshafts; each 1,800 shp (1,723 shp T700-GE-701A optional for export).

**Dimensions:** rotor diameter 53 ft 8 in, fuselage length 50 ft 0 1/2 in, height 16 ft 10 in.

**Weights:** empty 11,500 lb, gross 17,000-23,500 lb.

**Performance:** max cruising speed 173 mph, ceiling 19,000 ft, range with internal fuel 363 miles, with four external tanks 1,380 miles.

**Accommodation:** crew of three; 11-14 troops, or up to six litters and one to three attendants, or cargo, in cabin. VIP configurations for seven to 12 persons. Up to 8,000-lb load on external cargo sling.

**Armament:** provision for external stores support system on which can be suspended more than 10,000

lb of fuel tanks and weapons including 16 Hellfire laser-guided antiarmor or other missiles, gun pods, mine dispensers, rockets, or ECM pods. Two pintle mounts in cabin for a .50-in or 7.62-mm machine gun.

### SA 321 Super Frelon

In its maritime versions, this three-engine, heavy-duty helicopter has a boat hull and a stabilizing float on each side at the rear of the fuselage. IFF and dipping sonar are standard in versions used for ASW missions. Iraq acquired 10 SA 321GVs in the 1970s, each equipped with ORB-31D radar in a large nose radome and armed with two Exocet antiship missiles. Six more were bought in the early 1980s, but only eight are now thought to remain in service. Libya ordered eight SA 321Ms for SAR and logistical support in the early 1970s, followed in the 1980s by six maritime SA 321GMs with ORB-32WAS search radar, but the effective total is now thought unlikely to exceed five or six. (Data for SA 321G.)

**Contractor:** Aerospatiale, France.

**Power Plant:** three Turbomeca Turmo IIIIC6 turboshafts; each 1,550 shp.

**Dimensions:** rotor diameter 62 ft 0 in, fuselage length 65 ft 10 1/4 in, height 21 ft 10 1/4 in.

**Weights:** empty 15,130 lb, gross 28,660 lb.

**Performance:** cruising speed 155 mph, ceiling 10,325 ft, range 509-633 miles.

**Accommodation:** crew of five, including equipment operators; provision for 27 passengers.

**Armament:** two Exocet ASMs or four homing torpedoes carried on sides of hull.

### SA 342 Gazelle

Nine of the 11 nations in the Middle East and North Africa that bought military Gazelles of various models continue to fly them. Egypt imported 60 SA 342Ls and assembled another 30 locally; nine of these continue to serve with its Navy as antiship helicopters and about 65 of the others as an Air Force antitank element. Iraq and Syria are each thought to have around 50, Libya 40, Morocco 24, Kuwait 15, Qatar 12, Tunisia five, and Abu Dhabi 11. The predominant version is the SA 342L, and the great majority, as in Egypt, are equipped for antitank, antiship, or counterinsurgency duties, with only small numbers allocated to such nonbelligerent tasks as observation and liaison. (Data for SA 342L.)

**Contractors:** Aerospatiale, France, and Westland Helicopters, UK.

**Power Plant:** one Turbomeca Astazou XIVM turboshaft; 858 shp.

**Dimensions:** rotor diameter 34 ft 5 1/2 in, fuselage length 31 ft 3 1/4 in, height 10 ft 5 1/2 in.

**Weights:** empty 2,202 lb, gross 4,410 lb.

**Performance:** max cruising speed at S/L 161 mph, ceiling 13,450 ft, range with standard fuel 440 miles.

**Accommodation:** crew of one or two; up to three other persons.

**Armament:** outriggers on fuselage sides for variety of weapons, which can include up to six HOT wire-guided antitank missiles, two launchers for 68-mm or 2.75-in rockets, two 7.62-mm machine guns, or a single 20-mm gun.

### Sea King, Commando, and AS-61

All S-61/SH-3 helicopters operated by Middle Eastern nations were supplied by Sikorsky's European licensees: Westland (UK) and Agusta (Italy). Westland delivered 34 to Egypt and 12 to Qatar. Six of the Egyptian aircraft, of which five remain, were ASW/ASV **Sea King Mk 47s** for the country's Navy; the rest are of a model exclusive to Westland, the landbased **Commando** tactical transport. The initial Egyptian Air Force order comprised five **Commando Mk 1s**, minimally modified from the Sea King airframe, 17 tactical transport **Mk 2s**, and two VIP transport **Mk 2Bs**. Four electronic warfare **Commando Mk 2Es**, with Electronica ECM and ESM, were acquired later. Qatar's **Commando** consist of three **Mk 2A** transports, one **VIP Mk 2C**, and eight **Exocet**-equipped antiship **Mk 3s**; the transports serve with No. 9 (Multirole) Squadron and the **Mk 3s** with No. 8 (ASV) Squadron.

Agusta's contribution included two **VIP AS-61As** and 10 or more antisubmarine **ASH-3Ds** for Iran, one **VIP** and four utility **AS-61Ts** for Iraq, a single **VIP AS-61A** for Libya, and three similar aircraft for Saudi Arabia. (Data for **Commando Mk 2**.)

**Contractor:** Westland Helicopters, UK.

**Power Plant:** two Rolls-Royce Gnome H, 1400-1 turboshafts; each 1,660 shp.

**Dimensions:** rotor diameter 62 ft 0 in, fuselage length 55 ft 10 in, height 16 ft 10 in.

**Weights:** empty 12,390 lb, gross 21,500 lb.

**Performance:** max speed at S/L 140 mph, cruising speed at S/L 126 mph, hovering ceiling 1GE 6,500 ft, range 246 miles with max payload and fuel reserves, 920 miles with max fuel.

**Accommodation:** crew of two; up to 28 troops (21 in Mk 1).



**Armament:** provision for guns, missiles, rocket pods, bombs, torpedoes, depth charges, or other weapons, according to mission requirements.

### SH-2G Seasprite

New-build production of the SH-2G ended in early 1993, and conversion of earlier SH-2Fs to the same standard ended little more than a year later, a tribute to the enduring worth of this twin-turbine antisubmarine helicopter. It has filled the US Navy's LAMPS I (light airborne multipurpose system) requirement since late 1971, notwithstanding the introduction of the more sophisticated LAMPS III Sikorsky SH-60. Seasprites received a special upgrade for service in the Persian Gulf from 1987, a factor that may have helped persuade the Egyptian Navy to place a contract in February 1995 for 10 SH-2Gs. Kaman will remanufacture these from ex-USN F models, including new T700 engines offering more than 20 percent improvement in fuel consumption. Other improvements include AQS-18A dipping sonar, LN-66HP surveillance radar, self-protection systems, and cockpit/avionics upgrades. Deliveries will be made in 1997-98. In mid-1995, Egypt was negotiating purchase of a second batch of 10 SH-2Gs.

**Contractor:** Kaman Aerospace Corporation, USA.  
**Power Plant:** two General Electric T700-GE-401 turboshafts; each 1,723 shp.

**Dimensions:** rotor diameter 44 ft 0 in, fuselage length 40 ft 6 in (38 ft 4 in with nose and blades folded), height 15 ft 2 in.

**Weights:** empty 9,200 lb, gross 13,500 lb.  
**Performance:** max speed at S/L 159 mph, normal cruising speed 138 mph, ceiling 23,900 ft, max range with two external fuel tanks 500 miles.

**Accommodation:** crew of three; one passenger with LAMPS equipment installed, or four passengers or two litters with sonobuoy launcher removed.

**Armament:** one or two Mk 46 or Mk 50 torpedoes and eight smoke markers; provision for 7.62-mm gun in each cabin doorway.

## Reconnaissance and Special Mission Aircraft

### Beechcraft 1900C-1

Among orders for the Beechcraft 1900 civil commuter, cargo, or executive aircraft was a 1985 contract for six for the Egyptian Air Force: four for electronic surveillance and two for maritime patrol. All were of the 1900C-1 model, with a "wet" wing offering much better payload/range performance than the original design. Four were delivered in 1988 and two the following year. Equipment in the elint aircraft is still classified, but a fifth and sixth EW aircraft delivered to Egypt in September 1992 were described as having all main cabin windows deleted, an underfuselage radome forward of the wing, and more antennas above and below wings and fuselage than the previous elint quartet. Two of these antennas were of the "hockey stick" shape associated with the US Army's latest RC-12 Guardrail Common Sensor aircraft.

The maritime pair are each equipped with weather radar, Dalmio Victor S-3075 electronic support measures, and a long ventral pod containing a Motorola SLAMMR (side-looking airborne modular multimission radar). The cargo door of the standard 1900C-1 and about half of the main cabin windows are deleted; ESM equipment is thought to include a tailcone-mounted radar warning receiver.

**Contractor:** Raytheon Aircraft Company, USA.  
**Power Plant:** two Pratt & Whitney Aircraft of Canada PT6A-65B turboprops; each 1,100 shp.

**Dimensions:** span 54 ft 5 1/4 in, length 57 ft 10 in, height 14 ft 5 1/4 in.

**Weights:** empty approx 9,850 lb, gross 16,600 lb.  
**Performance:** max cruising speed at 8,000-16,000 ft 307 mph, ceiling more than 25,000 ft, T-O run 2,200 ft, landing run 1,530 ft, range 1,806 miles.

**Accommodation:** crew of one or two; mission systems operators according to role.  
**Armament:** none known.

### E-2C Hawkeye

Four Group 0 E-2Cs, delivered in 1977-78, equip Israel's No. 192 Squadron at Hatzorim; Egypt received five Group 0s from 1987, and a sixth, to upgraded Group II standard, was delivered in 1993.

The AN/APS-125 radar systems of all except the last Egyptian E-2C are less advanced than the APS-145

fitted to Group II US Navy Hawkeyes. The AN/APS-145 has greater resistance to jamming, better overland detection, and can detect and classify approaching aircraft more than 345 miles away, track more than 2,000 targets simultaneously and automatically, and control more than 40 intercepts. The radar and IFF antennas are mounted in a 24-ft-diameter disc above the center-fuselage, rotating at five to six rpm; four glassfiber vertical tail surfaces avoid compromising the radar's efficiency. An ATDS (airborne tactical data system) compartment in the center-fuselage receives and displays incoming intelligence to the combat information center officer, air control officer, and radar operator. Other Group II improvements include JTIDS tactical software, upgraded engines, and provision for GPS navigation. (Data for US Navy Group II E-2C.)

**Contractor:** Northrop Grumman Corporation, USA.  
**Power Plant:** two Allison T56-A-427 turboprops; each 5,100 shp.



**McDonnell Douglas 500MD, Royal Jordanian Air Force (Peter R. Foster)**



**S-70A-1L Black Hawk, Royal Saudi Land Forces Army Aviation Command**



**SA 342K Gazelles, Kuwaiti Air Force (Peter Steinemann)**

**Dimensions:** span 80 ft 7 in, length 57 ft 9 in, height 18 ft 4 in.

**Weights:** empty 40,484 lb, gross 54,426 lb.

**Performance:** max speed 389 mph, cruising speed for max range 299 mph, ceiling 37,000 ft, min T-O run 1,850 ft, min landing run 1,440 ft, on-station endurance 200 miles from base 4 h 24 min, max endurance 6 h 15 min.

**Accommodation:** flight crew of two; three mission personnel.

**Armament:** none.

### E-3A Sentry

Five Boeing E-3A AWACS aircraft are operated by No. 18 Squadron of the Royal Saudi Air Force from Riyadh Military City Airport. Carrying one or more relief crews, and refueled in flight, each E-3A can stay aloft for an average mission time of 18-18 hours, with two or more orbiting aircraft providing a constant radar picture of the region from the Red Sea to the Arabian Sea. **Contractor:** Boeing Aerospace Company, USA.

**Power Plant:** four CFM International CFM56-2A-2 turbofans; each 24,000 lb thrust.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.

**Weights:** empty (estimated) 160,000 lb, gross 335,000 lb.

**Performance:** max speed at 40,000 ft 530 mph, ceiling approx 40,000 ft, T-O run approx 5,200 ft, landing run approx 2,500 ft, on-station endurance 1,000 miles from base 6 h, max endurance (unrefueled) 11 h.

**Accommodation:** flight crew of four; up to 13 specialist AWACS personnel.

**Armament:** none.

### MiG-25R ("Foxbat")

Algeria, Libya, and Syria operate small numbers of reconnaissance MiG-25Rs side by side with their fighter versions. All are believed to be of the original RB series ("Foxbat-B"), with a nose-mounted pack of cameras and elint sensors. They have no guns but, like their counterparts in CIS air forces, can presumably offer the same ability to make precision automatic attacks with bombs in all weather, day and night, at supersonic speed, and from heights above 65,000 ft, against targets with known geographic coordinates. Equipment includes an inertial navigation system, updated by Doppler. Range at subsonic speed can be extended to nearly 1,500 miles by attaching a 1,400-gallon conformal underbelly fuel tank. Supersonic cruising speed is Mach 2.35.

**Contractor:** Mikoyan OKB, Russia.

**Power Plant:** two Soyuz/Tumansky R-15BD-300 turbojets, each 24,675 lb thrust with afterburning.

**Dimensions:** span 44 ft 0 1/4 in, length 70 ft 8 1/2 in, height 21 ft 4 in.

**Weight:** gross 81,570-90,830 lb.

**Performance:** max speed at height Mach 2.83, at S/L Mach 0.98, ceiling 68,900 ft, range at supersonic speed on internal fuel 1,015 miles, subsonic with underbelly tank 1,490 miles.

**Accommodation:** pilot only, on zero-height/80-775 mph ejection seat.

**Armament:** provision for six 1,100-lb bombs on two underfuselage and four underwing pylons.

### Mirage 5R

The 5R is a tactical reconnaissance version of the Mirage 5 fighter/ground-attack aircraft, recognizable by the different profile of a nose adapted to accept a pallet housing five (three oblique and two vertical) Omera 31 film cameras for all-altitude day and night photographic missions. It is operated by the air forces of Abu Dhabi (three 5RADs), Egypt (six 5SDRs), and Libya (eight 5DRs). (Data generally as for Mirage 5.)

### RC-12D and EU-21A/D

The RC-12D is a sigint/elint aircraft using the airframe of the Beechcraft Super King Air 200. Similar to the improved Guardrail V RC-12s operated by the US Army for battlefield intelligence-gathering, they are characterized by numerous large dipole antennas sprouting above and below the airframe. Five, known locally as Kookiya ("cuckoo"), were supplied to the Israeli Defense Force's No. 191 Squadron under FMS. Israel also has four standard Super King Air 200s (Zufit: "thrush") and nine much older aircraft for similar duties, in the form of three ex-US Army EU-21As (converted U-21As) and six EU-21Ds (ex-U-21Ds); these combine the unpressurized fuselage of the Beech Queen Air 65-80 with the wings of the King Air 90. (Data for RC-12D.)

**Contractor:** Raytheon Aircraft Company, USA.  
**Power Plant:** two Pratt & Whitney Canada PT6A-41 turboprops; each 850 shp.

**Dimensions:** span over wingtip pods 57 ft 10 in, length 43 ft 10 in, height 15 ft 5 in.

**Weights:** empty 8,143 lb, gross 14,200 lb.  
**Performance:** max speed at 14,000 ft 299 mph, ceiling 31,000 ft, T-O run approx 1,850 ft, landing run approx 1,750 ft, range approx 1,750 miles.

**Accommodation:** flight crew of two; up to eight other personnel.

**Armament:** none.

### RF-4 Phantom II

Iran may have available some of the 16 RF-4E reconnaissance Phantoms that it received, with the standard pack of oblique/panoramic cameras and SLAR/IR sensors in a modified nose. Israel certainly continues to operate most of its original 18 RF-4Es, which have Israeli-manufactured reconnaissance and avionics equipment, together with self-defense AAMs. Three of Israel's F-4E fighters were sent to the US in 1975-78 for conversion to F-4E(S) ("special") standard. This involved deleting the AN/APQ-120 radar and fitting a huge General Dynamics HIAC-1 high-altitude, high-resolution camera, a normal vertical KS-87 camera, and data link and other equipment into a new 70 cu ft nose, which increased the Phantom's length by 12 in. At least one is thought still to be



operational, offering a reconnaissance capability as good as that of any comparable system in the world. (RF-4E data similar to those for F-4E, except as follows.)

**Weights:** empty 31,110 lb, gross 52,835 lb.  
**Performance:** max speed at 40,000 ft Mach 2.25, at S/L Mach 1.2, ceiling 62,250 ft, ferry range 2,170 miles.  
**Armament:** normally none, but Israeli aircraft carry Python, Shafir, or Sidewinder self-defense AAMs.

#### RF-5E TigerEye

Ten RF-5Es (now possibly reduced to eight) constitute the only dedicated tactical reconnaissance unit of the Royal Saudi Air Force. Capable of round-the-clock operation, the single-seat TigerEye differs from the standard F-5E Tiger II fighter (which see) in having a longer nose of modified shape. A KS-87D oblique camera is standard and can be combined with one of three interchangeable nose pallets: one with a single LOROP (long-range oblique photography) camera, one with one medium- and one low-altitude pan camera, and a third that adds a Texas Instruments RS-700 series infrared linescan to the two pan cameras. (RF-5E data generally as for F-5E, except as follows.)

**Dimensions:** length 48 ft 0 $\frac{1}{2}$  in.  
**Performance:** combat radius with three drop tanks and two AIM-9 Sidewinder AAMs 403 miles (lo-lo-lo), 610 miles (hi-lo-hi).

## Transports and Tankers

#### An-12 ("Cub")

Fewer than a dozen veteran turboprop An-12s ("Cubs") remain in service with air forces in the Middle East/North African region, with an estimated five each in Algeria and Iraq, and one in Yemen. Their major shortcoming is lack of an integral rear-loading ramp/door. Instead, the bottom of the rear fuselage is made up of two longitudinal doors that hinge upward inside the cabin to permit direct loading from trucks or air-dropping of supplies and equipment. Sixty paratroopers can be dispatched via this exit in less than one minute.

**Contractor:** Antonov OKB, Ukraine.  
**Power Plant:** four ZMKB Progress AI-20M turboprops; each 4,190 ehp.  
**Dimensions:** span 124 ft 8 in, length 108 ft 7 $\frac{1}{4}$  in, height 34 ft 6 $\frac{1}{2}$  in.

**Weights:** empty 76,235 lb, gross 134,480 lb.  
**Performance:** max speed 385 mph, normal cruising speed 354 mph, ceiling 33,500 ft, T-O run 2,575 ft, landing run 2,756 ft, range with 39,680 lb payload 900 miles, with max fuel 4,225 miles.

**Accommodation:** crew of six; 44,090 lb of freight, 90 troops or 60 parachute troops. Built-in freight-handling gantry with capacity of 5,070 lb.

**Armament:** two 23-mm NR-23 guns in manned tail turret. Provision for bombs.

#### An-24/26 ("Coke/Curl")

Between 1960 and 1978, about 1,100 An-24 ("Coke") twin-turboprop transports were built, the final versions with 2,515 ehp AI-24A engines, an optional Type RU-19-300 auxiliary turbojet in the rear of the starboard nacelle, and a payload of up to 50 passengers or 10,168 lb of freight. The freighter had a belly cargo door at the rear of the cabin, with an electrically powered winch and conveyor to facilitate loading. To improve on this, Oleg Antonov designed a unique rear-loading ramp that forms the underside of the fuselage when retracted but can slide forward under the rear of the cabin for direct loading onto the floor of the hold, or when cargo is to be air-dropped. He then swept up the rear fuselage for much-enhanced access, to create the An-26 ("Curl"). With uprated turboprops, it offered increased performance and payload. More than 1,000 were built, and derivatives are still in production in China.

Libya has 15 An-26s; Syria's two An-24s and four An-26s operate in civil markings but are available to the military. The Yemen Air Force had a total of 13 An-24s and An-26s before its North/South war began. (Data for An-26.)

**Contractor:** Antonov OKB, Ukraine.  
**Power Plant:** two ZMKB Progress AI-24VT turboprops; each 2,780 ehp. One 1,765 lb thrust RU-19A-300 auxiliary turbojet for turboprop starting and to provide additional power for takeoff, climb, and cruising flight, as required.

**Dimensions:** span 95 ft 9 $\frac{1}{2}$  in, length 78 ft 1 in, height 28 ft 1 $\frac{1}{2}$  in.

**Weights:** empty 32,518 lb, gross 52,911 lb.

**Performance:** cruising speed at 19,685 ft 270 mph, ceiling 24,600 ft, T-O run 2,855 ft, landing run 2,135 ft, range with max payload 770 miles, with max fuel 1,652 miles.

**Accommodation:** crew of five, plus station for load supervisor or dispatcher. Electrically powered mobile hoist, capacity 4,409 lb, and conveyor. Provision for carrying 40 paratroops or 24 litters. Improved An-26B version has roll-gangs and mechanical handling system, enabling two men to load or unload three 8-ft-long standard freight pallets in 30 min.

**Armament:** provision for bomb rack on fuselage below each wingroot trailing-edge.

#### Boeing 707-320

Tanker/transport, elint, and other versions of this

ants carry appropriate mission personnel; VIP transports individually customized.  
**Armament:** none.

#### Boeing 747

Boeing's trend-setting wide-body 747 was quickly seen to have military as well as commercial worth. Prerevolution Iran was an early customer in the 1970s for six ex-airline 747-100s, three of which were converted as flight refueling tankers. The tankers are believed to remain in service, along with about four of a batch of 747F freighters ordered later. The other Middle East operator is Saudi Arabia, whose Royal Flight includes a single example of the short-fuselage 747SP and a more recently acquired 747-300. (Data for 747-200F)

**Contractor:** Boeing Company, USA.

**Power Plant:** four Pratt & Whitney JT9D-7R4G2 turbo-



Boeing 707 tanker, Israel



C-130H Hercules, Royal Jordanian Air Force (Peter R. Foster)

veteran airliner serve with half a dozen air forces in the region. The largest fleets are those of Iran (14) and Israel (13), including four (Iran) or five (Israel) converted to flight refueling tankers; eight tankers, illogically designated KE-3A, serve with No. 18 Squadron of the Royal Saudi Air Force. These can transfer up to 123,190 lb of fuel to fighters or other aircraft 1,150 miles from their bases. The Royal Moroccan Air Force has a short-fuselage 707-138 tanker, converted in-country by AMIN (Aéro Maroc Industrie). Israeli conversions were undertaken by IAI's Bedek Aviation Division, which has also converted six other 707s for "RC-707" elint/electronic countermeasures duties with No. 134 Squadron of the country's air force. Other 707-320s serve as VIP transports with Egypt (one), Israel (two), Libya (one), Morocco (one), and Saudi Arabia (two). (Data for basic 707-320, except where indicated.)

**Contractor:** Boeing Company, USA.

**Power Plant:** four Pratt & Whitney JT3D-7 turboprops; each 19,000 lb thrust.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.

**Weights:** (IAI tanker/transport): empty 145,000 lb, gross 335,000 lb.

**Performance:** max cruising speed at 25,000 ft 605 mph, ceiling 39,000 ft, T-O to 35 ft 10,020 ft, landing run 2,575 ft, range with 88,000 lb payload 3,625 miles, with max fuel 5,755 miles.

**Accommodation:** flight crew of three; standard airliner seats up to 219 passengers; elint/tanker vari-

fans initially; each 54,750 lb thrust. Later options include General Electric CF6-50E2 (52,500 lb thrust) and CF6-80C2 (56,700 lb) or Rolls-Royce RB211-524D4 (53,110 lb) turbofans.

**Dimensions:** span 195 ft 8 in, length 231 ft 10 in (747SP, 184 ft 9 in), height 63 ft 5 in.

**Weights:** empty 342,700-349,300 lb, gross 785,000-833,000 lb.

**Performance:** (at 785,000 lb T-O weight, JT9D engines): max speed at 30,000 ft 600 mph, ceiling 45,000 ft, T-O to 35 ft 10,350 ft, landing run 5 ft 6,900 ft, range 3,570-8,020 miles.

**Accommodation:** crew of three; up to 254,640 lb of cargo.

**Armament:** none.

#### C-130 Hercules

More than 20 older C-130Es still serve with the air forces of Iran, Israel (12), and Saudi Arabia (seven), and even a couple of C-130Bs with Jordan, but most Hercules in the Middle East are current-production C-130Hs or L-100s. Standard-length C-130Hs are operated by Abu Dhabi (four), Algeria (nine), Egypt (19), Iran (about 10), Israel (eight), Jordan (four), Libya (seven), Morocco (15), Oman (three), Saudi Arabia (22), Tunisia (two), and Yemen (two). Egypt (one) and Saudi Arabia (four) also each have VIP transport versions; Israel has three KC-130H hose/reel tankers, Morocco (two), and Saudi Arabia (seven); Egypt has two (unofficially "EC-130H") converted for electronic warfare/elint duties, Israel one for ECM duties, and Morocco two "RC-130H" border surveillance Hercules with a SLAR (side-looking airborne radar) in the starboard mainwheel fairing.

Stretched Hercules are operated by Algeria (seven C-130H-30s), Dubai (one H-30, one L-100-30), Egypt (two H-30s), Kuwait (two L-100-30s), and Saudi Arabia (seven L-100-30s). Three of Saudi Arabia's C-130Hs and six L-100-30s are outfitted as AEHs (airborne emergency hospitals). Israel calls its C/KC-130s by the name Karnaf ("rhinoceros") and its EC-130 Yanshuf ("eagle owl"). (Data for current basic C-130H.)

**Contractor:** Lockheed Martin Corporation, USA.

**Power Plant:** four Allison T56-A-15 turboprops; each 4,508 ehp.

**Dimensions:** span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

**Weights:** empty 76,469 lb, gross 155,000-175,000 lb.  
**Performance:** (at 155,000 lb gross weight): max cruising speed at 20,000 ft 374 mph, ceiling 33,000 ft, T-O run 3,580 ft, landing run 1,700 ft, range with max



payload 2,354 miles, with max fuel incl external tanks 4,891 miles.

**Accommodation:** flight crew of four, plus optional loadmaster/jumpmaster; up to 64 paratroops, 92 troops, or 74 litters plus two medical attendants standard (92/128/97/four in H-30), or up to 42,673 lb of light armored vehicles/artillery, supply pallets, or other cargo.  
**Armament:** none.

#### CN-235M

Saudi Arabia, whose first aircraft were the first production CN-235s off the Spanish production line, received two configured as VIP transports in February 1987, followed two months later by two standard general purpose transports. These early aircraft were Series 10s with 1,700 shp CT7-7A turboprops; later production aircraft, with Dash 9C engines, are designated Series 100 and 200. Morocco's seven Spanish-built Series 100s, including one to VIP standard, were delivered from September 1990; the seven for Abu Dhabi, delivered from August 1993, were produced in Indonesia by IPTN. Two other CN-235 Ms are operated by the Police Air Wing of Oman. (Data for Series 100.)  
**Contractor:** Aircraft Technology Industries (Airtech), a Spanish-Indonesian company.

**Power Plant:** two General Electric CT7-9C turboprops; each 1,750 shp (1,870 shp with automatic power reserve).

**Dimensions:** span 84 ft 8 in, length 70 ft 2½ in, height 26 ft 10 in.

**Weights:** empty 19,400 lb, gross 36,376 lb.

**Performance:** max cruising speed at 15,000 ft 286 mph, ceiling 26,600 ft, T-O to 50 ft 4,235 ft, landing run with propeller reversal 1,306 ft, range with 13,227 lb max payload 932 miles, with 7,826 lb payload 2,704 miles.

**Accommodation:** flight crew of two; up to 46 paratroops, 48 troops, 24 litters and four medical personnel, or equivalent cargo, plus jumpmaster/loadmaster when appropriate.

**Armament:** provision for six underwing stations for up to 7,716 lb of ASMs, bombs, or other weapons or stores.

#### F27 Friendship/Troopship

Efforts by Iran to improve the strength and serviceability of its armed forces appear to be achieving some success. Its decision to retain the large number of Iraqi aircraft that sought sanctuary in Iran during the Persian Gulf War provided an infusion of modern combat aircraft. The estimated number of Mk 400M and Mk 600 Friendship/Troopships available to the Air Force has also nearly doubled to 18 during the past year, with two more of each version in the Army Air Force and two of each available to the Navy. Both the Mk 400M and Mk 600 have a large cargo door, but the latter lacks the reinforced and watertight cabin floor of the dedicated military version. The Mk 600 has airline-type seating for 44 passengers, whereas the Mk 400M has folding sidewall canvas seats. Both can be operated in all-cargo or combi forms, and four Mk 400Ms modified by Fokker for target towing may still be available.

Most of Algeria's F27s were transferred to the country's civil airlines, but two Mk 400Ms and one Mk 600 appear to have been retained by the Air Force for transport use and for maritime surveillance on behalf of the Navy. (Data for Mk 400M.)

**Contractor:** Royal Netherlands Aircraft Factories NV Fokker, the Netherlands.

**Power Plant:** two Rolls-Royce Dart Mk 532-7R turboprops; each 2,140 ehp.

**Dimensions:** span 95 ft 2 in, length 77 ft 3½ in, height 27 ft 11 in.

**Weights:** empty 25,696 lb, gross 45,000 lb.

**Performance:** normal cruising speed at 20,000 ft 298 mph, ceiling 30,000 ft, T-O run 3,200 ft, landing run 2,000 ft, range (all-cargo) with standard fuel 1,375 miles, with max fuel 2,727 miles.

**Accommodation:** crew of two or three; 13,283 lb of freight, up to 46 troops, or 24 litter patients and nine attendants or sitting casualties.

**Armament:** none.

#### G222

Libya's decision to purchase 20 Italian-built G222s was frustrated initially by a US embargo on the aircraft's standard General Electric T64 turboprops and US avionics, but a revised version, designated G222T, with Rolls-Royce Tyne turboprops and UK/French equipment, was delivered from 1981. Within five years, these were spending long periods on the ground because of an Italian embargo on spares. Libya was not permitted to take up its option on further G222Ts, only 16 of which remain, and bought An-26s instead. Only the single standard G222 of Dubai appears to have experienced a normal military transport flying life in this region. (Data for G222T.)

**Contractor:** Aeritalia SpA, Italy.

**Power Plant:** two Rolls-Royce Tyne RTy.20 Mk 801 turboprops; each 4,860 shp.

**Dimensions:** span 94 ft 2 in, length 74 ft 5½ in, height 32 ft 1¾ in.

**Weights:** empty 39,685 lb, gross 63,935 lb.

**Performance:** long-range cruising speed at 30,000 ft 345 mph, T-O run 2,130 ft, landing run 1,240 ft, range with max payload 1,174 miles, with max fuel (ferry) 3,166 miles.

**Accommodation:** crew of three; 53 troops on folding and stowable seats; 42 paratroops; 36 litters, two seated casualties, and four attendants; or 19,840 lb of freight, vehicles, and guns.

**Armament:** none.



G222, UAE (Dubai) Air Force



IAI 201 Arava, Israeli Air Force (Press-Office Sturzenegger)



Skyvan 3M, Royal Air Force of Oman (Denis Hughes)

#### IAI 201 Arava

No. 126 Squadron of the Israeli Air Force uses a handful of standard IAI 201s, as both light transports and for operational conversion of pilots assigned to transport units. It also has four elint conversions, which have flown in at least two configurations. One of these has blade antennas located on the wings, tailbooms, flight deck roof, and elsewhere. Another, equipped with an Elta EL/L-8310 elint system, features a canister-shaped antenna stowed against the lower fuselage on the port side, just aft of the propeller plane; in operation this is lowered to an underfuselage location, enabling it to scan through a full 360°.

**Contractor:** Israeli Aircraft Industries Ltd, Israel.

**Power Plant:** two Pratt & Whitney Canada PT6A-34 turboprops; each 750 shp.

**Dimensions:** span 68 ft 9 in, length 42 ft 9 in, height 17 ft 1 in.

**Weights:** empty 8,816 lb, gross 15,000 lb.

**Performance:** max cruising speed at 10,000 ft 198 mph, ceiling 25,000 ft, T-O run 960 ft, landing run 820 ft, range with max payload 174 miles, with max fuel 656 miles.

**Accommodation:** flight crew of one or two; 16 paratroops plus two dispatchers, 24 troops, 12 litters plus two medical personnel, small wheeled vehicles (loaded via rear fuselage swing-tail), or equivalent cargo.

**Armament (optional):** 0.50-in Browning machine gun pack and/or six-rd 82-mm rocket pod on each side of fuselage.

#### Il-76 ("Candid") and Adnan 1

Il-76s exported to the Middle East/North Africa region often spend their time in the insignia of national airlines that make aircraft and crews available to the military when needed. As a result, Il-76Ms, with a rear gun turret but no weapons installed, arrive at civil airports on commercial business, while turretless Il-76Ts are called in to haul military cargoes. Typically, Jamahiriya Libyan Arab Airlines has a mix of 21 Il-76Ts and Ms; Syrianair has two of each version. Before Desert Storm, Iraqi Airways operated a fleet of around 30 Il-76Ts and Ms, mainly for military duties, of which 15 were flown to sanctuary in Iran. These included two of the three AEWC conversions produced in Iraq under the name Adnan 1; the third was put out of commission during an attack on Al Taqadum Airfield. With a dorsal rotodome, Adnan 1 closely resembles the Russian A-50 AEWC derivative of the Il-76 but can be identified by two large strakes under the rear fuselage. A further Il-76 operator in this region is the Algerian Air Force, which has three standard transports. (Data for Il-76M.)

**Contractor:** Ilyushin OKB, Russia.

**Power Plant:** four Aviadvigatel D-30KP turboprops; each 26,455 lb thrust.

**Dimensions:** span 165 ft 8 in, length 152 ft 10¼ in, height 48 ft 5 in.

**Weight:** gross 374,785 lb.

**Performance:** cruising speed at 29,500–39,350 ft 466–497 mph, ceiling 50,850 ft, T-O run 2,790 ft, landing run 1,475 ft, nominal range with max payload 3,100 miles, max range 4,163 miles.

**Accommodation:** crew of seven, incl two freight handlers; 88,185 lb of freight, or 140 troops, or 125 paratroops.

**Armament:** two 23-mm twin-barrel GSh-23L guns in tail turret.

#### L-410

Designed originally as a general-purpose light transport for the short-haul routes of the former Soviet airline Aeroflot, the L-410 flew for the first time in April 1969. More than 1,000 have since been built, the initial version (146 produced) being succeeded in 1980 by the improved L-410UVP (512 built) and since 1985 by the further upgraded L-410UVP-E with four extra passenger seats, permanent wingtip fuel tanks, and five-blade propellers. Principal Middle East customer is Libya, which is known to have received at least 18 UVPs. Three or more UVP-Es have recently been delivered to Tunisia, and one or two may also have been supplied to Djibouti. (Data for L-410UVP-E.)

**Contractor:** Let Kunovice, Czech Republic.

**Power Plant:** Two Walter M 601E turboprops; each 750 shp.

**Dimensions:** span over tip tanks 65 ft 6½ in, length 47 ft 4 in, height 19 ft 1½ in.

**Weights:** empty 8,785 lb, gross 14,110 lb.

**Performance:** max cruising speed at 13,780 ft 236 mph, ceiling 20,725 ft, T-O run 1,280 ft, landing run 1,000 ft, range 348 miles with max payload, 848 miles with max fuel.

**Accommodation:** crew of one or two; up to 19 passengers, 18 paratroops and a dispatcher, six litters plus five seated patients and a medical attendant, or 3,560 lb of cargo.

**Armament:** none.

#### Skyvan 3M

The 6 ft 4 in square cabin cross section, rear loading, and low floor of the little Skyvan enable it to handle a surprising variety of awkwardly shaped loads or cabin installations. The Royal Air Force of Oman has 15, of which eight are standard transports; the other seven are equipped with Racal ASR 360 surveillance radar for maritime patrol and search and rescue. The Sharjah Emiri Guard Air Wing of the United Arab Emirates has a single Skyvan 3M, plus a Shorts 330 UTT, similar in configuration but larger, with room for 33 troops, or 30 paratroops and jumpmaster, or 15 litters and four seated personnel in an ambulance role. (Data for Skyvan 3M.)

**Contractor:** Short Brothers plc, UK.

**Power Plant:** two AlliedSignal TPE331-2-201A turboprops; each 715 shp.

**Dimensions:** span 64 ft 11 in, length 41 ft 4 in, height 15 ft 1 in.

**Weights:** empty 7,400 lb, gross 13,700–14,500 lb.

**Performance:** (at 13,700 lb gross weight): max cruising speed at 10,000 ft 202 mph, ceiling 22,000 ft, T-O run 780 ft, landing run 695 ft, range with 5,000-lb payload 240 miles, with max fuel 670 miles.

**Accommodation:** flight crew of one or two; 16 paratroops plus dispatcher, 22 troops, 12 litters plus two medical personnel, or 5,200 lb of cargo.

**Armament:** none.



## No Single Gulf Syndrome

We're releasing today a report on our clinical investigation of [Persian] Gulf War veterans with illness symptoms. . . . It is a report of extensive and intensive medical evaluation of over 10,000 patients. . . . We do not find a single or unique illness responsible for a large or even significant proportion . . . of illness [in veterans of the 1991 war]. Rather, what we find are multiple illnesses with overlapping symptoms and causes—illnesses and symptoms with an extremely broad range. . . . I want to be clear that I'm not saying here that there are not people who are significantly ill [or] who are seriously disabled as a result of their symptoms, post-Gulf. There certainly are. But again, we're looking at the evidence from a large group—10,000 patients—and most of them are not seriously disabled.

**Dr. Stephen C. Joseph, assistant secretary of defense for Health Affairs, in an August 1, 1995, press conference announcing the results of the Pentagon's probe of "Gulf War Syndrome."**

## Yeah, Right

I estimate that 500 to 1,000 Western soldiers would be killed in a Bosnian war.

**Michael E. Brown, associate director of the International Security Program, Center for Science and International Affairs, Harvard University, in the July 25, 1995, Washington Post.**

## Collision Course With China?

By far the most worrisome policy area concerns Sino-American relations. For over twenty years after 1949, China and the US had no relations at all. Between 1971 and 1989, they achieved something approaching a strategic partnership. Since then, relations have steadily declined as a result, first, of the impact of Tiananmen Square and congressional pressures and, more recently, a cycle of action and reaction over Taiwan. Having just returned from Beijing, I want to say in the

most solemn way that our two countries are again on a collision course. I want to warn against the dangerous argument that good relations with China were important in the Cold War but have lost their significance with the collapse of the Soviet Union.

**Former Secretary of State Henry Kissinger, in July 13, 1995, testimony before the Senate Foreign Relations Committee.**

## Of Prophecies and Tragedies

If NATO enlargement [into eastern Europe] stays on its current course, reaction in Russia is likely to be a sense of isolation by those committed to democracy and economic reform, with varying degrees of paranoia, nationalism, and demagoguery emerging from across the current political spectrum. . . . By forcing the pace of NATO enlargement at a volatile and unpredictable moment in Russia's history, we could place ourselves in the worst of all security environments: rapidly declining defense budgets, broader responsibilities, and heightened instability. We will also find ourselves with increasingly difficult relations with the most important country in the world in terms of potential for proliferation of weapons of mass destruction. This is the stuff that self-fulfilling prophecies, and historic tragedies, are made of.

**Sen. Sam Nunn (D-Ga.), in a June 22, 1995, address delivered to the SACLANT Seminar 95, Norfolk, Va.**

## The Heartbreak of Satellites

It was a most heartbreaking business. If an airplane goes on a test flight and something malfunctions, and it gets back, the pilot can tell you about the malfunction, or you can look it over and find out. But in the case of a [reconnaissance] satellite, you fire the damn thing off, and you've got some telemetry, and you never get it back. There is no pilot, of course, and you've got no hardware; you never see it again. So you have to infer from telemetry what went wrong. Then you make a fix, and if it fails again, you know

you've inferred wrong. In the case of Corona, it went on and on.

**Richard M. Bissell, Jr., senior CIA official, commenting after the failure of the Discoverer I spy satellite in 1959, as quoted in a recently released official CIA history of the Corona satellite program.**

## This Just In

Iraq, marking the fifth anniversary of its invasion of Kuwait on Wednesday, blamed the United States and the rulers of [Kuwait] for the events of August 2, 1990.

State-run newspapers carried front-page editorials hitting out at Washington, with one paper saying the US represented the "empire of evil" in the world.

"The responsibility for the crisis does not fall on Iraq but on America in the first place and Kuwaiti rulers in the second," said the government newspaper *al-Jumhuriya*.

**Reuters News Service, in an August 2, 1995, dispatch from Iraq's capital.**

## "Not a Threat," But. . .

With one-fifth of the world's population, strategic nuclear weapons, permanent membership on the United Nations Security Council, and a dynamic economy, China is already a world power. . . . China continues to increase the pace and scope of its military modernization program, and many regional nations view China's growing power-projection capabilities with concern. Is China a threat? A threat comprises both capability and intention. Improved Chinese military capabilities, given China's robust economic growth, are inevitable. But a China with hostile intentions is not inevitable. I believe they desire a stronger . . . influence in global affairs and see military strength as supporting those ends. . . . I do not see China as a threat. My assessment would change, however, if we choose to isolate—rather than engage—China.

**Adm. Richard C. Macke, CINC, US Pacific Command, in June 27, 1995, testimony to the House International Relations Committee's Asia and the Pacific Subcommittee.** ■



Possibilities range from counterforce—strikes to destroy the weapons of mass destruction—to various protective measures.

# Counterproliferation

By James Kitfield

**E**VER SINCE the Persian Gulf War, US defense planners have tracked the spread of nuclear, biological, and chemical materials and know-how—and with mounting concern. They warn that US foes, having witnessed the utter destruction of Iraqi forces, now are scrambling to acquire such weapons as battlefield “equalizers.”

Moreover, they say, Operation Desert Storm exposed serious American vulnerabilities to special weapons. Secretary of Defense William J. Perry noted that the war inspired “counterproliferation”—the Pentagon damage-limitation plan for coping with these weapons of mass destruction (WMD).

In the post-Desert Storm years, the Pentagon and the services delved into how to fight a major regional conflict, said the DoD chief, finding “a very high probability” that local powers will “threaten, wield, or use” such arms against US forces, bases, and logistics. The fear is that even a threat of WMD could paralyze Washington and deter decisive US action in a crisis.

Ashton B. Carter, assistant secretary of defense for International Security Policy, said Desert Storm gave defense officials “our first hint of how these weapons can change the whole character of a regional conflict.”

Faced with the danger, the Clinton Administration has responded with the “Counterproliferation Initiative,” a package of programs designed to prevent adversaries from acquiring or using WMD—mostly by convincing them that such weapons will not confer a major battlefield advantage against US forces.

The program also includes the implicit option of mounting a preemptive strike to “neutralize” WMD



development and production facilities and storage sites before the onset of hostilities.

Mitchel B. Wallerstein, deputy assistant secretary of defense for Counterproliferation Policy, said DoD and the services have broken the problem down into three basic categories: counterforce activities—"which can range from being able to find and destroy mobile missiles to neutralizing underground facilities"—active defense, and passive protective measures.

The programs seek to eliminate or reduce weaknesses seen in Desert Storm.

### Hunting Mobile Missiles

On the offensive side, the Pentagon is working to improve the limited ability of US aircraft to locate and destroy mobile missile launchers or to judge accurately the extent of damage that the aircraft inflict on WMD facilities. Postwar analyses discovered that even concerted air strikes left much of the Iraqi weapon infrastructure intact. In July 1995, for example, Iraq admitted it still was running a major germ warfare program at a secret factory near Baghdad.

On the defensive side, the armed services have programs to strengthen the active and passive protection of their forces from WMD attacks. Iraq probably never used chemical or biological weapons against allied units, but after-action reports found US defensive systems to be woefully deficient. The same was true of the effort to defend troops by shooting down incoming Scud missiles.

When it comes to offensive counterforce operations, much of DoD's capability resides within USAF.

Most of DoD's attention has focused on the daunting problem of targeting mobile missile launchers. The Desert Storm experience—in which alliance aircraft mounted roughly 2,500 sorties against Scud launchers and related targets with only limited success—served notice of the difficulty of this mission.

Gen. Richard E. Hawley, now commander in chief of US Air Forces in Europe, formerly served as principal deputy to the assistant secretary of the Air Force for Acquisition and was deeply involved in USAF's counterproliferation effort. He said the basic requirements of missile-hunting are clear enough.

"The key to hunting mobile missiles," he said, "is, number one, having a good array of ground, air, and space sensors and then linking them to a command-and-control system that can get the information to a pilot fast enough for him to put ordnance on target." The General added, "That's not a trivial problem. In fact, it's very difficult."

That difficulty was evident last May during the joint exercise Roving Sands, an annual air defense training operation featuring 15,000 active-duty and reserve component airmen, soldiers, sailors, and Marines.

### The "War Stoppers"

For the first time, Roving Sands included a detailed countermissile operations element, complete with deployment of surrogate Scud missile launchers in the deserts of west Texas and southern New Mexico. Called "Joint Project Optic Cobra," the countermissile effort sought to integrate into the operational force some ongoing programs. The object was to find and destroy the weapons of mass destruction, "which are truly the war stoppers of the future," said Lt. Gen. Jay M. Garner, chief of the Army Space and Strategic Defense Command and a major participant in the exercise.

Using developmental systems, plus intelligence and reconnaissance satellites and unmanned aerial vehicles, the blue forces sought to locate and target the Scuds prior to simulated launch. They had some success.

"I won't tell you that we were successful 100 percent of the time, because we weren't," said Army Lt. Col. Dan Kirby, director of Optic Cobra, "but we were able to bring all of these pieces together with a focused effort and successfully get the data into a cockpit in time to put the Scuds at risk."

The key to the mission, according to Colonel Kirby, is improved sensor platforms and command-and-control systems and procedures to compress the cycle times from target detection to attack. "Our most significant finding," he reported, "is that we have viable systems today, but our capabilities need to evolve with a threat that is getting more and more complex."

He then added, "There's clearly room for improvement both technologically and tactically."

Also on the technological front, Air Force officials expect a quantum leap in missile-hunting capability from new satellites, especially the Spacebased Infrared system now under development.

"Our present spacebased systems were designed for the Cold War and the ICBM threat," said General Hawley, "so they're not optimized against the theater missile threat. The Spacebased Infrared system will give our field commanders an improved surveillance capability to better detect, identify, and [thus] destroy launchers."

Other surveillance systems identified as critical to the countermissile mission include the E-8 Joint Surveillance and Target Attack Radar System, advanced unmanned aerial vehicles capable of lingering over target areas for extended periods, and a number of classified sensor programs.

One of the latter programs has led to production of "scatterable ground sensors" that resemble rocks but can pick up and transmit information about the movement of mobile launchers without being detected by the enemy.

"The theory is the same as laying sonobuoys," said one defense official involved in the program. "In fact, Scud hunting is very much like antisubmarine warfare: the major challenge is finding the bastards, [not] killing them."

Also getting increased funding and attention are USAF programs aimed at more efficient and reliable destruction of hardened underground structures. The counterforce mission has been exceedingly difficult because much of the WMD infrastructure can be buried, a tactic employed by Iraq, North Korea, and a number of other possible foes.

Defense officials said that putting the complexes underground effectively shields them from attack with the current generation of nonnuclear weapons.

### No to Mininukes

Alerted to the problem by Desert Storm, the Pentagon, the Air Force, and nuclear weapons laboratories initiated several studies in 1991 to explore the option of using low-yield nuclear weapons, or "mininukes," to attack deeply buried targets. When word of the studies leaked, however,



a furor arose. Congress reacted by banning further research into the weapons.

DoD finds the entire subject sensitive. "I want to strongly emphasize," said Mr. Wallerstein, "that counterproliferation is fundamentally about finding nonnuclear solutions to these problems, which in the case of deep underground structures are admittedly challenging. The United States is not looking to retarget our nuclear weapons, nor are we developing any new nuclear weapons. We think the problem can be solved with further research and development" of nonnuclear arms.

Those efforts are coordinated in the Pentagon's Hard Underground Target Characterization and Defeat program, funded at \$25 million in 1995. Program initiatives include developing sensors capable of mapping and determining the possible use of underground structures, producing improved hard-target munitions, and insertion of technologies to limit the collateral damage to surrounding population centers that could stem from attacks on nuclear, biological, or chemical facilities.

Experts concede, however, that targeting hardened underground facilities remains daunting. One who states the case starkly is John Collins of the Congressional Research Service, a former Army officer and author of the report, "Weapons of Mass Destruction: The Impact of Proliferation on US Military Posture."

"If you take the case of North Korea," he said, "you have facilities that are buried in the bedrock of mountains with the only entrances facing north at the end of a narrow valley. Even if you had munitions capable of taking the facilities out—which we won't for some time—it would be difficult to deliver them without getting shot down."

The validity of such scenarios in the counterforce mission arena has produced an intense new focus on precision weapons, including air-to-surface missiles, laser-guided bombs, and air- and sea-launched cruise missiles.

"You need good standoff weapons that can penetrate heavy enemy defenses without a lot of risk, because [counterforce] missions usually involve a raid-type scenario, and you don't want to leave any hostages behind," said General Hawley. "At

the same time, these precision-strike weapons are important if you have a conventional fracas on your hands."

### The New Missiles

Current inventories of long- and medium-range precision-strike munitions include conventional versions of the Air Force's AGM-86 Air-Launched Cruise Missile and the Navy's Tomahawk sea-launched cruise missile, both with ranges of more than 700 miles. Meanwhile, stealth aircraft, such as the Air Force's F-117 fighter and eventually the B-2 bomber, could use conventional laser-guided bombs to mount a preemptive strike. Ground-attack variants of the forthcoming F-22 fighter, also a stealthy aircraft, could perform the same mission.

In terms of modernizing precision guided weapons, Pentagon plans call for buying the Joint Direct Attack Munition, a new guidance kit with a Global Positioning System receiver designed to improve the accuracy of dumb bombs, and the Joint Standoff Weapon, an unpowered glide weapon with a range of up to forty miles also equipped with GPS.

The Air Force and Navy also planned to acquire the Triservice Standoff Attack Missile, a stealthy missile with a range of up to 180 miles, for the job, but the program was canceled in December in favor of a successor Joint Air-to-Surface Standoff Missile.

Special operations forces routinely train to seize and disable or destroy weapon facilities and disarm nuclear-armed terrorists. As a precedent for this mission, experts point to the Allied raid on Hitler's heavy-water plant at Vemork, Norway, during World War II. An eleven-man special forces team crippled Germany's nuclear weapon program by demolishing the main source of deuterium oxide, the only moderator then available for uranium-fueled nuclear reactors.

"Doing 'what if' drills is in the very nature of rapid-reaction, special operations units," said Mr. Wallerstein, who expressed reluctance to discuss SOF measures. He added, "Certainly, special operations forces could very well be part of a counterforce response."

Finding the means to attack a facility is one part of the weapons problem. Another problem concerns

"collateral damage" to a surrounding population caused by breaching the structure containing nuclear, biological, or chemical substances.

Dr. Louis C. Marquet, a Pentagon weapon development official, stated, "If we release these pathogens or agents into the atmosphere, for example, we need to understand how [many] of them are going to get released and be able to predict with some confidence what exactly is going to happen as a consequence of this attack."

One Pentagon program, Dr. Marquet reported, is expected to result in a suite of highly sensitive sensors that could be used to examine and characterize the potential dangers of attacking a particular facility.

Dr. Marquet added that counterproliferation weapons will require a certain amount of "tailoring." He noted that Air Force weapon and armament designers at Eglin AFB, Fla., are developing specialized weapons that would permit aircraft to attack such facilities with a greatly reduced amount of lethal leakage.

### Active and Passive Defense

The second front in the Pentagon's counterproliferation battle plan is active defense against missiles that might escape offensive counterforce operations. Even if those strikes were overwhelmingly successful, experts realize that nuclear weapons leave no margin of error.

That concern has led the Pentagon to focus by far its greatest amount of funding on ballistic missile defense. Citing the limitations in countering tactical missiles revealed during Desert Storm, for instance, the Administration has shifted focus from the national antimissile shield once proposed by President Reagan to theater missile defenses. The Administration's Fiscal 1996 budget request includes \$2.9 billion for the Ballistic Missile Defense Organization, all but \$400 million of which would go to development of battlefield defenses.

The Persian Gulf War also sounded an alarm, say experts, about the need to improve the US military's passive defenses against weapons of mass destruction, particularly chemical and biological agents. The Defense Department has stated, for instance, that had the war lasted longer and chemical weapons been used, world-



wide stockpiles of US chemical warfare defensive gear might have been reduced to dangerously low levels.

Today, DoD acknowledges that current inventories of chemical and biological protection equipment may be inadequate to meet the wartime requirements of waging two nearly simultaneous regional conflicts, as called for in the Bottom-Up Review.

According to a May 1994 Pentagon report, "Nonproliferation and Counterproliferation Activities and Programs," the Pentagon will spend \$568 million in Fiscal 1995 on programs uniquely related to chemical and biological defenses.

Among the first to systematically examine the emerging danger of WMD was a group of RAND Corp. analysts—Marc D. Millot, Roger Molander, and Peter A. Wilson. In 1991, they began conducting an extensive study commissioned by the Air Force, titled "The Day After . . ." Study: Nuclear Proliferation in the Post-Cold War World."

The RAND study, released in mid-1993, brought together scores of security and foreign policy experts who were placed in war-game scenarios based on nuclear confrontations with North Korea, Iran, and Russia and a nuclear confrontation between India and Pakistan. The conclusions were troubling.

### "Devaluing" the Deterrent

"In a war of nerves with a new nuclear adversary," stated RAND's final report, "the sense was that the threat posed by a small number of nuclear-armed missiles might negate a US threat to deploy five to ten divisions [to a region]. Such arsenals were [thus] considered to devalue the deterrent power of US military capabilities, undermine the credibility of security assurances to US allies, and affect the regional balance of power in ways inimical to US interests."

One of the participants in the crisis simulations, Raymond Garthoff of the Brookings Institution in Washington, D. C., vividly recalled the paralyzing effect that the threat of nuclear attack had on decision-makers.

"Because the risk is clearly so much greater when you confront a nuclear-armed opponent," Mr. Garthoff said, "it tends to make decision-making far more difficult. We found that the level of risk inherent when

nuclear weapons were involved can push you to take a much weaker, or conversely a far more drastic, course of action than you normally would."

The RAND study concluded that the US military, in order to reduce the coercive impact of a few nuclear weapons brandished by a regional foe, would have to make vast improvements in its counterproliferation capabilities.

"If the United States is unwilling to give up its ability to project power around the world, it will have to invest heavily in highly capable conventional counterforce, missile defenses, and survivability measures to support military intervention in regional crisis," the study concluded.

By the time the RAND study was released, the Pentagon already was in the throes of an internal struggle about how best to put muscle behind counterproliferation efforts.

### Aspin's Bottom-Up Review

Initially, the Clinton Administration took an aggressive stance. Secretary of Defense Les Aspin's 1993 Bottom-Up Review of Defense Needs and Programs assigned top priority to the task of combating "dangers associated with the proliferation of nuclear, biological, and chemical weapons" in Third World nations as well as those existing within the boundaries of the old USSR.

For BUR analysts, the typical regional adversary would be equipped with "100 to 1,000 Scud-class ballistic missiles, some possibly with nuclear, chemical, or biological warheads." In an MRC, said the BUR, a major early task would be to "destroy high-value targets, such as weapons of mass destruction."

The BUR took a broad view of the new threat, noting that adversaries employing WMD can imperil not only "concentrations of US forces" and "regional airfields and ports critical to US reinforcement" in a war but also "American cities—either with covertly delivered weapons or, eventually, ballistic or cruise missiles."

The Aspin analysis contemplated fairly extreme measures to deal with the threat, even stating, "The United States will need to retain the capac-

ity for nuclear retaliation against those who might contemplate the use of weapons of mass destruction."

The BUR recommended improvements in intelligence—concerning both the overall WMD threat and support of battlefield operations and management. It also suggested preparing US armed forces to be able to "seize, disable, or destroy" WMD arsenals in foreign countries. The review found a need for having "flexible and robust nuclear and conventional forces to deter WMD attacks through the credible threat of devastating retaliation."

For traditional arms controllers, the BUR approach seemed overly aggressive and dangerous, calling to mind Israel's bolt-from-the-blue 1981 air attack that disabled the Osirak nuclear reactor near Baghdad. The statement has since been watered down. In his February 1995 annual report to Congress, Secretary Perry said counterproliferation "addresses the role of WMD in major regional conflicts"—making no mention of any preemptive effort to "defang" rogue states, as Mr. Aspin apparently envisioned.

Mr. Perry added that such measures would be used "in time of conflict, if necessary," and pointedly said that US counterforce operations would use only "prudent, nonnuclear means." Left unanswered, however, is whether the US would consider mounting a nuclear response to actual use of WMD.

The counterproliferation program is still in flux. Some experts believe that, until more robust defenses are developed, the military may even have to reconsider how it deploys to and fights future wars.

Said Mr. Collins, "We used to think a lot about these problems at the dawn of the nuclear age back in the 1950s, when we came up with doctrinal ideas, such as dispersing assets for survival and concentrating them to fight. We didn't have the technological capability back then to make them work. With today's advancements in command-and-control and mobility, however, it might be time to dust off some of those ideas." ■

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*James Kitfield is the defense correspondent for Government Executive Magazine in Washington, D. C. His most recent article for Air Force Magazine, "A Bigger Job For Medevac," appeared in the March 1995 issue.*



**Beijing is increasingly arrogant and is adding with determination to its military might.**

# The China Problem Ahead

By Stewart M. Powell

*Showing considerably more muscle than this terra-cotta army found in the tomb of third century B. C. Emperor Shih Huang-ti, today's Chinese military dwarfs its rivals in the region and is considered a "large peer competitor" by Pentagon planners.*

**W**HEN the US relationship with China plunged to its lowest depth in years last summer, alarm spread through Washington that Beijing's truculence reflected serious new military tensions, not merely the assertiveness of a late-blooming economic superpower.

Sino-American relations spiraled downward so fast it was hard to track the strains. Talk of military containment, Cold War-style, surfaced anew.

No less an authority than Henry Kissinger, former Secretary of State and architect of Sino-American détente, warned that Washington and Beijing were "on a collision course" that could prove "extremely costly to both sides."

China's words and actions raised serious questions about the long-term intentions of the world's most populous nation, especially regarding its ambitious military buildup fueled by an explosive, two-decade-long economic expansion.

Joseph S. Nye, Jr., a former CIA expert and assistant secretary of defense for International Security Affairs, warned, "Capabilities, for sure they'll grow. Intentions, we don't know."

Rep. Doug Bereuter (R-Neb.), chairman of the House International Relations Committee's Subcommittee on Asia and the Pacific, saw the start of serious trouble for the United States in China's military modernization, defiance on human rights, and high-handedness on a wide range of regional disputes. He even raised the specter of a fourth US war in the Pacific.

"Within a short period of time," he warned, "we may be in a major conflict, or that region [the Far East] may be involved in a major conflict that we are sucked into."

Outside Washington, concerns also mounted. David Shambaugh, University of London professor and the editor of *China Quarterly*, predicted that the United States would face "a very uncooperative regime" in China in the near future. Mr. Shambaugh emphasized that the tension was not based on trivial matters. "This is a systemic struggle," he said.

Likewise, the director of the University of California's Institute on Global Conflict and Cooperation, Susan Shirk, warned that the US would now encounter "conspicuous intransigence" from Chinese leaders. Embarked on a post-Deng Xiaoping

transition of power, the leaders are driven to "signal strength" to a Chinese domestic audience.

## Like the Kaiser's Germany

Writing in *Time*, columnist Charles Krauthammer detected "an old-style dictatorship" in China, not on a messianic mission but "just out for power." The result, he said, was a nation "like late nineteenth century Germany, a country growing too big and too strong for the continent it finds itself on."

The diplomatic turn of events was so swift, dramatic, and threatening that experts began taking a new and careful look at China's military and the course of its ongoing buildup.

The Pentagon's Office of Net Assessment, headed by Andrew W. Marshall, ordered up a RAND Corp. analysis of China's defense activities. The study concluded that China's spending on the People's Liberation Army tops \$140 billion a year—twenty times Beijing's official estimate. ("PLA" is used to denote all of the nation's military forces.)

Congress asked the General Accounting Office to take its own look at China's efforts. The resulting re-



## East and South Asian Armed Forces

	Personnel		Tanks		Fighters		Warships		Submarines	
	Total	Advanced Systems	Total	Advanced Systems	Total	Advanced Systems	Total	Advanced Systems	Total	Advanced Systems
China .....	3,030,000	9,400	500	5,224	124	57	40	53	7	
North Korea ..	1,127,000	4,200	2,225	730	136	3	0	23	0	
India .....	1,100,000	3,500	2,700	700	374	21	14	18	12	
Vietnam .....	857,000	1,900	400	240	0	7	5	0	0	
South Korea ...	633,000	1,860	450	334	48	17	9	3	3	
Pakistan .....	577,000	1,890	40	336	160	11	8	6	6	
Taiwan .....	442,000	1,400	0	460	10	38	11	4	2	
Thailand .....	295,000	663	313	74	18	14	6	0	0	
Indonesia .....	270,900	235	110	54	12	17	4	2	2	
Japan .....	237,700	1,200	929	324	231	62	40	17	17	
Malaysia .....	114,500	26	26	50	0	2	0	0	0	
Philippines .....	106,500	41	0	7	0	1	0	0	0	
Singapore .....	55,500	350	0	143	6	0	0	0	0	

Personnel=Total active-duty military.

Tanks=Main battle tanks and light tanks

Fighters=Air-to-air and ground-attack aircraft

Warships=Carriers, cruisers, destroyers, and frigates

Submarines=All types

Source: General Accounting Office



port, "National Security: Impact of China's Military Modernization in the Pacific Region," warned that China's "official" defense budget grows at four percent per year and that it was "impossible to determine" the true rate of the spending increase because of secret spending on foreign arms imports and uncertainty about the PLA's revenue-generating commercial enterprises.

The Air Force, for its part, commissioned a second RAND report, "China's Air Force Enters the 21st Century," prepared and written by Kenneth W. Allen, Glenn Krumel, and Jonathan Pollack. The three authors warned that Beijing's fleet of 5,200 military aircraft—the third largest in the world—could eventually emerge in the next century as a force to be reckoned with.

The danger is not immediate, they said. The authors maintained that China's air fleet still relies heavily on Russian technology for state-of-the-art subsystems and equipment and that it "does not constitute a credible offensive threat against the United States or its Asian allies today."

The RAND study also found the logistical support system to be so rudimentary that fighters were unable to generate more than one training sortie every four or five days. Pilots got little of the training that USAF pilots considered routine; the Chinese take off three months of each year and rarely get more than 110 hours of annual flying time.

However, the report noted that Beijing nonetheless was intent on modernizing its air force. China, it said, had bought twenty-six of Russia's advanced Su-27 "Flanker" multi-role fighters, some 100 RD-33 jet engines to power China's indigenously produced F-7 fighter, and ten Il-76 medium- to long-range transport aircraft suitable for use as aerial refuelers or platforms for electronic warfare.

That was just the start. Beijing has pursued co-production arrangements with Moscow to build a new-generation MiG-31 fighter for the Chinese inventory.

### Still a Decade Away

RAND estimated that it would probably take another decade for China's Air Force to turn itself into "an appreciably more formidable player." However, sometime after that ten-

year span, "Chinese airpower could emerge as a much more potent force," provided that the Chinese Air Force continues to reform itself, develops its aerospace industrial infrastructure, and acquires more resources.

In recent reviews of Chinese military capabilities, the experts and officials devoted considerable attention to Beijing's pursuit of nuclear weapons and intercontinental delivery systems.

"China appears determined to upgrade its strategic nuclear capabilities despite the end of the Cold War," said GAO's report to Congress. The agency further noted, "It has been the only country to continue nuclear testing during the past two years," a period in which other nations—the US included—have observed an unofficial worldwide moratorium on testing.

China continued its development of the nuclear-weapons-carrying B-7 supersonic bomber, first flown in 1988. The bomber would augment the Chinese Air Force's nearly 180 1960s-vintage nuclear-capable aircraft, which have ranges of up to 1,900 miles.

Upgrades to China's nuclear missile force also were under way. China was working to replace its modest arsenal of liquid-fueled landbased ballistic missiles with more reliable quick-launch solid-fuel systems. More important, China was working to equip its missiles with multiple independently targetable reentry vehicles (MIRVs).

Paul Dibb, a specialist in Pacific and Asian defense at the Australian National University, claimed that China in a few years will have deployed up to seventy MIRVed, solid-fuel ICBMs, each of which would have a range of some 7,500 miles.

Beijing-based Western diplomats reported in June that China test fired the newly developed Dongfeng-31 ICBM, with a range of about 5,000 miles.

At sea, according to Navy analysts, China deploys one *Xia*-class ballistic-missile-firing submarine equipped with twelve ballistic missiles. Mr. Dibb said it planned to acquire a total of six more ballistic missile boats within the next fifteen years.

Perhaps the most problematic development in Chinese military affairs has been Beijing's preparation of a go-anywhere, anytime rapid reaction force, which would pose an

obvious danger to other nations in the region. Mr. Dibb, one of the foremost authorities on Chinese defense affairs, said that the 2.2 million member ground force has been putting "heavy emphasis" on modernizing rapid deployment forces equipped with highly accurate weapons.

### Strengthening the "Fist"

China's so-called "Fist" units, assigned to rapid deployment duties, acquired a "higher priority in the allocation of equipment and funding for training in order to maintain a high level of operational readiness," reported Mr. Dibb, who added that Chinese capability to mount airborne and amphibious assaults was being "considerably enhanced."

He warned, "Countries that share land borders with China will be concerned about its numerical land force superiority and its increased emphasis on rapid reaction troops and training for combined arms operations."

The GAO report echoed this assessment. "If only the modernized 'Fist' units are considered," it stated, "China still enjoys a substantial size advantage over most of its neighbors. With an emphasis on combined arms training exercises, China's 'Fist' units will enhance China's power projection capabilities."

Naval affairs experts maintain that China is striving to construct a blue-water fleet and that the Chinese Navy is likely to put to sea an aircraft carrier by 2010 and deploy as many as three by 2015. Naval officers point out that it takes many years to master carrier operations and that no one should expect China to match US naval aviation prowess anytime soon. However, the capability will be large and threatening by regional standards.

China's ongoing buildup leaves American planners facing the age-old dilemma of how to respond to the military capabilities of a potential adversary when the nation's intentions are uncertain and the actual correlation of military forces has not yet been seriously disrupted.

Mr. Nye urged China to "allay neighboring Asian nations' concerns over the buildup" with a series of discussions to "increase transparency [of Chinese military actions] and confidence in the region so that the worst-case assumptions will not be made."

American specialists focused immediate concerns on the festering



dispute between China and six other Asian nations over the Spratly Islands, a potentially oil-rich chain of 200 largely barren islets, reefs, and shoals scattered across nearly 150,000 square miles of the South China Sea.

James Lilley, a former ambassador to Beijing and one-time CIA station chief in Asia, said there was little doubt that China was staging "a creeping take-over" of the South China Sea.

"It's going to happen—not in this century perhaps but in the next century," Mr. Lilley told Congress last summer. "They are modernizing their military with this objective in mind."

China's officials appear to be waging a war of nerves with its neighbors. For example, China two years ago issued a new map bearing a mysterious dotted line encircling the Spratly Islands and Indonesia's Natuna gas field, site of a \$35 billion joint enterprise between Exxon and Pertamina, the Indonesian state oil company. Despite numerous requests, China has refused to clarify the significance of the marking.

### Still Waiting

"We have asked what the dotted line is, and we are waiting for an answer," said Indonesian Foreign Minister Ali Alatas. "We do not know for sure what China is actually claiming."

The Philippines accused China of building naval support structures on Mischief Reef, claimed by Manila. Beijing planted its flag on the site while dubbing the structures *ad hoc* construction by Chinese fishermen.

In the face of ill-defined Chinese intentions, the Clinton Administration deepened its interest in the dispute. Instead of merely reciting appeals for Beijing to work peacefully with other nations to resolve conflicting claims, the assistant secretary of state for East Asia and Pacific Affairs, Winston Lord, told Congress in July that China's interest in the Spratlys had become "a major concern" to the Administration.

The Defense Department put China on notice that the US will not tolerate any interference with freedom of navigation in what it considers international waters. The US Seventh

Fleet recently joined forces of the Philippines for military exercises near the islands.

The US-China tension over Taiwan was revived last summer when President Clinton approved a brief US visit by the Taiwanese president. Chinese Defense Minister Chi Hao-tian sparked concern with his tough statement in late July that China could use force to "settle the Taiwan issue" in the face of attempts by "foreign forces" to "interfere in China's internal affairs."

The People's Liberation Army retaliated against Taiwan with psychological warfare, ordering the 90,000-strong missile forces to launch short-range, surface-to-surface missiles at a target zone within eighty-five miles of the northern tip of Taiwan as part of the "Blue Whale Five" exercises in July. "The basis for bilateral relations [with the US] has been shaken," warned Chinese Foreign Ministry spokesman Chen Jian. "This is no trivial matter."

John W. Lewis, a China expert at Stanford University, returned from meetings with Chinese military leaders to warn that the PLA's top brass had ordered a comprehensive review of military contingency plans for preventing Taiwan from declaring independence.

In a more general sense, China's growing military has major implications for US military strategy, which calls for retaining a force capable of fighting two nearly simultaneous major regional conflicts. The strategy has tended to focus on such potential foes as North Korea, Iraq, or Iran—local powers all. More recently, however, the Pentagon began to put emphasis on planning for a larger conflict with a so-called "large peer competitor"—a euphemism for such nations as China and Russia.

### Flash Points

US government analysts had no difficulty locating possible sources of a clash with China. They pointed to the danger of war on the Korean peninsula, with the prospect of the US and China on different sides. Russia, Japan, India, and Vietnam all have dormant but still unresolved

disputes with Beijing. Pakistan and Iran have been receiving shipments of advanced weapons, including missile components, from China.

The Pentagon began quietly taking Chinese developments into account. The Defense Department's blueprint for Asia strategy, "United States Security Strategy for the East-Asia Pacific Region," released in February 1995, said, "Although China's leaders insist their military buildup is defensive and commensurate with China's overall economic growth, others in the region cannot be certain of China's intentions, particularly in this period of leadership transition."

The Pentagon study, prepared by Mr. Nye's staff, went on to say, "China's military modernization effort is in an early stage and its long-term goals are unclear. Absent a better understanding of China's plans, capabilities, and intentions, other Asian nations may feel a need to respond to China's growing military power."

The Clinton Administration abruptly halted planned post-Cold War force cutbacks across Asia and froze deployments at 100,000 troops in the wake of the DoD study.

"Our presence in Asia will remain strong enough to address regional requirements and to enable us to respond to global security contingencies," said Mr. Nye's report.

Mr. Lord, the State Department's top Asia hand, remarked that China will be "a major power whether we wish it to be or not." The best strategy remained integrating Beijing into the worldwide system of economic and political ties to help stem "any adventurous impulses, if there are any."

Adm. Richard C. Macke, commander in chief of US Pacific Command, told Congress that China posed no "near-term threat to the US or to our interests in Asia," but he added that he would have to revise that benign assessment immediately "if we choose to isolate—rather than engage and reassure—China."

When Sino-American diplomatic ties hit bottom, the Clinton Administration enlisted Mr. Kissinger as go-between to try to patch up the damage. Little came of it immediately. Washington did restate its commitment to a "one China" policy, writing Taiwan out of the official picture. Two-way trade continued to boom. Underneath the surface, however, pressures continue to build. ■

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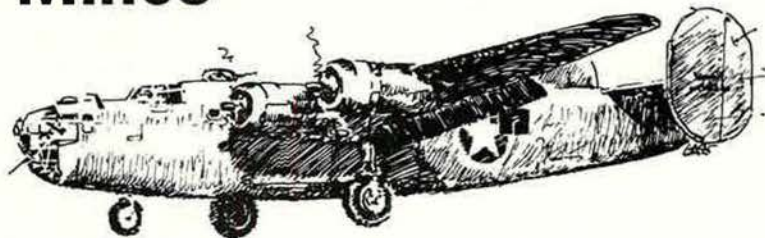
*Stewart M. Powell, White House correspondent for Hearst Newspapers, has covered national and international affairs for years in Washington and London. His most recent article for Air Force Magazine, "A Forecast of the Arms Trade," appeared in the September 1995 issue.*



By John L. Frisbee, Contributing Editor

## Target: The Linsi Mines

Early in the war against Japan, five B-24 crews were launched in a daring strike 800 miles behind enemy lines in northern China.



**T**ENTH Air Force, established in India in early 1942, was one of the smallest and least celebrated combat air forces of World War II, but it had a primary mission of great importance: protecting the logistics lifeline from India to China. In mid-1942, that air force included the 7th Bomb Group with two heavy and two medium squadrons; two fighter groups; and some transports. Only six of the ten combat squadrons were even marginally operational.

In June 1942, the already feeble Tenth was eviscerated when its commander, Maj. Gen. Lewis H. Brereton, was ordered to the Middle East to help stop Field Marshal Erwin Rommel's drive into Egypt. He took with him most of the command's heavy bombers and its key personnel. The 7th Bomb Group's 436th Bomb Squadron, which was converting to longer-range B-24s, was left in India at scattered locations, far from combat ready. Gradually, replacement crews and aircraft arrived in India, and Tenth Air Force began a slow recovery.

Before his air force came off the critical list, Maj. Gen. Clayton L. Bissell, who had been named commander of the Tenth, was handed a mission unrelated to the protection of the India-China lifeline. Its audacity must have staggered the imagination of the few who were privy to the details.

Far behind enemy lines in the vicinity of Beijing, China, lay the Linsi mines, which produced a major share of coking coal used by the Japanese to produce high-grade steel. These were "wet mines" that could be kept in operation only by continuous pumping, powered by an electric generating plant at the site. If the plant could be knocked out, it was believed, the flooded mines would be useless for perhaps a year. The only bomber

that had the range to reach the mines was the B-24, and even it required staging to bases in west-central China. This would be the first ever strike north of the Yellow River.

Maj. Max R. Fennell, who had gone to the Middle East with Brereton, was recalled to lead the B-24s to Linsi. Fennell had flown in China and was familiar with some of the inevitable problems. He arrived at Karachi on October 8, where he met five B-24D crews of the 436th Bomb Squadron. On October 11, his B-24s and a spare flew to Allahabad in northern India, where they were met by General Bissell. Only the crew members who needed to know were told what their target was.

The General informed one of the crews that if it returned from the mission, the crew members could consider themselves among the luckiest of men. His pessimism was not unfounded. From their forward staging base at Chengdu, they would fly 800 miles into enemy territory without adequate maps, weather forecasts, or fighter escort, and past several Japanese airfields that were believed to be occupied by some 300 enemy fighters. If a crew went down, there could be no rescue attempt.

Major Fennell's flight proceeded from Allahabad over The Hump to Kunming, en route to Chengdu, nearly losing one B-24 to icing as they crossed the Himalayas. On October 20, the B-24s took off from Chengdu on the 1,100-mile flight to Linsi, heavy with bombs and fuel. Over 14,000-foot mountains, they ran into a violent front causing severe icing and were forced to return to Chengdu. The following day, the weather was clear but very cold. On the flight to Linsi, Major Fennell's formation passed seven enemy airfields, none occupied. Apparently, the Japanese

were confident that no American aircraft would penetrate that far behind the lines.

One B-24 had to abort before reaching Linsi. The other five bombed from 14,000 feet, each making two runs over the powerplant. The crews, who encountered light flak, believed they had scored several direct hits. Their photos showed tall columns of smoke rising from the Linsi complex. All returned safely to Chengdu more than twelve hours after takeoff, having completed one of the potentially most hazardous missions flown in China up to that time.

One senior commander recommended that all crew members be awarded the Silver Star for this pioneering mission. Another held that no awards should be made because air combat had not taken place. With the brass deadlocked on that issue, the crews went undecorated.

*Seventh Bomb Group Report, WW II* says that, according to ground sources, the power station was destroyed and the mines flooded. On the other hand, *The Army Air Forces in World War II* reports that "while the bombs struck in the target area they failed to destroy the objectives." Japanese officials who have been queried replied that records of that mission have been destroyed. The actual outcome may never be known, but the measure of heroism lies not in the success but in the doing. The men of these crews accepted without hesitation a mission from which it seemed they were not likely to return. Their heroism has been recognized by little more than a footnote in history. ■

*Thanks to retired Maj. John T. Foster of Keene, N. H., author of the privately published China Up and Down, who allowed the use of his files on the Linsi mission.*





**An Air Force Association National Symposium**

Annual Air Force Ball and Golf Day

**Los Angeles Airport Marriott Hotel (310) 641-5700**

October 27, 1995

# The US Air Force Today and Tomorrow

This national symposium, now in its twentieth year, will provide extensive reviews of today's Air Force requirements and capabilities and projections on how they will evolve in the future in the context of changing national security conditions.

Invited participants include the Secretary of the Air Force and the Chief of Staff, as well as other Air Force leaders from the major commands.

## The 24th Annual Air Force Ball

The twenty-fourth Annual Air Force Ball will also be held this year at the Los Angeles Airport Marriott. The theme for this year's black-tie affair is "Proud to Serve." We will honor those individuals who are now serving in the armed forces and those who have served. We will also recognize two individuals, one from the private sector and one from government, who have made significant advances in aerospace.

## Air Force Symposium Golf Day

Please join us for the Air Force Symposium Golf Day, which will be held at the Los Alamitos Navy Golf Course on Thursday, October 26. Tee times will be from 11:00 a.m. to 1:00 p.m. Attendance is limited, so be sure to register early.

## Registration Information

**Symposium:** The cost to attend the Symposium is \$275 for AFA members and \$325 for nonmembers. The registration fee includes a continental breakfast, refreshments, and lunch. Additional luncheon tickets are available at \$40 each. Call Elizabeth Smith at (800) 727-3337, extension 5838, or, for information twenty-four hours a day, call extension 2030.

**Air Force Ball and Golf:** For additional information on the Ball and to reserve tickets and/or a table, or for golf information, please call Henry Sanders at (310) 645-3982.

**Los Angeles Marriott:** Please identify yourself as an AFA member when you call the LA Marriott at (310) 641-5700 to make reservations at the special room rate of \$99 per night, single or double.



It contains examples of nearly every Russian advance in aviation. Few people know where it is, much less have a chance to visit.

# Russia's Air & Space Museum





Photographs by Jay Miller

**V**iewed by Westerners in the past only via reconnaissance satellites, the Russian Air Force Museum has become more accessible since the 1991 collapse of the Soviet Union. The museum, with its vast display area, lies within the Monino military complex, in a forest about forty miles east of Moscow. Monino houses the Russian Air Force's primary officer training academy. The museum was created in the 1960s to give the students a historical perspective through such aircraft as the supersonic research Sukhoi T-4, at left, that flew at nearly Mach 3 during the 1960s. Its articulated nose brings to mind today's supersonic Concorde.







Covering many acres, the museum ranks in size with the Smithsonian's collection and France's Musée de l'Air. It contains everything from the famous to the obscure in Russian aviation history, including more than 150 full-size aircraft. One aircraft that may look familiar (at left) is the Soviet Union's first strategic bomber, the Tupolev Tu-4. If it resembles a B-29, that is because it was copied from aircraft damaged during World War II air raids over Japan and forced to land in the Soviet Union.

World War II, called "the Great Patriotic War" in Russia, receives much attention at the museum. Examples from this time include a Bell P-63 Kingcobra (at right), provided to the Soviet Union as part of the lend-lease program during the war. While not widely used by US pilots, more than 1,000 P-63s saw service in the Soviet Air Force. Below is the small but important Polikarpov Po-2. More than 40,000 were built, making it one of the world's most produced aircraft. Introduced in 1927 as an easy-to-fly, basic trainer, it saw extensive use as a light night bomber when a famous squadron of female Russian aviators known as the "Night Witches" conducted daring low-level attacks on German troops. After the war, Po-2s became aerial taxis and crop dusters. These aircraft were supplied to many other countries and surfaced again in the Korean War, harassing US troops during night bombing attacks and earning the nickname "Bedcheck Charlies."







*Among the World War II aircraft on display are Russia's famous fighters (above). One of the best Soviet fighters was the Yakovlev Yak-9 (above left), a refined version of the Yak-7DI, often compared to the British Spitfire. Next to it sits the the Ilyushin Il-2 Shturmovik, the famous "flying tank." Covered in armor, it proved difficult to shoot down, and it packed a punch with a maximum of 1,320 pounds of bombs, two 37-mm cannon, and three heavy machine guns. At right, a Lavochkin La-7 sports the markings of Russia's top World War II ace, Maj. Gen. Ivan Kozhedub, who achieved seven of his sixty-two victories in this aircraft.*







*A vast "airpark" outdoors shows off examples of almost every Russian aircraft. The aircraft seem to be arranged in no particular order, which makes for some odd neighbors.*

*Above, a Tupolev SB-2, a medium bomber used in both the Spanish Civil War and World War II, sits under the wing of a huge Mil V-12, the largest helicopter ever flown. In 1969, the "Homer" dead-lifted a forty-four-ton payload more than a mile in the air. By comparison, the largest and most powerful US helicopter, the CH-53E, has a gross takeoff weight (including cargo) of 36.75 tons. The V-12's tip-to-tip rotor span is more than two-thirds the length of a football field. At right is one of the more unusual items in the Monino collection, an experimental aircraft used in the 1970s to investigate the wing-in-ground effect. Designated VVA-14, it was developed by the Bartini Design Bureau. Below right is an early vertical-takeoff-and-landing test-bed.*





The museum houses many of the older aircraft and almost all of its memorabilia in buildings and hangars that date to the 1940s. They have not received much upkeep. At right, a Tupolev Tu-128 is displayed outside an old hangar. The large all-weather interceptor, built by a company normally associated with bomber design, was one of the largest fighters to enter service. It has a wingspan of sixty-five feet, a length of eighty-five feet, and could achieve speeds of up to Mach 1.75.



Westerners used to know the aircraft at left only through fuzzy reconnaissance photos. Today, this Sukhoi T-10—prototype for the Su-27 fighter—stands out in the open, near a grove of birch trees at the Russian Air Force Museum. Below, a section nicknamed "MiG Row" displays some of its famous line of fighters, including a MiG-19 in the foreground. While the vast collection at Monino is technically open to the public, visitors get the impression that those who run the museum view them as intruders. The few visitors who manage to gain entrance and walk through the deserted airpark among so much hardware get the eerie feeling of being the only people around for miles. ■





The Germans condemned him to death for “inciting a riot,” but Col. Henry Spicer’s words gave his fellow POWs strength and fortitude.

# A Speech Worth Dying For

By C. V. Glines

**T**HOSE who served with him remember that big, mischievous grin under the wide, thick mustache, the close haircut, and the ever-present pipe. Equipped with a fabulous memory for names, Maj. Gen. Henry Russell Spicer was known as “Hank,” “Russ,” or “Pappy,” depending on when and where you served with him.

For those who were prisoners of war with him in Stalag Luft 1 at Barth, Germany, in World War II, he is remembered as the senior officer in the North No. 2 Compound, the one who went to great lengths to antagonize his German captors and make them adhere to the Geneva Convention in their treatment of POWs. Spicer, then a colonel, once was accused of inciting the camp to riot with a speech he gave to the 1,800-man compound. He received a German death sentence for that speech and thus became an enduring part of the lore of the Air Force.

Spicer graduated from the Army Air Corps advanced flying school in 1934 but had to remain a Flying Cadet for another year because the service was short of funds to commission new flying officers. He was later assigned to fighter units at







***The man who survived a Nazi death sentence became a proficient jet fighter pilot and instructor after the war and eventually achieved the rank of major general and served in many posts, including vice commander of Air Training Command.***

March Field, Calif., and Wheeler Field, Hawaii, before becoming an instructor at Randolph Field, Tex., in 1941.

Spicer's fighter background was evident to those of us who were flying cadets at Randolph in the summer of 1941. As our flight commander, he gave us the all-important forty-hour flight checks in the BT-14 basic trainer. You knew you passed if, after demonstrating your skills,

he would say, "OK, Mister, I've got it" and then put on a demonstration of aerobatics stretching the BT-14 to its limits. You knew you flunked if he merely took over and returned to the field.

Spicer's skills made it inevitable that he would get into combat in fighters. He was assigned to Eighth Air Force as executive officer of the 66th Fighter Wing and then took command of the 357th Fighter Group in February 1944. He was in England only a short time and had led only fourteen missions, with three enemy aircraft destroyed, when his Mustang was damaged by flak March 3, 1944.

Spicer bailed out into the near-freezing waters of the English channel and drifted for two days in a one-man dinghy. Rescue boats and aircraft couldn't find him. His feet and hands were badly frostbitten when he finally drifted ashore near Cherbourg, France. Unable to walk and near collapse, he was found lying on the beach by some German soldiers. He was taken to Oberursel, near Frankfurt, for interrogation and medical treatment before being sent to Stalag Luft 1.

### **Unintimidated**

The Germans didn't know what a strong-willed person they had on their hands. He was not about to be intimidated or give any information of value, especially names of anyone who might later become a POW. He was questioned by Hans Scharff, a master Luftwaffe interrogator who spoke excellent English and later became a US citizen. Scharff admitted that Spicer was expert at dodging his questions and made a fool of him.

Spicer was still suffering from frostbitten feet and hands when he arrived at Stalag Luft 1. Lt. John J. Fisher, a fellow POW, recalls him lying on his back for long periods, rubbing his legs to restore the circulation. Lt. Richard McDonald, who walked the perimeter of the compound with him, recalls how Spicer had set himself a rigorous rehabilitation program, determined to regain full use of his legs and the ability to walk normally.

Gerald W. Johnson, then a major and one of the top aces in the European Theater of Operations, was a fellow POW. He recalls spending many hours with Spicer playing



chess. Sometimes a game would go into a second day, the two not exchanging a word. Spicer also played Parcheesi by the hour, umpired softball games, and was said to have taken up knitting to keep his mind off the pain in his feet.

Even before his feet healed, however, Spicer began to give his captors trouble. New POWs gave him news of the war and told him about atrocities that had been documented. Greatly affected by this, he organized a program of resistance and took every opportunity to harass the guards and cause as much trouble for them as he and his fellow prisoners could get away with. They paid for it with frequent "appell" (roll call) turnouts in the middle of the day when they would have to stand in formation while the "goons" and the "ferrets" went through their barracks looking for anything they said was illegal to possess.

Capt. Mozart Kaufman, who wrote a book about his experience as a German POW, said, "We felt it was a small price to pay." He added that he regarded Spicer as a good example of a commander—one who kept morale high by challenging the Germans every chance he got. This helped the whole compound maintain a feeling of solidarity against the enemy.

### The Speech

On the very cold morning of November 1, 1944, the entire prison camp population had been rousted out of the barracks for a required daily roll call, usually a fifteen minute procedure. "The Germans kept us there shivering for an unusually long time," recalled one POW, Lt. Philip Robertson, "claiming that they weren't getting the correct count."

Robertson went on, "After about two hours, Colonel Spicer dismissed us, over the loud protestations of the German guards. He then called us over to his barracks, and we gathered around him, standing on the ground, as he stood on the steps about three feet above us and began to talk loud enough for the guards to hear."

In his postwar book, *Fighter Pilot*, Captain Kaufman recalls what Spicer said:

"Yesterday an officer was put in the 'cooler' for two weeks. He had two counts against him. The first

was failure to obey an order of a German officer. That is beside the point. The second was failure to salute a German officer of lower rank.

"The Articles of the Geneva Convention say to salute all officers of equal or higher rank. The Germans in this camp have put out an order that we must salute all German officers, whether of lower or higher rank. My order to you is salute all German officers of equal or higher rank."

Then he got to the real point, saying, "I have noticed that many of you are becoming too buddy-buddy with the Germans. Remember we are still at war with the Germans. They are still our enemies and are doing everything they can to win this war. Don't let them fool you around this camp, because they are dirty, lying sneaks and can't be trusted.

"As an example of the type of enemy you have to deal with, the British were forced to retreat in the Arnhem area. They had to leave the wounded in the hospital. The Germans took the hospital and machine-gunned all those British in their beds. In Holland, behind the German lines, a woman with a baby in her arms was walking along the road, evacuating the battle zone. Some British prisoners were passing her. She gave them the V sign. A German soldier saw her and without hesitation swung his gun around and shot her on the spot.

"They are a bunch of murderous, no-good liars, and if we have to stay here for fifteen years to see all the Germans killed, then it will be worth it."

Loud cheers arose from all the men. The German major in charge of the guards was furious. Within a short time, Spicer was put in solitary confinement in the "cooler," a small cell that measured about six by eight feet. Meanwhile, Kaufman, sensing that Spicer had just made a speech that should be remembered, returned to his barracks and began, with the help of his roommates, to reconstruct Spicer's words. He recorded them in a logbook, which he then buried under the barracks in a tin can.

### The Sentence

Spicer was hauled away for a court-martial, charged with inciting prisoners to riot. Later, his fellow prisoners learned he had been convicted and sentenced to serve six months in solitary confinement and then be executed by a firing squad. Spicer was returned to the cooler to serve his sentence while awaiting the execution order.

Occasionally, some of his men would be led by guards past the building in which he was incarcerated, and they would shout out words of encouragement. Robertson recalled, "Then we would hear Colonel Spicer shout back, 'Keep fighting! Don't give in to the bastards!'" When asked if he needed anything, he always replied, "Yeah, send me machine guns!"

In the end, Spicer managed to evade the firing squad—by a single day—and the death sentence was never carried out. Shortly before Stalag Luft 1 was overrun by Soviet troops on the night of April 30, 1945, the German guards fled and left the prison camp untended. When a fellow prisoner awakened Spicer and told him they had been freed, Spicer wouldn't leave. "I have one more night to make it an even six months," he explained. "I'm staying here tonight."

When Spicer finally did come out, according to Robertson, "Every prisoner—to the man—gathered at the entrance to greet him, cheering and trying to pat him on the back. He gave a short speech and said that seeing us and hearing our shouts made the whole experience in solitary confinement worth it."

In the next few days, Spicer was evacuated with the 6,250 other former kriegies and flown from Barth to Camp Lucky Strike in France for processing before going home. Colonel Spicer, who later became an Air Force major general, retired in 1964 and passed away in 1967, but he will always be remembered for the speech that not only brought him a death sentence but also brought strength and fortitude to his fellow prisoners. ■

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*C. V. Glines is a writer living in Dallas, Tex. He was a flying cadet taking basic flying training at Randolph Field, Tex., when then Lieutenant Spicer was a flight commander. His most recent article for Air Force Magazine, "Another Title for Crew Chief," appeared in the February 1994 issue.*



Over the course of thirty-five years, the US and Russia have mounted nearly 200 missions in space.

# Spaceflight

(As of September 1, 1995)

Compiled by Tamar A. Mehuron, Associate Editor

(Information provided by Air Force Space Command History Office, Molniya Space Consultancy, and NASA History Office.)

## US Manned Spaceflights, 1961-95 (Launch date, spacecraft, crew)

May 5, 1961 ... <b>Mercury-Redstone 3</b> ... Alan B. Shepard, Jr.	Jan. 31, 1971 ... <b>Apollo 14</b> ... Alan B. Shepard, Jr. Stuart A. Roosa, Edgar D. Mitchell
July 21, 1961 ... <b>Mercury-Redstone 4</b> ... Virgil I. Grissom	July 26, 1971 ... <b>Apollo 15</b> ... David R. Scott Alfred M. Worden, James B. Irwin
Feb. 20, 1962 ... <b>Mercury-Atlas 6</b> ... John H. Glenn, Jr.	Apr. 16, 1972 ... <b>Apollo 16</b> ... John W. Young Charles M. Duke, Jr., Thomas K. Mattingly II
May 24, 1962 ... <b>Mercury-Atlas 7</b> ... M. Scott Carpenter	Dec. 7, 1972 ... <b>Apollo 17</b> ... Eugene A. Cernan Harrison H. Schmitt, Ronald E. Evans
Oct. 3, 1962 ... <b>Mercury-Atlas 8</b> ... Walter M. Schirra, Jr.	May 25, 1973 ... <b>Skylab 2</b> ... Charles Conrad, Jr. Joseph P. Kerwin, Paul J. Weitz
May 15, 1963 ... <b>Mercury-Atlas 9</b> ... L. Gordon Cooper, Jr.	July 28, 1973 ... <b>Skylab 3</b> ... Alan L. Bean Jack R. Lousma, Owen K. Garriott
Mar. 23, 1965 ... <b>Gemini 3</b> ... Virgil I. Grissom, John W. Young	Nov. 16, 1973 ... <b>Skylab 4</b> ... Gerald P. Carr Edward G. Gibson, William R. Pogue
June 3, 1965 ... <b>Gemini 4</b> ... James A. McDivitt Edward H. White II	July 15, 1975 ... <b>Apollo 18</b> ... Thomas P. Stafford Donald K. Slayton Vance D. Brand
Aug. 21, 1965 ... <b>Gemini 5</b> ... L. Gordon Cooper, Jr. Charles Conrad, Jr.	Apr. 12, 1981 ... <b>Columbia</b> (STS-1) ... John W. Young Robert L. Crippen
Dec. 4, 1965 ... <b>Gemini 7</b> ... Frank Borman James A. Lovell, Jr.	Nov. 12, 1981 ... <b>Columbia</b> (STS-2) ... Joseph H. Engle Richard H. Truly
Dec. 15, 1965 ... <b>Gemini 6</b> ... Walter M. Schirra, Jr. Thomas P. Stafford	Mar. 22, 1982 ... <b>Columbia</b> (STS-3) ... Jack R. Lousma C. Gordon Fullerton
Mar. 16, 1966 ... <b>Gemini 8</b> ... Neil A. Armstrong, David R. Scott	June 27, 1982 ... <b>Columbia</b> (STS-4) ... Thomas K. Mattingly II Henry Hartsfield, Jr.
June 3, 1966 ... <b>Gemini 9</b> ... Thomas P. Stafford Eugene A. Cernan	Nov. 11, 1982 ... <b>Columbia</b> (STS-5) ... Vance D. Brand Robert F. Overmyer, Joseph P. Allen IV William B. Lenoir
July 18, 1966 ... <b>Gemini 10</b> ... John W. Young, Michael Collins	Apr. 4, 1983 ... <b>Challenger</b> (STS-6) ... Paul J. Weitz Karol J. Bobko, Donald H. Peterson, Sr. F. Story Musgrave
Sept. 12, 1966 ... <b>Gemini 11</b> ... Charles Conrad, Jr. Richard F. Gordon, Jr.	June 18, 1983 ... <b>Challenger</b> (STS-7) ... Robert L. Crippen Frederick H. Hauck, John M. Fabian Sally K. Ride, Norman E. Thagard
Nov. 11, 1966 ... <b>Gemini 12</b> ... James A. Lovell, Jr. Edwin E. Aldrin, Jr.	Aug. 30, 1983 ... <b>Challenger</b> (STS-8) ... Richard H. Truly Daniel Brandenstein, Dale A. Gardner William E. Thornton, Guion S. Bluford, Jr.
Oct. 11, 1968 ... <b>Apollo 7</b> ... Walter M. Schirra, Jr. Donn F. Eisele, R. Walter Cunningham	Nov. 28, 1983 ... <b>Columbia</b> (STS-9) ... John W. Young Brewster H. Shaw, Jr., Owen K. Garriott Robert A. R. Parker, Byron K. Lichtenberg, Ulf D. Merbold
Dec. 21, 1968 ... <b>Apollo 8</b> ... Frank Borman James A. Lovell, Jr., William A. Anders	
Mar. 3, 1969 ... <b>Apollo 9</b> ... James A. McDivitt, David R. Scott Russell L. Schweickart	
May 18, 1969 ... <b>Apollo 10</b> ... Thomas P. Stafford John W. Young, Eugene A. Cernan	
July 16, 1969 ... <b>Apollo 11</b> ... Neil A. Armstrong Edwin E. Aldrin, Jr., Michael Collins	
Nov. 14, 1969 ... <b>Apollo 12</b> ... Charles Conrad, Jr. Richard F. Gordon, Jr., Alan L. Bean	
Apr. 11, 1970 ... <b>Apollo 13</b> ... James A. Lovell, Jr. Fred W. Haise, Jr., John L. Swigert, Jr.	



- Feb. 3, 1984 .... **Challenger** (STS-41B) ..... Vance D. Brand  
Robert L. Gibson, Bruce McCandless II  
Ronald E. McNair, Robert L. Stewart
- Apr. 6, 1984 .... **Challenger** (STS-41C) ..... Robert L. Crippen  
Francis R. Scobee, Terry J. Hart  
George D. Nelson, James D. A. van Hoften
- Aug. 30, 1984 ... **Discovery** (STS-41D) .... Henry Hartsfield, Jr.  
Michael L. Coats, Richard M. Mullane  
Steven A. Hawley, Judith A. Resnick  
Charles D. Walker
- Oct. 5, 1984 .... **Challenger** (STS-41G) ..... Robert L. Crippen  
Jon A. McBride, Kathryn D. Sullivan  
Sally K. Ride, David C. Leestma  
Paul D. Scully-Power, Marc Garneau
- Nov. 8, 1984 ... **Discovery** (STS-51A) ..... Frederick H. Hauck  
David M. Walker, Joseph P. Allen IV  
Anna L. Fisher, Dale A. Gardner
- Jan. 24, 1985 ... **Discovery** (STS-51C) ... Thomas K. Mattingly II  
Loren J. Shriver, Ellison S. Onizuka  
James F. Buchli, Gary E. Payton
- Apr. 12, 1985 ... **Discovery** (STS-51D) ..... Karol J. Bobko  
Donald E. Williams, M. Rhea Seddon  
S. David Griggs, Jeffrey A. Hoffman  
Charles D. Walker, E. Jacob Garn
- Apr. 29, 1985 ... **Challenger** (STS-51B) .... Robert F. Overmyer  
Frederick D. Gregory, Don L. Lind  
Norman E. Thagard, William E. Thornton  
Lodewijk van den Berg, Taylor G. Wang
- June 17, 1985 ... **Discovery** (STS-51G) ..... Daniel Brandenstein  
John O. Creighton  
Shannon W. Lucid, John M. Fabian  
Steven R. Nagel, Patrick Baudry  
Prince Sultan bin Salman bin Abdulaziz Al-Saud
- July 29, 1985 ... **Challenger** (STS-51F) .... C. Gordon Fullerton  
Roy D. Bridges, Jr., Karl G. Henize  
Anthony W. England, F. Story Musgrave  
Loren W. Acton, John-David F. Bartoe
- Aug. 27, 1985 ... **Discovery** (STS-51I) ..... Joseph H. Engle  
Richard O. Covey, James D. A. van Hoften  
William F. Fisher, J. Michael Lounge
- Oct. 3, 1985 .... **Atlantis** (STS-51J) ..... Karol J. Bobko  
Ronald J. Grabe, Robert L. Stewart  
David C. Hilmers, William A. Pailes
- Oct. 30, 1985 ... **Challenger** (STS-61A) . . . Henry Hartsfield, Jr.  
Steven R. Nagel, Bonnie J. Dunbar  
James F. Buchli, Guion S. Bluford, Jr.  
Ernst W. Messerschmid, Reinhard A. Furrer  
Wubbo J. Ockels
- Nov. 26, 1985 ... **Atlantis** (STS-61B) ..... Brewster H. Shaw, Jr.  
Bryan D. O'Connor, Mary L. Cleave  
Sherwood C. Spring, Jerry L. Ross  
Rudolfo Neri Vela, Charles D. Walker
- Jan. 12, 1986 ... **Columbia** (STS-61C) ..... Robert L. Gibson  
Charles F. Bolden, Jr., Franklin R. Chang-Diaz  
Steve A. Hawley, George D. Nelson  
Roger J. Cenker, C. William Nelson
- Jan. 28, 1986 ... **Challenger** (STS-51L)<sup>1</sup> .... Francis R. Scobee  
Michael J. Smith, Judith A. Resnick  
Ronald E. McNair, Ellison S. Onizuka  
Gregory B. Jarvis, S. Christa McAuliff
- Sept. 29, 1988 ... **Discovery** (STS-26) ..... Frederick H. Hauck  
Richard O. Covey, J. Michael Lounge  
David C. Hilmers, George D. Nelson
- Dec. 2, 1988 ... **Atlantis** (STS-27) ..... Robert L. Gibson  
Guy S. Gardner, Richard M. Mullane  
Jerry L. Ross, William M. Shepherd
- Mar. 13, 1989 ... **Discovery** (STS-29) ..... Michael L. Coats  
John E. Blaha, James P. Bagian  
James F. Buchli, Robert C. Springer
- May 4, 1989 .... **Atlantis** (STS-30) ..... David M. Walker  
Ronald J. Grabe, Norman E. Thagard  
Mary L. Cleave, Mark C. Lee
- Aug. 8, 1989 ... **Columbia** (STS-28) ..... Brewster H. Shaw, Jr.  
Richard N. Richards, James C. Adamson  
David C. Leestma, Mark N. Brown
- Oct. 18, 1989 ... **Atlantis** (STS-34) ..... Donald E. Williams  
Michael J. McCulley, Shannon W. Lucid  
Franklin R. Chang-Diaz, Ellen S. Baker
- Nov. 23, 1989 ... **Discovery** (STS-33) ..... Frederick D. Gregory  
John E. Blaha, Kathryn C. Thornton  
F. Story Musgrave, Manley L. Carter
- Jan. 9, 1990 .... **Columbia** (STS-32) ..... Daniel Brandenstein  
James D. Wetherbee, Bonnie J. Dunbar  
Marsha S. Ivins, G. David Low
- Feb. 28, 1990 ... **Atlantis** (STS-36) ..... John O. Creighton  
John H. Casper, David C. Hilmers  
Richard M. Mullane, Pierre J. Thuot
- Apr. 24, 1990 ... **Discovery** (STS-31) ..... Loren J. Shriver  
Charles F. Bolden, Jr., Steven A. Hawley  
Bruce McCandless II, Kathryn D. Sullivan

<sup>1</sup>Liquid fuel booster exploded seventy-three seconds after liftoff, killing all crew members.



**President Eisenhower chose military test pilots as the first astronauts. From a list of 110 candidates, these seven were chosen in April 1959 as the Mercury astronauts (left to right, front row): Virgil Grissom, M. Scott Carpenter, Donald Slayton, L. Gordon Cooper, Jr., and (back row) Alan Shepard, Walter Schirra, and John Glenn.**



Oct. 6, 1990 .... **Discovery** (STS-41) ..... Richard N. Richards  
 Robert D. Cabana, Bruce E. Melnick  
 William M. Shepherd, Thomas D. Akers

Nov. 15, 1990 ... **Atlantis** (STS-38) ..... Richard O. Covey  
 Frank Culbertson, Jr., Charles D. Gemar  
 Robert C. Springer, Carl J. Meade

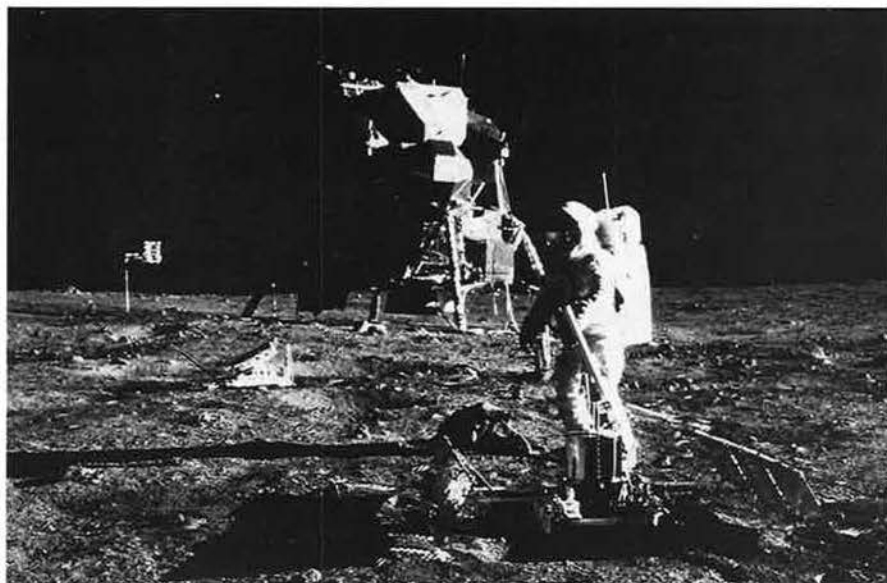
Dec. 2, 1990 ... **Columbia** (STS-35) ..... Vance D. Brand  
 Guy S. Gardner, Jeffrey A. Hoffman  
 J. Michael Lounge, Robert A. R. Parker  
 Samuel T. Durrance, Ronald A. Parise

Apr. 5, 1991 .... **Atlantis** (STS-37) ..... Steven R. Nagel  
 Kenneth D. Cameron, Linda M. Godwin  
 Jerry L. Ross, Jerome Apt III

June 25, 1992 ... **Columbia** (STS-50) ..... Richard N. Richards  
 Kenneth D. Bowersox, Bonnie J. Dunbar  
 Ellen S. Baker, Carl J. Meade  
 Lawrence J. DeLucas, Eugene H. Trinh

July 31, 1992 ... **Atlantis** (STS-46) ..... Loren J. Shriver  
 Andrew M. Allen, Claude Nicollier  
 Marsha S. Ivins, Jeffrey A. Hoffman  
 Franklin R. Chang-Diaz, Franco Malerba

Sept. 12, 1992 ... **Endeavour** (STS-47) ..... Robert L. Gibson  
 Curtis L. Brown, Jr., Mark C. Lee  
 Jerome Apt III, N. Jan Davis  
 Mae C. Jemison, Mamoru M. Mohri



*On July 20, 1969, the Apollo 11 mission brought the first humans to the moon's surface. Neil Armstrong, the first to step on the moon, took this photo of Edwin Aldrin deploying a Passive Seismic Experiments Package.*

Apr. 28, 1991 ... **Discovery** (STS-39) ..... Michael L. Coats  
 L. Blaine Hammond, Jr.  
 Gregory J. Harbaugh  
 Donald R. McMonagle, Guion S. Bluford, Jr.  
 C. Lacy Veach, Richard J. Hieb

June 5, 1991 ... **Columbia** (STS-40) ..... Bryan D. O'Connor  
 Sidney M. Gutierrez, James P. Bagian  
 Tamara E. Jernigan, M. Rhea Seddon  
 F. Andrew Gaffney, Millie Hughes-Fulford

Aug. 2, 1991 ... **Atlantis** (STS-43) ..... John E. Blaha  
 Michael A. Baker, Shannon W. Lucid  
 G. David Low, James C. Adamson

Sept. 12, 1991 .. **Discovery** (STS-48) ..... John O. Creighton  
 Kenneth S. Reightler, Jr.  
 Charles D. Gemar, James F. Buchli  
 Mark N. Brown

Nov. 24, 1991 .. **Atlantis** (STS-44) ..... Frederick D. Gregory  
 Terrence T. Henricks, James S. Voss  
 F. Story Musgrave, Mario Runco, Jr.  
 Thomas J. Hennen

Jan. 22, 1992 .. **Discovery** (STS-42) ..... Ronald J. Grabe  
 Stephen S. Oswald, Norman E. Thagard  
 David C. Hilmers, William F. Readdy  
 Roberta L. Bondar, Ulf D. Merbold

Mar. 24, 1992 .. **Atlantis** (STS-45) ..... Charles F. Bolden, Jr.  
 Brian Duffy, Kathryn D. Sullivan  
 David C. Leestma, C. Michael Foale  
 Dirk D. Frimout, Byron K. Lichtenberg

May 7, 1992 .... **Endeavour** (STS-49) ..... Daniel Brandenstein  
 Kevin P. Chilton, Richard J. Hieb  
 Bruce E. Melnick, Pierre J. Thuot  
 Kathryn C. Thornton, Thomas D. Akers

Oct. 22, 1992 ... **Columbia** (STS-52) ..... James D. Wetherbee  
 Michael A. Baker, William M. Shepherd  
 Tamara E. Jernigan, C. Lacy Veach  
 Steven G. MacLean

Dec. 2, 1992 .... **Discovery** (STS-53) ..... David M. Walker  
 Robert D. Cabana, Guion S. Bluford, Jr.  
 James S. Voss, Michael R. U. Clifford

Jan. 13, 1993 ... **Endeavour** (STS-54) ..... John H. Casper  
 Donald R. McMonagle, Gregory J. Harbaugh  
 Mario Runco, Jr., Susan J. Helms

Apr. 8, 1993 .... **Discovery** (STS-56) ..... Kenneth D. Cameron  
 Stephen S. Oswald, C. Michael Foale  
 Kenneth D. Cockrell, Ellen Ochoa

Apr. 26, 1993 ... **Columbia** (STS-55) ..... Steven R. Nagel  
 Terrence T. Henricks, Jerry L. Ross  
 Charles J. Precourt, Bernard A. Harris, Jr.  
 Ulrich Walter, Hans W. Schlegel

June 21, 1993 ... **Endeavour** (STS-57) ..... Ronald J. Grabe  
 Brian J. Duffy, G. David Low  
 Nancy J. Sherlock, Peter J. K. Wisoff, Janice E. Voss

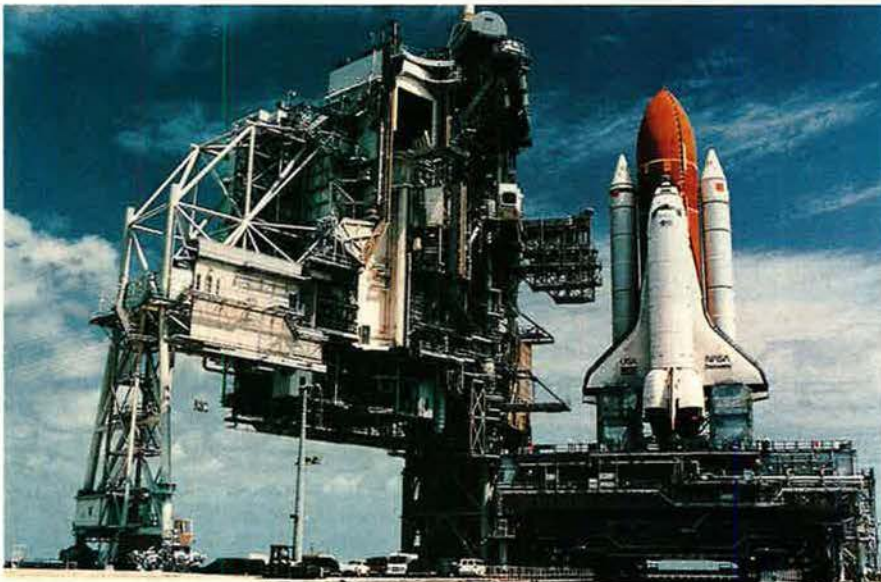
Sept. 12, 1993 ... **Discovery** (STS-51) ..... Frank Culbertson, Jr.  
 William F. Readdy, James H. Newman  
 Daniel W. Bursch, Carl E. Walz

Oct. 18, 1993 ... **Columbia** (STS-58) ..... John E. Blaha  
 Richard A. Searfoss, M. Rhea Seddon, Shannon W. Lucid  
 David A. Wolf, William S. McArthur, Jr., Martin J. Fettman

Dec. 2, 1993 .... **Endeavour** (STS-61) ..... Richard O. Covey  
 Kenneth D. Bowersox, Thomas D. Akers  
 Jeffrey A. Hoffman, Kathryn C. Thornton  
 Claude Nicollier, F. Story Musgrave



Feb. 3, 1994	<b>Discovery</b> (STS-60)	Charles F. Bolden, Jr. Kenneth S. Reightler, Jr., N. Jan Davis Ronald M. Sega, Franklin R. Chang-Diaz Sergei K. Krikalev	Nov. 3, 1994	<b>Atlantis</b> (STS-66)	Donald R. McMonagle Curtis L. Brown, Jr., Ellen Ochoa Scott E. Parazynski, Joseph P. Tanner Jean-Francois Clervoy
Mar. 4, 1994	<b>Columbia</b> (STS-62)	John H. Casper Andrew M. Allen, Pierre J. Thuot Charles D. Gemar, Marsha S. Ivins	Feb. 3, 1995	<b>Discovery</b> (STS-63)	James D. Wetherbee Eileen M. Collins, Bernard A. Harris Michael C. Foale, Janice Voss, Vladimir G. Titov
Apr. 9, 1994	<b>Endeavour</b> (STS-59)	Sidney M. Gutierrez Kevin P. Chilton, Jerome Apt III Michael R. Clifford, Linda M. Godwin Thomas D. Jones	Mar. 2, 1995	<b>Endeavour</b> (STS-67)	Stephen S. Oswald William G. Gregory, John M. Grunsfeld Wendy B. Lawrence, Tamara E. Jernigan Samuel T. Durrance, Ronald Parise
July 8, 1994	<b>Columbia</b> (STS-65)	Robert D. Cabana James D. Halsell, Jr., Richard J. Hieb Carl E. Walz, Leroy Chiao Donald A. Thomas, Chiaki Naito-Mukai	June 27, 1995	<b>Atlantis</b> (STS-71)	Robert L. Gibson Charles J. Precourt, Ellen S. Baker Gregory J. Harbaugh, Bonnie Dunbar Mir 19 ... Anatoly Y. Solovyev, Nikolai Budarin Mir 18 ... Vladimir Dezhurov, Gennady Strekalov Norman E. Thagard
Sept. 9, 1994	<b>Discovery</b> (STS-64)	Richard N. Richards L. Blaine Hammond, Jr. J. M. Linenger, Susan J. Helms Carl J. Meade, Mark C. Lee	July 13, 1995	<b>Discovery</b> (STS-70)	Terence T. Henricks Kevin R. Kregel, Nancy J. Currie Donald A. Thomas, Mary Ellen Weber
Sept. 30, 1994	<b>Endeavour</b> (STS-68)	Michael A. Baker Terrence W. Wilcutt, Thomas D. Jones Steven L. Smith, Daniel W. Bursch Peter J. K. Wisoff			



**A crawler transporter moves the space shuttle Discovery to its launchpad at Kennedy Space Center, Fla., in preparation for a July 1995 satellite deployment mission, STS-70.**

### Russian Manned Spaceflights, 1961-95 (Launch date, spacecraft, crew)

Apr. 12, 1961	<b>Vostok 1</b>	Yuri A. Gagarin	Jan. 15, 1969	<b>Soyuz 5</b>	Boris V. Volynov Alexei S. Yeliseiev, Yevgeni V. Khrunov
Aug. 6, 1961	<b>Vostok 2</b>	Gherman S. Titov	Oct. 11, 1969	<b>Soyuz 6</b>	Georgi Shonin, Valery N. Kubasov
Aug. 11, 1962	<b>Vostok 3</b>	Andriyan G. Nikolaiev	Oct. 12, 1969	<b>Soyuz 7</b>	Anatoly V. Filipchenko Victor N. Gorbatko, Vladislav N. Volkov
Aug. 12, 1962	<b>Vostok 4</b>	Pavel R. Popovich	Oct. 13, 1969	<b>Soyuz 8</b>	Vladimir A. Shatalov Alexei S. Yeliseiev
June 14, 1963	<b>Vostok 5</b>	Valery F. Bykovsky	June 1, 1970	<b>Soyuz 9</b>	Andriyan G. Nikolaiev Vitaly I. Sevastyanov
June 16, 1963	<b>Vostok 6</b>	Valentina V. Tereshkova	Apr. 22, 1971	<b>Soyuz 10</b>	Vladimir A. Shatalov Nikolai N. Rukavishnikov Alexei S. Yeliseiev
Oct. 12, 1964	<b>Voskhod 1</b>	Vladimir M. Komarov Konstantin P. Feoktistov, Boris B. Yegorov	June 6, 1971	<b>Soyuz 11</b>	Georgi T. Dobrovolsky Vladislav N. Volkov, Victor I. Patsaiev
Mar. 18, 1965	<b>Voskhod 2</b>	Pavel I. Belyayev			
Apr. 23, 1967	<b>Soyuz 1</b>	Vladimir M. Komarov			
Oct. 26, 1968	<b>Soyuz 3</b>	Georgi T. Beregovoy			
Jan. 14, 1969	<b>Soyuz 4</b>	Vladimir A. Shatalov			



Sept. 27, 1973	<b>Soyuz 12</b>	Vasily G. Lazarev, Oleg G. Makarov	Aug. 19, 1982	<b>Soyuz T-7</b>	Leonid I. Popov Alexander P. Serebrov Svetlana Y. Savitskaya
Dec. 18, 1973	<b>Soyuz 13</b>	Peter I. Klimuk Valentin V. Lebedev	Apr. 20, 1983	<b>Soyuz T-8</b>	Vladimir G. Titov Alexander P. Serebrov Gennady M. Strekalov
July 3, 1974	<b>Soyuz 14</b>	Pavel R. Popovich, Yuri P. Artyukhin	June 27, 1983	<b>Soyuz T-9</b>	Vladimir A. Lyakhov Alexander P. Alexanderov
Aug. 26, 1974	<b>Soyuz 15</b>	Gennady V. Sarafanov Lev S. Demin	Feb. 8, 1984	<b>Soyuz T-10</b>	Leonid D. Kizim Vladimir A. Solovyev, Oleg Y. Atkov
Dec. 2, 1974	<b>Soyuz 16</b>	Anatoly V. Filipchenko Nikolai N. Rukavishnikov	Apr. 3, 1984	<b>Soyuz T-11</b>	Yuri Malyshev Gennady Strekalov, Rakesh Sharma
Jan. 10, 1975	<b>Soyuz 17</b>	Alexei A. Gubarev Georgi M. Grechko	July 17, 1984	<b>Soyuz T-12</b>	Vladimir A. Dzhaniybekov Svetlana Y. Savitskaya, Igor P. Volk
Apr. 5, 1975	<b>Soyuz 18-1<sup>1</sup></b>	Vasily G. Lazarev Oleg G. Makarov	June 6, 1985	<b>Soyuz T-13</b>	Vladimir A. Dzhaniybekov Victor P. Savinykh
May 24, 1975	<b>Soyuz 18</b>	Peter I. Klimuk Vitaly I. Sevastyanov	Sept. 17, 1985	<b>Soyuz T-14</b>	Vladimir V. Vasyutin Georgi M. Grechko, Alexander A. Volkov
July 15, 1975	<b>Soyuz 19</b>	Alexei A. Leonov Valery N. Kubasov	Mar. 13, 1986	<b>Soyuz T-15</b>	Leonid D. Kizim Vladimir A. Solovyev
July 6, 1976	<b>Soyuz 21</b>	Boris N. Volynov Vitaly M. Zholobov	Feb. 5, 1987	<b>Soyuz TM-2</b>	Yuri V. Romanenko Alexander I. Laveykin
Sept. 15, 1976	<b>Soyuz 22</b>	Valery F. Bykovsky Vladimir V. Aksyonov	July 22, 1987	<b>Soyuz TM-3</b>	Alexander S. Victorenko Alexander P. Alexanderov Mohammed Ahmad Faris
Oct. 14, 1976	<b>Soyuz 23</b>	Vyacheslav D. Zudov Valery I. Rozhdestvensky	Dec. 21, 1987	<b>Soyuz TM-4</b>	Vladimir G. Titov Musa K. Manarov, Anatoly S. Levchenko
Feb. 7, 1977	<b>Soyuz 24</b>	Victor V. Gorbatko, Yuri N. Glazkov	June 7, 1988	<b>Soyuz TM-5</b>	Anatoly Solovyev Victor P. Savinykh Alexander P. Alexanderov
Oct. 9, 1977	<b>Soyuz 25</b>	Vladimir V. Kovalyonok Valery V. Ryumin	Aug. 29, 1988	<b>Soyuz TM-6</b>	Vladimir A. Lyakhov Valery V. Polyakov, Abdul Ahad Mohmand
Dec. 10, 1977	<b>Soyuz 26</b>	Yuri V. Romanenko Georgi M. Grechko	Nov. 26, 1988	<b>Soyuz TM-7</b>	Alexander A. Volkov Sergei K. Krikalev, Jean-Loup Chrétien
Jan. 10, 1978	<b>Soyuz 27</b>	Vladimir A. Dzhaniybekov Oleg G. Makarov	Sept. 5, 1989	<b>Soyuz TM-8</b>	Alexander S. Victorenko Alexander P. Serebrov
Mar. 2, 1978	<b>Soyuz 28</b>	Alexei A. Gubarev, Vladimir Remek	Feb. 11, 1990	<b>Soyuz TM-9</b>	Anatoly Y. Solovyev Alexander N. Balandin
June 15, 1978	<b>Soyuz 29</b>	Vladimir V. Kovalenok Alexander S. Ivanchenkov	Aug. 1, 1990	<b>Soyuz TM-10</b>	Gennady M. Manakov Gennady M. Strekalov
June 27, 1978	<b>Soyuz 30</b>	Peter I. Klimuk Miroslaw Hermaszewski	Dec. 2, 1990	<b>Soyuz TM-11</b>	Victor M. Afanasiev Musa K. Manarov, Toyohiro Akiyama
Aug. 26, 1978	<b>Soyuz 31</b>	Valery F. Bykovsky, Sigmund Jähn	May 18, 1991	<b>Soyuz TM-12</b>	Anatoly P. Artsebarsky Sergei K. Krikalev, Helen P. Sharman
Feb. 25, 1979	<b>Soyuz 32</b>	Vladimir A. Lyakhov Valery V. Ryumin	Oct. 2, 1991	<b>Soyuz TM-13</b>	Alexander A. Volkov Tokbar O. Aubakirov, Franz Viehboeck
Apr. 10, 1979	<b>Soyuz 33</b>	Nikolai N. Rukavishnikov Georgi I. Ivanov	Mar. 17, 1992	<b>Soyuz TM-14</b>	Alexander S. Victorenko Alexander Y. Kaleri, Klaus-Dietrich Flade
June 6, 1979	<b>Soyuz 34</b>	(unmanned at launch, returned with Soyuz 32 crew)	July 27, 1992	<b>Soyuz TM-15</b>	Anatoly Solovyev Sergei V. Avdeyev, Michel Tognini
Apr. 9, 1980	<b>Soyuz 35</b>	Leonid I. Popov, Valery V. Ryumin	Jan. 24, 1993	<b>Soyuz TM-16</b>	Gennady M. Manakov Alexander F. Poleshchuk
May 26, 1980	<b>Soyuz 36</b>	Valery N. Kubasov, Bertalan Farkas	July 1, 1993	<b>Soyuz TM-17</b>	Vasily V. Tsiblyev Alexander P. Serebrov Jean-Pierre Haignere
June 5, 1980	<b>Soyuz T-2</b>	Yuri V. Malyshev Vladimir V. Aksenov	Jan. 8, 1994	<b>Soyuz TM-18</b>	Victor M. Afanasyev Yuri V. Usachov, Valery V. Polyakov
July 23, 1980	<b>Soyuz 37</b>	Victor V. Gorbatko, Pham Tuan	July 1, 1994	<b>Soyuz TM-19</b>	Yuri I. Malenchenko Talgat A. Musabayev
Sept. 18, 1980	<b>Soyuz 38</b>	Yuri V. Romanenko Arnaldo Tamayo-Mendez	Oct. 3, 1994	<b>Soyuz TM-20</b>	Alexander S. Victorenko Yelena E. Kondakova, Ulf D. Merbold
Nov. 27, 1980	<b>Soyuz T-3</b>	Leonid D. Kizim Oleg G. Makarov, Gennady M. Strekalov	Mar. 14, 1995	<b>Soyuz TM-21</b>	Vladimir M. Dezhurov Gennady M. Strekalov Norman E. Thagard
Mar. 12, 1981	<b>Soyuz T-4</b>	Vladimir V. Kovalyonok Victor P. Savinykh			
Mar. 22, 1981	<b>Soyuz 39</b>	Vladimir A. Dzhaniybekov Jugderdemidiyn Gurragcha			
May 14, 1981	<b>Soyuz 40</b>	Leonid I. Popov, Dumitru D. Prunariu			
May 13, 1982	<b>Soyuz T-5</b>	Anatoly N. Berezovoy Valentin V. Lebedev			
June 24, 1982	<b>Soyuz T-6</b>	Vladimir A. Dzhaniybekov Alexander S. Ivanchenkov Jean-Loup Chrétien			

<sup>1</sup>Aborted twenty-one minutes after liftoff.





# National Report

## AFA Moves into Cyberspace

AFA's Management Information Systems Department and the Communications Department have been working on an AFA Home Page for the Internet's World Wide Web. The Home Page was unveiled at AFA's National Convention and will continue to be publicized in all of AFA's publications. The two departments and *Air Force Magazine* have also collaborated on an Enola Gay Home Page that will be accessible on the Web independently or through AFA's Home Page.

The move to the Internet is part of a strategy to use technology from the lowest end to the highest end to better serve AFA members and to reach out to potential members. On the low end, AFA recently established a fax broadcast service that will be accessible to anyone with a fax machine. Membership appli-

cations, insurance forms, fact sheets, issue summaries, legislative information, and bios, among other material, will be available instantly by fax. [Call (800) 232-3563]

The Internet's World Wide Web will give us access to a growing audience that cuts across industries and age groups.

Estimates of Internet users range from 20-30 million. Our Home Page will contain basic information on the Association, current issues, bios, and other material.

AFA members and others interested in learning more about the association can gain access to AFA's Web

page in one of two ways: through a direct Internet connection or through an on-line service like Prodigy, America Online, and CompuServe, all of which offer links to the Internet.

### World Wide Web Home Page Addresses

Air Force Association	<a href="http://www.afa.org/">http://www.afa.org/</a>
Enola Gay	<a href="http://www.afa.org/enolagay/">http://www.afa.org/enolagay/</a>
Aerospace Education Foundation	<a href="http://www.aef.org/aef/">http://www.aef.org/aef/</a>

## Reach AFA via E-Mail

AFA can now be reached via Internet e-mail. You can reach individuals or departments at AFA using Internet's, America Online's, CompuServe's, or Prodigy's mail services. The protocol for an individual is the first initial and last name followed by @AFA.org. The protocol for all AFA departments is the three-letter department abbreviation followed by @AFA.org. Examples follow:

### Individuals

Steve Aubin, Director of Communications.....	SAubin@AFA.org
Jack Giese, Chief of Media Relations .....	JGiese@AFA.org
Ken Goss, Director of National Defense Issues .....	KGoss@AFA.org
Jim Simpson, Membership Director .....	JSimpson@AFA.org
Richard Collins, Director of Management Information Systems .....	RCollins@AFA.org
Katy DuGarm, Manager of Multimedia Services .....	KDuGarm@AFA.org
John Correll, Editor in Chief, <i>Air Force Magazine</i> .....	JCorrell@AFA.org

### Departments

Communications .....	COM@AFA.org
National Defense Issues .....	NDI@AFA.org
Membership Operations .....	MOP@AFA.org (or MbrServ@AFA.org)
Management Information Systems .....	MIS@AFA.org
<i>Air Force Magazine</i> .....	MAG@AFA.org

For technical questions, please call Richard Collins at (800) 727-3337, ext. 5809, or Katy DuGarm, ext. 5841. For questions related to the content of AFA's Home Page, please call Steve Aubin at (800) 727-3337, ext. 5850, or Jack Giese, ext. 5843.







By Frances McKenney, Assistant Managing Editor

## John Shaud Becomes Executive Director



John A. Shaud, former chief of staff of Supreme Headquarters Allied Powers Europe, becomes Executive Director of AFA and its Aerospace Education Foundation upon the retirement of Monroe W. Hatch, Jr., on October 1. Since his retirement from the Air Force in 1991, John Shaud has been director of the Air Force Aid Society.

Among other assignments during his military career, he was USAF deputy chief of staff for Personnel and commander of Air Training Command. He was born in Cleveland, Ohio, and graduated from the US Military Academy in 1956. He is a command pilot with more than 5,600 flying hours and has flown more than thirty-five different types of aircraft.

In his early career, John Shaud was assigned to Strategic Air Command, where he flew B-47s and B-52s. During the Vietnam War, he flew RF-4Cs. He has served as a wing and division commander in Strategic Air Command. Pentagon assignments included duty as deputy director and director of Air Force Plans in the office of the deputy chief of staff for Plans and Operations.

Shaud holds a bachelor of science degree from West Point, a master of science degree from George Washington University, and a doctorate from Ohio State University. He is a graduate of the National War College. He is married to the former Janelle M. Ohlenbusch of Lubbock, Tex. They have three children: Patricia, James, and Katherine.

## Acquisition Roundtable

AFA's Central East Region and the Office of the Assistant Secretary of the Air Force for Acquisition co-sponsored an acquisition reform industry roundtable at Fort Belvoir, Va., on August 11, 1995. Senior USAF officials solicited and received industry views of recent acquisition reforms. AFA National Director Charles G. Durazo was the principal event organizer.

Acting Assistant Secretary of the Air Force for Acquisition Darleen Druyun offered her insights on the future of acquisition reform and her "lightning bolt" initiatives. Other senior Air Force officials addressed changes in the process by which requests for proposal are produced and the need to change the relationship of the military to industry from one of oversight to one of collaboration.

The roundtable was one of a series sponsored by AFA and the Air Force acquisition secretariat de-



At the Washington-Oregon State Convention, 62d Airlift Wing Commander Col. Craig Rasmussen welcomed (left to right) National Vice President (Northwest Region) John Lee, Oregon President Barbara Brooks, Washington President Richard Seiber, and AFA Chairman of the Board James McCoy.



signed to inform industry on new ways USAF is doing business and to provide an opportunity for the Air Force to get industry feedback. Other sessions were to be held in Los Angeles, Dallas, and Dayton, Ohio, throughout September and October.

**Just Plane Fun**

Frankly, a paper airplane competition sounded ho-hum to **Razorback (Ark.) Chapter** President John L. Burrow, so he was astounded when

craft aloft, and a Civil Air Patrol composite squadron conducted aerodynamics and flight demonstrations. Besides the Mustang, awards included the promise of meeting Rep. Tim Hutchinson (R-Ark.) at a chapter luncheon to be held later this year, subscriptions to *Air Force Magazine*, and an orientation flight with CAP.

Participation in this aerospace activities day shows the renewed strength of the Razorback Chapter, which merged last spring with the Fort Smith

tended the convention's Salute to Veterans luncheon.

**Visiting the Past**

The **Chautauqua (N. Y.) Chapter** took to the road for three days in August, traveling by bus to Ohio. There, the group of forty-five chapter members and guests visited the US Air Force Museum at Wright-Patterson AFB, Ohio, and Freedom Flight America—the World War II aircraft show that originated in California and stopped at various cities en route to a flyby of the Statue of Liberty.

Some chapter members had been stationed at Wright-Patterson and had lots of war stories to swap, Chapter President John Dunderdale said. The group was especially interested in exhibits at the museum, where they spent a day. Mr. Dunderdale worked in crash rescue during World War II and enjoyed checking out the fire equipment. "It was state of the art when I got out," he said, "and now it's in the Air Force Museum."

Chapter member William R. Stroh helped Mr. Dunderdale organize the trip for the chapter, which numbered sixty-eight members at last count. The Chautauquans enjoyed the excursion enough to decide to make it an annual event.

**Convening in Ohio**

A retired USAF combat pilot who flew 300 combat missions in Vietnam was one of the featured speakers at the Ohio State Convention at Wright-Patterson AFB.

Paul D. Tackabury spoke to the luncheon crowd about the B-2 bomber. He is Northrop Grumman Corp.'s vice president, Business and Advanced Systems Development, B-2 Division. At the evening banquet, Lt. Gen. George Rhodes, USAF (Ret.), spoke about his distinguished career that started with his 1940 enlistment in the US Army Air Corps. General Rhodes, who lives in Ohio, is a former vice commander of Air Force Logistics Command and also retired from Northrop Grumman, where he served as vice president for Customer Military Requirements.

The **Steel Valley Chapter**, which pushed its membership over the 200 mark this year, received the Francis Spalding Memorial Award for Outstanding Chapter. Its leader, Fred F. Kubli, Jr., was honored with the Chapter President and Person of the Year Awards, and, for his work as **Frank P. Lahm Chapter** Vice President (Veterans Affairs), Robert J. Puglisi received an American flag enclosed in



*William Sparks, Chief of Staff Gen. Ronald Fogleman, AFSOC Commander Maj. Gen. James Hobson, Raymond Turczynski, and Robert Patterson (l-r) pose at an awards ceremony at the Florida State Convention. General Hobson won the Jerry Waterman Award for outstanding support in contingency operations.*

busloads of kids turned out for the event.

They were Boys and Girls Club members from Rogers and Bentonville, Ark., and they swarmed the Bentonville Airport to find paper planes and compete for—among other prizes—a 1995 Ford Mustang. Most of the children didn't even have driver's licenses, but because none of the contestants was able to fly a paper plane in one of the car's open windows and out the other, the Mustang went back to a local dealership anyway.

This creative contest took place during Aerospace Appreciation Day, organized by SSgt. Robert London, an administrative specialist from the University of Arkansas's AFROTC Detachment 30, with backing from the Razorback Chapter and sixteen groups and businesses.

Also during the day, members of the Benton County Flying Tigers remote-control airplane club sent their

Chapter. Vice President Paul W. Bixby wrote, "For the first time in the chapter's history, the geographical area covered by the membership—which spans about fifteen counties and a quarter of the state—includes an Air Force flying unit." He refers to the 188th Fighter Group (ANG), nicknamed the "Flying Razorbacks," an F-16 unit based at the Fort Smith Municipal Airport.

Elsewhere in the state, the **David D. Terry, Jr. (Ark.) Chapter** hosted the Arkansas State Convention in Jacksonville, Ark., in July. Arkansas State President Marleen Eddlemon and Chapter President Phil Sullivan, welcomed guest speaker Rep. Ray Thornton (D-Ark.) and Brig. Gen. Donald A. Streater, commander of the 314th Airlift Wing at Little Rock AFB, Ark. Deputy Secretary for Veterans Affairs Hershel W. Gober, 314th AW Vice Commander Col. Edward L. LaFontaine, and AFA National President R. E. Smith at-



a cherry case. National Vice President (Great Lakes Region) Harold F. Henneke swore in two new state officers—Ron Goerges, president, and Chuck Spencer, treasurer.

#### A Keystone Convention

AFA conventioners from the Keystone State gathered in Harrisburg, Pa., in late July, where they reelected their current slate of state officers for another year: Raymond Hamman, president; Jerome Ashman, vice president; Alma Cannon, secretary; and Karen Hartman, treasurer.

A highlight of the convention, hosted by the **Eagle Chapter**, was the Fiftieth Anniversary Banquet attended by more than seventy people. World War II veterans who served overseas received a commemorative medal at this dinner. State President Hamman said that some guests admired the medals so much that they bought the extras—their way of remembering the sacrifices of World War II veterans.

At the convention, the **Pocono Northeast Chapter** received Pennsylvania's Chapter of the Year Award. Mr. Hamman explained that the choice was made for some practical reasons: The 215-member chapter turns in its various reports on time and distributes a newsletter produced by Chapter President Joseph D. Sylvester. The deciding factor, though, was diligence. Mr. Hamman said many chapters were excused from attending a regional meeting in Binghamton, N. Y., last winter, but Pocono Northeast was among those who braved the uncertain weather and made it to the upstate location.

#### Texas Roundup

The **Gen. Charles L. Donnelly, Jr. (Tex.), Chapter** hosted an activity-packed Texas Convention in Wichita Falls that included a golf tournament at Sheppard AFB and two historical tours for the spouses. For a third year, the **San Jacinto Chapter** conducted its popular silent auction at the convention, collecting bids for such local products as wine and resort weekends and raising about \$2,000 for Texas AFA. A "Taste of Texas" dinner took attendees to the Wichita Falls Country Club for a huge buffet of cuisine from four ethnic groups who have contributed to the state's heritage.

State President Larry L. Miller handed over the reins to his successor, Thomas J. Kemp, at the convention that had 172 registered attendees. Other new state officers are Executive Vice President Henry Hill and Regional Vice Presidents Ronald K. Blilie, C. N. Horlen, Jerrald W. Smith, and William D. Brown.

The **Northeast Texas Chapter** took home the Chapter of the Year honor. It is the newest chapter in the state and has grown significantly in the last year, Mr. Miller explained.

#### In the Emerald City

A 1991 tornado left McConnell AFB, Kan., with considerable damage, but part of the base's recovery included construction of Emerald City, a large recreational complex that includes everything from a swimming pool, running track, and twelve bowling lanes to a food court, a restaurant, two lounges, a ballroom, and meeting rooms.

State President Eddie D. Brown reports that about 100 AFA members converged on Emerald City—named after Dorothy's destination in "The Wizard of Oz"—for the Kansas State Convention and Recognition Banquet, hosted by the **Lt. Erwin R. Bleckley Chapter** and Brig. Gen. Charles H. Coolidge, Jr., 22d Air Refueling Wing commander.

During the two-day event, attendees took part in a golf tournament, roundtable discussions, and tours of McConnell's facilities and listened to keynote speaker Lt. Gen. Jay W. Kelley at the evening banquet. The Air University commander joined AFA Chairman of the Board James M. McCoy in presenting AFA charter member Cletus J. Pottebaum with a Jimmy Doolittle Fellowship, representing a \$1,000 contribution to AEF. Along with the presentation of eighteen awards to outstanding AFA, active-duty, ANG, and AFRES members, it was also announced that Bill

Myers will receive an AFA Medal of Merit this fall.

#### Chapter News

The awards ceremony at the Georgia State Convention at Robins AFB in July honored Vicki Honeycutt as Teacher of the Year, Deborah Drazdowski for exceptional service to Georgia AFA, Col. P. J. Johnson with an AFA Recruiting Award, and Tom Reed for Superior Service in Media Support. Lt. Col. Gregory A. Bricker was named Airlifter of the Year; TSgt. Charlie Howell, Cargo Technician of the Year; Shawn A. Eikenberry, Fighter Aircraft Technician of the Year; TSgt. Mary Fuller, Outstanding Logistician of the Year; and Cadet Col. Stacy Ganter, AFJROTC Cadet of the Year. Georgia President Jack H. Steed, MSgt. Glenda Solomon of the Robins NCO Academy, and 2d Lt. Timothy M. Bennett received Exceptional Service Awards. Chapter President Chester A. Lowe, Jr., collected the Chapter of the Year Award for the **Carl Vinson Memorial (Ga.) Chapter**.

Montana AFA State Secretary Ron R. Glock presented awards to cadets from Montana State University's AFROTC Detachment 450 at a dining-out. The **Bozeman (Mont.) Chapter** sponsored the awards, given to Ryan Richardson, Jennifer Lane, Shayne Yorton, and Bjorn Holmquist.

Retired Navy Cmdr. Robert J. Jensen took over the helm from Michael E. Richardson at the **John W. DeMilly, Jr. (Fla.), Chapter** in August. Mr. Jensen entered the service as a sea-



Warner Robins Air Logistics Center's new commander, Maj. Gen. Rondal Smith, presented Carl Vinson Memorial Chapter President Chet Lowe (center) with the Chapter of the Year Award at the Georgia State Convention. Georgia State President Jack Steed (left) assisted at the ceremony.



man basic and rose through the ranks to E-7 before receiving his commission in 1964. He is a bank executive and has headed many local organizations in the Homestead, Fla., area. John Breslin, a US Customs personnel specialist, was elected vice president at the chapter meeting. Ray Monti, an aircraft simulator operations supervisor, was elected secretary. William Susser, who served with the Flying Tigers during World War II,

has become the chapter's new treasurer.

The **Richard D. Kisling Chapter** hosted several distinguished guests at the Iowa State Convention—Air National Guard Director Maj. Gen. Donald W. Shepperd and National Vice President (Midwest Region) Samuel M. Gardner. Col. Dennis B. Swannstrom, commander of ANG's 185th Fighter Group at Sioux City Gateway, accepted an Outstanding Unit award

at the convention. More than fifty AFA members and guests also enjoyed a Missouri River cruise on the *Belle of Sioux City* riverboat.

**Have AFA/AEF News?**

Contributions to "AFA/AEF Report" should be sent to the Director of Volunteer and Regional Activities or to *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. ■

## Unit Reunions

**Air Force Management Engineering Agency.** Twentieth-anniversary celebration, October 31, 1995, at Randolph AFB, Tex. Former personnel are invited. **Contact:** Gloria U. Williams, AFMEA/PLD, Randolph AFB, TX 78150-4451. Phone: (210) 652-2497. DSN 487-2497 or 487-5910.

**Society of the Strategic Air Command, Inc.** Fiftieth-anniversary reunion, March 21-23, 1996, in Omaha, Neb. **Contact:** Bonnie Reid, P. O. Box 1244, Bellevue, NE 68005-1244. Phone: (402) 293-7433. Fax: (402) 292-5536.

**2d Air Division, 8th Air Force (World War II).** February 3, 1996, in Orlando, Fla. **Contact:** L. G. Gilbert, 1482 Granville Dr., Winter Park, FL 32789. Phone: (407) 647-2623.

**4th Airlift Squadron.** Sixtieth-anniversary reunion, October 5-7, 1995, at McChord AFB, Wash. **Contact:** Maj. Kenneth Terry, USAF, 62d AW, 4th AS/DO, McChord AFB, WA 98438-1300. Phone: (206) 984-2905. Fax: (206) 984-3966.

**6th Bomb Group, 24th, 39th, and 40th Bomb Squadrons, and personnel of the 313th Bomb Wing (Tinian).** October 26-29, 1995, at the Holiday Inn-Palo Verde in Tucson, Ariz. **Contact:** John E. Jennings, 6149 E. Wilshire Dr., Scottsdale, AZ 85257. Phone: (602) 945-7335.

**30th Bomb Group, 7th Air Force (World War II).** October 20-21, 1995, in Riverside, Calif. **Contact:** Edward Hattrup, 24306 Del Amo Rd., Ramona, CA 92065.

**41st Troop Carrier Squadron (C-130A).** March 15-17, 1996, at the Menger Hotel in San Antonio, Tex. **Contact:** Skip Allen, 714 Fabulous Dr., San Antonio, TX 78216. Phone: (210) 340-1610.

**46th/27th Tactical Fighter Squadron (1967-72).** January 12-14, 1996, in Tampa, Fla. **Contacts:** Col. J. K. Sloan, USAF (Ret.), 10015 Barrinson N. E., Albuquerque, NM 87111. Phone: (505) 828-3629. Col. Daniel O. Walsh, USAF (Ret.), 4044 S. Carson St., Aurora, CO 80014. Phone: (303) 680-7568.

**90th Air Refueling Squadron, Forbes AFB, Kan., (1954-63).** April 28-May 1, 1996, at the Holiday Inn-Downtown, in San Antonio, Tex. **Contact:** Tom Borre, 2404 Laramie Trail, Austin, TX 78745. Phone: (515) 442-7691.

**319th Fighter-Interceptor Squadron.** May 18-21, 1996, in Dayton, Ohio. **Contact:** Bob Fredericks, P. O. Box 798, Wickenburg, AZ 85358. Phone: (602) 684-9648.

**374th Aerial Port Squadron, Clark AB, the Philippines.** June 8-10, 1996, in Melbourne, Fla. **Contact:** Mike Poundstone, 1638 Chachalaca Lane, Abilene, TX 79605-5465. Phone: (915) 698-5190.

**552d Airborne Early Warning and Control Wing (EC-121).** May 17-19, 1996, at McClellan AFB,

Calif. **Contact:** Tony Praxel, 3005 El Prado Way, Sacramento, CA 95825. Phone: (916) 487-1975.

**556th Reconnaissance Squadron (1968-72).** March 29-31, 1996, in Las Vegas, Nev. **Contacts:** Lt. Col. Donald J. Chase, USAF (Ret.), 3923 N. 111th Plaza, Omaha, NE 68164-2858. Phone: (402) 493-5612 or (800) 522-7366, Ext. 3 (Giles Robb).

**854th Medical Group, 341st Strategic Missile Wing, stationed at Malmstrom AFB, Mont.** Seeking contact with former members for a reunion. **Contact:** William D. Reid, 1600 Prairie, Essexville, MI 48732. ■

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Mall unit reunion notices well in advance of the event to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

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# Bulletin Board

Seeking tail numbers and information on missions of twin-engine, heavy-lift **Sikorsky helicopters** worthy of museum display. Also seeking help in persuading the US Air Force Museum to display an HH-3 and HH-53. **Contact:** Thomas J. Benic, 3701 Northampton Rd., Cuyahoga Falls, OH 44223.

Seeking photos and information from pilots and aircrews stationed at **Bluethenthal Field, N. C.**, during World War II. **Contact:** Robert J. Kemp, New Hanover International Airport, 1740 Airport Blvd., Wilmington, NC 28405.

Seeking the whereabouts of former members of **The Fighting 448th Coffee Drinkers Association** of McCook AAB, Neb., 1945-46. **Contact:** Frank W. Austin, 700 Mt. Vernon Rd., Newark, OH 43055.

Seeking names of **POWs** who left Hanoi, Vietnam, on **C-141 #66-0177** February 12, 1973, as part of Operation Homecoming. **Contact:** SSgt. Henry R. Harlow, USAF, 445th Aircraft Generation Squadron/CCP, 5514 McCormick, Wright-Patterson AFB, OH 45433-5146.

Seeking contact with former members of the **47th, 48th, 49th, 58th, 59th, and 60th Fighter-Interceptor Squadrons** or the **551st Airborne Early Warning and Control Wing** at Otis, Westover, or Hanscom AFBs, Mass., and Grenier Field, N. H., 1952-60. **Contact:** Bill Green, 1460 Persimmon Lane, Fairview, PA 16415.

Seeking the whereabouts of **James Brown** from Kentucky, who was with the 501st Bomb Squad-

ron, 345th Bomb Group. **Contact:** Sandy A. Cortesio, 906 Drake Ave., Centerville, IA 52544.

Seeking a 431st Fighter-Interceptor Squadron **patch**. **Contact:** Richard L. Beltzhoover, 3659 Brumley Way, Carmel, IN 46033

Seeking information on the **2d, 3d, 4th, 6th, 7th, and 8th Antisubmarine Squadrons** and the **25th and 26th Antisubmarine Wings**. Also seeking information on bomb groups that used B-18Bs for antisubmarine warfare. **Contact:** Robert Lumpkin, 9366 E. Stella Rd., Tucson, AZ 85730-2928.

For the South Dakota Air and Space Museum, seeking information on and photos and stories of **B-17 crew training** during World War II. **Contact:** Ellsworth Heritage Foundation, P. O. Box 871, Box Elder, SD 57719-0871.

Seeking the diaries or writing of **Maj. Gen. Uzal Ent**, commander of IX Bomber Command during World War II. **Contact:** William Lake, 1094 Madrone Way, Livermore, CA 94550.

Seeking B-52 and F-4 wing, squadron, or program **patches** and stickers. Also seeking photos of and information on the **RBS express**. **Contact:** A1C Christian Q. Anderson, USAF, 29 B Statesboro Cir., Belle Fourche, SD 57717.

Seeking the whereabouts of former members of **Basic Military Training Squadron 3709**, Flight 1818. **Contact:** CMSgt. Virgil O. Childers, USAF, 315 MSS/DPMA, 218 N. Bates St., Charleston AFB, SC 29404-4917.

Seeking contact with **1st Lt. Alfred H. Richter**, of the 23d Antisubmarine Squadron, stationed at Drew Field, Fla., 1942-43, and in Trinidad. **Contact:** Ralph Jensen, 2656 N. 56th St., Sp 84, Mesa, AZ 85215.

For a newsletter, seeking former **33d Fighter Group** members. **Contact:** George E. Dively, P. O. Box 10743, Alexandria, VA 22310-0743.

Seeking **patches** from the 432d Tactical Reconnaissance Wing and 432d Organizational Maintenance Squadron, Udorn RTAFB, Thailand, 1973; 23d OMS, England AFB, La., 1973; 380th Bomb Wing and 380th OMS, Plattsburgh AFB, N. Y., 1975; and 81st Tactical Fighter Wing and 81st OMS, RAF Bentwaters, UK, 1977. **Contact:** Capt. Kent L. Malcolm, USAF (Ret.), 29 Tanglewood Ct., Manchester, NH 03120.

Seeking contact with those affected by the **Voluntary Separation Incentive/Special Separation Benefit** 180-day law. **Contact:** Raymond M. Smith, 4349 Grandview St. S., Wichita Falls, TX 76305.

Seeking photos of the area around the **30th Bomb Squadron**, 19th Bomb Group, Kadena AB, Japan, 1951-53. **Contact:** Bill Stock, 2327 Hillside Ave. W., St. Paul, MN 55108.

Seeking contact with or information on **Capt. Gail S. Brewer**, who was stationed at Ridgewell, UK, 1943-45, and who knew Dora L. Askew. He later served with the 1st Bomb Wing at McChord AFB, Wash. **Contact:** Bruce G. Glass, Lower Weeke Farm, Dartmouth, South Devon TQ6 0JT, UK.



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# Pieces of History

Photography by Paul Kennedy

## Baptism of Fire



Memorabilia courtesy Warren Thompson, Memphis, Tenn.

*The smoke of World War II had barely cleared when US forces found themselves engaged in another major conflict. Two days after North Korea invaded South Korea on June 25, 1950, President Harry S. Truman ordered US forces to support the South in the war, which lasted more than three years. The Korean War saw the advancement of such*

*innovations as forward air control, joint air-to-ground support, and helicopter medevac—elements that have become standard in today's Air Force. The memorabilia collected here represent several of the flying units that helped the newly independent Air Force make those types of operations integral parts of the US wartime mission.*



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