

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

ANNIVERSARY  
of  
WAR II



## AIR FORCE ASSOCIATION 1995 AEROSPACE TECHNOLOGY

### USAF's Outstanding Twelve



### AFA Convention Report



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**About the cover:** USAF's twelve Outstanding Airmen stand proudly at the entrance to the 1995 AFA National Convention Aerospace Technology Exposition. See "The Outstanding Airmen," p. 76. Photo by Paul Kennedy.

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AFA 1996 Statement of Policy, adopted by the delegates at the 1995 Air Force Association National Convention September 18, 1995

## Global Power From Air and Space

**T**HE defining task for US military power in the years ahead will be the response to regional crises. The responsibility for this mission will be vested in a force that is much smaller than before and based primarily in the United States. That force will be expected to respond quickly and resolve conflicts decisively with an absolute minimum cost in American lives.

Meeting that requirement is complicated by the fact that the United States will not have a monopoly on advanced technology. The proliferation of high-quality sensors, computers, highly accurate weapons, and weapons of mass destruction has already begun. It will become increasingly possible for an aggressor to instigate a significant military action with speed and surprise, precipitating a crisis at an unpredicted place and time.

Much will depend on the relative capability of US forces to look deep, reach far and fast, penetrate hostile territory, maintain a global situational awareness, and strike with precision. More often than not, holding the combat advantage will depend on systems operating in air and space.

In addition, US forces must continuously project US power and presence from intercontinental distances and deter aggression across the range of military operations. With genuine respect and regard for the contribution of other force components, we believe that response to conflict of the future will be heavily dependent on landbased airpower and space power and that our planning should be directed to that end.

■ **Strategy and forces.** The declared US policy is that our armed forces will be prepared to fight and win two near-simultaneous regional conflicts. That is the stated basis for projecting requirements, but the actual force has not and does not meet that standard.

We stand on our position that to fulfill the two-conflict strategy and meet its requirements in wartime and peacetime, the Air Force component of the force structure must include

not less than twenty-four combat-coded fighter and attack wings, at least 184 operational bombers with precision guided munitions, and a modernized airlift capability that will meet requirements for forty-nine million to fifty-two million ton-miles per day.

We further note that while the emphasis is properly placed on regional conflicts, the armed forces also retain their fundamental strategic mission of deterring aggression on the United States and its allies.

■ **Resources for defense.** This year, after ten consecutive years of decline in the defense program, both the Administration and Congress have finally recognized that the reductions must stop. The Administration says the defense cuts are nearly over and that the defense budget will begin to level out in 1998.

The fact is, the reductions have gone too far already. By the turn of the century, the United States is projected to spend only 2.8 percent of its Gross Domestic Product (GDP) on defense, compared with 11.9 percent in the 1950s. Time and again, the defense program has been marked down from the requirements of strategy in order to meet arbitrary budget ceilings.

We reject the proposition that the only way to fund "Quality of Life" initiatives and other valid defense requirements is to divert money from elsewhere in the defense budget, primarily from force modernization accounts. Many of the defense reductions over the past decade were levied in the name of economy. For the most part, however, the resources have been reallocated to other spending instead. Since 1990, total federal cutlays have risen by 22.8 percent while defense outlays fell precipitously.

Unfunded defense requirements exist, and they are at least as deserving as most of the nondefense programs that continue to grow. The Air Force Association reaffirms its belief that 4.0 percent of GDP should be established as the minimum level required to support forces needed for a two major regional conflict strat-

egy and below which defense should not be reduced to meet external budget constraints.

■ **Equipping the force.** Special attention must be paid to weapon systems and force modernization. In recent years, the Air Force cut back on modernization to fund readiness and "Quality of Life" programs. It is now spending a record portion, approximately two-thirds, of its total obligation authority on operations and support.

In 1995, for the first time in its history, the Air Force will purchase no bombers and no fighters. The Air Force is not programmed to purchase another combat aircraft of any kind until 1998. A shortage is developing in the attrition reserve. Without more aircraft, the Air Force will not be able to maintain even its reduced complement of twenty fighter wing equivalents beyond the turn of the century. Force modernization programs have been held up, delayed, and scaled down.

The Persian Gulf War of 1991 demonstrated the overwhelming advantage that accrues from superior technology. Other nations saw the results as clearly as we did, and many of them have intensified efforts to catch up or perhaps gain some advantage of their own. Superiority of US forces in conflicts of the future depends on priority and investment today in force modernization, particularly in stealthy aircraft, precision-strike munitions, modern air mobility, information warfare capabilities, and space systems that enable us to hold the high ground.

■ **The industrial base.** In 1992 and 1993, the National Security Strategy and the National Defense Strategy identified force reconstitution—including an industrial base capable of surge production—as a "fundamental element" in the rationale that permitted the United States to draw down its defense program. In 1995, however, the National Security Strategy and the National Defense Strategy no longer mention the defense industrial base and force reconstitution has disappeared as a "fundamental element." Since 1987, the number of





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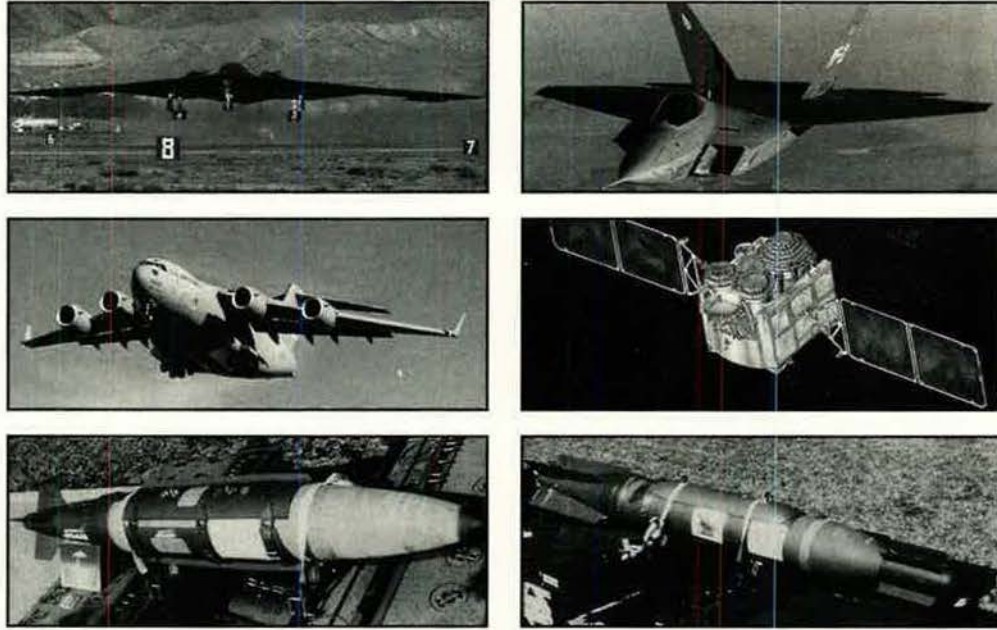
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\* **streamline** *v.t.* **1.** to bring up to date. to render more efficient by modernizing. **2.** a. organize. b. to make simpler or more efficient.

\*\* **downsize** *v.t.* to do the above with less funding and reduced manpower.

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firms doing defense business has decreased by seventy-five percent. The Department of Defense demonstrates only limited interest in the problem, and even that interest has been concentrated in selected sectors such as shipbuilding. The Air Force Association deplores the nation's inattention to industrial preparedness.

■ **Space.** Information and assistance from space have become central to US military operations. The contribution of space systems is decidedly impressive as well as vital in functions ranging from intelligence to weather reporting. Nevertheless, acute limitations remain. The worst of these is the drift and delay in space-launch modernization. This is a national problem, not just a military problem. In the military arena, the urgent requirements include better systems to detect and track theater ballistic missile launches.

The Air Force is responsible for ninety-three percent of the people and eighty-nine percent of the funding for the military space program. We believe that the nation would gain in effectiveness and economy by formally designating the US Air Force as the executive agent for launch, operational control, research, development, and acquisition of military space assets.

■ **Needs of military people and veterans.** We have been encouraged by a number of positive actions on behalf of military people and veterans. These have included provision for a full pay raise for military members, more timely cost-of-living adjustments for military retirees, and a resurgence of interest in "Quality of Life" issues by the Department of Defense. It remains to be seen whether the government will follow through with actions to stop the erosion of benefits for military people, veterans, and retirees.

Military pay has not kept up with inflation and has fallen behind private-sector compensation by 12.6 percent. The gap is projected to widen to eighteen percent by FY 2001. Service members, most of whom live off base if they have families, currently absorb twenty-two percent of their off-base housing costs because allowances for quarters do not match actuality. Reimbursement for a typical permanent change of station move is only about sixty-five cents on the dollar. It is not surprising that service members rate pay and allowances as their chief complaint about military life.

The combination of changes to the military retirement system has al-

ready reduced the lifetime value of retired pay for newer service members by twenty-six percent. Retirees are increasingly concerned about their benefits, especially medical care. We call on Congress to confirm that military retirees and their families are entitled to medical care—that it is not simply a "contingent benefit" that can be withdrawn at will—and that older retirees will be assured access to the military health-



**The threat to the interests and security of the US is not gone. It has diversified, proliferated, and evolved.**

care system by allowing Medicare to transfer funding to military Medical Services on their behalf.

■ **Total Force.** The Air National Guard and the Air Force Reserve account not only for an increasing share of the force structure but also an increasing share of the mission. They provide all of the air defense forces, more than half of the airlift and tanker forces, and significant portions of the fighter, bomber, special operations, electronic warfare, tactical reconnaissance, and rescue forces. The Air Force Association congratulates the Air National Guard and the Air Force Reserve for demonstrating the potential of Total Force and congratulates the Air Force for its effective use of Guard and Reserve components.

The Air Force Association considers it timely and appropriate to associate the official auxiliary of the Air Force—the Civil Air Patrol (CAP)—with the Total Force of the USAF and that CAP's unique civil resources, capabilities, and training activities be used to augment USAF missions when feasible.

■ **US troops in combat.** The National Security Strategy of Engagement and Enlargement, set forth in February 1995, declares that American troops will be employed abroad only when US values and interests are at stake; that when US forces are employed, it will be for clear objectives to which the nation is firmly committed; and if those forces are to enter combat, it will be with the means to achieve their objectives decisively.

Current policy, stated earlier this year, is that the armed forces may be used on behalf of interests that are deemed important but which are not necessarily vital interests of the United States. We particularly urge the utmost care in deciding our national interests, national security objectives, and role for the military in "Operations Other Than War." Too often in the past, concepts of employing forces for limited objectives have led to the mistaken beliefs that warfare can be regulated and that military power can always be applied in measured increments and for such uncertain purposes as the sending of signals. We believe clear military objectives must be established, based on national goals, before forces are committed.

*When US forces are committed to combat, it must be under US command, except as provided for by established treaty arrangements.*

■ **A continuing and proliferating threat.** The threat to the national interests and security of the United States is not gone. Instead, it has diversified, proliferated, and evolved.

In addition to the five declared nuclear weapons states, at least twenty other nations have acquired or are attempting to acquire weapons of mass destruction—nuclear, biological, or chemical weapons—and the means to deliver them. The number of nations that possess ballistic missiles is growing, and we do not yet have an effective means to counter this threat. In the years ahead, we will see rapid proliferation of modern fighters, air defenses, and access to space technologies.

To meet the challenges that are to come, the nation will have a continuing need for superior land, sea, air, and space forces that in their composite strengths are second to none. The most severe challenges, however, are likely to be complex, fast-breaking, and highly technological, occurring in distant locations where the zone of conflict is lethal and deep.

Core capabilities in this realm of conflict point to the US Air Force as the nation's first line of defense. ■



## McNamara's Mismanagement

I was interested in the responses to your editorial "The Confessions of Robert S. McNamara" [June 1995 "Editorial," p. 2], particularly those from readers who apparently are still unaware of the extent to which he micromanaged and mismanaged the war.

In the late 1960s, I was a participant in Corona Harvest, a study directed by Hq. USAF on the effectiveness of US airpower in Vietnam. This required access to all classified documents relating to the air war.

In early 1964, the Pentagon submitted to the President a contingency plan, including a list of the ninety-four most important targets in North Vietnam. In February 1965, when President Lyndon B. Johnson authorized a sustained air campaign (Rolling Thunder) against North Vietnam, the military anticipated an aggressive campaign of short duration that would include many of the targets on the list of ninety-four. This was not to be.

Rolling Thunder was under the direct supervision of President Johnson and required target recommendations to be submitted up the chain of command for his approval. For the span of time covered by my research, I tracked these communications. With few exceptions, the commander in chief of Pacific Command and the Joint Chiefs of Staff would concur with the theater command's recommendations. Almost invariably, Secretary McNamara would make changes. Frequently, he would delete most of the military's recommendations. Sometimes he deleted all of them, substituting his own selections, which were often targets that were of high risk to our aircrews but of little military importance. And the President, with few exceptions, approved the changes made by his Secretary of Defense.

In early 1965, North Vietnam was vulnerable to air attack. By 1968, when Mr. McNamara resigned as Secretary of Defense, North Vietnam was a formidable opponent with massive and sophisticated air defenses.

Any hope for an early and satisfactory end to the war had been lost.

Col. Samuel S. Palmer,  
USAF (Ret.)  
St. Petersburg, Fla.

## Space in the Classroom

Reading the August issue of *Air Force Magazine*, I was amazed at the quality and quantity of information amassed within twenty pages in the "Space Almanac" [p. 30].

I have taught aviation and space as part of my classroom curriculum since 1984, long before I completed a Teacher in Space application. One thing my collection has always lacked is a clear, concise compilation of space history, both national and international. The "Space Almanac" is exactly what I've been visualizing: an easy to read, high-interest resource for my students to use while building their foundations for tomorrow.

Lee Ann Richardson  
Indianapolis, Ind.

## The Revisionists and the *Enola Gay*

"Washington Watch: The Activists and the *Enola Gay*" [September 1995, p. 18] provides an admirable and pointed answer to some of the "activists" who planned the original Smithsonian exhibit. However, it will not convince them or their sympathizers. You might also have pointed out other actions and attitudes of the Japanese military authorities at the time, such as the intention to slaughter all prisoners of war if the Japanese mainland were invaded or Field Marshal Hiseichi Terauchi's orders (which, in

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the chaos at the time, fortunately never left his headquarters) that all the prisoners—military and civilian, men, women, and children, US, British, Dutch, Indonesian, Chinese, Filipino—in the camps in southeast Asia were to be slaughtered immediately. Such details, however, will not convince such people as Gar Alperovitz.

People of this type exist all over the world. It is unfortunate that nearly all governments or government agencies sometimes behave in disgraceful ways, leading idealists to turn against their own governments without considering how other governments behave (such as the Japanese military government or the Bolshevik governments) or how they themselves might behave if they had power. . . .

I am old enough to remember World War II and the feelings of the people, at least in England. We knew what was happening in the camps (and what we heard were not idle rumors but were confirmed after the war) and felt the greatest revulsion for the Japanese, not on racial grounds but because of what they had done in the war. We received the news of the bomb with relief because it meant that such atrocities were at an end.

Earlier in the century, Westerners had much admired the Japanese soldier as "a gentleman," and Japanese officers impressed Europeans with their chivalrous attitude. The Japanese military later changed entirely and became bestial. The Japanese in World War II were victims of their own authorities, not of the decision to drop the bomb.

Activists for any cause—or against any cause—are often unpleasant people with unpleasant motives and methods, and they cannot be reasoned with. They must simply be watched, not for their cause or argument, but for the dishonesty of their methods, and opposed firmly when their dishonesty becomes visible.

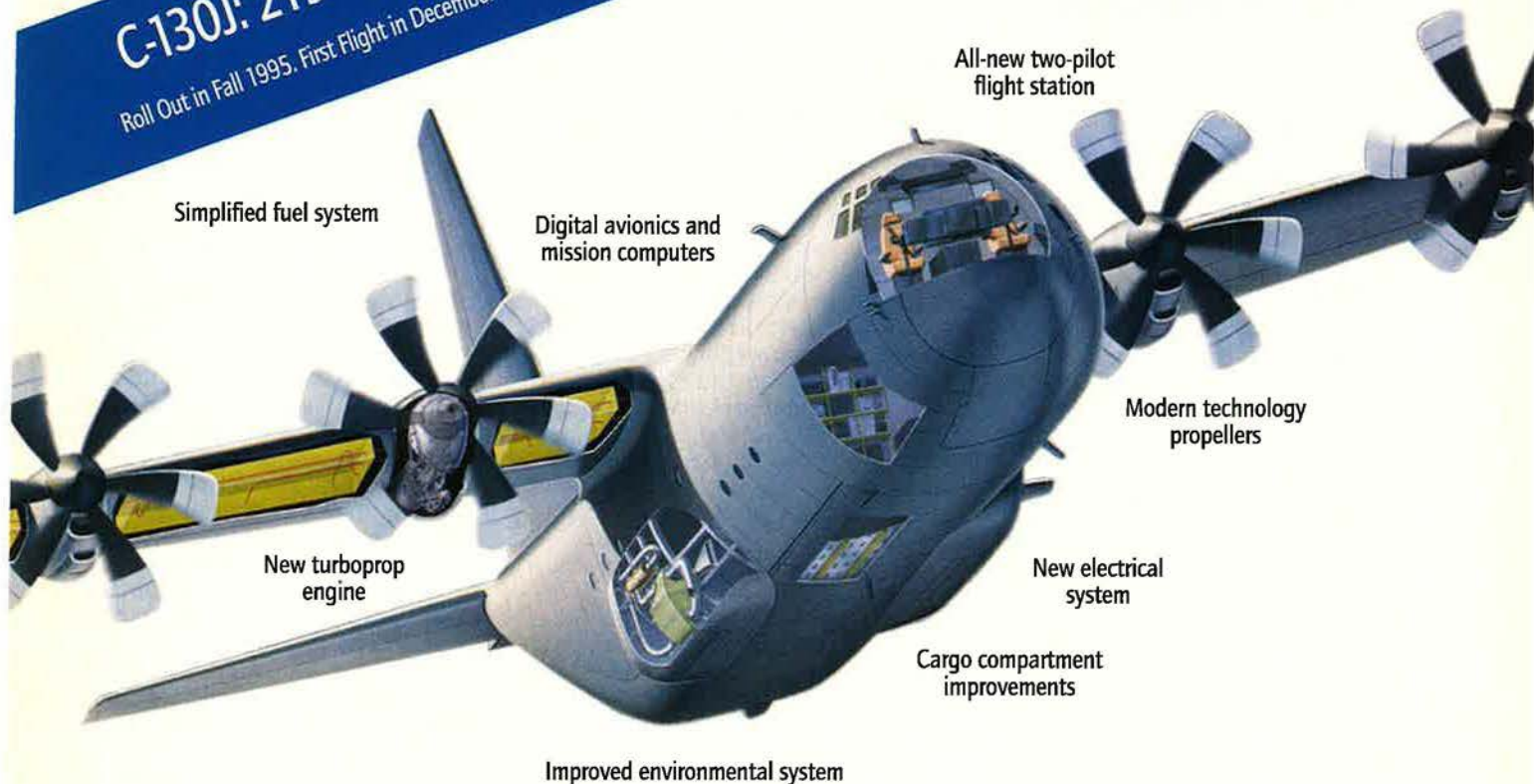
Roderick Rees  
Woodinville, Wash.

Why do history's revisionists keep pushing their warped view of history? With such a superabundance of evi-



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## Letters

dence, including testimony from thousands of us still alive who were there, available for the activists to learn what really happened, they have no excuse for not knowing the truth.

They remind me of what happened in Vietnam after the 1968 Tet Offensive. I got dropped there on temporary duty three days after it was officially terminated. I spent the next twenty-eight days talking with hundreds of individuals who were involved.

Contrary to what the media reported, we cleaned the enemy's plow, not the other way around. From that time on, the Viet Cong never again functioned as an effective military or political organization. And the vaunted North Vietnamese Army couldn't mount an offensive with a unit larger than a platoon for about eight months. The news people decided we should not be in Vietnam, so they reported what they wanted, not what happened. This is just one example of their deceitful behavior. I have not trusted them since. . . .

Lt. Col. Wallace H. Little,  
USAF (Ret.)  
Fort Walton Beach, Fla.

It has been suggested that somehow an apology is due the Japanese for our conduct of the war in the Pacific during World War II. To many, this suggestion is ludicrous, ridiculous, and asinine.

The Japanese started the Pacific war. The Japanese ended the Pacific war. They decided when to start it; they decided when to end it. It was *their* war. They decided how many of their people they would sacrifice on the altar of "The Rising Sun." They could have ended their war before Hiroshima. They chose not to do so.

Now the blame-America-first revisionists are apparently determined to ignore the facts and create past events and conditions out of whole cloth in an effort to heap culpability on the US. They may succeed.

Napoleon is reputed to have defined history as "a set of lies agreed upon." Perhaps a set of lies about the Japanese attempted world conquest is in the making. A subset has already been created in connection with the originally proposed display of the *Enola Gay*. This misrepresentation, making the US the culprit in the Pacific war, would have been adopted except for a wave of protest led by those whose military service during World War II was slandered thereby.

The Japanese attack on Pearl Harbor was the mistake of the millennium. It resulted in the ultimate de-

struction of their war machine designed for world conquest. This egregious mistake was not ours. We cannot be held accountable for it. Nor can we be expected to apologize for its results.

What we *can* do is realize that the present generation of Japanese people is also not responsible for the folly of its predecessors. . . .

And we can insist that Americans, Japanese, and the rest of the world be made aware of the historical facts of the Pacific war, free of interpretive insinuations of irrelevant issues by Monday-morning philosophers.

Col. Samuel F. Miller,  
USAF (Ret.)  
Tullahoma, Tenn.

Contrary to most of the opinions expressed in *Air Force Magazine* about the Hiroshima bombing, the bomb was not used to shorten the war or save hundreds of thousands of our servicemen's lives. This was proven by the report of the Truman-ordered US Strategic Bombing Survey after the war, which stated: "Certainly prior to December, 1945, and in all probability prior to November 1, 1945, Japan would have surrendered even if the atomic bombs had not been dropped."

The bombs were dropped because Brig. Gen. Leslie Groves (head of the Manhattan Project) felt that it was "his duty to have them used, so that among other things, their effectiveness as weapons could be judged." Moreover, he drafted the order to drop the bomb, which he then had President Truman sign.

Interservice rivalry also contributed to the military's determined push to use the bombs against nonmilitary targets. As Murray Sayres, in his well-documented *New Yorker* article, "Did The Bomb End The War?" (July 21), stated, "With Germany finished, the American services were vying for postwar appropriations and prestige that would come with the inevitable victory over the last enemy." General Groves helped accomplish, through the dropping of the bombs, the creation of an independent US Air Force in 1947, which "finally became free to shape its own atomic strategy."

The following question must be answered by all of the doubters: If the bomb was so vital to ending the war and the saving of hundreds of thousands of lives (some claim millions), why weren't B-29 pilots Col. Paul W. Tibbets, Jr., and Maj. Charles W. Sweeney and General Groves awarded Medals of Honor? Could it be that our government and the mili-



tary realized that dropping the bomb was not a heroic feat and were embarrassed after the bomb's horrible implications became known to the world?

Lt. Col. Louis J. Kaposta,  
USAF (Ret.)  
Southlake, Tex.

### A Bargain Benefit

"The Quality of Military Life" [June 1995, p. 64] notes the decline of the conditions of military life and examines a number of negative trends. After nearly thirty-four years of active service, I agree that many aspects of service life have changed. I do not agree with the representation of the commissary and exchange role. The author states, "In earlier times, . . . commissaries and exchanges sold goods at or near wholesale costs" and claims that those days are largely over. He notes that commissaries and exchanges, while convenient, offer "few spectacular bargains."

The commissary pricing policy has not changed. All items are sold at cost, plus a five percent surcharge, which is used for capital expenditures to improve the system and to partially offset some operational costs. This surcharge has not changed since 1983. That, it seems to me, does not reflect days that are largely over.

The exchange system also has not changed. For 100 years, the mission has been to provide items of convenience and necessity at low prices and to return earnings (profits) to supplement funds used for morale, welfare, and recreation (MWR). Prices are still about twenty percent below prices "outside the gate" (exclusive of sales tax) when you look at a total market basket. The exchange has never been responsible for "spectacular bargains." Still, those bargains exist.

What has changed? Competition outside the gate. Yet, the last time I looked, that competition was not in Haiti or Macedonia. The competition was not in Saudi Arabia, Somalia, or Kuwait, either. Many exchanges operate at a loss. That requires the larger locations to offset those losses.

In the past ten years, the Army and Air Force Exchange Service has provided \$1.7 billion to military MWR accounts to support recreation and family activities. To me that is a significant benefit and a significant aspect of the quality of life for the military member and his family.

The commissary and exchange are still one of the benefits of military service—and a good one.

Maj. Gen. Robert F. Swarts, USAF  
Commander, AAFES  
Dallas, Tex.

### The Pocket Rocket

I wish to point out what I believe is an error in one of the badge titles in "Space and Missile Badges," on p. 42 [*Space Almanac*, August 1995]. The badge labeled "Master Missile Operations" in your chart is actually titled "Command Missile Badge" in AFR 35-42, dated April 29, 1991. Since USAF Chief of Staff Gen. Ronald R. Fogleman is retaining the "pocket rocket," "Command Missile Badge" should still be the proper title.

Maj. Edward B. Janeczko, Jr.,  
USAF  
Offutt AFB, Neb.

■ Major Janeczko is correct. However, Air Force Space Command has proposed reinstating the badge (discontinued October 1, 1994) with the title, "Master Missile Badge with Operations Designator."—THE EDITORS

### Looking Back on World War II

"Fifty Years Ago, Looking Back" [August 1995, p. 54] serves as a good broadbrush treatment of the history of US aerial bombing of German targets in central Europe in World War II. It is possible that, by design, author Gen. T. Ross Milton did not wish to dramatize the tremendous daily pressures the crews faced from the incessant missions and the loss of close friends to combat. He did not adequately paint the fear and horror of actual air warfare.

As a former B-17 combat pilot and squadron commander (368th Squadron, 306th Bomb Group), I flew my first German combat mission in October 1942 and my last in April 1944. General Milton states, "The first few [Eighth Air Force missions] were tentative ones of shallow raids, . . . in preparation for the real contests later." He also says, "The early ventures across the Channel were easy" and implies that the real US bomber effort against German targets did not start until the summer of 1943.

The bomb group to which I was assigned flew twelve missions in 1942 and thirty-eight more by July of 1943. These early missions could hardly be characterized as easy. They included the first US aerial bombing of a target on mainland Germany (Wilhelmshaven, January 1943) and several other targets in Germany plus numerous targets elsewhere to include the submarine pens in Lorient, La Pallice, and Saint-Nazaire, France.

The 306th lost many men to combat on those early missions. For example, sixty men from my squadron were lost on a Bremen, Germany, raid April 17, 1943. On the early mis-

sions, we had no fighter escort in the target areas (limited fighter range). In those days, enemy ground anti-aircraft fire was even somewhat of a blessing because enemy fighters left us alone when it was present.

The 306th participated in the 1943 raids on Schweinfurt and Regensburg mentioned in the article. We lost no aircraft on the August 17 raid but ten on October 14. At the time of this latter raid, the 306th had already flown eighty missions. The number of aircrews involved in the early missions was not so large as at Schweinfurt and Regensburg, yet the difficulty of combat and the strain on crews was similar. Considering all factors, all missions were tough. . . .

Col. John M. Regan,  
USAF (Ret.)  
San Mateo, Calif.

"Fifty Years Ago, Looking Back" includes a photo on p. 56 of a B-24 Liberator on fire.

For the record, this aircraft, *Extra Joker*, was based in Italy and assigned to the 725th Bomb Squadron, 451st Bomb Group, Fifteenth Air Force—not the Eighth or Ninth Air Force in England as the caption implies.

*Extra Joker* was on a mission to Markersdorf Airdrome in Austria on August 23, 1944, when it was hit by 20-mm cannon shells fired from attacking FW-190 fighters. The B-24 blew up shortly after this photograph was taken by SSgt. Leo Stoutsenberger from another 451st Bomb Group Liberator. There were no survivors.

Frank J. Lather  
Brownsville, Vt.

### The Architects of Green Flag

We were pleased to see a photo feature on Green Flag in the July 1995 issue [p. 42], but the article contained an oversight: It wrongfully indicated that the 609th Air Intelligence Squadron (AIS) set up the command, control, communications, computer, and intelligence architecture for the exercise.

The more complete picture shows that the 612th Air Intelligence Squadron and the 612th Air Communications Squadron (ACOMS) from 12th Air Force at Davis-Monthan AFB, Ariz., mobilized, deployed, operated, and maintained the C<sup>4</sup>I systems for the duration of the exercise. The success at Green Flag of 12th Air Force's recently acquired Senior Troupe signals intelligence system led the commander to declare initial operational capability for the system—an Air Combat Command first.





## Air Force Association

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## Letters

With augmentation from the 609th AIS and 609th ACOMS, the system provided near-real-time intelligence reporting to Green Flag customers from the 366th Wing at Mountain Home AFB, Idaho, 8th Air Force at Barksdale, La., and 9th Air Force at Shaw AFB, S. C.

The 612th AIS and 612th ACOMS are the standard-bearers and trailblazers in the field of integrating new intelligence and communications capabilities into Air Operations Centers. . . .

Capt. Joe Guyton, USAF  
612th AIS  
Davis-Monthan AFB, Ariz.

■ *This letter was also signed by Capt. Joe Scherrer of the 612th ACOMS.*—  
THE EDITORS

### The Wrong JPATS

In thirty years with Marine Corps aviation, I've seen the Air Force do some really dumb things; however, the Joint Primary Aircraft Training System selection tops them all [*"Faytheon Wins JPATS Contract," August 1995 "Aerospace World," p. 18*]. Imagine, Air Force pilots will still be flying propellers at least twenty years into the next century.

That USAF elects to ship American jobs overseas and tie itself to foreign suppliers for critical components, all for the purpose of buying a fourth-rate aircraft, is beyond belief. Considering the selection, I think we can rest assured that no foreign air force will follow our lead and share the sale and the cost. So, we'll foot the entire bill. In the process, we can say good-bye to the ejection seat industry in America, meaning that lots of good high-tech jobs are gone for good and another critical technology has moved offshore—all at the convenience of the government. What are we coming to?

Col. William L. Traynor,  
USMC (Ret.)  
Asheville, N. C.

### A Not-So-Smart Salute

The kindest thing I can say about Lt. Col. Mark Chapman [*"Salute Smartly," August 1995 "Letters," p. 8*] is that he probably represents a minority of today's military members who consider it a "privilege to salute smartly" a President and Commander in Chief who avoided serving in the US military during a time when our country was involved in an armed conflict. I would be very pleased for Colonel Chapman to include me in Maj. Henry A. Barkalow's "ilk" [*"Can-*

*nibal Controversy Continues," February 1995 "Letters," p. 9*].

Col. L. M. Tannenbaum,  
USAF (Ret.)  
Cocoa Beach, Fla.

With reference to the letter from the "smart saluter" in the August 1995 issue, I wonder if a requirement for assignment to Quarry Heights, Panama, is uncritical acceptance of every questionable decision (prominent among which is the decision to abandon the Panama Canal) relating to national defense made by whatever bunch of politicians happens to be in office. One of the principal lessons that ought to have been learned by armed services officers from events in this century is that "I was just following orders" (i.e., "saluting smartly") is really not an acceptable excuse.

If I had to pick out the most serious shortcoming of today's active-duty officers, from the middle to the most senior ranks, it would be a lack of willingness to act on a matter of principle. The letter's author clearly places himself on or near that fault line. . . .

Lt. Col. John I. Jenkins,  
USAF (Ret.)  
Alamogordo, N. M.

### Your Grandfather's Aircraft

The lack of understanding concerning the need for additional B-2s is disturbing [*"Washington Watch: The Pentagon Declines More B-2s," July 1995, p. 13*]. The failure to account for normal attrition brings the whole study into question. It indicates that DoD is playing a numbers game without understanding the realities of life.

If by some miracle they can keep B-52s flying until 2030, the B-52s will not be able to penetrate any plausible defense system. I say "miracle" because the B-52 was designed for high altitudes and spent most of its life flying at low altitudes with a high cycle life of severe gust loading. Even with Boeing continuing to run cycle tests on the airframe, B-52s will have to be re-winged before they reach the seventy-year point, a very expensive and wasteful project on an obsolete aircraft.

Recruiters will have to change their slogan from "Aim High" to "Keep a Military Tradition: Fly the Plane Your Grandfather Flew." Yes, we need to buy precision guided munitions, but we also need credible delivery platforms. We desperately need a reality check before buying into an unworkable defense plan.

Lt. Col. Morris Betry,  
USAF (Ret.)  
Midlothian, Va.



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# The Chart Page

By Tamar A. Mehuron, Associate Editor

## USAF in Freeze Frame

Strength	
Enlisted	324,600
Officers	79,800
Total	404,400

Duty Station	
US	79.5%
Overseas	20.5%

Sex	
Men	84.1%
Women	15.9%

Race / Ethnicity	
Caucasian	77.9%
Black	14.6%
Hispanic	3.7%
Other	3.8%

Marital Status	
Married	68.0%
Unmarried	32.0%

Experience	
1st term	30.1%
2d term	21.7%
3d term or more	48.2%

Officer Education	
Bachelor's degree only	46.2%
Master's degree	43.1%
Professional degree	9.4%
Doctorate	1.3%

Enlisted Education	
High school diploma	99.9%
Some college hours	64.0%
Associate degree or more	18.2%

Commission Source	
Reserve Officers Training Corps	41.6%
Officer Training School	21.9%
US Air Force Academy	18.6%
Direct appointment, other	17.9%

Of 404,400 active-duty members, 15.9 percent (64,311) are women, up from 5.4 percent (33,000) in 1975. Racial minority representation in the Air Force has also increased, rising from fourteen percent in 1975 to twenty-two percent in 1995.

Source: USAF Military Personnel Center, Randolph AFB, Tex.





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# Aerospace World

By Suzann Chapman, Associate Editor

## AWACS Crash Claims Twenty-Four Lives

An Air Force E-3B Airborne Warning and Control System aircraft crashed September 22 just after takeoff from Elmendorf AFB, Alaska. The disaster killed all twenty-four US and Canadian personnel on board. [See box, at right.]

The E-3B, embarking on a surveillance training mission and loaded with 125,000 pounds of jet fuel, went down and exploded in a fireball at about 7:45 a.m. in a heavily wooded area some two miles northeast of the Elmendorf runway.

The mishap was the first crash of an AWACS aircraft, a modified Boeing 707 fitted with a rotating radar dome atop the fuselage, according to USAF

## Victims of First AWACS Crash

The following service members were killed in the Elmendorf AWACS crash: 1st Lt. Carlos A. Arriaga, Winter Park, Fla.; SSgt. Mark A. Bramer, Grant Park, Ill.; SSgt. Scott A. Bresson, Warranton, Va.; SSgt. Mark A. Collins, Moore, Okla.; SrA. Lawrence E. DeFrancesco, San Antonio, Tex.; TSgt. Bart L. Holmes, Milpitas, Calif.; Lt. Col. Richard G. Leary, Windsor, Conn.; SSgt. Jean-Pierre J. Legault (CF), Pointe Aux Trembles, Quebec; Capt. Robert J. Long (hometown not disclosed); MSgt. Stephen C. O'Connell, Hilo, Hawaii; Capt. Bradley W. Paakola, Zion, Ill.; TSgt. Ernest R. Parrish, Tampa, Fla.; Sgt. David L. Pitcher (CF), Saint Margarets Bay, Nova Scotia; Capt. Glenn J. Rogers, Jr., Lake Charles, La.; Amn. Jeshua C. Smith, Colorado Springs, Colo.; SSgt. Raymond O. Spencer, Jr., Defuniak Springs, Fla.; Maj. Richard Stewart (hometown not disclosed); TSgt. Charles D. Sweet, Jr., Norwalk, Ohio; Maj. Marlon F. Thomas (hometown not disclosed); SSgt. Timothy B. Thomas, Coos Bay, Ore.; Maj. Steven A. Tuttle (hometown not disclosed); TSgt. Brian K. Vanleer, North Highlands, Calif.; Amn. Darian F. Watson, Chicago, Ill.; SrA. Joshua N. Weter, Rapid City, S. D.

*This ammunition plant was among the targets destroyed in the recent NATO bombings in Bosnia-Herzegovina. Laser-guided bombs, Tomahawk cruise missiles, and Standoff Land-Attack Missiles were just some of the nearly 600 precision weapons used in the strikes.*





officials. This aircraft type has been in continuous service since 1977.

Searchers found the "black box" cockpit voice recorder the night of the crash, said base spokesman Maj. Jerry Brown. Some news reports cited local sources who said a flock of Canada geese might have been sucked into an engine. Several dead geese were found on the runway used by the aircraft.

Twenty-three of the crew members on board, including two Canadian Forces (CF) personnel, were assigned to Elmendorf's 962d Airborne Air Control Squadron. The twenty-fourth was a member of the 381st Intelligence Squadron, also based at Elmendorf.

### "High One" Defeated

Two major defense committees in the House and Senate killed a controversial military retirement pay plan that would have penalized some 650,000 service members.

The so-called "High One" plan supposedly would have saved \$649 million over seven years. Rather than going with High One, the panels proposed to achieve the savings another way—by selling unneeded metals and rubber from the national defense stockpile.

High One would have reduced the retired pay by three percent to as much as nine percent for members who had joined prior to September 8, 1980. The plan called for averaging the last year of pay, instead of using the final month as the basis for pay computation. [See "High One Breaks Faith With Troops," *October 1995 "Aerospace World,"* p. 17, and "High One Is a Low Blow," *October 1995 "Editorial,"* p. 2.]

Amid finger-pointing between political parties, one congressman also blamed the Defense Department leadership for being unresponsive in seeking alternatives. On the other hand, a senior senator praised DoD for helping to work out the alternative solution.

While this particular raid on retirement pay accounts has failed, service members have to wonder when or where the next hit may come. Personnel officials said that continuing uncertainty over such quality-of-life issues could cause some to review their career plans—a very real hazard to recruiting and retention.

### C-17s Can Transport Heavier Tanks

Contrary to earlier press reports, Air Mobility Command announced that

the Air Force's newest airlifter, the C-17, will be able to transport the Army's newest version of the M1A2 Abrams main battle tank.

Air Mobility Command in August officially approved the C-17 to carry the M1A2, which in airlift configuration—without crew or ammunition and with minimal fuel—weighs about 132,000 pounds. Some reports suggested that the tank would crush the C-17's loading ramp, thought to be incapable of withstanding more than 130,000 pounds.

However, when AMC airlift specialists reviewed the C-17's structural data, they determined the maximum to be 135,000 pounds.

### Bottom-Up Review II?

The armed services face yet another comprehensive force-structure review and possible cutbacks, reported Lt. Gen. George K. Muellner, USAF's principal deputy assistant secretary for Acquisition.

General Muellner told defense reporters in early September that current indicators point to a need to reduce force structure further to free up funds to modernize the services' equipment, though such a cutback would be painful.

Pentagon critics have expressed doubt that the current force, whose size was dictated by the 1993 Bottom-Up Review, will be able to fight and win two near-simultaneous major regional conflicts and also deploy repeatedly for peacekeeping and humanitarian operations. General Muellner also said that maintaining the two-MRC force has left little money for new weapons.

He noted that another major force-structure analysis, along the lines of the first Bottom-Up Review, could take place in the early 1997 at the start of a new administration. Asked to name those pushing for such a review, the General identified Paul G. Kaminski, under secretary of defense for Acquisition and Technology, the Pentagon's top weapons official.

However, Mr. Kaminski subsequently issued a statement that appeared to contradict General Muellner, saying that DoD does not plan another review. The statement said that any adjustments that eventually come about would be part of DoD's normal budget process.

Additionally, Deputy Defense Secretary John P. White stated that current priorities focus on modernization. "We don't anticipate doing another Bottom-Up Review," he said, responding to questions at the Air Force Association's National Convention in September.

## Air Campaign was "Stellar Performance"

Operation Deliberate Force, the US-led NATO bombing campaign in Bosnia-Herzegovina, was "incredibly powerful and accurate," said Deputy Secretary of Defense John P. White.

The Pentagon official issued his remarks at the Air Force Association Convention in Washington, D. C., on September 18.

The campaign started August 30 when US-led NATO air forces responded to an August 28 Bosnian Serb mortar attack that killed thirty-eight civilians at an outdoor market in Sarajevo. NATO suspended this first major campaign on September 14 to give Bosnian Serb forces time to remove their heavy weapons from the Sarajevo area.

A variety of USAF and US Navy and Marine aircraft took part in the operation:

■ **Air Force:** Eight F-15E dual-role fighters, twenty F-16C/D multirole fighters, eight A-10 attack aircraft, three EC-130 electronic warfare aircraft, four AC-130 gunships, six EF-111 standoff jammers, and ten KC-135 tankers.

■ **Naval Aviation:** Six Navy A-6E attack aircraft and F/A-18C strike fighters, six Navy EA-6B electronic warfare aircraft, and twelve Marine Corps F/A-18D strike fighters.

NATO aircrews flew more than 3,200 sorties and delivered some 600 precision weapons.

Pentagon officials said that ninety percent of the precision weapons launched against Bosnian Serb targets consisted of three types of weapons: 1,000-pound laser-guided bombs, 2,000-pound LGBs, and AGM-65 Maverick missiles.

US forces also launched thirteen Tomahawk cruise missiles, High-Speed Antiradiation Missiles, and Standoff Land-Attack Missiles.

The Air Force employed some F-16s with the new HARM Targeting System to destroy important air defense sites. [See "Electronic Warfare, Economy Style," p. 24.] Eight F-16 HTS aircraft flew 166 of the 1,288 NATO sorties flown out of Aviano AB, Italy.

Helping USAF aircrews develop their threat and target analyses was the newly developed Combat Intelligence System. CIS collects and collates intelligence information from a variety of sources. The information then feeds directly into an Air Force Mission Planning System at the squadron level, enabling aircrews to produce a flight plan, including targets and threat scenarios with recommended weapons.



## Long-Term Readiness in Jeopardy

US armed forces have sufficient political support and resources to sustain near-term readiness, said Joint Chiefs of Staff Chairman Gen. John M. Shalikashvili, who appeared before Congress September 21 on his nomination for a second term.

What about long-term readiness?

General Shalikashvili is not confident about support to modernize the nation's military force—simply to replace existing pieces of equipment as they grow old and wear out. He told a group of military reporters that lacking the funds to modernize or to replace worn out items will “pretty

## Commission Proposals Pass Muster

Out of some 100 recommendations proposed by the Commission on Roles and Missions of the Armed Forces, the Pentagon has said “yes” to about seventy, DoD announced August 25.

Deputy Secretary of Defense White said the Pentagon had already carried out some recommendations and was looking to implement others. He said that DoD had rejected very few recommendations.

Among those supported by the Pentagon are initiatives to enhance jointness, which DoD agrees is a key to readiness. The Joint Chiefs of Staff will review the commission's proposal

services determine overseas presence requirements.

- Reviewing the operational support aircraft fleet, also known as “executive” aircraft.

The Pentagon will also study the possible “outsourcing” of depot maintenance, medical care, family housing, finance and accounting, data center operations, education and training, and base management and infrastructure.

## Survey: USAF Career Still Attractive

Today's high operations tempo has taken its toll, but two-thirds of Air Force active-duty members still say they would like to stay in the service until they retire, according to USAF's 1995 Quality-of-Life survey, released in mid-September.

To gather primary information, Air Force personnel officials made available to all active-duty personnel and civilian employees a computerized questionnaire. It attracted 356,409 respondents—sixty-six percent of the combined active and civilian force.

Survey results indicated that ninety percent of officers and sixty-four percent of enlisted troops had been on temporary duty during the twelve-month survey period. Some forty percent of the civilian respondents had been on TDY.

Despite their continued enthusiasm for an Air Force career, officers and enlisted both noted the down side of TDY. They said they had less opportunity to receive professional military education, obtain required training, or complete nonmilitary education programs. In addition, they said heavy TDY schedules caused personal problems, especially financial hardships, but that their families were generally supportive.

## Members Doubtful About Evaluations

The Quality-of-Life survey also showed that, despite recent and continuing changes in USAF's performance evaluation systems, many members still question the fairness of these programs.

Six of every ten military members reported doubts that the service regards job performance as the most important criterion for promotion. Fifty percent of all military members believe that factors other than performance carry too much weight in the promotion system.

Fifty percent of all enlisted members and forty-five percent of all officers believe their promotion systems

## Rapid Reaction Force Moved Quickly

Even before the NATO bombing campaign began, US forces garnered high praise for their participation in Operation Quick Lift, moving NATO Rapid Reaction Forces into Croatia to reinforce UN peacekeeping forces in Bosnia.

According to Army Gen. George A. Joulwan, Supreme Allied Commander Europe and commander in chief of US European Command, US forces steamed more than 31,000 nautical miles, flew twenty-three C-5 airlift missions, and thirty-five C-141 missions to move more than 4,300 British and Dutch troops, 1,500 vehicles, and 1,500 trailers and containers.

On July 4, fifty-five men and women and some eighty tons of equipment from the 621st Tanker Airlift Control Element at McGuire AFB, N. J., arrived via C-5 in Split, Croatia, to set up a mobile airlift control center. Nine other TALCE personnel arrived a couple of hours later on board another C-5 with more equipment.

A few days earlier, eleven members of the 1st Combat Communications Squadron from Ramstein AB, Germany, arrived in Split to set up and maintain secure satellite communications. Another nine 1st CCS members arrived July 4.

soon . . . reflect on how well we can do our job”—tomorrow's readiness.

He said that military budgets have been declining for ten straight years and may go down forty percent by 1999 compared to the budget approved in 1988. By 1999, the force itself will be more than one-third smaller than in 1991 at the end of the Persian Gulf War.

“If you add this up,” the General said, “an awful lot of swords have been pounded into plowshares, and an awful lot of great soldiers, sailors, airmen, and Marines have been asked to leave the military—nearly 700,000.”

The General told the Senate Armed Services Committee that he fears conducting another Bottom-Up Review, as some congressmen and military leaders have suggested, because it would only delay the painful steps that he believes must be taken.

for a unified command to handle joint training and force integration.

Additionally, to help support its theater commanders in chief, the department will consider centralizing authority for developing intelligence support capabilities and expects to publish its findings by May 1996.

The department is working with the CIA to integrate DoD and intelligence community space activities, including giving DoD a greater voice in satellite taskings. The Joint Staff will speed its work on integrating DoD's command, control, communications, computer, and intelligence (C<sup>4</sup>I) architecture.

Other initiatives include:

- Making a comprehensive assessment of the deep attack mission.
- Developing a new estimate of wartime medical requirements.
- Taking a new look at how the



are inequitable. Among officers, this negative view of the system's fairness was held more frequently by rated members (fifty-three percent) than by nonrated officers (forty-one percent).

The survey revealed a sharp difference in views among civilian employees. Some sixty-six percent of lower-level civilian workers think their promotion system is ineffective, while sixty-two percent of Senior Executive Service members think it works.

#### **New Personnel Policies for Reservists**

For the first time in forty years, the Air Force is preparing to significantly change the rules for managing reserve officer personnel.

The change stems from the Reserve Officer Personnel Management Act (ROPMA) passed by Congress last year. One provision of the act, which goes into effect October 1, 1996, reduces the minimum time-in-grade requirement for promotions. ROPMA also eliminated time-in-service requirements, set promotion quotas by grade (changing promotion opportunities from "fully qualified" to "best qualified" candidates), and will allow reservists to delay promotions for up to three years to search for positions in the new grade.

The time-in-grade change does not mean that promotion opportunities for all grades will drop to the minimum, however. Lt. Col. Ron See, an Air Force Reserve personnel division chief, said that a working group would develop policies to implement that new rule and the others, and then present them to Maj. Gen. Robert A. McIntosh, chief of the Air Force Reserve. Colonel See said that he expects the Air Force to release the new policies in January.

#### **EELV Names Contractors**

The Air Force awarded four \$30 million contracts August 24 covering the fifteen-month low-cost concept validation phase of the Evolved Expendable Launch Vehicle program. It is the first of three phases for the EELV family of new low-cost rockets planned to replace existing medium-through heavy-lift vehicles for military and civilian satellites.

The four contractors are: Alliant Techsystems, Inc., Magna, Utah; Boeing Defense and Space Group, Seattle, Wash.; Lockheed Martin Technologies, Inc., Denver, Colo.; McDonnell Douglas Aerospace, Huntington Beach, Calif.

Secretary of the Air Force Sheila E. Widnall said that the primary objective for the \$2 billion EELV program is to reduce expendable launch



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vehicle cost for economic and commercial reasons as well as national defense. The Air Force expects to generate savings from the single-family approach by using common launch crews and increased production rates.

The EELV will be able to place payloads ranging from 2,500 pounds to 45,000 pounds into a low-Earth

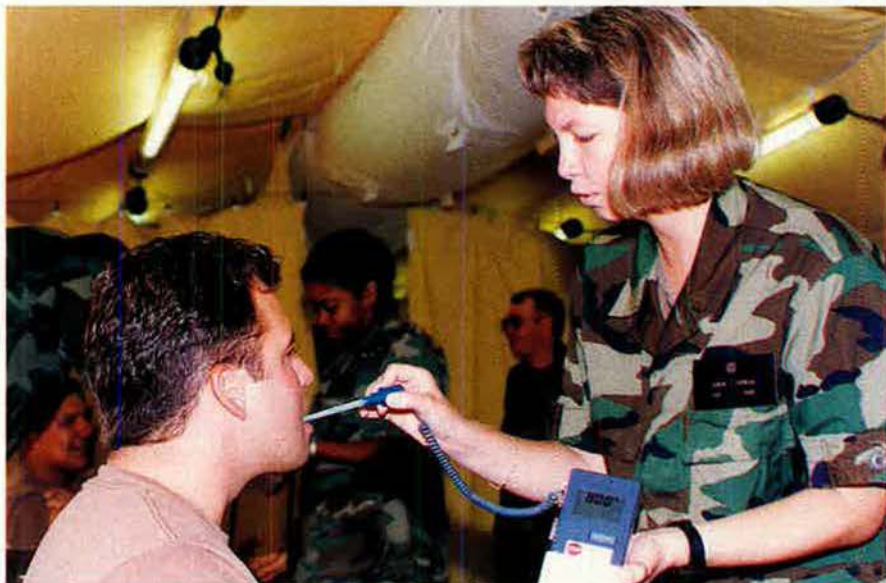
orbit, replacing Titan II, Delta II, Atlas II, and Titan IV. The Air Force plans to achieve initial operational capability (IOC) for the medium-lift version from Vandenberg AFB, Calif., in 2001 and Cape Canaveral AS, Fla., in 2002. Plans call for IOC for the heavy-lift EELV in 2005 at Vandenberg and the following year at Cape Canaveral.



### DoD Names "Space Architect"

The Pentagon announced September 14 that USAF Maj. Gen. Robert S. Dickman would be DoD's first Space Architect, a position proposed last January by defense and service acquisition executives. General Dickman was the director of Space Programs for the assistant secretary of the Air Force for Acquisition.

The Space Architect, who may be a two-star flag officer from the Air Force, Army, Navy, or Marine Corps, will report through the Air Force Acquisition Executive to the under secretary of defense for Acquisition and Technology. The Architect will also work closely with Robert V. Davis, named August 6 to be the deputy under secretary of defense for Space, a position created last December.



During an annual exercise, SSgt. Sandra Tyburski of the 347th Medical Group, Moody AFB, Ga., practiced her medical skills on SrA. Richard Lepore during sick call, held in an Air Transportable Hospital.

The Space Architect's multi-service office will develop an integrated DoD space architecture to meet US military operational needs and ensure coordination between space acquisition and architect planning. The DUSD (Space) will develop space policy, oversee space architecture and acquisition programs, and oversee "community planning" of space missions, such as Military Satellite Communications, and systems architectures, such as for the Milstar communications satellites.

### Mishap Prevention Program Is Sound

After its sixty-day review of avia-

tion safety in the Air Force, the four-man blue-ribbon panel formed by Air Force Chief of Staff Gen. Ronald R. Fogleman reached two major conclusions:

- USAF should retain its Mishap Prevention Program within the existing command structure.

- The Safety Investigation Board process must be strengthened to ensure the SIB report "reflects precisely the results of the investigation and cannot [be] changed by the people in the chain of command."

General Fogleman convened the panel, which was chaired by retired Navy Vice Adm. Donald D. Engen, former member of the National Transportation Safety Board and former FAA administrator, in response to widespread questions about the Air

Force's investigation process and the rash of aircraft crashes early this year.

As the panel learned, the current aircraft mishap rate has dropped to near an all-time low. In 1975, the rate, based on the number of mishaps per 100,000 flying hours, was 2.82. By contrast, the rate in 1994 was only 1.51. It has risen slightly in 1995 to 1.53 mishaps per 100,000 flying hours.

However, the safety panel did find through a survey and discussions that many service members believe "SIB [Safety Investigation Board] results are occasionally driven by factors outside of the board process." In fact, the survey showed that nine percent

of former boards felt that the conclusions of their reports had been changed.

One panel member, retired USAF Brig. Gen. Joel T. Hall, former USAF director of Aerospace Safety, said that the panel found that items in the reports had not been deleted but only had been "broadened."

The panel demurred on the key question of whether an independent military safety agency should be created, as exists in civil aviation. It said that the top priority for civil aviation is public safety, while "the overriding priority for military aviation must be maintaining and enhancing combat efficiency," according to the panel's report. The risks are inherently greater in flying combat and combat training.

### Young Blacks Less Likely to Serve

Over the past year, Pentagon officials have been sounding an alarm about how America's young men are becoming less inclined to think seriously about pursuing a military career. They have detected a major threat to future recruiting in this declining propensity to serve.

Now, Pentagon data are showing the decline is five times higher among blacks than among white youths.

General Fogleman delivered this startling bit of news in August in an address to the Tuskegee Airmen Convention. He said that in 1989, fifty-four percent of black youths expressed a desire to serve in the military, while in 1994, that number dropped to thirty-two percent.

For white youths, he said, the propensity to serve has dropped only four percentage points.

General Fogleman appealed to the Tuskegee Airmen to enlist their thirty-seven chapters across the nation to help encourage young black people not only to join the Air Force but also to apply for pilot training. He said that the number of black youths entering pilot training has never reached five percent of total entrants. The best two years were 1992 and 1993, which stood at four percent; last year the number dropped to three percent.

### B-52 Sets World Record

A five-member crew from the 2d Bomb Wing, Barksdale AFB, La., flying a B-52H bomber, on August 25 broke the existing speed record for aircraft weighing 440,000 to 550,000 pounds, with a payload of 5,000 kilograms (11,000 pounds), flying unrefueled for 10,000 kilometers (5,400 nautical miles).



The Barksdale crew's time was eleven hours, twenty-three minutes, flying at an average speed of 556 mph.

Original plans called for the crew members to fly from Edwards AFB, Calif., to Greenland. Weather conditions forced them to fly to Alaska instead.

Ray Lutz, the National Aeronautic Association observer on board representing the Fédération Aéronautique Internationale, the aviation world-record sanctioning body, confirmed the crew's record.

#### Stress Crack Cited in T-38 Crash

When a T-38 training jet crashed on May 31 at the Amber Falls apartment complex in Wichita Falls, Tex., killing a couple outside the complex, the culprit was a stress crack from a small corrosion pit on a metal engine compressor disk, according to Air Education and Training Command officials.

AETC released the results of the accident investigation August 24. The investigation revealed that a portion of the compressor disk in the left engine had cut through the engine casing, severing a fuel line. That caused a fire that destroyed hydraulic lines, knocking out the jet's control systems.

Though the instructor pilot tried to select "a flight path toward a sparsely populated area," according to AETC officials, "the T-38 began a series of erratic and unpredictable movements." The IP and student pilot ejected moments before it crashed.

The T-38 had received all scheduled maintenance, according to current technical orders. As a result of this accident, the Air Force has revised the maintenance schedule for the compressor disk and will replace it sooner in its life cycle.

#### BRAC 1995 List Is Final

House approval of base realignment and closure (BRAC) actions for 132 facilities on September 8 set in stone the 1995 Defense Base Closure and Realignment Commission's recommendations. The commission's plan could only have been rejected if both the House and Senate voted against it.

This fourth and final authorized round of closures will result in a loss of 43,742 direct military and civilian jobs and 49,823 indirect jobs, according to the commission. In all, the commission anticipates savings of \$19.3 billion over twenty years.

Among the changes the commission made to the original Pentagon

list were the closures of Air Force depots at Kelly AFB, Tex., and McClellan AFB, Calif. To help ease the economic impact, the Air Force plans to privatize as many as two-thirds of the 16,000 jobs at Kelly and more than half of McClellan's 13,300 jobs.

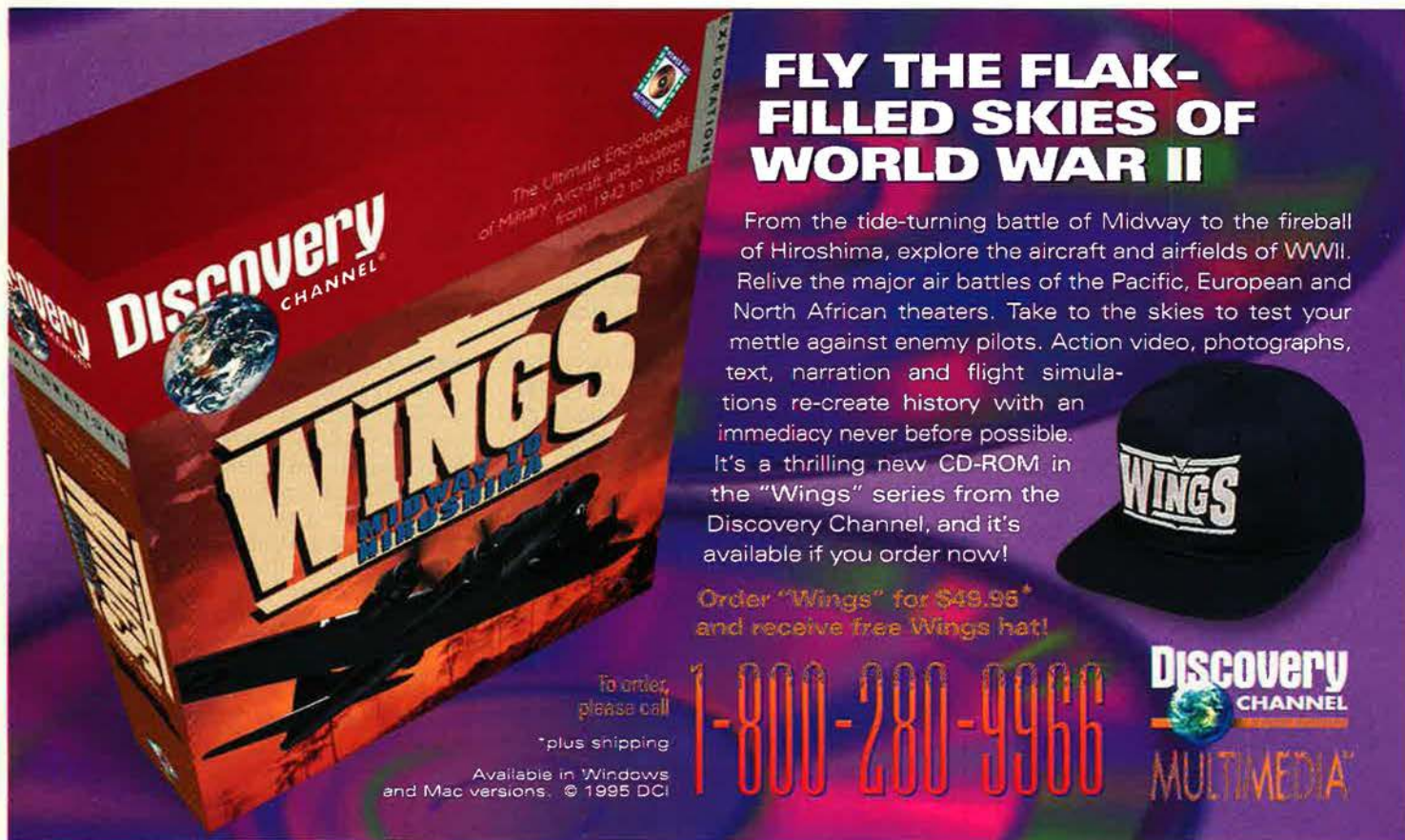
Under the BRAC process, the services have two years to start closure and realignment actions and six years to complete them.

#### Communities Need Assistance

Now that the BRAC list is final, many cities and towns that relied on military installations to sustain their economies have to be asking, "How can we survive?" The bad news is that it might not be easy. The good news is that it can be done, and the Pentagon is ready to help.

Defense Secretary William J. Perry said that the department has improved its programs for job creation on former bases and for job training and placement of former DoD employees. According to DoD, sixty percent of civilian jobs at bases that have been closed for one year have been replaced.

The Air Force even created a special organization to help communities by making Air Force property available for reuse quickly and effi-



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## Aerospace World

ciently. After establishing the Air Force Base Disposal Agency in 1991, the service renamed the unit—Air Force Base Conversion Agency—in 1993 to better reflect its mission.

The AFBCA now works with community planners to develop reuse plans and ensures fast-track environmental cleanup and handles interim property leasing and final disposal. The AFBCA also provides base transition coordinators at closing installations.

As experience grows, so do the success stories. Among several successful Air Force conversion actions are:

- Myrtle Beach AFB, S. C.—Timberland Properties, Inc., will purchase 432 acres for a planned \$510 million theme park and golf resort, creating 5,000 permanent jobs.

- Pease AFB, N. H.—now home of the Pease International Tradeport with thirty-six tenants occupying more than 855,000 square feet of building space, creating more than 1,000 new jobs since closure; additional companies are constructing facilities or renovating other former base buildings. [See "The Economic Impact of Base Closure," July 1995, p. 38.]

### Accurate Bombing in Reserve Hands

Bomber crews know the wind can play havoc with gravity bombs. A new system to predict wind values accurately all the way to the ground and thus greatly improve the accuracy for gravity weapons takes on added significance these days with emphasis on the conventional role.

An Air Force Reserve B-52 aircrew may have helped set the stage to increase the use of gravity bombs, which cost much less than precision guided weapons.

The crew, from the Reserve's 93d Bomb Squadron at Barksdale AFB, La., dropped fifty-two 500-pound inert bombs on the Utah Test and Training Range in July using wind measurements provided by the Light Detection and Ranging (LIDAR) laser system. Test officials said the bombs were all "pretty much" on target, calling the LIDAR "100 percent effective."

The system shoots a laser through the atmosphere to determine wind values all the way to the ground, according to Capt. Russ Welsch, chief of 49th Test Squadron special projects, also at Barksdale. He said that bomber crews currently can only measure wind speed at the altitude they fly.

### It's Your Health

Taking a bite out of soaring health-care costs and improving patient quality of life are the aims of the Air Force's move into preventive medicine.

"Put Prevention into Practice" is the Air Force's new disease-prevention campaign and "is based on the US Public Health Service program to establish tools and strategies for clinical preventive services," according to the USAF Surgeon General's office.

Essentially, the service intends to train both health-care providers and patients to identify appropriate disease-prevention intervention practices. Providers will counsel patients at each visit on how to reduce their health risk.

Another major effort to help individuals reduce health risks, and thereby save the Air Force money in the long run, includes a study sponsored by the National Institutes of Health to try new smoking cessation/prevention techniques on basic military trainees at Lackland AFB, Tex.

Surveys of USAF recruits have shown that twenty-eight percent are smokers when they arrive at Lackland. After one year, the number jumps to forty-one percent.

The service's ban on smoking during the six weeks of basic training makes the trainees ideal subjects, according to the study team. They found in preliminary studies that about ten percent intend to resume smoking after completing basic training, while another forty-five percent would like to quit but are not certain they can. The team includes psychologists from the Air Force, the University of Memphis, and the University of Minnesota.

### New Mission, Old Airframe

The first production airframe to be used for the E-8C Joint Surveillance and Target Attack Radar System mission flew for the first time August 17 at Northrop Grumman's Lake Charles, La., facility. The airframe is a remanufactured 1968-vintage Boeing 707-300, flown first by Qantas Airlines. Grumman, now Northrop Grumman, purchased the aircraft from Clipper International and began the remanufacturing process on May 29, 1992.

To refashion the 707 for the Joint STARS program, Northrop Grumman disassembles much of the aircraft, rebuilds it, and then modifies the airframe structure and system by adding cabling, ducting, and instrument



racks required for radar, computers, and workstations. The remanufacturing process gives the airframes an operational life well into the next decade.

Currently six aircraft are in the remanufacturing and modification process.

A joint crew from Electronic Systems Center's Joint Test Force, part of Air Force Materiel Command, and prime contractor Northrop Grumman conducted the three hour and forty-six minute test flight. The Air Force expects delivery of the completed Joint STARS aircraft—airframe plus mission electronics—early next year.

The key Army and Air Force operational test and evaluation will start November 22, according to program director USAF Col. Robert W. Chedister, with initial operational capability slated for 1997.

#### ANG Unit Trains Chilean Medics

Flying to "the end of the Earth" is just one more example of the far-reaching missions presented to both active-duty and reserve components in today's military.

In mid-August, thirty-one members of the California Air National Guard's 146th Aeromedical Evacuation Squadron flew in their C-130s to the end of

the Earth near the Strait of Magellan at Tierra del Fuego to train counterparts in Chile on the fundamentals of using C-130s in a natural-disaster support role. The Chileans are creating a full-time medical evacuation squadron.

According to Guard member Maj. Nancy Sumner of Glendale, Calif., a team of military and civilian health-care professionals spent 6,400 hours translating and perfecting the presentations to the Chileans. The two-week training mission included such medical exercises as putting up tents, triage, building litters, performing checks on aircraft, and evacuating patients by plane.

#### Tech Transfer Pays Off—Royalty

Electronic Systems Center, Hanscom AFB, Mass., not only will begin receiving royalty payments on a commercial intrusion-detection device developed by Racon, Inc., of Seattle, Wash., according to ESC officials, but ESC and other Air Force units can now buy the less expensive commercial devices.

Racon received a new technology license in August under a cooperative research and development agreement (CRDA) signed in 1992, which allowed it to produce and sell a de-

vice based on ESC technology. The small company postponed the expense of getting a license until it was certain the product could be sold successfully on the commercial market.

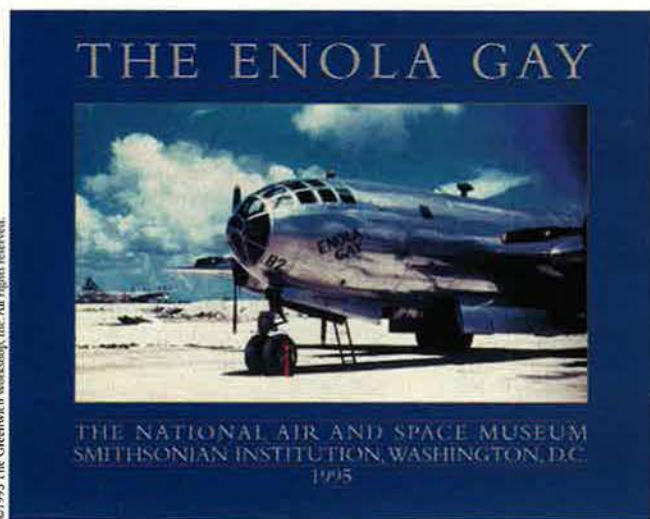
ESC 1st Lt. Mara McNeill said, "Now that the license is signed and the product is available, ESC will get two percent of each sale, with the proceeds coming directly to ESC for further research and development as well as technology transfer initiatives."

The CRDA allowed Racon to develop and produce the device—reducing its cost to about \$8,500, compared to the original 1992 cost of \$50,000, when ESC first developed it, according to Lieutenant McNeill.

The intrusion-detection system consists of a small canister-shaped item that, when placed in a series, will provide an electronic fence for perimeter protection of valuable assets. It takes three devices to protect an aircraft. "As sales of this item continue, we expect the price to drop even further," the Lieutenant said, adding that technology-transfer agreements significantly lower costs for Air Force customers.

The CRDA with Racon was the first such agreement signed by an Air Force product center, according to ESC officials. Since then, ESC has

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entered into forty-nine C<sup>4</sup>I technology agreements.

**News Notes**

■ Capt. David Hawkens was killed when the Air Force U-2R he piloted crashed on August 29 near RAF Fairford, UK. The U-2R has only one crew member. Assigned to the 9th Reconnaissance Wing from Beale AFB, Calif., the pilot and other 9th RW members have been on temporary duty at RAF Fairford since April.

■ A few days earlier, on August 25, Capt. Gregory Gilbreath ejected safely from his A-10, which crashed in a field southeast of Naylor, Ga. He was on a routine training mission for the 347th Wing at Moody AFB, Ga.

■ Applications under the Air Force's Fiscal 1996 voluntary early retirement program totaled 1,466 as of September 13. The total includes 955 enlisted members and 511 officers. The goals are 1,200 enlisted and 650 officers. The Air Force also needs to drop another 350 officers with twenty or more years of service by waiving their remaining active-duty service commitments. The waivers include allowing lieutenant colonels or colonels to retire with only two years' time in grade instead of three and letting

retirement-eligible captains retire with only eight years' commissioned service instead of ten.

■ Singles currently make up about thirty-five percent of the Air Force,

and that number is growing, according to Capt. Bruce Kite, a chaplain from Tyndall AFB, Fla. He helped organize USAF's first singles conference, attended by nearly 450 officers



*After twenty-two years of flying fighters, the 116th Fighter Wing, Dobbins ARB, Ga., said good-bye to their F-15s in August. As it converts to the B-1, the 116th looks back on an impressive history of worldwide deployments, appearances at William Tell fighter competitions, and eight Air Force Outstanding Unit awards.*

## Senior Staff Changes

**RETIREMENT:** M/G John F. Phillips.

**PROMOTION:** To be Brigadier General: William Welser III.

**CHANGES:** M/G A. Bowen Ballard, AFRES, from Mobilization Ass't to Ass't C/S, Intel., Hq. USAF, Washington, D. C., to Asst. C/S, Intel., Hq. USAF, Washington, D. C., replacing M/G (L/G Selectee) Kenneth A. Minihan . . . B/G Richard E. Brown III, from Cmdr., 24th Wing, ACC, and Cmdr., USSOUTHCOM, Air Forces Forward, Howard AFB, Panama, to Cmdr., 354th FW, PACAF, Eielson AFB, Alaska, replacing B/G Ronald E. Keys . . . M/G James S. Childress, from PEO, Tactical/Airlift Sys., AFPEO, Ass't Sec'y of the Air Force for Acquisition, Hq. USAF, Washington, D. C., to Cmdr., San Antonio ALC, AFMC, Kelly AFB, Tex., replacing retiring M/G Lewis E. Curtis III . . . B/G Ronald E. Keys, from Cmdr., 354th FW, PACAF, Eielson AFB, Alaska, to Cmdr., USAF Air Warfare Ctr., ACC, Eglin AFB, Fla., replacing M/G Carl E. Franklin.

M/G Robert F. Raggio, from Prgm. Dir., F-22 Sys. Program Office, APFEO, Ass't Sec'y of the Air Force for Acquisition, Hq. USAF, Wright-Patterson AFB, Ohio, to PEO, Tactical/Airlift Sys., AFPEO, Ass't Sec'y of the Air Force for Acquisition, Hq. USAF, Washington, D. C., replacing M/G James S. Childress . . . B/G Randall M. Schmidt, from Chief, Western Hemisphere Div., Dep. Directorate for Politico-Military Affairs, J-5, Jt. Staff, Washington, D. C., to Cmdr., 24th Wing, ACC, and Cmdr., USSOUTHCOM, Air Forces Forward, Howard AFB, Panama, replacing B/G Richard E. Brown III . . . M/G Eugene L. Tattini, from Dir., P&P, Hq. AFMC, Wright-Patterson AFB, Ohio, to Cmdr., Sacramento ALC, AFMC, McClellan AFB, Calif., replacing retired M/G John F. Phillips.

**SENIOR EXECUTIVE SERVICE (SES) CHANGES:** Brian M. Hendrickson, to Senior Scientist, Photonics, Surveillance and Photonics Directorate, Rome Laboratory, Griffiss AFB, N. Y. . . . John C. Wilson, Jr., to Dir., Engineering and Prgm. Mgmt., Hanscom AFB, Mass., replacing Anthony D. Salvucci.

and enlisted members August 25 at Estes Park, Colo. The Air Force's head chaplain, Maj. Gen. Arthur S. Thomas, is single and wants to expand the ministry beyond the traditional family.

■ The near-paperless environment for Air Force military personnel records is almost a reality. USAF's Military Personnel Center digitized its last active-duty record on August 29, after spending 248 work-days converting more than 450,000 records. More than 100 employees, who split sixteen-hour days, digitized 13,152,358 microfiche images and 1,858,378 paper documents for transfer to optical disks, according to Air Force officials. Next up, the Guard and Reserve.

■ Technical orders are going digital. During the next three years, the new Air Force Technical Order Conversion Operation Facility at Wright-Patterson AFB, Ohio, will convert more than 240,000 TOs from paper to digital form, reducing the \$21 million spent annually for maintenance and distribution of paper TOs, according to Air Force officials. The facility staff will process 420,000



pages a month for three years to complete conversion of about sixteen million TO pages.

■ Foundation Health Federal Services, Inc., of Rancho Cordova, Calif., has won another Tricare contract, this one covering California and Hawaii,

darts at the waist and has a closed kick pleat, according to USAF officials.

■ Air Force Materiel Command's Phillips Laboratory will test a next-generation solar propulsion technology for space in early 1997 as part of

■ The Yokota AB, Japan, enlisted club received the 1994 award for Best Enlisted Club in the Air Force.

■ The 497th Intelligence Group's Directorate of Security and Communications Management won a Vice Presidential Hammer Award for revolutionizing the way USAF processes security clearances. As the sole clearance-granting office in the Air Force, the unit faced an annual backlog of 44,000 cases based on 110,000 cases per year. Their new approach reduced the backlog to less than 1,000 and decreased adjudication time for a case from nearly 200 days to seven.

■ The 96th Services Squadron, Eglin AFB, Fla., won the 1994 Gen. Curtis E. LeMay Services Award, and the 722d SS, March AFB, Calif., won the 1994 Maj. Gen. Eugene L. Eubank Services Award.

■ Designation of July 27 of each year through 2003—the fiftieth anniversary of the Korean War cease fire and truce—as Korean War Veterans Armistice Day became a reality with the signing of Public Law 104-19, the Fiscal 1995 Rescissions Act.

■ Organizations may request to have a tree planted at Arlington National Cemetery under a "living memorial" tree planting program. Arlington's horticulturist will select a site, suggest a tree, coordinate with the group's nursery or landscaper, and help place a marker, if any. For more information, contact ANC, Arlington, Va., 22211-5003.

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for \$2.5 billion, including a start-up period and five one-year options. The original contract for these states went to QualMed, Inc., of Pueblo, Colo. However, the General Accounting Office upheld two protests because of an organizational conflict of interest between a QualMed subcontractor and a consulting firm used by CHAMPUS to help evaluate the proposals.

■ The GAO denied another protest on the contract awarded to United Concordia Companies, Inc., of Camp Hill, Pa., for the Tricare Active-Duty Family Member Dental Plan. UCC will take over the program on February 1, 1996. The premiums dropped from \$10 to \$6.77 per month per enrolled family member and from \$20 to \$16.92 per month for two or more.

■ About 150 active-duty Air Force women in the Washington, D. C., area and at Wright-Patterson AFB, Ohio, will test two new designs for service dress skirts this fall. Women had complained about the pleated waistline in the skirts designed for the latest dress uniform. One prototype is similar to the current skirt, but it is resized so pleats lie flat and features an open kick pleat; the other test model uses

a cooperative research and development agreement with McDonnell Douglas, the University of Alabama, United Technologies, Thiokol Corp., and NASA. Phillips Lab has researched solar propulsion for fifteen years.

■ The last active-duty F-15B, tail number 77-0156, left Tyndall AFB, Fla., for its final flight on September 22 on its way to Sheppard AFB, Tex., where it will become a permanent maintenance trainer for new crew chiefs. The aircraft flew for seventeen years.

■ Westover ARB, Mass., is the best base in the Air Force Reserve. It won the 1994 Installation Excellence Award for making a major contribution to national defense through efficient and innovative operations.

■ The Air Force Reserve Ground Combat Readiness Center at Bergstrom ARS, Tex., won the 1994 Air Force award for Outstanding Security Police Reserve Unit.

■ The Geophysics Directorate of Phillips Laboratory and the Electromagnetic Directorate of Rome Laboratory, both at Hanscom AFB, Mass., each turned fifty years old on September 25.

### Obituaries

**Oveta Culp Hobby**, the World War II commander of the Women's Army Auxiliary Corps and the first secretary of Health, Education, and Welfare, died August 16 after a series of strokes.

Nicknamed "the little Colonel," the ninety-year-old, Killeen, Tex., native, and former co-owner of the now-defunct *Houston Post*, was selected to head the War Department's Women's Interest Section in 1941, then to head the WAAC. During her tenure, she got the word "Auxiliary" removed from the title, and Congress increased the number of Army jobs women could perform from fifty-four to 239. She was the first woman to receive the Distinguished Service Medal.

**Garrison Norton**, an assistant secretary of the Air Force from 1950 to 1956, died at his home in Washington, D. C., September 9, after a stroke. He was ninety-four. Mr. Norton also served as an assistant secretary of the Navy and of the State Department and was president of the Institute for Defense Analyses from 1959 until retiring in 1965. ■



The Air Force is retiring its “Wild Weasels” and EF-111s. It will rely on stealth, “hard kill” tactics, strap-on pods, and Navy escort jammers.

# Electronic Warfare, Economy Style

By John A. Tirpak, Senior Editor

**W**HEN surface-to-air missiles (SAMs) appeared in North Vietnam thirty years ago and began knocking down US aircraft, the Air Force had to improvise a response. It developed the “Wild Weasel”—a fighter dedicated to finding and destroying enemy air defenses. The Weasels cleared a path through which the “strickers” could safely fly to their targets with reduced fear of missile attack.

In time, airborne standoff jammers and other tools were employed to further deny enemies the ability to protect their own airspace. The mission developed its own tools, language, and culture and became a pillar in the planning and execution of an air campaign. The system paid off during the Persian Gulf War, when the Weasels, EF-111A Ravens, and other systems were so effective that Iraqi radar operators soon feared even to turn their equipment on.

Now, thirty years after Suppression of Enemy Air Defenses (SEAD) became an integral part of the Air Force, SEAD is undergoing a major change. This time, however, the necessity is not one of operational survival—it is cost. The shrinking de-



*There has been no letup in the demand for the F-4G “Wild Weasel,” but the type will be phased out of the inventory in less than a year, as a cost-saving measure. Above, a Phantom II from the 561st Fighter Squadron, Nellis AFB, Nev., heads out on a SEAD mission. Opposite, Capt. Paul Pryor and Weapon System Officer Capt. Darin Colarusso prepare for a sortie with a deadly High-Speed Antiradiation Missile looming under the left wing.*

fense budget has driven whole categories of systems out of the force, requiring the Air Force to use other systems to take up the slack or leave the missions unmet.

The Air Force will retire the last of its 1960s-vintage F-4G Wild Weasels in less than a year; the first ones are already on their way to being converted into target drones. The

Staff photo by Guy Aceto

Photo by Paul Kennedy

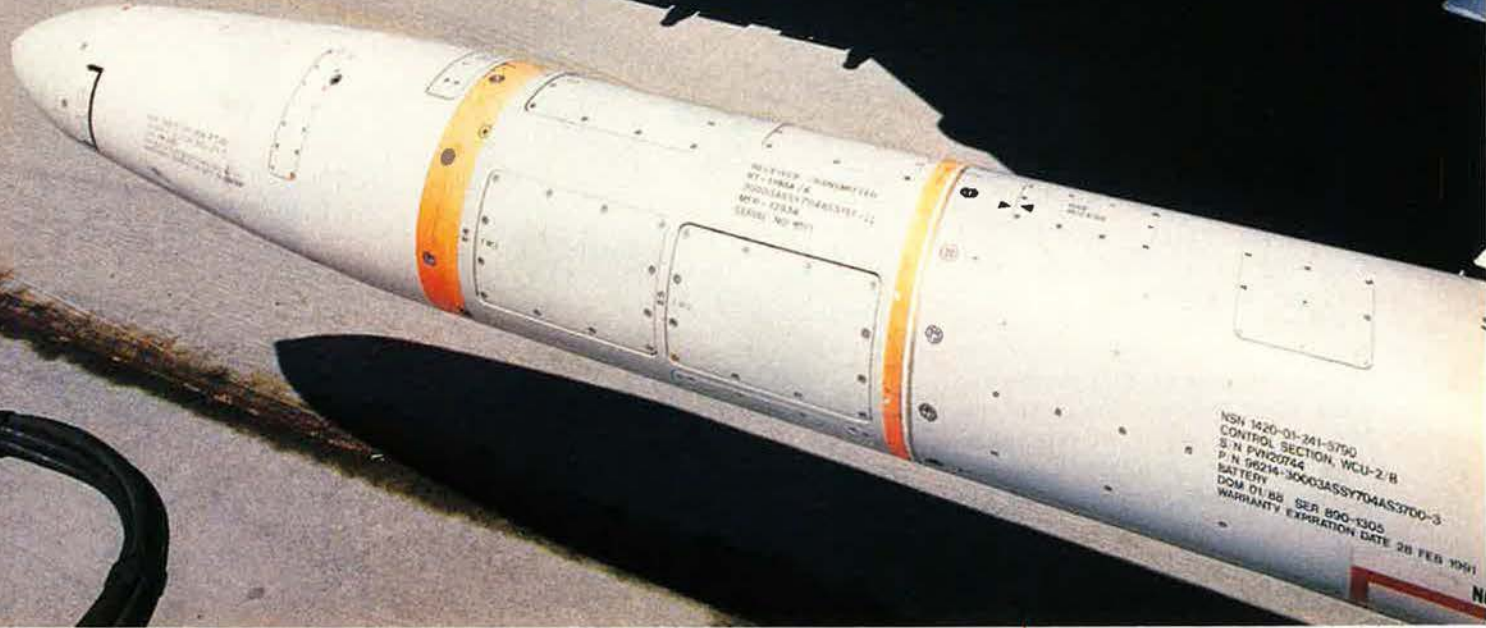




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**Captain Colarusso, part of a vanishing breed, conducts a walkaround. Weasel WSOs have skills and experience that black boxes have never matched. Some will deploy in Navy EA-6Bs as USAF attempts to preserve their institutional knowledge.**

EF-111A Raven standoff jamming airplane is also being yanked out of service. It, too, will be gone by the end of the decade. The System Improvement Program upgrade, intended to give the Raven an up-to-date capability, has also been canceled.

These moves are significant because the Air Force typically avoids retiring an airplane until its replacement is well in hand. There will be no direct replacement for these two aircraft in the near future, if ever.

### Alarm on Capitol Hill

The new approach is controversial—and not only in the Air Force. Congress is alarmed by the trends in electronic warfare (EW) investment, particularly in light of the proliferation of highly lethal and relatively inexpensive SAMs around the world.

Still, until the Air Force can find a new way of doing the SEAD mission, it will have to rely on the Navy for standoff jamming. In addition, it will use F-16 fighters equipped with a strap-on antiradar system—the High-Speed Antiradiation Missile Targeting System (HTS) to deal with “pop-up” SAM threats.

Through 1997, the Air Force will retain two dozen EF-111s; half that number will remain in the force through 1999. Over the next few years, the Navy will add about two dozen EA-6B Prowlers to its ready inventory, and they will then perform all standoff

jamming for all fixed-wing US aircraft through about 2015.

Why the Prowler and not the Raven? “When [the military services] can only afford to have one standoff jammer, then it has to be carrier-capable,” said Air Force Chief of Staff Gen. Ronald R. Fogleman. Though it is faster and longer-legged than the EA-6B, the Raven cannot land on an aircraft carrier.

“This is what it really means to be ‘joint,’” General Fogleman added. “The Navy relies on us for long-distance tanking, for example, and

we will rely on them for escort stand-off jamming. I don’t have a problem with that.”

Nevertheless, it was General Fogleman who halted an earlier plan to retire the EF-111 in Fiscal 1995 and “bought back” the capability for two years—through 1997—by sacrificing funds from the high-priority F-22 fighter program. Subsequently, the Raven’s retirement was pushed back again, to 1999, because of uncertainties regarding EW capabilities.

For the pop-up SAM threat, the Air Force is looking to use Block 50 F-16s, some of which can carry the HTS. The system is a fuselage pod that provides some of the capabilities found in the F-4G’s extensive on-board systems for precisely identifying and locating an enemy emitter. The Navy and Marine Corps F/A-18 strike fighter carries a system comparable to the HTS.

Air Force leaders describe the F-16-plus-HTS combination as “the eighty percent solution” for the problem of how to replace the capability that will be lost when the F-4G retires. Critics—some F-4G crews among them—view this step as a “forty percent solution,” given the fact that the single-seat F-16 will lack not only precision-location capability but also the second set of eyes and hands found in the two-seat F-4G. The Air Force has no plans to use two-seat F-16s for the mission.

USAF plans to enhance the system’s software and hardware in or-



**The EA-6B Prowler will carry the standoff jamming burden for both the Air Force and the Navy through 2015. New tactics must be devised, so the subsonic Prowler can substitute for the supersonic EF-111A Raven in the escort role.**



der to give the HTS greater precision, as well as make it more "user-friendly," but that effort is only now being defined. Also, a low-cost Joint Emitter Targeting System (JETS) that would provide an HTS-like capability using existing wiring and displays in an internal set has yet to reach the drawing board.

### Less Capability

The Navy's EA-6B, which will have to shoulder the load of escort standoff jamming for all the services, also offers less capability than originally planned because of budget hits. The Navy had planned a \$7.8 billion advanced capability program (ADV-CAP) to radically improve the airplane through electronic upgrades and structural enhancements, but the program has been scrapped.

A few pieces of the ADV-CAP will survive in a lesser program, known as ICAP (improved capability) III. Still being defined, the improvement will focus on software upgrades and some hardware improvements in the receiver package, reported a Navy program official. A "limited number" of EA-6Bs, the oldest of which date to the 1970s, must be fitted with new wings.

Congress has doubts about the Defense Department's overall EW plan. The Senate Armed Services Committee, in its 1996 defense spending authorization report, complained that, "because of previous and planned cancellations, the combatant commanders have less EW capability available now than they had during [Operation] Desert Storm."

The panel charged that the Pentagon had "no coherent plan . . . for a joint future capability to conduct integrated strike warfare" and was engaging in wishful thinking, hoping that the situation "will solve itself." It moved to add \$205 million to various accounts to correct what it saw as a situation rapidly becoming "unacceptable."

The Senate panel's highly critical report was made public shortly after an Air Force F-16, carrying an ALQ-131 jammer pod, was speared and broken in two by a SAM fired by Bosnian Serb forces, capturing headlines and intensifying concerns about the adequacy of available electronic combat assets. The Pentagon quickly ordered that all missions over the Balkans would include escort jam-



Photo by Randy Jolly

*The SEAD mission now falls to the F-16C fitted with the HARM Targeting System pod. Senior USAF officials believe that the HTS may be all that is needed in a future air campaign, given the effectiveness of stealth and precision weapons.*

mer aircraft, a move that further aggravated problems caused by the shortage of such airplanes.

The concerns of Congress "I think . . . are founded," according to Brig. Gen. (Maj. Gen. selectee) David J. McCloud, the Air Force's director of Operational Requirements.

"Until we can convince all concerned that we can do the job in a different way," he continued, "there is a risk" in the near-term SEAD strategy the Air Force—and the Pentagon—has adopted.

However, General McCloud contended the level of risk is "acceptable" to the Air Force. "Nobody is perfectly comfortable with it," he said. "But [the risk factor] has been identified" and is understood as the by-product of moving to the "next" way of doing things.

General McCloud said that Congress and the electronic combat community are worried because they are accustomed to seeing SEAD done in a certain way. "We have a tendency . . . [to] think of SEAD as EF-111s, EA-6Bs, F-4Gs, and HARMs," he observed. "That has had a lot of focus lately. . . . It's on the front burner in everyone's mind."

However, he added, "that is, in my opinion, a 'microview' of what we're really trying to do."

### Still Waiting

General McCloud explained that changes in technology—particularly

information technology—coupled with the advent of stealth and precision standoff munitions, have made it possible, in the near future, to conduct the SEAD mission more effectively and less expensively. But "it's not here yet," he acknowledged.

The Pentagon is not taking the EW situation lightly, according to Col. Ronald R. Barrett, the Air Staff's chief of Policy and Requirements Management.

"A lot of people are working this issue very hard," he said.

Hanging on his office wall is a photo, taken at a recent international air show, depicting an array of Soviet-developed SAMs and radars. Referring to it, Colonel Barrett observed, "We know Moscow is having a garage sale. That stuff is out there."

Colonel Barrett said the military is nearing completion of a "Joint Tacair Electronic Warfare Study" using extensive modeling and simulation of various kinds of EW and SEAD assets operating in a wide variety of combat situations. The goal of the exercise is to find the mix of capabilities that best—read "most cost-effectively"—addresses them. The study is an update of one completed in mid-1994 and includes "more campaign analyses, . . . more analytical work," the Colonel continued.

The study in turn feeds another ongoing EW study by the Joint Requirements Oversight Council. The





**The Idaho ANG's 190th Fighter Squadron is the last Air Guard unit to fly F-4Gs. It will give them up by spring 1996. The Air Force is planning a "farewell to the Phantom" at Nellis AFB to mark the passing of the workhorse.**

JROC study, a Joint Warfighting Capability Assessment (JWCA), will be completed before next May. It was to have been finished next month, but "more things keep getting added in," Colonel Barrett said.

The JWCA will provide a basis for EW and SEAD spending decisions into the early years of the next century.

What is emerging from the studies, Colonel Barrett said, is the need to "look outside the box" and examine capabilities and assets that can play a role in SEAD but that until now have not been involved in the mission.

For example, demonstrations have shown that a satellite can guide a HARM to its target—out of sight and beyond obstacles—with minimal intervention from the launch aircraft. Such demonstrations are "representative of the direction we may be going in," Colonel Barrett said. Such "off-board" sensor utilization is likely to be a hallmark of aircraft emerging from the Joint Advanced Strike Technology program. [See "Fighters for the Twenty-First Century," July 1994, p. 50.]

When the original Wild Weasels arrived in southeast Asia, their mission was to provoke enemy SAM and anti-aircraft artillery (AAA) operators into turning on their radars and then to use new direction-finding avionics and weapons to locate and attack them. This was an extremely dangerous business, which,

when first proposed, drew a response from crews that later went onto their unit patches in shorthand: "YGTBSM," or "You've Got To Be [Kidding] Me!"

### The Goal

If all goes as planned, the need for such derring-do will become a thing of the past. Soon, according to General McCloud, the emphasis will be on "taking down your enemy's Integrated Air Defense System in such a manner that you don't expose your own forces."

Under the emerging strategy, timely intelligence, standoff and precision munitions, stealth, and inter-linked sensors and "shooters" will make it possible to cripple an enemy's Integrated Air Defense System (IADS) rapidly then pick off the pop-up threats in a matter of minutes from the time they are first detected.

This SEAD strategy of the future is a more refined version of the strategy that worked so well in Desert Storm. The object would be to "peel away" elements of the enemy IADS like layers of an onion. Long-range radars, communications nets, and acquisition radars will go off the air, destroyed by precision, long-range missiles, such as the Conventional Air-Launched Cruise Missile and the stealthy, medium-range Joint Stand-off Weapon.

As American airplanes develop the capabilities to drive deeper into en-

emy territory, they will be able to use Joint Direct Attack Munitions and other less expensive means to disable the enemy's air defense net.

"The emphasis will be on the 'hard kill,'" Colonel Barrett said. "We don't want to just shut them off. We want to take them out, permanently."

As the enemy's IADS is dismantled, the only remaining threat will be from mobile SAM launchers that somehow escaped the intelligence-gathering effort, General McCloud said. For those, there will still be HARMs and aircraft well able to shoot them with high accuracy.

"I don't think we'll ever get away from . . . the need for that kind of capability," he said. "There will always be some dormant SAMs that you miss." But the rest of the strategy should work well enough so "that you have a diminished need" for what he calls the "reactive" response, *i.e.*, the Wild Weasel.

"We are evolving into a strategy that will allow us to do a lot more 'preemptive' strike than 'reactive,'" he said.

### Tying it Together

The tools to implement the new strategy already exist in the current inventory of sensor platforms, General McCloud noted.

"I don't believe we have utilized those assets nearly to the extent that they could be," he asserted. "You've got U-2s, [RC-135] Rivet Joint[s], EP-3s, [RC-12] Guardrail, overheads [satellites], [E-8] JSTARS [Joint Surveillance and Target Attack Radar System], and UAVs [unmanned aerial vehicles]," he said. Tied together, these sensors could provide precise information on the location of an enemy SAM site or AAA battery and pass it on to "the shooters."

The location of many of these sites "is already in the database," General McCloud said. "And we're updating that information all the time." When it appears that war is indeed coming, "we keep updating that database in near real time," such that, "at the kickoff," a coherent plan for rapidly rendering the enemy defenseless against air attack is ready to go.

General McCloud said one serious obstacle to implementing the envisioned SEAD campaign is that unit leaders are not yet familiar with all the sensor assets available, and so do not take advantage of them.



"As a wing commander at three wings," he said, "I had extremely limited knowledge of what the overhead systems could do—and could not do—for me. If you don't have access to it, you don't include it in your thinking."

He said that information on the various sensors—how they work and the intelligence products they can provide—is now being disseminated throughout the command schools of all the services, so that commanders know what they can request and how to get it. The "cultural barrier" of reserving such intelligence only for top decision-makers is "gradually being broken down," he said. Putting the sensor curriculum into command schools and changing the intelligence culture "are being worked aggressively now, with some progress being made."

Satellites, in particular, are playing a bigger role in Green Flag—the EW version of Red Flag [see "Green Flag," July 1995, p. 42]—and other exercises, which are more "joint" than ever before, General McCloud said.

"A system that is knowledgeable of the capability of all these collectors and knows how to task them and then passes that information on" is the technological and operational goal, he said.

"But what I've described doesn't exist today," he added.

General McCloud said that the system will be demonstrated "in



Photo by Paul Kennedy

**The AGM-88 HARM is "God's gift to Wild Weasels," said one operations officer for the 561st FS. HARMs were so effective in Operation Desert Storm that the Iraqis feared turning on their radar equipment.**

pieces" through the turn of the century. Advanced Concept Technology Demonstrators are being pursued to add punch and increase interoperability to the evolving system.

"Most of these are classified, but some of them involve precision location of emissions," General McCloud said. "Just think about that one thing. If I can geo-locate the emitters as soon as they come up [on the air] and, within a few seconds, pass that information to a shooter . . . and respond within minutes, then we

can take out that SAM without ever exposing that launch aircraft."

General McCloud said that the need to be able to fight two major regional conflicts (MRCs) at more or the less the same time—the basis of current US military strategy—would not necessarily overtax the SEAD operation.

"How simultaneous are these two MRCs going to be?" he asked. Because it will take only a few days of carefully orchestrated, relentless but precise attacks to systematically "take down the enemy's air defense system," even two conflicts a week apart should be manageable, from a SEAD perspective, he said.

### "Weasel Police"

One who agrees with this assessment is Lt. Col. Mark E. Bruggemeyer, the operations officer of USAF's 561st Wild Weasel Squadron at Nellis AFB, Nev. In the Gulf War, he said, the Air Force learned that a few F-4Gs, dubbed "weasel police," could "cover several strike packages at once," especially during the latter part of the war when Iraqi SAM activity was low. In the view of Colonel Bruggemeyer, this showed that the job could be done with fewer assets, at a given point.

"So this is not difficult to do, from a 'shifting resources' point of view," General McCloud said. "What's hard is getting the joint warfighting mindset put together [to] allow you to use

Staff photo by Guy Aceto



**The swing-wing EF-111 has twice been rescued from early retirement because of uncertainties about near-term EW power. The reprieve is brief—twenty-four will be retained through 1997, and "last call" for the final twelve is 1999.**





**The F-4G will likely be the last dedicated Wild Weasel platform. Will sensor fusion, pods, and data links make any combat aircraft capable of performing the SEAD mission, as the Air Force plans?**

these [sensor systems] routinely, and train with them, so that when war comes, you can make it all happen.”

The one aspect of the emerging SEAD strategy that gives General McCloud pause is “the magnitude of doing this integration” of sensor systems, he said. “It is not a trivial task.”

The system will be called ADSI (Air Defense System Integration), and it will require interfaces and data links among all the available sensors—a huge project.

“They’re all talking in different languages,” General McCloud noted. “We’ve identified in the JROC/JWCA process that we need to improve this situation throughout the joint community. It’s going to take some time because there are many ‘legacy’ systems . . . in place.”

The services are working on Link 16, a system that will permit the crosstalk necessary to achieve the desired sensor fusion.

“Clearly that needs to happen” if the services are to develop a means of destroying a pop-up SAM or AAA threat “within minutes, not hours or days,” of its being discovered, General McCloud observed.

Stealth is slated for a crucial role in the future SEAD campaign because it provides a means for the attacking force to get past enemy air defenses without tripping them.

“Stealth offers an extremely robust capability to take on the toughest

est threats,” General McCloud noted, “but I don’t think there’s ever going to be one system that will hack the whole problem. . . . You’re going to need all the elements . . . to prevail.”

#### **What About Today?**

The sensor-fusion elements and precision weapons are still on the drawing board, and EC officials and Congress are wondering how existing systems will be able to “hack” the immediate threat. One example: The EA-6B, unlike the swift EF-111, is too slow to escort a fast-moving strike package comprising F-15s and F-16s. How will the Air Force deal with that reality?

“We’re not sure yet,” Colonel Barrett said. “We’re studying that very closely right now.”

But General McCloud said, “We’re simply going to have to use a different tactic. The EA-6B is going to have to rendezvous with the strike package. . . . What you’re trying to do is get the right jamming in the right place at the right time.” He said he is not worried about it—“It’s just a change in tactics”—and that “very smart people in the Air Force, Navy, and Marines are working together on the problem. It’s solvable.”

The Air Force will not be relinquishing its dedicated SEAD expertise completely when the F-4G and EF-111 are gone. Four Air Force flyers reported for duty last month at NAS Whidbey Island, Wash., for

training in the EA-6B, and more are expected. Since the EA-6 will be a “joint-use” airplane, the Prowler will have some joint crews, as well.

“The Air Force wants to keep at least some of its EWOs [electronic warfare officers] gainfully employed as such,” said Colonel Bruggemeyer. Some of his Weasel backseaters are going to the EA-6B, while others are going to the EF-111 and others to the dual-role F-15E.

Colonel Bruggemeyer said his crews don’t resent the HTS for putting their airplane into the boneyard. “The F-4 is an old plane,” he said. “Its time is done. The HTS . . . is going to be the force protector. We know that.” His unit is scheduled to go out of business in September 1996.

General McCloud said it is too soon to tell if there will ever be another strictly Wild Weasel airplane.

“The question is, do you really need a dedicated asset to do it, or will a multimission asset do it as well?” he said. “I am more and more convinced the latter is true.”

Air Force planners believe that, by the time the EA-6B starts to drop out of the force in large numbers in twenty years, the service may be able to field extremely small and powerful electronic components that can accomplish all the functions of an entire Prowler in a single small pod.

There may also be autonomous UAVs that can jam and even fire HARMs, General McCloud postulated.

The plan in place through the turn of the century “hedges the bet” the Air Force is making that the evolution of the SEAD mission will happen as expected, General McCloud noted.

“We have bought ourselves some time . . . to build up the EA-6B force, develop tactics, train additional aircrew, . . . and convince ourselves that some of these things are possible,” he said. “We are integrating the overheads into our exercises. We’re integrating them into our schools. We’re making the software and hardware changes that preserve a good capability for the interim. We’re developing a new generation of standoff weapons” and stealth aircraft.

“The pieces are coming together,” he said. “And I believe they will come together in the 2000 time frame.” ■



## McGovern Speaks

What you don't understand is that I didn't want us to win that war [Vietnam].

**Former Sen. George S. McGovern, antiwar activist and 1972 Democratic presidential candidate, in a recent statement to former Secretary of the Navy James Webb, as quoted by Mr. Webb in the September 10, 1995, Washington Times.**

## Get Past the Legalisms

Although there is no statute that guarantees free medical care for life, all the retired military were promised this during recruitment. So, there is no legislation that was passed, but when you hand out brochures and the recruiting officer tells you that one of the benefits of enlisting is that you are going to get lifetime free medical care, there is a type of contract there, and we ought not take it lightly.

**Rep. James P. Moran, Jr., (D-Va.), in a September 12, 1995, House Government Reform and Oversight subcommittee hearing.**

## No Damned Fool Thing in the Balkans . . .

As long as I am Secretary of Defense, I will not send US ground forces to be combatants in the war in Bosnia.

**Defense Secretary William J. Perry, in an August 6, 1995, speech at the Aspen Institute in Colorado.**

## . . . We're Not Totally Reassured

Mr. President, we have serious concerns about the commitments you and your Administration reportedly have made with respect to US participation—to include thousands of ground forces—in enforcing a possible Bosnia peace settlement.

**Ten Republican senators—among them, Majority Leader Robert J. Dole (R-Kan.)—in a September 25, 1995, letter to President Bill Clinton challenging his developing policy.**

## "Do What Is Right"

Current Air Force directives give commanders wide latitude concern-

ing performance evaluations, and that's exactly as it ought to be. However, I expect commanders and supervisors to have the courage to do what is right. Doing what is right is often unpopular and difficult, but commanders and rating officials have a responsibility they must step up to. . . .

It is important for commanders and raters to remember that your ratings, comments, and actions do not represent arbitrary action against the individual but reflect an appropriate response to their misconduct or failure to meet standards. And recognize that your loyalty and commitment must be to the larger organization—to the Air Force as an institution.

So, do not selectively enforce standards. You cannot afford to disillusion the majority by being lenient with those few who fail to meet, or choose to ignore, Air Force standards. The [Army UH-60] Black Hawk incident was serious. Lives were lost—our people did not meet Air Force standards.

**Gen. Ronald R. Fogleman, Air Force Chief of Staff, in an August 10, 1995, message to all commissioned officers and senior NCOs.**

## No Warless Wars

I applaud the pilots and the equipment and the technology and all of the skills of the planners in avoiding collateral damage on the bombings that have taken place [in Bosnia], but some critics . . . believe that we have reached the point where the American public and many in Congress expect the United States to be able to fight a war and have no casualties. That's virtually impossible. . . . I do not want to see us evolve to a point where we have expectations in this country of a war where nobody gets killed on our side and where we don't have any collateral damage on the other side. . . . I hope we don't set up in expectation such high hurdles for ourselves that we begin to gradually become impotent in our ability to respond.

**Sen. Sam Nunn (D-Ga.), ranking Democrat on the Senate Armed**

**Services Committee, in a September 21, 1995, hearing.**

## Not Happy at All

NATO was a fist aimed at the Soviet Union, . . . now reaimed at Russia's forehead.

**Gen. Alexander Lebed, Russia's leading presidential candidate, quoted September 27, 1995, in The Times, London.**

## Heyman on Atomic Bombing

My own personal view? I think it was the right decision. Certainly it was the right decision, viewed at the time, and I guess that is the way one ought to make a judgment. . . . I was fifteen years old when that bomb was dropped [on Hiroshima]. I was a part of that whole generation that just missed the Second World War but [was] subject to all of the feelings and with all the relatives in service. . . . It would be interesting if some of the folks who are post-that-generation, who have been making commentary on it, had been of that age. I don't know whether that would have affected their viewpoint. It certainly affects mine.

**I. Michael Heyman, secretary of the Smithsonian Institution, in a September 27, 1995, Washington Times interview.**

## Heyman on Curating

I think I differ a little bit from my predecessor [Robert McC. Adams], who viewed this [Smithsonian Institution] quite with university eyes and believed that each of the people who curate . . . ought to have absolute freedom with respect to what they're stating. My view is that they ought to have quite a lot of freedom. . . . On the other hand, what goes up on the walls is really an institutional product, so that there have to be some rules of the game. . . . If anybody were going to characterize Air and Space, it ought to be a temple in which we show our very positive response to the brilliance and courage of Americans with regards to aviation and space.

**Heyman, in the same interview. ■**



**The services say that wartime and peacetime medical missions are inseparable. The debate, however, is not over yet.**

# The Quest for Medical Readiness

By Suzann Chapman, Associate Editor

**P**ROVIDING high-quality combat care to US troops is the primary mission of military medical forces, and medical readiness is top priority. The 1991 Persian Gulf War, however, exposed serious deficiencies, most of which could be attributed to the Pentagon's tight focus on "global war" with the former Soviet Union. Officials said the system designed for use in a superpower conflict was ill-suited for application to a limited regional war.

Today, that global-war tilt has vanished, replaced by plans to fight two major regional conflicts (MRCs) at nearly the same time.

However, few believe that the services' medical forces have changed nearly as much or that they are better prepared today for the demands of regional warfare. Critics maintain that, even today, the Clinton Administration has not resolved basic issues of force size and training requirements.

Service medical operations, though they have not been cut nearly as far or as fast as the operational elements of the armed forces, nevertheless have been suffering reductions. Neither the military nor congressional experts can agree on whether the

cuts have been too shallow, too deep, or about right.

## Sizing the Medical Establishment

Since Fiscal 1988, the Pentagon has eliminated fifty-three military hospitals and today operates 124. During the same period, the number of normal beds has dropped by about forty percent, from roughly 30,000 to 18,000.

Overall medical manpower—military and civilian—has declined. In Fiscal 1990, the total stood at 209,091 for all the services. The number in FY 1995 was 183,109, a drop of 12.4 percent. The Army has cut the most from its medical forces, shedding more than seventeen percent of its personnel in recent years. The Air Force and Navy have dropped 10.3 percent and 6.1 percent, respectively.

The force-sizing issue was a central focus of an April 1994 Department of Defense assessment unofficially called the "733 Study." According to the study, the number of active-duty physicians programmed for FY 1999 (12,600) could be reduced by half and still meet all wartime and peacetime readiness requirements.

*While this USAF pararescueman performs much the same job in peacetime or wartime, other medical personnel rely on day-to-day peacetime practice to prepare for battlefield medicine—a practice supported by senior service officials. Critics contend that caring for retirees and family members is a world away from treating combat casualties.*

The lower number, however, would have to be augmented by a twenty-six percent increase in reserve physicians, said the study.

The authors of the 733 Study found the same to be true of military hospital beds. They contended that the number of beds in the continental United States could be reduced from 30,000 (the level of the early 1990s) to only 9,000. The latter figure would





represent a fifty percent cut in the already reduced number left in place today. The number of beds in various theaters also would be reduced, but exact figures are classified.

These conclusions did not win universal praise, to put it mildly. Many in the service medical system argue that the 733 Study came up short in a number of important ways. They claim that it did not fully consider the input of theater commanders or adequately cover the requirements to sustain a wartime-capable medical force in peacetime.

Consequently, each service is attempting to determine its own "right size" based on guidance in the Medical Readiness Strategic Plan (MRSP) 2001, released in March 1995.

The plan constitutes the first "comprehensive update" of medical readiness strategy since 1988, according to Dr. Stephen C. Joseph, assistant secretary of defense for Health Affairs. Dr. Joseph called the new plan "an evolutionary course correction," rather than a revolutionary break with the past. He pointed out that it builds on service programs already in progress.

MRSP 2001 asserts that the primary factor for determining the size

and composition of the medical force must be the mission and population of the operational force it must support. The plan also states that the active-duty medical forces "will provide the immediate medical response capability" in war, but the reserve component will provide the "major portion" of the total required medical force. The plan further states that the armed services must:

- Size the active-duty medical forces to provide immediate contingency response until mobilization and deployment of reserve component elements can satisfy mission needs.

- Adjust the size of the active-duty medical force to cover any additional health-care needs for forward-deployed military forces and their family members, after considering the force required to prepare for war.

- Consider adjusting the size of the active-duty medical force if the direct-care military health-service system (MHSS) "can provide more cost-effective health care to beneficiaries."

This last item clearly identifies a central reality for Pentagon and service health officials: The wartime

and peacetime medical missions are inseparable. In fact, that assumption goes to the heart of the debate over the size of the medical force.

Congress appears convinced, at least for now, that the two missions cannot be separated. The Senate Armed Services Committee has recommended extending a 1991 legislative restriction that limits the extent to which services may reduce medical forces and links manpower cuts to the requirement to provide care to non-active-duty beneficiaries. The committee's latest proposal would limit reductions in active and reserve medical personnel to "not more than five percent per year, or a total of ten percent over three years" unless the Pentagon could "certify that CHAMPUS [Civilian Health and Medical Program of the Uniformed Services] costs will not increase and that the reductions are excess to the current and projected needs of the military department."

The proposal also requires the Pentagon to produce a plan by March 1, 1996, to "right-size" the number of medical personnel over the next five years.



## Is Peacetime Care Essential?

Dr. Joseph told Congress that those who evaluate the MHSS superficially can easily miss the point that combat readiness and peacetime missions are inseparable.

"It is the operation of military hospitals and clinics," he said, "the everyday care and treatment of our broad range of beneficiaries, that affords our health-care professionals the necessary experience to maintain their skills."

Reinforcing that statement, Air Force Surgeon General Lt. Gen. (Dr.) Edgar R. Anderson, Jr., told a House subcommittee that the final and crucial factor in the medical readiness equation is the peacetime health-care base.

General Anderson warned, "I cannot emphasize too strongly the interdependence of these two missions [medical readiness and peacetime care]. Contrary to some reports, our peacetime health-care system is essential to our ability to sustain medical readiness."

Among the reasons cited by General Anderson:

- The Air Force's peacetime health-care system serves as a training base to ensure wartime skills are well honed and up-to-date when a war starts.

- Unit cost for care is lower in the military direct-care system than in the civilian sector, and the "demand effect" [see "Sizing Up Tricare," August 1995, p. 64] should be offset by business and management changes.

The Army's chief medical officer, Lt. Gen. (Dr.) Alcide M. LaNoue, testifying before the same subcommittee, said state-of-the-art medical centers with a variety of training programs and a diverse patient population—including retirees and their family members—"are absolutely essential if clinicians are to acquire and maintain skills crucial to combat casualty care in wartime." He added, "Limiting health care to the active component—a healthy and young population—would not provide the necessary clinical experience or retention incentives. For example, the surgeon who performs a gastric resection on a retired beneficiary is practicing for future repair of major abdominal trauma on the battlefield."

Not everyone agrees with these statements, however.

One of the critics is Neil M. Singer, deputy assistant director for the Congressional Budget Office's National Security Division. Mr. Singer told Congress that his agency, in preliminary studies, has found that skills developed in peacetime care are of little use in treating war-related diseases and injuries.

Mr. Singer testified that CBO used Pentagon data projecting the wartime work load—about two-thirds of which would stem from disease and nonbattle injuries (DNBI) and one-third of which would result from wounded-in-action (WIA) injuries—in a two-MRC scenario. The agency did a comparative analysis of these data and those pertaining to the primary diagnoses of peacetime patients. The sample included more than one million records for patients in military medical facilities in 1993.

Mr. Singer said that the DNBI findings showed that peacetime care provides some training for wartime, but most peacetime care is not relevant to the requirements generated even by noncasualty wartime patient loads. Specifically, the CBO analysis asserted the following:

- Seventy-five percent of peacetime primary diagnoses match primary DNBI diagnoses—not the more relevant WIA diagnoses.

- The most common wartime DNBI diagnoses do not appear frequently in peacetime care. Only about ten percent of the fifty most common peacetime diagnoses match the ten most frequent DNBI categories.

Moreover, said Mr. Singer, the value of peacetime practice is even more limited when applied to WIA conditions. The WIA findings indicated that:

- Only about five percent of the primary peacetime diagnoses truly match a WIA diagnoses.

- None of the fifty most frequent peacetime diagnoses matches a WIA condition.

Mr. Singer did not completely dismiss the wartime benefits of peacetime care. He said that the military graduate medical education programs provide "some training relevant to wartime readiness." He added that Brooke Army Medical Center and the Air Force's Wilford Hall Medical Center, which form part of the San Antonio, Tex., emergency trauma

## Right-Sizing the Navy Way

The Navy has come up with an approach to determine medical readiness force requirements, one that it believes might be used by the other services.

Unlike the "733 Study," which focused wartime requirements only on those forces needed to support the two-MRC scenario, the Navy's Total Health-Care Support Readiness Requirements (THCSRR) model incorporates the 733 Study's wartime active-duty data with the Navy's day-to-day operational requirements to derive its Medical Operational Support Requirement (MOSR).

As members of the Navy Surgeon General's staff explained it, the MOSR combines the unique requirements of both elements but eliminates redundancies, ensuring no double counting.

The next step is to add sustainment—in this case, the number of training positions, or "billets," needed for a continuous flow of qualified people, essentially replacing those who leave the service or move on to a higher skill level. Adding the sustainment number to the MOSR provides the THCSRR.

Using this model, Navy medical officials say, provides a dynamic assessment that can adapt to changes in DoD missions and priorities, providing accurate requirements down to subspecialty level.

According to Vice Adm. (Dr.) Donald F. Hagen, USN (Ret.), who was until recently the Navy Surgeon General, Navy medicine must devote some thirty percent of its resources to support forward-deployed forces—more than any other service.

Full implementation of the THCSRR model probably will not occur until Fiscal 1999, as the Navy works out training pipeline schedules and personnel plans.

The THCSRR model does not address all of the questions about medical "right-sizing." It covers only manpower requirements for the readiness mission.

While Admiral Hagen, like the other surgeon generals, believes that the readiness and peacetime missions are closely interrelated, he stated in congressional testimony that the Navy could not provide care for all beneficiaries within the Navy's Military Health-Service System. He said the Navy will continue to rely on Tricare, DoD's new regional managed-care program, "to ensure cost-effective, quality health care is available to all our beneficiaries."

Nonetheless, relying more and more on Tricare with its potential emphasis on using civilian providers may undermine the Pentagon's current premise that active-duty medical personnel need the challenges of peacetime health care for a wide range of patients to practice their wartime skills.



## Medical Manpower Strength: Fiscal 1990-95

	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995*	Total Decrease
<b>Army</b>							<b>17.45%</b>
Officer .....	18,348	18,478	18,041	17,466	16,576	15,902	2,446
Enlisted .....	47,037	42,149	43,387	42,405	37,637	35,122	11,915
Total Military .....	65,385	60,627	61,428	59,873	54,213	51,024	14,361
Civilian .....	30,872	31,974	31,162	28,558	28,166	28,436	2,436
Total .....	96,257	92,601	92,590	88,431	82,379	79,460	16,797
<b>Navy</b>							<b>6.13%</b>
Officer .....	12,002	12,064	12,287	12,266	11,997	12,106	(104)
Enlisted .....	33,919	31,457	30,684	30,261	30,094	30,099	3,820
Total Military .....	45,921	43,521	42,971	42,527	42,091	42,205	3,716
Civilian .....	11,990	12,863	12,842	12,841	12,618	12,155	(165)
Total .....	57,911	56,384	55,813	55,368	54,709	54,360	3,551
<b>Air Force</b>							<b>10.26%</b>
Officer .....	15,074	14,814	14,606	14,279	14,195	14,131	943
Enlisted .....	30,607	28,233	27,100	26,474	25,817	27,535	3,072
Total Military .....	45,681	43,047	41,706	40,753	40,012	41,666	4,015
Civilian .....	9,242	7,556	8,141	7,330	7,588	7,623	1,619
Total .....	54,923	50,603	49,847	48,083	47,600	49,289	5,634
Total Military .....	156,987	147,195	146,105	143,153	136,316	134,895	22,092
Total Civilian .....	52,104	52,393	52,145	48,729	48,372	48,214	3,890
Total Force .....	209,091	199,588	198,250	191,882	184,688	183,109	25,982
Total Decrease** .....		9,503	1,338	6,368	7,194	1,579	
Percent*** .....		4.54	0.67	3.21	3.75	0.86	12.43

\*Fiscal 1995=authorized projection.

\*\*Decrease from previous year.

\*\*\*Percent decrease from previous year.

Source: DoD

system, routinely receive a large number of civilian patients with blunt and penetrating injuries.

"Treating those injuries contributes strongly to wartime preparedness," Mr. Singer acknowledged.

He offered an alternative approach for wartime medical training, which he said will continue to be limited under DoD's present system. The CBO alternative would build on the Brooke and Wilford Hall experiences by having the services establish "affiliations" with civilian trauma centers in cities throughout the country.

For CBO, evidence to support this concept could be found by comparing trauma center cases at a Baltimore, Md., hospital with wartime diagnoses. CBO analysts found that ninety-eight percent of the civilian trauma cases matched WIA diagnoses.

One military doctor, a professor at the Uniformed Services University of the Health Sciences (USUHS), Bethesda, Md., does not believe that peacetime care or civilian trauma experience provide the necessary training for wartime medicine. Navy Reserve Medical Corps Capt. Arthur M. Smith, a USUHS clinical profes-

sor of surgery and clinical professor of military and emergency medicine, wrote an article for the US Naval Institute's July 1995 *Proceedings*, in which he contrasted the civilian trauma setting with combat.

He said there is no way to compare the rapid and sophisticated care provided by modern trauma centers for a typical urban victim who has been shot by a 9-mm pistol to a Marine rifleman lying in a muddy field for perhaps hours after being hit by fragments from a rocket-propelled grenade. He added that, in combat, wounds are often caused by multiple fragments, sometimes with coexisting blast effects, "a phenomenon rarely seen in nonmilitary practice."

Captain Smith maintained that USUHS is a critical element in sustaining knowledge about and training for combat medicine.

### Looking in a Mirror

Determining the best method to provide wartime training for active-duty personnel is difficult—and even more so for reserve forces. In fact, the lack of adequate training for Reserve and National Guard medical personnel was a major criticism noted

by the General Accounting Office, a congressional watchdog agency, in its Gulf War reviews.

To help close the gap, the Air Force Medical Service has embarked on a new program called Mirror Force, the brainchild of Maj. Gen. (Dr.) Charles H. Roadman II, USAF's deputy surgeon general. The object is to take Total Force a step further to ensure that medical personnel, whether active-duty or reserve, receive the same readiness training—ensuring they can perform the same jobs as their active-duty counterparts during contingencies.

The program's director, Col. Mary Jane Koch, an Air Force Reserve nurse and a medical marketing consultant in her civilian job, said that the need became apparent during Operation Desert Storm because "it was just a fiasco."

What looked good on paper, she explained, had no basis in reality when it came time for action. Guard and Reserve forces simply were not able to fill in where they were needed—that is, they could do a particular job, but it did not match the specific duties they were asked to perform. There was no flexibility.



In some cases, according to Colonel Koch, the personnel actually should have been ineligible to deploy for a variety of reasons, including pregnancies and bad teeth.

Initially thought of as just another "program du jour," she said, the get-well operation has become a more sensitive subject. Active-duty and reserve personnel are beginning to think about ways to integrate training and programs.

The Mirror Force steering committee, which includes all three elements and both officer and enlisted medical personnel, met in May to consolidate a preliminary list of issues. The panel then instructed working groups to develop recommendations. The major issue is training, but the working groups are also looking at medical recruiting and retention and are developing ways to ensure that personnel are prepared to deploy for war.

The goal is to eliminate friction among the various force elements, said Colonel Koch.

### Creating a Modern Capability

The Pentagon is also in the midst of transforming its medical force to match the more mobile, flexible, expeditionary force that has supplanted the heavier, stationary, forward-based US military of the Cold War years.

Dr. Joseph, the Pentagon health affairs chief, said, "No longer can we plan to deploy medical capabilities that consume an extraordinary amount of lift or that are difficult to relocate once situated. We must plan for mobility, technological innovation, efficiency, and joint service operations."

Each of the services is pursuing modernization approaches best-suited to its service-specific requirements. They are also collaborating on technological enhancements, grouped under the heading "telemedicine."

Today, the Army has the lead in a triservice effort to develop and implement a telemedicine test-bed project, the goal of which is to guide automation and telecommunication technologies into the MHSS mainstream.

General LaNoue said that the Army is evaluating such concepts as tele-surgery, robotics, and virtual reality, as well as currently testing electronic medical imaging and automated, digitized patient care records.

Vice Adm. (Dr.) Donald F. Hagen, USN (Ret.), who recently stepped

down as Navy Surgeon General, said the Navy found telemedicine innovations invaluable, "particularly aboard ship, where the practice of medicine is at its most isolated."

He noted that the use of tele-radiology digitization technology on a four-month deployment of the carrier USS *George Washington* in the Mediterranean and Indian Ocean obviated the need for more than thirty medical evacuations, saving almost \$100,000 and keeping people on the job at sea.

The Air Force is working several initiatives, including teleconferencing to enable deployed medical personnel to consult with specialists back in the States and the USTRANSCOM Regulating and Command and Control Evacuation System (TRAC<sup>2</sup>ES), which will provide patient visibility and critical data throughout the aeromedical evacuation system. [See "A Bigger Job for Medevac," *March 1995*, p. 52.]

### USAF's Flexible Approach

To increase its flexibility, the Air Force medical establishment conducted its own bottom-up review, emerging with a plan to develop a package approach to meet medical needs under current aerospace doctrine.

According to Lt. Col. (Dr.) Joseph Palma of USAF's Medical Readiness Division, the Air Force's new modular approach "is a dynamic process that puts capability where it's needed, only where it's needed—the right size, the right care, the right time, the right place, for the right reasons."

Using the basic Joint Strategic Capabilities Plan as a benchmark, Colonel Palma said, USAF experts developed an operating philosophy that traded the old "fixed-footprint," echelon-based system for a dynamic, flexible, and rapidly deployable system that can be airlifted with great efficiency. Moreover, the system is no budget-buster. The proposal would enable theater surgeon generals to select various capabilities, or modules, they might need for particular operations.

They would choose from six basic areas: prevention, stabilization, sustainment, specialty support, aeromedical evacuation, and OOTW (Operations Other Than War). Each area would include some form of telemedicine, ranging from a basic two-

suitcase package for the first deployers to two aircraft pallets for follow-on requirements.

Within each area would be various modules, or medical specialties. For example, prevention would include four modules: NBC (nuclear, biological, and chemical), prevention and aerospace medicine, theater epidemiology, and a telemedicine capability.

Colonel Palma said the Air Force had the most trouble in the OOTW area because the force mix for the two-MRC requirement is not the same as that needed for peacetime activities. As a result, after adapting capabilities from the other areas, OOTW would still require additional special modules, such as pediatrics and nutrition.

The first deployers—probably the prevention modules and stabilization modules, such as general surgery and primary care—could be transported using one or two C-141s. Moving an entire air-transportable hospital requires about seven C-141s.

At the same time, the Air Force is enhancing its aeromedical evacuation process, which contains unique modules, such as TRAC<sup>2</sup>ES and Critical Care Teams (CCTs), as well as selected modules from the other primary areas.

The approach is designed to make aeromedical evacuation a self-reliant, completely equipped box, according to Colonel Palma, to meet the Pentagon's new policy, which cut the time allotted to evacuate "stabilized and shock-treated" patients. He also said the service already has identified some people to form CCTs, including some specially trained to handle burn cases.

The Air Force expects to initially deploy the modular concept by October 1997, following additional fine-tuning by the major commands, identifying and refining requirements, conducting tests, and developing a funding level. After that, it will take five years to carry out the entire program.

Making technological and structural changes, such as these, requires time and money. Add the ongoing effort to cut the medical force, provide peacetime care to all beneficiaries, and reduce the medical infrastructure, and it becomes only too clear that the Pentagon faces major obstacles on the road to achieving full medical readiness. ■



By John L. Frisbee, Contributing Editor

## The WASPs of World War II

Early in World War II, Army Air Forces was critically short of pilots, but a partial solution was immediately at hand.

**T**HEY made a notable contribution to America's role in World War II and to the future of military aviation, yet they were not officially a part of our wartime air arm. They were the Women's Airforce Service Pilots (WASPs), and they freed hundreds of male pilots for combat duty.

The WASPs sprang from two roots that merged in August 1943. First was the Women's Auxiliary Ferrying Squadron, approved in September 1942 and headed by Nancy Love, an experienced pilot and civilian member of the Air Transport Command Ferrying Division. Applicants to the squadron were required to have 500 hours flying time and a 200-horsepower rating.

Second was the Women's Flying Training Detachment (WFTD), created in November 1942 and headed by Jacqueline Cochran. Located at Avenger Field, Tex., the WFTD trained women with varying pilot experience, eventually down to a minimum of thirty-five hours, to fly "the Army way." Over time, the curriculum went through many changes to become a virtual duplicate of the Aviation Cadet program. Both groups were under civil service, but Cochran had in mind militarization with eventual commissions for her graduates, who would serve in many domestic flying roles, including ferrying aircraft.

Against the wishes of both women, WASPs initially were restricted to daylight flights in liaison aircraft and primary trainers. Nancy Love broke that barrier by wangling permission to check out in B-17s and P-51 Mustangs. Cochran did her part by convincing Gen. Henry H. "Hap" Arnold, Commanding General of US Army Air Forces, that her graduates could tow targets as well as ferry aircraft. At Camp Davis, N. C., an antiaircraft training base, the WASPs flew tired,

badly maintained A-24 and A-25 dive bombers. Two women lost their lives because of engine failure, and several were hit by ground fire, but others volunteered for that risky business, which few male pilots wanted.

Now that the barriers were down, the WASPs began flying every first-line fighter, bomber, trainer, and transport in USAAF's inventory. By



*The WASPs adopted the Disney-created Fifinella for their insignia.*

late 1944, half of Ferrying Division's fighter pilots were WASPs, and they made three-quarters of all domestic fighter deliveries with a lower accident rate than male pilots had.

Many WASPs became test pilots at overhaul and repair depots, another dicey and anonymous job. Others were assigned to Training Command as flying cadet navigators, bombardiers, and instrument instructors.

About 100 WASPs were sent directly from AT-6s to B-26 Marauder transition. At that time, the B-26 was considered by some to be the most difficult and dangerous USAAF aircraft. The WASPs did as well as the men at flying the bomber and much better in ground school. After completing the course, many WASPs flew B-26s on tow-target missions to train aerial gunners. A few visited B-26 transition bases as a confidence-builder for male pilots who did not regard the Marauder as user-friendly.

In its early days, the B-29 also had a bad reputation. Lt. Col. Paul W. Tibbets, of *Enola Gay* fame, checked out two WASPs, Dora Dougherty and Dorothea Johnson, in the B-29 and sent them to a heavy bomber base to reassure nervous B-29 students. The Air Staff, when it learned of Colonel Tibbets's ploy, directed that WASPs were not to fly the B-29 again.

Perhaps the most unusual WASP flying experience was that of twenty-nine-year-old Ann Baumgartner, who was sent to Wright Field, not as a pilot but as a consultant on new flying equipment. She soon persuaded the brass to let her fly P-51s, P-47 Thunderbolts, a Japanese Zero, and a Bf-109. Ms. Baumgartner also got permission to fly the experimental Bell YP-59 jet fighter, becoming the only American female jet pilot, a distinction she held for almost a decade.

In December 1944, as the need for combat pilots declined, the WASPs were inactivated. In its twenty-eight-month life, the WASP organization drew 25,000 applicants; 1,830 were accepted, 1,074 won their wings, and thirty-eight lost their lives taking part in a wide range of domestic flying duties. They ferried more than 12,000 aircraft of seventy-eight types, served without military benefits, and were paid two-thirds as much as the male civilian ferry pilots they had replaced. The WASPs frequently endured discrimination, yet many offered to continue ferrying aircraft for a dollar a year.

In 1949, the newly independent United States Air Force offered commissions to former WASPs. The 121 who accepted were assigned to administrative and support duties and did not fly military aircraft again. It was not until 1977 that Congress passed a bill, introduced by Sen. Barry Goldwater (R-Ariz.), that gave the WASPs honorable discharges and declared them veterans. Their accomplishments during the war reflected courage and determination, paving the way for women to be admitted to military flying training again, but it would be more than thirty years before the road was completed. ■







For many allies, it is a long commute to Nellis AFB, Nev.  
But they all agree that the experience can't be beat.

# Training With the Allies

Photographs by Paul Kennedy and Guy Aceto, Art Director

*Armed with an AGM-88 High-Speed Antiradiation Missile, a Spanish Air Force EF-18 sits on the Nellis ramp awaiting the first sortie of the day.*





**A**fter providing nearly twenty years of highly realistic combat training, the Red Flag operation at Nellis AFB has become respected worldwide for giving pilots, aircrews, and support personnel an opportunity to hone the skills needed to succeed in their real-world missions. Foreign air forces routinely participate in the Red Flag exercises, and many consider the time they fly here to be the most important period they spend away from home. Because of the importance of Red Flag, many allied forces can't wait to come to Nellis. This year's Red Flag 95-5 was organized around an unusually high percentage of foreign players—so much so that planners called it "Coalition Flag."

Above, F-16s and F-15s from the 366th Wing, Mountain Home AFB, Idaho, sit on the ramp in the early morning light. At right, 366th pilots walk out to their aircraft as the day's flying begins. Most Flag exercises last six weeks, but this was a shorter, four-week exercise. Almost 4,000 personnel and more than 110 aircraft from four different countries participated.



Paperwork comes with the job no matter where you are from, and it still needs to be completed before you "borrow" an aircraft from the crew chief. At left, a Spanish EF-18 pilot signs his share of it before his sortie. Along with Canada, Spain participates in Operation Deny Flight, and many of the crews have stories to tell about missions over Bosnia-Herzegovina. In preparation for their next rotation to that volatile region, these crews take their lessons here especially seriously.





A Spanish EF-18 tucks in its gear as it takes off on the next sortie. Nellis has its own morning rush hour as aircraft meet their tightly scheduled takeoff times in order to complete the day's scenario. Some countries use these exercises to warm up skills they will need on upcoming deployments. In many cases, units coordinate with Red Flag planners, telling them what kind of threat they want to train against, the types of missions they need to train for, and what kind of targets they need to be able to strike. Col. Thomas A. "Hymie" Oram, then Red Flag commander, said, "We don't have our own particular agenda. . . . We don't have to invent anything. All we have to do is find out what [they] do and how to efficiently create that here."



Above right, members of a Spanish EF-18 crew strap on their jet and receive last-minute instructions as (right) an F-111F from the 27th Fighter Wing, Cannon AFB, N. M., launches on its sortie, bringing the 27th's precision deep-strike capability into play in the day's events.







Heavy bombers, fighters, tankers, and transports—if you would see it in an actual mission, you are likely to see it here. The coalition “packages” at Red Flag can be as large and as realistic as any in a true combat operation. Above, a B-1B from the 366th takes off for a mission, while at right a Canadian Forces crew chief checks two bundles that his C-130 will drop later in the day. The aircraft is equipped with an extensive chaff and flare system (below right) that has proven its worth in a high-threat environment. The C-130 crews bring to the exercise many hours of experience in dropping supplies into Bosnia. Colonel Orem said Canadian participants have returned from Flag exercises directly to their home base to pack for humanitarian missions to the Balkans.



Photo by Paul Kennedy



Staff photo by Guy Aceto



Flag exercises have changed dramatically in the twenty years since they were established by Gen. Robert J. Dixon, then commander of Tactical Air Command. Colonel Oram, at right, said that Red Flag started with a handful of aircraft types. "Now we're talking about everything from an airman working on a computer to the bombers, tankers, satellites, UAVs, air to air, air to ground." He said future Red Flags will introduce an academic course for flight leaders, prior to the actual exercise, to give them experience in the assembly and employment of larger "packages" of aircraft. Also in the works is expanded training that includes administrative, personnel, medical, public affairs, and morale, welfare, and recreation specialists.

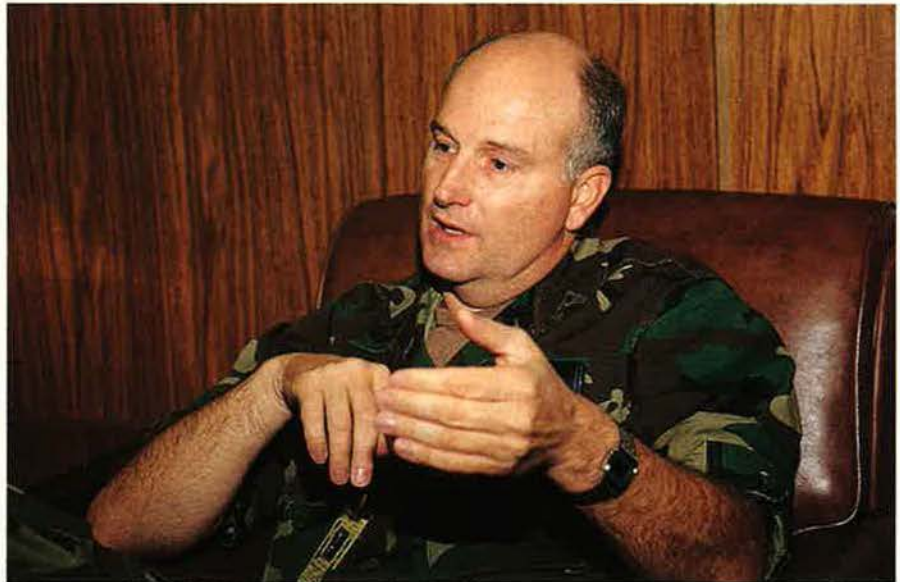


Photo by Paul Kennedy

Staff photo by Guy Aceto



Spanish units brought not only their own C-130s but also two of their own Airtech (CASA/IPTN) CN-235 multipurpose light transports. Small and very maneuverable, the aircraft were worked into the scenarios flying at altitudes under 200 feet, inserting small teams or supplies behind lines or transporting wounded from unprepared strips on the ranges. Crews that flew the nimble transport were proud that, even though they had been targeted by some fighters, they had not been "shot down" during the first two weeks of the exercise.

Above, the CN-235 sits in the foreground, with a Spanish C-130 behind it. At right, crew members postflight the small transport after a sortie.



Staff photo by Guy Aceto



Since December 1992, under the Peace Carvin II program, the 425th Fighter Squadron, from the 56th Fighter Wing at Luke AFB, Ariz., has provided unit-level combat readiness training for the Republic of Singapore. The unit was a natural to lend an Asian flavor to Coalition Flag. At right, two pilots from the 425th prepare for their next sortie. Below, having finished prepping his aircraft, a crew chief keeps a close eye on his charge. He'll have plenty to do in the next two or three hours before the aircraft's return. There is constant evaluation of how well the job is being done.



Staff photo by Guy Aceo

Photo by Paul Kennedy



Air Force crews are aware that national forces seldom go it alone. A coalition of experienced allies working together sits on the line at a number of hot spots around the world. At times, a USAF pilot might find a coalition partner in the next seat. Part of a long-standing exchange program with USAF is F-111F Weapon System Officer and Royal Air Force Squadron Leader Colin Basnett, who checks over a GBU-15 before a mission. The F-111s from the 524th Fighter Squadron, part of the 27th FW, brought their precision deep-strike capability to this year's Flag.



Staff photo by Guy Aceo





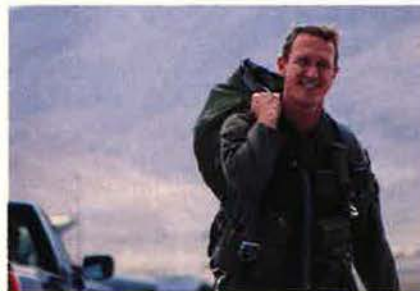
Staff photo by Guy Aceto

Above, an F-16C from the 366th takes off for one last sortie before it is time to return home, evaluate what has been learned, and apply the lessons to the next mission. At right, the EF-18s from Spain sit in a neat row at the end of the day, waiting for their crews to prepare for the long trip home. At bottom, 366th F-16 pilot Capt. Glen Gentilin walks off the flight line at the end of the day. Meeting and working closely with allies whom you may see again can be a satisfying experience.

For the last two decades, whether named Red Flag, Green Flag, Maple Flag, or Coalition Flag, the goals for these exercises have been the same—to provide crews with their first eight to ten combat missions in a realistic training environment. Colonel Oram said the demand for such practice is actually increasing because most missions these days have not been giving pilots a chance to carry out a full range of activities. "Training is not a luxury," he said. "It's a necessity." ■



Photo by Paul Kennedy



Staff photo by Guy Aceto



The TRANSCOM chief surveys needs and prospects for air mobility.

# Rutherford on Lift



*Gen. Robert L. Rutherford is commander in chief of US Transportation Command and commander of USAF's Air Mobility Command, based at Scott AFB, Ill. He is responsible for all military transportation matters. A command pilot with more than 4,000 flying hours to his credit, he assumed his current duties in October 1994. The following is an excerpt of the General's remarks to the Defense Writers Group in Washington, D. C., this past September 14, as the Pentagon grappled with major decisions about the C-17 airlifter, the Nondevelopmental Airlift Aircraft program (NDAA), and other airlift issues.*

## A Bigger Airlift Requirement?

"There are a couple of separate studies going on right now. One of them is looking at two MRCs—the capability with our airlift to do two major regional contingencies. The title of that study is 'Strategic Airlift Force Mix Analysis'—the SAFMA study. It's [studying] what we had looked at in [an earlier mobility study] in terms of [prepositioned supplies], in terms of equipment that needs to be moved into a theater in a certain time. . . .

"A Tactical Utility Analysis is actually being done by PA&E [the Pentagon's Program Analysis and Evaluation office]. That analysis asks, 'Is there anything other than those two MRCs that we need to be concerned about when we buy an airlifter? Are there peacekeeping missions where we would have a requirement for short fields, austere airfields, that would make a difference? Is there a brigade-airdrop requirement?' . . . Will strategic lift be required to support intratheater movement during two MRCs? It's obvious that if they're moving stuff from [rear bases] up to the front lines in Korea, that they're not going to be doing the strategic lift mission. . . .

"Are there things in the Tactical Utility Analysis that would add to the requirement, that we have in the SAFMA analysis, of two MRCs? That's the basic question."

## Concerns about Force Structure

"I think there is a legitimate concern about where we're going with force structure and modernization, and there's a lot of discussion in that regard. . . . [The concern is] general, across the board. In the lift business, we're on a cycle where we are [modernizing] right now. It's about time, I might say. Those C-141s that we're talking about are, on average, twenty-nine-years old. When we designed them, we designed them

for 30,000 hours. They now average 37,000 flying hours. We think we can take them to 45,000 flying hours. Having said that, we've already retired twenty-three of them, just because it wasn't economical to repair them. We've been in this process for some time. We've been working on the C-17 program for about thirteen years."

## C-17 Back From the Grave

"[In 1993,] there was great concern about the future of the [C-17]. . . . At that time Congress saw fit, and I think appropriately so, to allow the US government and McDonnell Douglas to clear the slate and start fresh with a clear understanding that we had about two years to either make or break the C-17 program.

"I would tell you that the progress has been very good. I would cite the testing that's been done. The development test and operational test have been completed. We did the reliability, maintainability, and availability test. . . . It went extremely well. Much better than we had hoped. We think the numbers are rather dramatic. We flew the airplane for thirty days, more than 500 sorties, almost 2,300 hours of flying time, with a ninety-nine percent departure reliability rate. And if you look at the reliability factors, they were very, very good. . . .

"So I think in terms of performance, there's little question now that the C-17 is capable of meeting our requirements and that it performs as advertised."

## Will C-17 Go in Harm's Way?

"We would use the C-17 in a combat situation if we are required to use the C-17. We have built defensive features into the airplane. I can think of a situation where we might well have used the C-17 in Desert Shield and Desert Storm, and that's when we talked about the 'left hook' [the swift,



westward repositioning of US forces to outflank Iraqi forces]. That would have been an outstanding airplane to use in that role, if we needed to. I don't want to run the C-17 or any airlifter into a high-threat environment. I would not do that unless the [theater] commander said it was important. I mean, 'US lives are at stake, and we need to get lift in there.' Then, I think we would probably do it. . . .

"I can think of a lot of situations—in Korea, for example—where we might need to use that airplane. That's just because of the way the airfields are situated, where we're going to be going into, and where the troops are going to be. . . . We couldn't use the 747. I'm not going to say that that's its primary role, but it's one more thing that we've got the capability to do that we can't do today."

### **C-17 For the Balkans?**

"US Transportation Command did participate in the movement of [NATO's Rapid Reaction Force] into Split, Croatia. They moved about 4,500 personnel into Split and something in the neighborhood of 285,000 square feet of equipment down there, for the British and the Dutch. So we are familiar with the area. We fly into Belgrade fairly regularly and Zagreb. . . . I would feel comfortable flying in a C-17, just as easily as I would a C-130, or a -141, or a C-5. I have no preference. I would simply tell you that, if I had to put an airlifter in there—a -141, C-5, or C-17—I would opt for the C-17. If we had to go in, and there was some threat there. I don't want to put my people at risk if I don't have to, but if I've got to do it, I would choose the C-17."

### **Unique Benefits of the C-17?**

"Number one, you can jump out of a C-17; there continues to be an air-drop mission. You can air refuel a C-17. . . . With a roll-on/roll-off capability, easy to load, easy to unload, the C-17 is much easier, and it can be done faster [than with any of the available alternatives]. Short runway, austere airfield—the C-17 has a clear advantage.

"Where does the NDAA fit in? I would tell you that the 747-400, which is the one that we generally talk about when we talk about an NDAA, is a very capable airplane. It will go a long way, and it carries quite a bit of capability. Some would say it's cheaper. We need

to see the numbers, and you need to assess its capability against its cost. So I think it does offer some potential."

### **Not Really a "Commercial" Aircraft**

"The 747-400 is not like any other airplane out there today. The one that we're talking about has a bigger door. It has reinforced floors in it. The bigger door will allow you to handle some of the equipment—the outsize equipment—which we can't carry in another NDAA configuration today. The 747-400 has more range than some of those other airplanes out there. Those are things that we need to consider, have considered. . . .

"The 747-400, by the way, was in two configurations—the A configuration and the B configuration. The A configuration did not have the enlarged door and the strengthened floors. The B configuration did. My preferred option is the B. I want it to be able to handle a full range of equipment if we're going to buy it."

### **Civil Reserve Air Fleet**

"CRAF forms a very, very big portion of our lift capability on a day-to-day basis. When we talk about forty to fifty-two million ton-miles per day—the requirement for this two-MRC we talked about earlier—we've got to remember that the foundation . . . is in the CRAF program. The CRAF program will give us more millions of ton-miles per day than the C-17 does, even if we bought 120 of them. Today we're talking about in the neighborhood of nineteen million ton-miles per day that belong to the CRAF program."

### **No Long-Term Assurances**

"I have committed to me in the CRAF program—the 1996 program—about 274 wide-body-equivalent airplanes. We thought that it was going to be a little bit higher, as a matter of fact. One of the offerers told us on Thursday that he was going to give us fifty-five airplanes, and on Friday he took twenty-five of those back. . . .

"This CRAF program is based on a one-year contract. From year to year, we go out and negotiate that contract with airlines. And it's business decisions that they make out there. That's very volatile, and we need to think about that as we go through the analysis. . . .

"We have to have a sufficient business base out there for the CRAF part-

ners to attract them to the program because they are absolutely vital. This nation cannot afford to buy another 274 wide-body-equivalent airplanes, which is what the CRAF brings to the table. . . . We've got a very, very good program here, and I don't want to in any way compromise it."

### **Ways to Protect CRAF?**

"I don't see much change in the portion of the business going to the CRAF. It might actually creep up a little. The question that the CRAF people have proposed really has to do with the NDAA. 'If you buy these 747-400s, are you going to use them in peacetime, and would that be at the expense of our business?'

"I don't think it's a major problem, but I think the CRAF partners perceive it as a problem. We would not fully utilize a 747-400 in peacetime. We would keep the crews training. I would fly a few routes with them, probably up to that point where the CRAF business will stay at about the same level as today. . . .

"I will fly [the 747-400] about 600 hours a year. I will fly it enough to keep the crews proficient. . . . I don't see the decisions on the C-17/NDAA as affecting the CRAF business base. I think there is concern that we might affect their business base. I don't see it that way."

### **Old Tankers and Transports**

"The KC-135 fleet is old—a little bit older than the -141s. However, if you think about the mission they had, they sat on SAC alert for a number of years. So, while the C-141 has got about 37,000 hours on it, on average, the KC-135 fleet has about 13,000. So we've flown those airplanes significantly less.

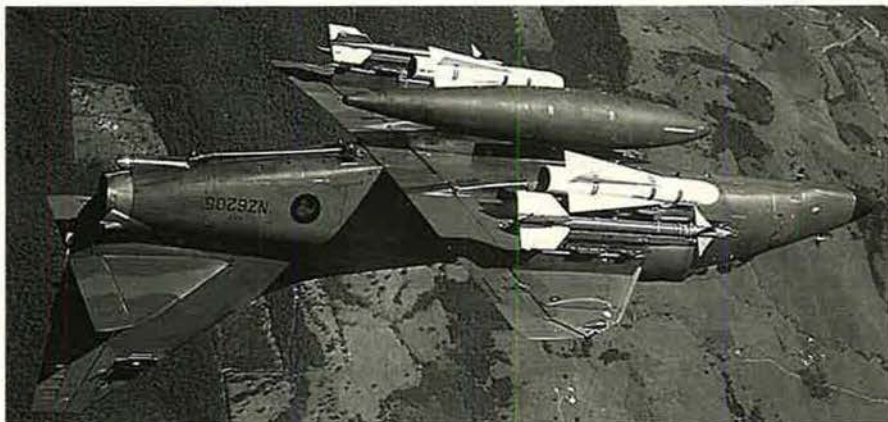
"We think we can extend those [KC-135s] for some time. We've just re-engined the airplanes. We spent almost \$5 billion on those airplanes. We re-skinned them and put new gear on them.

"I'm more concerned about the replacement for the C-5A models than I am right now for a replacement for the KC-135s. But we are looking at both those issues. We are doing engineering analysis down at Oklahoma City [Air Logistics Center] right now to look at the effects of corrosion on both of those airplanes. Right now, we think we can keep the -135s around for some years to come—we think beyond the turn of the century." ■



# Gallery of Far East/Pacific Airpower

By John W. R. Taylor and Kenneth Munson



**A-4K Skyhawk, Royal New Zealand Air Force (Peter Steinemann)**

## Attack Aircraft

### A-4 Skyhawk

Nos. 11 and 12 Squadrons of the Indonesian Air Force, with 26 A-4E Skyhawks and two TA-4H tandem two-seat trainers, constitute their nation's small air attack force. Most other A-4s in the region are upgraded versions.

The Republic of Singapore Air Force recently applied a succession of upgrades to survivors of the 75 surplus USN A-4s that it acquired from 1974, with all but the first eight remanufactured by Singapore Aerospace. Phase I involved reengining with an F404 turbofan; Phase II upgraded the avionics with head-up/head-down displays, LN-93 INS, and other new equipment, leading to initial redesignation as A-4S-1 Super Skyhawks, before full upgrading as A-4SU. Forty-seven are flown by Nos. 142, 143, and 145 Squadrons, from Tengah. Also in service are eight TA-4SU conversion trainers, unique in having separate tandem cockpits.

The Royal New Zealand Air Force has 14 A-4Ks and five TA-4Ks, all upgraded with new wing spars, an AN/APG-66(NZ) radar, HUD/HDDs, a digital flight-control system, radar warning receivers, and a chaff/flare system, plus the capability of carrying Mavericks, AIM-9L Sidewinders, and GBU-16 laser-guided bombs. Six of the A-4Ks are assigned to No. 2 Squadron, based at Nowra, New South Wales, to collaborate with the Royal Australian Navy on maritime strike and air defense duties. The remainder serve with No. 75 Squadron at Ohakea, New Zealand. They are soon to receive self-protection jammers, a laser designator, and (later) GPS navigation and new antiship missiles, ensuring a further decade or more of useful service.

The Royal Malaysian Air Force's 34 A-4PTMs and TA-4PTMs (for Peculiar to Malaysia) were upgraded from ex-USN A-4C/Ls by Grumman with an angle rate bombing set, AGM-65 Maverick compatibility for the air-to-surface role, and AIM-9 Sidewinder AAMs for secondary air defense. They serve with Nos. 6 and 9 Squadrons at Kuantan but are soon to be put up for sale. (Data for A-4SU.)

**Contractors:** McDonnell Douglas Corporation, USA; Singapore Aerospace.

**Power Plant:** one General Electric F404-GE-100D turbofan; 10,800 lb thrust.

**Dimensions:** span 27 ft 6 in, length 41 ft 8½ in, height 14 ft 11½ in.

**Weights:** empty 10,250 lb, gross 22,500 lb.

**Performance:** max speed at S/L 701 mph, ceiling 40,000 ft, T-O run 4,000 ft, landing run 4,500 ft,



**AT-3B Tsu-Chiang, Republic of China Air Force (Denis Hughes)**



**F-111C, Royal Australian Air Force (Peter R. Foster)**

range with max weapon load 720 miles, with max internal/external fuel 2,356 miles.

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

**Armament:** two 20-mm guns in wingroots. Five external stations (one under fuselage, two under each wing) for bombs, rockets, gun pods, and (excluding outboard wing points) drop tanks.

### A-37B Dragonfly

South Korea is the only Pacific Rim country still operating these small counterinsurgency aircraft based on USAF's T-37B Tweet trainer. The Republic of Korea Air Force has about 24 of the 27 A-37Bs acquired in 1976 to replace its F-86D Sabres. Their 2,850 lb thrust turbojets, compared with the T-37's 1,025 lb thrust J69s, permit a better than doubled gross weight. Maximum speed and range are considerably greater, with added provision for in-flight refueling, and up to 4,100 lb of weapons and stores can be carried underwing.

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

**Power Plant:** two General Electric J85-GE-17A turbojets; each 2,850 lb thrust.

**Dimensions:** span over tip tanks 35 ft 10½ in, length 29 ft 3½ in, height 8 ft 10½ in.

**Weights:** empty 6,211 lb, gross 14,000 lb.

**Performance:** max speed at 16,000 ft 507 mph, ceiling 41,765 ft, T-O run 1,740 ft, landing run 1,710-4,150 ft, range with max payload 460 miles, ferry range 1,012 miles.

**Accommodation:** crew of two, side by side, on ejection seats.

**Armament:** one 7.62-mm Minigun in front fuselage. Eight underwing stations for bombs, rocket packs, gun pods, cluster weapons, or other stores.

### AT-3 Tzu-Chung

Design of Taiwan's AT-3 jet basic and advanced trainer started in 1975. The first of two prototypes flew September 16, 1980, and 60 production AT-3s were delivered in 1984-89. Twenty were later converted for close air support duties to equip one RoCAF squadron. Two others were modified for more capable offensive roles in 1989, both receiving a Smiths Industries nav/attack system and a Westinghouse AN/APG-66 fire-control radar. One, redesignated AT-3A Lui-Meng, was fitted with a 30-mm underfuselage gun and a pair of Hsiung-Feng II antiship missiles; the two-seat AT-3B prototype remained in trainer configuration. Neither has yet entered production. (Data for basic standard AT-3.)

**Contractor:** Aero Industry Development Center, Taiwan.

**Power Plant:** two AlliedSignal TFE731-2-2L turbofans; each 3,500 lb thrust.

**Dimensions:** span 34 ft 3¾ in, length 42 ft 4 in, height 14 ft 3¾ in.

**Weights:** empty 8,500 lb, gross 17,500 lb.

**Performance:** max speed at 36,000 ft 562 mph, at S/L 558 mph, ceiling 48,000 ft, T-O run 1,500 ft, landing run 2,200 ft, range on internal fuel 1,415 miles.

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

**Armament:** provision for semirecessed machine gun pack under fuselage. Centerline pylon, two under each wing, and wingtip launch rails, for 6,000 lb of stores including rocket packs, cluster and fire bombs, bombs, flare dispensers, and (on wingtips) close-range AAMs.

### F-111C/G and RF-111C

The Royal Australian Air Force placed an order in the late 1960s for 24 General Dynamics F-111Cs (RAAF designation A8), a model similar to USAF's F-111A except for the longer-span wings of the FB-111A and RAAF-specified avionics. Four ex-USAF F-111As were acquired later as attrition replacements, after refit with F-111C avionics; four of the original 24 were converted to RF-111C strike/reconnaissance configuration, retaining their attack capability but equipped with a Honeywell AN/AAD-5 infrared linescan, three film cameras, and a TV camera. Capability of the F-111Cs has been enhanced by the purchase of 10 Loral AN/AVQ-26 Pave Tack laser designation and ranging pods, carried on a rotating cradle in the aircraft's internal weapons bay.

Seventeen F-111Cs remain in RAAF service with Nos. 1 and 6 Squadrons at Amberley, near Brisbane, the latter unit also accommodating the four RF-111Cs. Replacement of their analog avionics (Texas Instruments terrain-following radar, General Electric attack radar, ccm/nav, flight-control, and weapon delivery systems) with digital systems was initiated by a Rockwell team that includes Hawker de Havilland (airframe modifications) and Smiths Industries. The first upgraded F-111C flew in December 1994. In September 1993 Amberley received the first two of 15 ex-USAF F-111Gs—which already have digital avionics—to augment the existing fleet. It is planned to allocate 13 of these to bring the operational units back to full strength, enabling the F-111 to remain in current inventory until 2020. The other two Gs will provide spares and attrition backup. (Data for F-111C.)

**Contractor:** General Dynamics Corporation, USA.

**Power Plant:** two Pratt & Whitney TF30-P-3 turbofans; each 13,500 lb thrust with afterburning.



**Dimensions:** span 70 ft 0 in spread, 33 ft 11 in swept, length 33 ft 11 in, height 17 ft 1½ in.  
**Weights:** empty 45,200 lb, gross 92,500 lb.  
**Performance:** max speed at 40,000 ft 1,450 mph, ceiling more than 60,000 ft, T-O and landing distance approx 3,000 ft, max range (internal fuel) more than 3,800 miles.

**Accommodation:** crew of two, side by side in zero/zero escape module.

**Armament:** internal weapons bay used for Pave Tack pod; eight underwing weapon stations (inboard four pivoting as wings sweep) for up to 30,000 lb of free-fall or guided bombs, Harpoon or HARM ASMs.

#### Hawk

Export variants of the Royal Air Force's standard advanced flying and weapons trainer have had progressively greater capability for light attack, air defense, and reconnaissance and have led to four dedicated combat versions being sold in the Far East/Pacific region, as follows:

**50 Series.** Combat-capable tandem two-seat trainer, with 5,200 lb thrust Adour 851 turbofan and gross weight of 16,200 lb. Fifteen of the 20 Mk 53s supplied to the Indonesian Air Force in 1980-84 continue to equip the Java-based No. 103 Squadron.

**60 Series.** Development of 50 Series, with 5,700 lb thrust Adour 861, gross weight of 20,061 lb, modified wing leading-edges and flaps, strengthened landing gear, and provision for wingtip AAMs. Disposable load increased by 33 percent (to 6,614 lb) and range by 30 percent, with improved field performance, acceleration, rate of climb, and turn rate. Twenty Mk 67s (hybrids of Series 60/100) delivered to South Korea 1992-93, of which at least three have since been lost.

**100 Series.** Enhanced ground-attack development of 60 Series. Basically two-seater, but likely to carry only pilot on combat missions. Adour 871 turbofan. New combat wings for improved lift and maneuverability. Taller tailfin. Provision for extended nose for FLIR and laser rangefinder. Head-up display/weapon aiming computer, radar warning system, HOTAS (hands on throttle and stick) controls, multipurpose color CRTs, provision for ECM. External load and max T-O weight as for 60 Series. Ten Mk 108s delivered to Malaysia 1994-95 to equip No. 3 Flying Training Center at Kuantan; eight Mk 109s on order for Indonesia. Brunei is expected to order up to 16 Series 100/200 Hawks.

**200 Series.** Single-seat multirole combat aircraft; 80 percent airframe commonality with Series 100. Modified wing leading-edge; new front fuselage with provision for Westinghouse AN/APG-66H radar, FLIR, and laser rangefinder. Max external load 6,614 lb. All five pylons cleared for 8g maneuvers with 1,100-lb loads. First order, from Malaysia, for 18 Mk 208s with wingtip Sidewinders (also fitted to its Mk 108s) and flight refueling nose probe, delivered 1994-95 and equip No. 9 Squadron. Sixteen Mk 209s have been ordered by Indonesia. (Data for Series 200.)

**Contractor:** British Aerospace Defence Ltd, UK.  
**Power Plant:** one Rolls-Royce Turbomeca Adour 871 turbofan; 5,845 lb thrust.

**Dimensions:** span 30 ft 9¾ in, length 37 ft 2½ in, height 13 ft 6¾ in.

**Weights:** empty 9,810 lb, gross 20,061 lb.  
**Performance:** never-exceed speed at height Mach 1.2, max speed at S/L 621 mph, ceiling 45,000 ft, T-O run 2,070 ft, landing run 1,960 ft, radius of action 120-765 miles.

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

**Armament:** four underwing pylons for bombs of up to 2,000 lb, pods of 18 x 2.75-in air-to-surface rockets, Sea Eagle antiship missiles, Sky Flash, Sidewinder, or other AAMs, laser-guided munitions, reconnaissance or EW pods. Wingtip Sidewinders optional.

#### J-5

The MiG-15s of the Chinese People's Liberation Army Air Force that confronted USAF fighter pilots in the Korean War were Russian-built. Jet fighter production in China began when Moscow provided full sets of design drawings of the improved MiG-17F, two completed examples, 15 knocked-down kits, forgings and raw materials for 10 aircraft, and parts for 15 more. The first of 767 MiG-17s built subsequently at Shenyang flew on July 19, 1956, under the designation J-5. Most of them probably remain available to the PLA Air Force and PLA Navy in a training role. At least 100 others are deployed by the Air Force of North Korea for ground-attack. Those supplied to Vietnam are believed to be in storage. The basic J-5 is equivalent to the MiG-17F (NATO "Fresco-C") day fighter. The J-5jia is the Chinese-built MiG-17PF ("Fresco-D"), with IZUMRUD radar. The WP5 afterburning turbojet fitted to aircraft built at Shenyang is similar to the Soviet Klimov VK-1F, itself developed from the Rolls-Royce Nene. (Data for J-5.)

**Contractor:** Shenyang Aircraft Corporation, People's Republic of China.  
**Power Plant:** one Liming WP5 turbojet; 7,450 lb thrust with afterburning.



**Hawk Mk 108, Royal Malaysian Air Force (Peter Steinemann)**



**J-6, Chinese PLA Air Force**

**Dimensions:** span 31 ft 7 in, length 37 ft 3¼ in, height 12 ft 5¼ in.

**Weights:** empty 8,664 lb, gross 13,393 lb.  
**Performance:** max speed at 10,000 ft 711 mph, ceiling 54,450 ft, T-O run 1,935 ft, landing run 2,690-2,790 ft, range 870 miles.

**Accommodation:** pilot only, on ejection seat.  
**Armament:** one 37-mm N-37D and two 23-mm NR-23 guns in nose; underwing pylons for four eight-rocket packs or total of 1,100 lb of bombs.

#### J-6

Although the J-6 is China's counterpart of the MiG-19, which entered Soviet Air Force service 40 years ago, it outnumbers any other type of aircraft in the PLA Air Force. Around 3,000 were delivered from Shenyang and Nanchang, exceeding the total built in the USSR. Most are single-seat, similar to the MiG-19SF day fighter (NATO "Farmer-C") and MiG-19P limited all-weather fighter ("Farmer-D"). More than 2,000 are believed to serve with the PLA Air Force and 300 with the Navy, for both interception and ground attack. Shenyang also built tactical reconnaissance JZ-6s, with an IR linescan/camera pack in the front fuselage, and 634 JJ-6 tandem-seat fighter-trainers. The Guizhou aircraft factory delivered a small number of J-6As, with all-weather radar, PL-2 IR-homing AAMs similar to the Russian AA-2 ("Atoll"), a rocket ejection seat, and other changes.

The Air Force of North Korea operates about 100 J-6s. At least five still serve in the reconstituted Cambodian Air Force. (Data for J-6 day fighter.)

**Contractors:** Shenyang Aircraft Corporation, Nanchang Aircraft Manufacturing Company, and Guizhou Aircraft Industrial Corporation, People's Republic of China.

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

**Dimensions:** span 30 ft 2¼ in, length incl probe 48 ft 10½ in, height 12 ft 8¾ in.

**Weights:** empty 12,700 lb, gross 22,045 lb.  
**Performance:** max speed at 36,000 ft Mach 1.45, at S/L 832 mph, ceiling 58,725 ft, T-O run 2,953 ft, landing run with brake-chute 1,970 ft, combat radius with two drop tanks 426 miles, max range on internal fuel 863 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 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.

#### JH-7

At least one prototype of this important new Chinese warplane flew for the first time in late 1988 or early 1989. In much the same role class as the Soviet Sukhoi Su-24 "Fencer," the JH-7 was designed for a main all-weather interdiction/strike function in the PLA Air Force (with a secondary role of air defense interceptor) and as a maritime strike aircraft with the PLA Navy. Design features include shoulder-mounted swept wings and an all-moving tailplane; avionics are said to include terrain-following radar.

It is believed that service entry was originally scheduled for 1992 or 1993, but this appears to have been delayed, and no genuine photographs (apart from one of a static test airframe) have yet been publicly seen. However, there were indications earlier this year that the type—perhaps in the form of a preproduction batch for operational trials—has at least been delivered to PLA Naval Aviation.

**Contractor:** Xian Aircraft Manufacturing Company, People's Republic of China.

**Power Plant (prototypes):** two Xian WS9 (license Rolls-Royce Spey Mk 202) turbofans, each 20,515 lb thrust with afterburning. Intended production engines believed to be Liming turbofans of 31,085 lb afterburning thrust.

**Dimensions:** span 42 ft 0 in, length (excl nose probe) 68 ft 10¾ in, height 20 ft 4¾ in.

**Weights:** max weapon load 11,023 lb, gross 60,439 lb.  
**Performance:** max speed at height Mach 1.6-1.7, ceiling (clean) 50,850 ft, T-O run 3,019 ft, landing run 3,445 ft, combat radius 559 miles.

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

**Armament:** 23-mm twin-barrel gun in nose. Four underwing hardpoints for various external weapons (including C-801 sea-skimming antiship missiles in maritime configuration), drop tanks, or other stores; rail for close-range AAM at each wingtip.

#### MB-339A/C/FD

First flown on December 17, 1985, the MB-339C is an upgraded model of Aermacchi's earlier MB-339A, which equips the Italian and several foreign air forces as a basic/advanced trainer and ground-attack aircraft. Further MB-339A details can be found in the "World Gallery of Trainers" in the December 1994 *Air Force Magazine*. Malaysia's No. 3 Flying Training Center has eleven As for advanced and weapons training, which could provide a light attack capability if required. Differences in the MB-339C include a more powerful engine, modified nose contours, larger permanent wingtip fuel tanks, and a fully integrated digital nav/attack system with a HUD in each cockpit, enabling either crew member to instigate air-to-ground weapon delivery. In May 1990, the Royal New Zealand Air Force ordered 18 MB-339Cs (known locally as MB-339CBs) to replace its elderly BAe Strikemasters. Deliveries began in March 1991. At least one has been lost and another badly damaged since then. Aermacchi has teamed with Hawker de Havilland and Honeywell to offer the MB-339FD (full digital) to meet Australia's need for up to 45 new lead-in fighter-trainers to replace its elderly MB-326Hs. The winner is expected to be selected in mid-1996. (Data for MB-339C.)

**Contractor:** Aermacchi SpA, Italy.  
**Power Plant:** one Rolls-Royce Viper Mk 680-43 turbojet; 4,400 lb thrust.

**Dimensions:** span 36 ft 9¾ in over tip tanks, length 36 ft 10½ in, height 13 ft 1¼ in.

**Weights:** empty 7,562 lb, gross 10,983-14,000 lb.  
**Performance:** at 10,983 lb clean gross weight: max speed at S/L 558 mph, at 30,000 ft 508 mph, ceiling 46,700 ft, T-O run 1,608 ft, landing run 1,509 ft, range 1,266 miles with two 86-gal drop tanks and 10 percent reserves.

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

**Armament:** three hardpoints under each wing for up to 4,000 lb of stores including 12.7-mm or 30-mm gun pods (inboard pair only), single or cluster bombs, rocket launchers, ASMs or antiship missiles, or (outboard pair only) AAMs.

#### MiG-23

Suggestions that Vietnam has variable-geometry MiG-23 fighters have never been substantiated. The only confirmed operator among nations included in this "Gallery" is North Korea, which received the first of some 60 single-seat interceptors and a handful of MiG-23UB (NATO "Flogger-C") tandem two-seat fighter-trainers in 1984. The first batch consisted of MiG-23MFs ("Flogger-Es"), with R-23R ("Apex") AAMs instead of the less-effective R-3S ("Atoll") of the Air Force's earlier MiG-21s, a 23-mm twin-barrel GSh-23 gun, Sapfir-23D ("High Lark") radar with a search range of 43 miles and tracking range of 34 miles, undernose IR sensor pod, and RWR as standard. They were followed by MiG-23MLs ("Flogger-Gs"), with R-35 turbojet in place of the MF's 27,540 lb thrust R-29-300, lighter-weight Sapfir-23ML radar, and distinctive small dorsal fin. (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 spread, 25 ft 6¼ in swept, length incl nose probe 54 ft 10 in, height 15 ft 9¾ 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 with six AAMs 715 miles, with 4,410 lb of bombs 435 miles.

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

**Armament:** one twin-barrel 23-mm GSh-23L gun, with 200 rds, in belly pack; six external hardpoints for up to 6,615 lb of R-60T ("Aphid") and R-23R/T ("Apex") AAMs, bombs, rocket packs, or other stores.

#### OV-10 Bronco

Indonesia operates about 12 of the 16 OV-10F Bronco counterinsurgency aircraft that it received from August 1976 to replace F-51D Mustangs. Now equipping No. 3 Squadron of the Air Force, at Baucou, the twin-boom, turboprop OV-10Fs have been used during campaigns to subdue unrest in parts of what is the world's fifth most populous nation, made up of some 13,000 islands. Faced with similar internal problems, the Philippine Air Force acquired 24 ex-USAF OV-10As by mid-1992, as AT-28D Trojan replacements. At least one has since been lost; the remainder equip No. 16 Squadron of its 15th Strike Wing at Sangley Point.

**Contractor:** Rockwell Corporation, USA.

**Power Plant:** two AlliedSignal T76-G-416/417 turboprops; each 715 ehp.

**Dimensions:** span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.

**Weights:** empty 6,893 lb, gross 9,908–14,444 lb.

**Performance:** max speed at S/L 281 mph, ceiling 24,000 ft, T-O run (9,908 lb gross weight) 740 ft, landing run 740–1,250 ft, combat radius with 3,600-lb weapon load 228 miles.

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

**Armament:** two short spigons each house two 7.62-mm M60C machine guns, with 500 rds per gun. Four pylons under spigons each have a capacity of 600 lb; a centerline fifth pylon can carry 1,200 lb. Stores can include bombs, fire bombs, cluster bombs, rocket packs, 7.62-mm Minigun and 20-mm gun pods, flares, smoke canisters, and Sidewinder AAMs.

#### Q-5/A-5

This much-redesigned attack version of the J-6 (Chinese MiG-19) was first flown on June 4, 1965. The original Q-5 had a 13-ft internal bay for two 551-lb or 1,102-lb bombs, with two more under the fuselage, plus four underwing stations for rockets or other stores. A few were adapted to carry nuclear weapons. In the Q-5 I, which replaced it in production from late 1981, the bomb bay was blanked off, its space being used for additional fuel, and all four bombs were hung under the fuselage. Other features included improved engines and pilot seat and a relocated brake-chute. January 1985 saw production approval for the Q-5 IA, with two more underwing stations (increasing external load by 1,102 lb), pressure refueling, improved warning and ECM systems, and other refinements. Current version in Chinese service is the Q-5 II, which is similar to the IA but fitted (or retrofitted) with a radar warning receiver. Some 500–600 Q-5s of all versions are thought to be in PLA service, including about 100 with the Naval Air Force. The latter can carry two underfuselage torpedoes or C-801 antiship missiles.

The first Far East/Pacific export customer was North Korea, which received 40 Q-5 IAs in the 1980s. More recently, deliveries were completed in 1994 of 24 A-5Cs (similar to those for Pakistan; see "Gallery of South Asian Airpower," February 1995, p. 39) to the Myanmar Air Force. (Data for Q-5 IA.)

**Contractor:** Nanchang Aircraft Manufacturing Company, People's Republic of China.

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

**Dimensions:** span 31 ft 9 in, length (incl nose probe) 51 ft 4 1/4 in, height 14 ft 2 1/4 in.

**Weights:** empty 14,054 lb, gross 20,913–26,080 lb.

**Performance:** (clean): max speed at 36,000 ft 740 mph, at S/L 752 mph, ceiling 52,000 ft, T-O run 2,300–2,460 ft, landing run 3,480 ft, combat radius with max external stores 248–373 miles, range with max internal/external fuel 1,240 miles.

**Accommodation:** pilot only, on low-speed/zero height ejection seat.

**Armament:** one 23-mm Norinco 23-2K gun in each wingroot (100 rds/gun); 10 external stations (four under fuselage, three under each wing) for many different combinations of bombs, rockets, antiship or AAMs, ECM pods, or drop tanks, up to max load of 4,410 lb.

#### Su-7 and Su-20/22

The 923d "Yen The" and 937th "Hau Giang" Fighter-Bomber Regiments of the Vietnamese People's Air Force, based at Tho Xuan, fly variable-geometry Su-22M-3s (NATO "Fitter-Js"), plus a few tandem two-seat Su-22UM-3K ("Fitter-G") trainers. Their primary mission is ground attack, but some aircraft carry reconnaissance pods.

The Su-22M-3 is supersonic at both high and low altitude. It has a laser rangefinder in its air intake centerbody but no fire-control radar. Its equipment

includes a radar warning system with 360° cover, chaff/flare and decoy dispensers. Only the outer 13 ft 9 in of each wing is pivoted, with manually selected sweep angles of 30°, 45°, and 63°. Like the Su-22s supplied to North Korea, it has a Tumansky R-29BS-300 turbojet; but North Korea also has some earlier Su-20s ("Fitter-Cs") with 24,800 lb thrust Saturn/Lyulka AL-21F-3 engine, as well as about 30 original fixed-wing Su-7BMKs ("Fitter-As"). (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 spread, 32 ft 10 3/4 in swept, length incl probes 62 ft 5 in, height 16 ft 10 in.

**Weight:** gross 42,990 lb.

**Performance:** max speed at height Mach 1.74, at S/L (clean) Mach 1.1, ceiling 49,865 ft, T-O run (clean) 4,922 ft, landing run 3,609 ft, max range 870 miles at S/L, 1,585 miles at height.

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

**Armament:** two 30-mm NR-30 guns, each with 80 rds, in wingroots; up to 8,820 lb of external stores, including Kh-23 ("Kerry") and antiradiation Kh-28 ("Kyle") ASMs, rocket packs, and bombs.

#### Su-25

North Korea's ground-attack force is spearheaded by 20 Su-25 (NATO "Frogfoot-A") single-seat, close-support aircraft. As described in the "Gallery of Russian Aerospace Weapons" (March 1995 issue), the Su-25 was designed to battle through to its targets at low level, with a heavy weapon load, against heavy opposition. The pilot sits in an armored cockpit, which, with other survivability features, accounts for 7.5 percent of the aircraft's normal takeoff weight. The engines, based on the MiG-21MF's well-proven R-13 turbojet, will run on any fuel likely to be found in a combat area, 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 level speed at S/L 606 mph, max attack speed, airbrakes open, 428 mph, ceiling 22,965 ft, T-O run 3,935 ft, landing run 1,312–1,970 ft, range with combat load at S/L 466 miles, at height 776 miles.

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

**Armament:** one twin-barrel 30-mm gun in port side of nose, with 250 rds. Eight underwing pylons for 9,700 lb of air-to-surface weapons, including Kh-23 ("Kerry"), Kh-25 ("Karen"), and Kh-29 ("Kedge") ASMs, SPPU-22 pods for 23-mm guns with twin barrels that pivot downward, 57-mm to 330-mm rockets, laser-guided rocket-boosted bombs, and 1,100-lb incendiary, anti-personnel, and other cluster bombs. Two small outboard pylons for R-3S ("Atoll") or R-60 ("Aphid") AAMs.



**E-2C Hawkeye,  
Republic of Singapore Air Force  
(Peter Steinemann)**



**F-50 Maritime Enforcer Mk 2s,  
Republic of Singapore Air Force  
(Peter Steinemann)**

## Bombers and Maritime

#### E-2C Hawkeye

The E-2 Hawkeye, the US Navy's standard carrier-based AEW&C (Airborne Early Warning and Control) aircraft since the mid-1960s, pioneered the now-standard rotodome form of rotating "saucer" radome, containing a Randtron AN/APA-171 radar with antennas that provide both radar and IFF data. The General Electric AN/APA-145 radar processing system fitted to the latest Group II E-2Cs can detect and assess more than 2,000 targets over a radius of more than 345 miles, from 3,000 ft, and can control more than 40 intercepts simultaneously. Smaller targets, such as cruise missiles, can be detected at well over 100 miles range, the movement of ships and land vehicles can be monitored, and friendly aircraft can be helped to elude enemy defenses by a Litton AN/ALR-73 passive detection system that locates hostile radar emitters over twice the range of the radar.

Singapore received four Group 0 E-2Cs, with AN/APA-138 radar, in 1987. Japan received eight Group 0 and five Group II E-2Cs, in four batches, between 1982 and the end of 1993. The latest recipient in the region is Taiwan, which received the first of an order for four in 1994. (Data for Group II E-2C.)

**Contractor:** Northrop Grumman Corporation, USA.

**Power Plant:** two Allison T56-A-427 turboprops; each 5,100 shp.

**Dimensions:** span 80 ft 7 in (folded 29 ft 4 in), length 57 ft 9 in, height (rotodome raised) 18 ft 4 in.

**Weights:** empty 40,484 lb, gross 54,426 lb.

**Performance:** max speed 389 mph, max cruising speed 374 mph, ceiling 37,000 ft, T-O run 1,850 ft, landing run 1,440 ft, time on station 200 miles from base 4 h 24 min, endurance 6 h 15 min.

**Accommodation:** crew of five, comprising pilot, copilot, combat information center officer, air control officer, and radar operator.

**Armament:** none.

#### F27/F50 Maritime and Enforcer

The three twin-turboprop F27 Maritime aircraft of No. 27 Squadron, Philippine Air Force, are variants of the Fokker F27 Friendship transport produced for unarmed reconnaissance duties. When the F27 was succeeded on the production line by the upgraded F50, with more powerful PW125B engines in place of the earlier 2,050 shp Darts, Fokker continued to offer unarmed F50 Maritime Mk 2s for coastal surveillance or search and rescue, and Maritime Enforcer Mk 2s for antiship warfare (ASW), antisurface vessel (ASV), or armed surveillance missions, weapon selection and installation being done by the operator rather than the manufacturer.

The Republic of Singapore Air Force is taking delivery of five Maritime Enforcer Mk 2s, with a 230-mile range Texas Instruments APS-134(V)7 search radar in an underbelly blister, MAD (magnetic anomaly detector), FLIR imaging turret, ESM, and other specialized equipment. Its No.121 Squadron is already replacing veteran Skyvans with four UTA utility transports generally similar to the standard Fokker 50 except for a rear cargo door and reinforced cabin floor that enable it to carry an F-16's F100 engine, extra fuel, and provisions for airdrop and medevac missions. (Data for Maritime Enforcer Mk 2.)

**Contractor:** Fokker Aircraft BV, the Netherlands.

**Power Plant:** two Pratt & Whitney Canada PW125B turboprops; each 2,500 shp.

**Dimensions:** span 95 ft 1 1/4 in, length 82 ft 10 in, height 27 ft 3 1/2 in.

**Weights:** empty 32,620 lb, gross 45,900–47,500 lb.

**Performance:** normal cruising speed at 20,000 ft 298 mph, typical search speed 172 mph, ceiling 25,000 ft, T-O distance 5,000 ft, landing distance 2,500 ft, max radius of action with external tanks 1,956 miles; max time on station 14 h 20 min.

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

**Armament:** Fokker-installed stores management system only: weapons (selected and fitted by operator) can be carried on two fuselage stations and three under each wing, and can include two or four homing torpedoes and/or depth bombs for ASW, or four AGM-84D Harpoon ASMs for antiship missions. Two underwing drop tanks can be carried to extend patrol range.

#### H-5/II-28

After receiving up to 500 II-28 bombers (NATO "Beagle") from the Soviet Union, China's leaders decided to use experience gained in repairing and manufacturing spares for these aircraft to produce



design drawings and build the aircraft in series at Harbin as the H-5 (Hongzhaji-5: "Bomber 5").

About 40 percent of the airframe was redesigned. A one-piece wing superseded the original design, spliced on the centerline, saving 220 lb of structure weight. Many components, including the tailgun turret, were made common with those of the H-6 (Tu-16). The radar, bombsight, and IFF were new. A prototype flew for the first time on September 25, 1966; production began seven months later. At least 100 H-5s and H-28s are believed to still be used for training in the PLA Air Force, plus 150 serving as torpedo-bombers with the Navy. (Data for H-28; H-5 generally similar.)

**Contractors:** Ilyushin OKB, former USSR; Harbin Aircraft Manufacturing Corporation, People's Republic of China.

**Power Plant:** two Klimov VK-1A turbojets; each 5,952 lb thrust. (Chinese WP5 equivalent in H-5.)

**Dimensions:** span 70 ft 4 1/2 in, length 57 ft 11 in, height 21 ft 11 3/4 in.

**Weights:** empty 28,417 lb, gross 46,738 lb.

**Performance:** max speed at 14,760 ft 560 mph, ceiling 40,350 ft, T-O run 2,870-3,773 ft, landing run 3,838 ft, range 1,490 miles.

**Accommodation:** crew of three, comprising pilot, navigator/bombardier in nose compartment, and radio operator/gunner in tail turret.

**Armament:** two 23-mm NR-23 guns, each with 100 rds, in nose; two more, each with 225 rds, in tail turret. Up to 6,614 lb of stores in internal weapons bay, typically four 1,100-lb or eight 550-lb bombs. Naval version carries one large or two smaller torpedoes, mines, or depth charges.

## H-6

China's strategic bomber force consists of around 120 license-built copies of the intermediate-range Russian Tupolev Tu-16 (NATO "Badger"). The Chinese prototype, designated H-6, flew for the first time at Harbin on September 27, 1959. An H-6 assembled that year from a knocked-down component kit was modified to carry China's first atomic bomb, which was dropped successfully in 1965. Difficulties experienced by Chinese industry in the early 1960s delayed manufacture, but, following transfer of the program to Xian, the H-6A production prototype eventually flew there on December 24, 1968.

The H-6A's Xian-built WP8 turbojets are generally similar to the Tu-16's RD-3M engines. It has a Chinese-developed avionics suite, comprising a computer, automatic navigation system, Doppler radar, heading and attitude system, autopilot, and bombing radar. A version designated H-6D and first flown on August 29, 1981, is operated by the PLA Naval Air Force as a carrier for China's C-601 antiship missile. An enlarged cylindrical undernose fairing houses associated missile guidance radar. Other variants are in service as ECCM aircraft and, in small numbers, as launch aircraft for high-speed, high-altitude drones. Production ended in the late 1980s. (Data for H-6D.)

**Contractor:** Xian Aircraft Manufacturing Company, People's Republic of China.

**Power Plant:** two Xian WP8 turbojets; each 20,944 lb thrust.

**Dimensions:** span 112 ft 2 in, length 114 ft 2 in, height 33 ft 11 3/4 in.

**Weights:** empty 84,944 lb, gross 158,733-167,110 lb.

**Performance:** max cruising speed 488 mph, ceiling 39,370 ft, T-O run 6,890 ft, landing run 5,050 ft, max range 2,672 miles.

**Accommodation:** crew of six.

**Armament:** six guns, in pairs, in dorsal, ventral, and tail turrets. Two C-601 antiship missiles underwing. Nuclear or conventional bombs in weapons bay. Chute for flares and marine markers to rear of weapons bay.

## N22 Searchmaster

Like the Missionmaster (see Transports and Tankers section), the maritime Searchmaster is based on the Nomad twin-turboprop STOL utility aircraft. This began life, in N22B form, as a short/medium-range transport for 13 passengers and/or freight. With a lengthened fuselage, seats for 17 passengers, a commuter interior, and IFF avionics as standard, it became the N24A.

The basic coastal patrol Searchmaster B has a Bendix/King RDR 1400 search radar, with an 18-in forward-looking flat-plate antenna in a nose radome, and carries a four-man crew. Three serve with the Papua New Guinea Defence Force. The other operator in this region is the Indonesian Navy's No. 800 Squadron, whose 16 N22s include a few more-sophisticated Searchmaster Ls. These have a Litton APS-504(V)2 search radar, with a 360° scan, 40-in flat-plate phased-array antenna in an undernose "lozenge" radome; Doppler, Omega, or inertial long-range navigation; and a crew of five. (Data for Searchmaster L.)

**Contractor:** Government Aircraft Factories, Australia.  
**Power Plant:** two Allison 250-B17C turboprops; each 420 shp.



**P-3C/Update III Orion, Republic of Korea Navy**



**S-2E Tracker, Republic of China Navy (Peter Steinemann)**

**Dimensions:** span 54 ft 2 in, length 41 ft 3 in, height 18 ft 2 in.

**Weights:** empty 5,897 lb, gross 9,100 lb.

**Performance:** normal cruising speed 193 mph, ceiling 21,000 ft, T-O run 970 ft, landing run 780 ft, range 841 miles.

**Accommodation:** crew of five.

**Armament:** provision for four underwing hardpoints, each for a 500-lb store, including gun and rocket pods.

## P-3 Orion

Five P-3Ks (equivalent to the USN's P-3B) were delivered to the Royal New Zealand Air Force in 1966. Augmented by a sixth (ex-Australian) example in 1985, they underwent a stage 1 avionics upgrade in the mid-1980s. Stage 2, now approved, involves partial wing and tail component replacement (Project Kestrel) and a further avionics improvement program (Project Sirius), which will enable them to remain in service with No. 5 Squadron beyond 2000.

Australia replaced its original P-3Bs by 10 P-3C/Update II Orions (Australian designation P-3W) and a further 10 Update II.5s. Equipment differences in the P-3Ws, 18 of which still equip Nos. 10 and 11 Squadrons, include an AQS-901 processing system for Australian Barra sonobuoys. E-Systems, Inc., is to integrate a new mission and avionics suite for these aircraft that includes an Elta EL/M-2022A(V)3 radar, ASQ-504 MAD, Computing Devices of Canada UYS-503 acoustic processor, Loral data management system, Honeywell ring-laser gyro inertial navigation system with GPS positioning, and Magnavox HF, VHF, and UHF radios. A 3,000-lb weight saving will enhance aircraft performance. The RAAF is also to acquire three ex-USN P-3Bs as TAP-3B crew trainers.

Japan acquired three US-built P-3C/Update II.5s before local production (starting with four CKD kits) was initiated by Kawasaki for the JMSDF, which plans to have 109 eventually. One hundred and eight have so far been ordered, of which more than 100 have been delivered, including 69 Update II.5s; they equip nine JMSDF patrol squadrons of the 1st, 2d, and 4th Fleet Air Wings at Atsugi (two), Hachinohe (two), Kanoya (two), Naha (two), and one at Iwakuni, plus three miscellaneous units. Four of those ordered are electronic surveillance EP-3s (NEC/Mitsubishi suite with 230-mile capture range; first delivery March 1991); two others are UP-3D ECM trainers; one is a UP-3C for use as a test-bed.

The South Korean Navy ordered eight of the latest-standard P-3C/Update IIIs to replace its older S-2 Trackers of No. 613 Squadron at Pohang. Deliveries (two aircraft) began in April 1995 and should be completed this year. (Data for P-3C/Update III.)

**Contractor:** Lockheed Martin Aeronautical Systems, USA.

**Power Plant:** four Allison T56-A-14 turboprops; each 4,910 hp.

**Dimensions:** span 99 ft 8 in, length 116 ft 10 in, height 33 ft 8 1/2 in.

**Weights:** empty 61,491 lb, max expendable load 20,000 lb, gross 135,000-142,000 lb.

**Performance:** econ cruising speed at 110,000 lb gross weight at 25,000 ft 378 mph, patrol speed at 1,500 ft at same weight 237 mph, ceiling 28,300 ft, T-O run 4,240 ft, landing distance 2,770 ft, mission radius (3 h on station at 1,500 ft) 1,550 miles.

**Accommodation:** normal crew of 10, including five in tactical compartment in main cabin; up to 13 additional relief crew or passengers optional.

**Armament:** one 2,000-lb or three 1,000-lb mines, or up to eight depth bombs or torpedoes, or depth bomb/torpedo combinations (incl nuclear depth bombs) in internal weapons bay. Ten underwing pylons for torpedoes, mines, rockets, or other stores. Total max weapons load 19,250 lb.

## S-2 Tracker and Turbo Tracker

The strong fleet of Tracker antisubmarine and maritime patrol aircraft operational in South Korea will diminish in importance as this country builds up its new P-3 Orion units. South Korea has around 20 of the original S-2A and S-2F piston-engine versions of the Tracker, restricted to shorebased operation. Standard equipment includes AN/APS-38 search radar in a retractable radome in the center-fuselage, AN/ASQ-10 MAD in a retractable tailsting, a 70 million candlepower searchlight on the leading-edge of the starboard wing, and sonobuoy stowage in the rear of the engine nacelles. The S-2F differs from the A primarily in having added AQA-3 Jezebel passive acoustic search equipment and Julie explosive echo-sounding equipment.

Taiwan's Navy contracted with Grumman to have its 32 S-2Es, S-2Fs, and S-2Gs converted into S-2T Turbo Trackers, with 1,645 shp AlliedSignal TPE331-15AW turboprops. An updated avionics/ASW package includes a MAPADS 902F acoustic processor, AN/ASQ-504(V) MAD, AN/APS-509 radar, AN/ARR-84 acoustic receivers, and an AN/ASN-150 tactical navigation system integrated with the INS and Rockwell Collins radios. Max speed is increased to 311 mph at 5,000 ft, with an 1,100-lb increase in payload and generally improved field and climb performance. The first two S-2Ts, converted by Grumman, were delivered in 1992; the remainder were to be modified in Taiwan by AIDC, using kits supplied by Grumman. (Data for S-2E.)

**Contractor:** Grumman Corporation, USA.  
**Power Plant:** two Wright R-1820-82WA piston engines; each 1,525 hp.

**Dimensions:** span 72 ft 7 in, length 43 ft 6 in, height 16 ft 7 1/2 in.

**Weights:** empty 19,033 lb, gross 26,867 lb.

**Performance:** max speed at 5,000 ft 253 mph, ceiling 22,000 ft, T-O run 1,300 ft, range 1,150 miles.

**Accommodation:** crew of four, comprising pilot, copilot, and two radar operators.

**Armament:** one depth bomb or two torpedoes in weapons bay. Depth bombs, torpedoes, or rockets on six underwing hardpoints. Max weapon load is 4,810 lb.

## SH-5

Detail design of China's SH-5 (Shuishang Hongzhaji 5: "Maritime Bomber 5") was completed in February 1970. The first flying prototype came out of final assembly in December 1973 but did not begin water taxi tests until late 1975; it made its first flight on April 3, 1976. The program then languished until 1984-85, when six more were built and flown. Four of these were handed over to the PLA Navy in September 1986 for service at Tuandao Naval Air Station, Qingdao. One of the others was successfully used in a fire-fighting (water-bombing) trials program, but no further SH-5s have been built.

Primary roles intended for the SH-5 were antisubmarine and antiship warfare and maritime patrol and surveillance. It can also be used for mine-laying, SAR, or carriage of bulk cargo. The hull is unpressurized but fully amphibious; wingtip stabilizing floats are non-retractable. Doppler search radar is installed in the nose "thimble" and MAD in the tailsting. SAR gear, sonobuoys, and other maritime equipment can be carried internally.

**Contractor:** Harbin Aircraft Manufacturing Company, People's Republic of China.

**Power Plant:** four Dongan WJ5A turboprops; each 3,150 hp.

**Dimensions:** span 118 ft 1 1/4 in, length 127 ft 7 1/2 in, height 32 ft 2 in.

**Weights:** empty (ASW) 58,422 lb, gross 99,208 lb.

**Performance:** max cruising speed 280 mph, min patrol speed 143 mph, ceiling 33,630 ft, T-O run (water) 1,582 ft, landing run (water) 2,143 ft, max range 2,951 miles, endurance (on two engines) 12-15 hours.

**Accommodation:** flight crew of five, plus systems/equipment operators (normally three) according to mission.

**Armament:** twin-gun remotely controlled dorsal turret. Four underwing hardpoints for C-101 sea-skimming antiship or other missiles (one on each inboard pylon), lightweight torpedoes (up to three on each outer





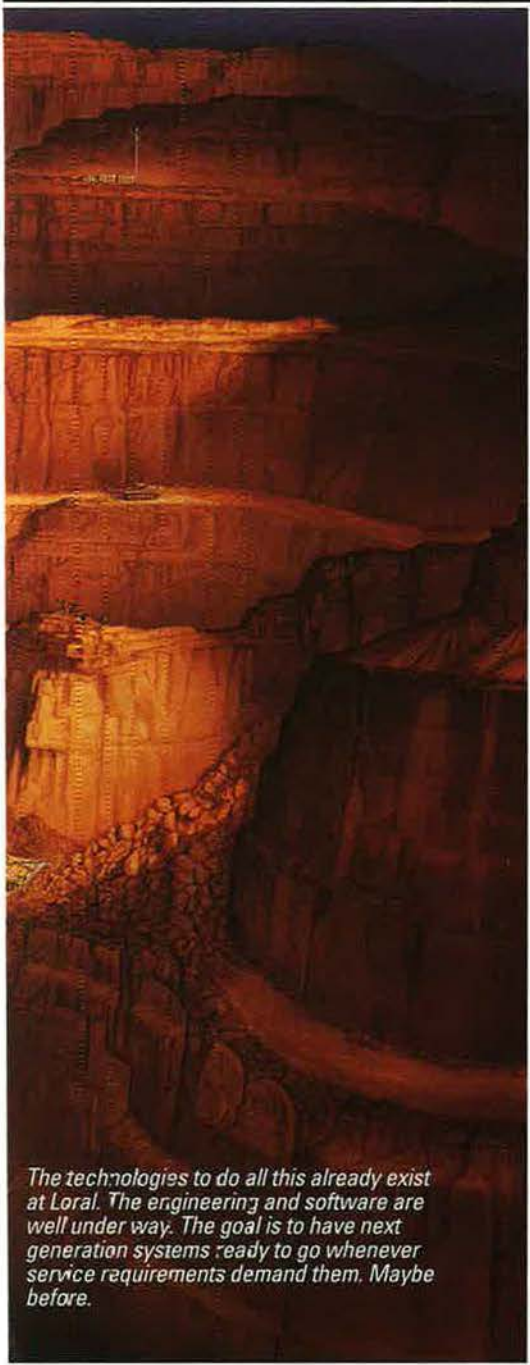
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pylon), or other stores. Internal bay in rear of hull for depth charges, mines, or bombs.

### Surveillance

The Indonesian Air Force's three special Boeing 737-200 Surveillers are undergoing a four-year upgrade program to enhance their long-range overwater patrol capability. The first was redelivered in August 1993 after modification by Boeing's Defense & Space Group; the others are being reworked under subcontract by IPTN of Indonesia.

The Surveiller has always been distinguished by its Motorola SLAMMR (side-looking airborne modular multimission radar) installation, which requires a 16-ft antenna fairing on each side of the upper rear fuselage. With this equipment, it can spot small ships in heavy seas up to 115 miles away, from a patrol altitude of 30,000 ft. The upgrade provides a real-time SLAMMR display as part of a package that includes a new nose-mounted search radar, Cossor IFF interrogator, long-focal-length camera, improved mission avionics, a five-console data processing and display system derived from the system developed by Boeing for the P-3 Update IV, and updated nav/com equipment. All three aircraft continue to double as government transports, with 14 first-class and 88 tourist-class seats.

**Contractor:** Boeing Commercial Airplane Group, USA.  
**Power Plant:** two Pratt & Whitney JT8D-17A turbofans; each 16,000 lb thrust.

**Dimensions:** span 93 ft 0 in, length 100 ft 2 in, height 37 ft 0 in.

**Weights (standard 737-200):** empty 61,630 lb, gross 124,500 lb.

**Performance:** max cruising speed at 33,000 ft 532 mph, ceiling approx 40,000 ft, T-O field length 5,300 ft, landing field length 4,500 ft, max range approx 2,900 miles.

**Accommodation:** crew of three or four; up to 20 seated survivors, or 12 litters and up to three medical attendants or observers, in main cabin.

**Armament:** none.

## Fighters

### Ching-Kuo

Although the US government embargoed sale of the Northrop F-20 Tigershark to Taiwan, it permitted US manufacturers to cooperate with that nation's Aero Industry Development Center in designing and building an indigenous defensive fighter (IDF), and the influence of the F-16 on the IDF airframe is clear. AlliedSignal developed an afterburning version of its TFE731 turbofan jointly with Taiwan's Chung Shan Institute of Science and Technology. Avionics include a 93-mile-range Golden Dragon 53 multimode pulse-Doppler radar, based on Lockheed Martin's AN/APG-67(V) but embodying features of Westinghouse's AN/APG-66; Honeywell INS; and one head-up and three multifunction cockpit displays by Bendix/King. A Lear Astronics fly-by-wire control system is used, with a sidestick controller. The aircraft's missile armament is of Taiwanese origin.

The first of four prototypes, which included one two-seater, made its initial flight on May 28, 1989. These were followed by 10 preproduction aircraft, the first four of which were handed over to the RoCAF in March 1992. Plans to produce 250 Ching-Kuos (named after the late President of Taiwan) were virtually halved following the US decision to allow Taiwan to buy 150 F-16s, and total procurement is now set at 130 (102

single-seat and 28 two-seat), including the preproduction 10. Deliveries began in early 1994 and totaled 34 (22+12) by the beginning of this year. The first three RoCAF squadrons are Nos. 7, 8, and 28 of the 3d Tactical Fighter Wing at Ching Chuan Kang AB, where they replaced F/TF-104G Starfighters. Three other F-104 or F-5 squadrons are to be reequipped.

**Contractor:** Aero Industry Development Center, Taiwan.  
**Power Plant:** two AlliedSignal/AIDC TFE1042-70 turbofans; each 9,460 lb thrust with afterburning.

**Dimensions:** span over wingtip missiles 29 ft 6 in, length (excl nose probe) 43 ft 6 in, height 14 ft 6 in.

**Weight (estimated):** gross approx 20,000 lb.

**Performance (estimated):** max speed at height Mach 1.7, ceiling 55,000 ft.

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

**Armament:** one 20-mm M61A gun in port side of fuselage; two medium-range Sky Sword II radar-homing AAMs under fuselage and four close-range IR-homing Sky Sword Is on two underwing and two wingtip pylons. For attack role, bombs, cluster bombs, rockets, or ASMs may be carried, including three Hsiung Feng II sea-skimming antiship missiles, plus wingtip Sky Sword Is.

### F-1

First interceptor/close air support jet fighter designed by the Japanese aerospace industry, the Mitsubishi F-1 emerged in much the same way that Northrop's F-5 was derived from the T-38—by adapting a two-seat supersonic trainer to single-seat configuration. Mitsubishi's T-2 was the first supersonic aircraft designed in Japan. Two examples served as F-1 prototypes, deletion of the second cockpit allowing such additional avionics as an inertial navigation system, radar homing and warning system, and J/ASQ-1 bombing computer, to be installed in its stead. Other equipment includes nose-mounted Mitsubishi Electric J/AWG-12 fire-control radar, Ferranti INS, and license-built Thomson-CSF HUD.

The F-1 first flew in June 1975 and entered service with the Japan Air Self-Defense Force in the fall of 1977. The last of 77 production aircraft was delivered in March 1987. F-1s currently equip the 3d and 8th Squadrons of the 3d Air Wing at Misawa and the 6th Squadron of the 8th Air Wing at Tsuiki. They are expected to serve until replaced by the FSX in the latter half of the 1990s.

**Contractor:** Mitsubishi Heavy Industries, Japan.  
**Power Plant:** two Ishikawajima-Harima TF40-IHI-101A (license Rolls-Royce Turbomeca Adour) turbofans; each 7,305 lb thrust with afterburning.

**Dimensions:** span 25 ft 10 1/4 in, length (incl nose probe) 58 ft 7 in, height 14 ft 5 in.

**Weights:** empty 14,017 lb, gross 28,219-30,203 lb.

**Performance:** max speed (clean) at 36,000 ft Mach 1.6, ceiling 50,000 ft, T-O run 4,200 ft, combat radius (hi-lo-hi) 218-345 miles.

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

**Armament:** one JM61 multibarrel 20-mm gun in port side of front fuselage. Up to 6,000 lb of ordnance on four underwing hardpoints, with multiple carriers, plus one under fuselage. Weapon loads can include two Mitsubishi ASM-1 ASMs; up to twelve 500-lb or eight 750-lb bombs (including IR- or laser-guided); four pods of 70-mm or 125-mm underwing rockets; four AIM-9 Sidewinder AAMs (two underwing and two at wingtips); or up to three drop tanks.

### F-4 Phantom II

A detailed career of the F-4 can be found in the USAF "Galleries" in the May issues of *Air Force Magazine* for the past several years. In Japan, Mitsubishi built 138 F-4Es under license (local designation F-4EJ), of which about 124 currently remain in service with the Air Self-Defense Force. Under a Service Life Extension Program begun in 1987, 100 of these are being upgraded to F-4EJKai (modified) standard. Funding for the first 86 has been approved, and redelivery to the 6th Air Wing at Komatsu began in November 1989. More than 80 have now been redelivered to Nos. 301, 302, and 306 Squadrons. In addition to some structural changes, the main ingredients of the upgrade are a Mitsubishi (Westinghouse license) AN/APG-66J radar; Japanese license-built Litton LN-39 INS, Kaiser HUD, and Hazeltine AN/APX-79A IFF; and a locally developed fire-control system and radar warning receiver. Missile capability includes AIM-7E/F Sparrows, AIM-9P/L Sidewinders, and Mitsubishi ASM-1 and -2 antiship weapons. Seventeen other F-4EJs are being converted to reconnaissance RF-4EJs (which see).

The Republic of Korea Air Force received more than 130 new-build or ex-USAF F-4Ds (66) and F-4Es (67), of which about 120 remain in service. Of these, at least 32 are equipped with target designation systems (24 Ds with Pavé Spike and eight or more Es with Pavé Tack). The RoKAF is planning an upgrade, along similar lines to that of the JASDF, involving 38 of its F-4Es. This is intended to include radar/HUD/INS/mission



A-1 Ching-Kuo, Republic of China Air Force (T. Malcolm English)

**Accommodation:** crew of two; 102 passengers in main cabin.

**Armament:** none.

### US-1A

The last of the Japan Maritime Self-Defense Force's PS-1 antisubmarine flying boats was retired in 1989, but its amphibian descendant, the US-1A, continues in service as a long-range SAR aircraft. The JMSDF has so far received 14 US-1As, and one more is on order, although attrition and phase-out of older aircraft have reduced the in-service total to about half that number. Deliveries (as US-1s with less powerful -10 engines and earlier avionics) began in March 1975, but all those now in service with detachments of No. 71 (Air Rescue) Squadron at the Iwakuni and Atsugi naval bases are to US-1A standard with nose-mounted AN/APN-115(2) search radar and AN/APN-187C Doppler navigation radar; SAR equipment includes flares, a rescue hoist, marine markers, a loudspeaker, life rafts, a powered lifeboat, and droppable rescue kits.

**Contractor:** ShinMaywa Industries Ltd, Japan.  
**Power Plant:** four Ishikawajima-Harima (GE license) T64-IHI-10J turboprops; each 3,493 ehp

**Dimensions:** span 108 ft 9 in, length 109 ft 9 1/4 in, height 32 ft 7 3/4 in.

**Weights:** empty 56,218 lb, gross 94,800 lb (water T-O), 99,200 lb (land T-O).

**Performance:** cruising speed at 10,000 ft 265 mph, ceiling 23,600 ft, T-O distance (water) 1,820 ft, landing distance (water) 2,655 ft, max range 2,372 miles.



F-4EJ Phantom II, Japan ASDF (Peter R. Foster)



F-5E Tiger IIs, Indonesian Air Force



computer modernization, linked through a MIL-STD-1553B data bus. Radars on offer are the Hughes AN/APG-65 and Westinghouse AN/APG-68, the latter perhaps being the more likely to be selected, for commonality with Korea's recently acquired F-16s. (Data for standard F-4E.)

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

**Dimensions:** span 38 ft 7½ in, length 63 ft 0 in, height 16 ft 5½ in.

**Weights:** empty 30,328 lb, gross 41,487–61,795 lb.  
**Performance:** max speed at 40,000 ft Mach 2 class, ceiling 54,400 ft, T-O run at max gross weight 4,390 ft, landing run with brake-chute 3,040–3,120 ft, combat radius 494 miles (defensive counterair) to 786 miles (area intercept).

**Accommodation:** pilot and weapon systems operator in tandem on zero/zero ejection seats.

**Armament:** one M61A1 multibarrel 20-mm gun; provision for up to four AIM-7 Sparrow or AIM-9 Sidewinder AAMs semisubmerged under fuselage; or seven hardpoints (one under fuselage, three under each wing) for up to 16,000 lb of bombs, rocket pods, gun pods, or flares and ECM/camera pods.

### F-5E Tiger II

Six countries in the Far East/Pacific region continue to operate Northrop's "Freedom Fighter" and its developments. Most are of the IFA (International Fighter Aircraft) model, the F-5E Tiger II and its F-5F two-seat combat trainer counterpart, and many of them are the subject of modernization programs.

Largest Asian operators are South Korea and Taiwan, both of which manufactured these versions under license. The RoKAF received 159 Es and 64 Fs, of which Korean Air built 48 and 28, respectively, between 1981 and 1986 under the Korean name *Chegoong-ho* ("Air Master"). Korea also continues to operate nearly 50 F-5A/Bs from earlier deliveries. In Taiwan, AIDC produced 248 Es and 60 Fs for the Republic of China Air Force, nearly all of which remain in service. Singapore Aerospace (SAe) is contracted to upgrade an initial batch of 10. Singapore's own 26 Es and nine Fs, recently augmented by seven F-5E/Fs acquired from Jordan, are also undergoing upgrading by SAe and Israel's Elbit, which includes HOTAS controls, FIAR Grifo radar, and Israeli HUD, mission computer, multifunction displays, and a radar warning receiver. The Singapore aircraft have dual air-defense/ground-attack duties, with the ability to carry TV-guided Mavericks and laser-guided bombs.

Other regional operators are the air forces of Indonesia (eight Es, four Fs, to be upgraded by SABCA of Belgium) and Malaysia (12 Es, three Fs). The Philippine Air Force, now reduced to only a handful of its older F-5A/Bs, has recently had these augmented by the gift of three F-5As from South Korea. (Data for F-5E.)

**Contractor:** Northrop Grumman 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 11½ in over wingtip AAMs), length (incl nose probe) 47 ft 4¼ in, height 13 ft 4¼ in.

**Weights:** empty 9,723 lb, gross 24,722 lb.  
**Performance:** max speed at 36,000 ft 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; AIM-9 Sidewinder AAM at each wingtip; one underfuselage and four underwing stations for up to 7,000 lb of bombs, cluster bombs, rocket packs, napalm tanks, missiles, or other stores.

### F-15J Eagle

Japan, which is now well into a program to produce a total of 223 for the country's Air Self-Defense Force, is the only country outside the US yet granted a manufacturing license for the F-15. The program began in 1980, with a first flight in June of the first of two US-built F-15J single-seat prototypes, and continued in 1981 when deliveries began of 12 two-seat F-15DJs, also US-built. Japanese industry then assembled eight single-seaters from CKD kits before assuming full responsibility for subsequent production. Japanese F-15Js are generally equivalent to the US F-15C but with some domestic avionics, including the J/APR-4A radar warning system, ALE-45(J) chaff/flare dispenser, and J/ALQ-8 ECM.

By March of this year, a total of 209 (166 Js and 43 DJs) had been funded for the JASDF, of which approximately 200 have been delivered. First Japanese squadron to achieve IOC, in January 1983, was No. 202 (5th Air Wing) at Nyutabaru. All of the remaining six planned squadrons have since been formed: Nos. 201 and 203 (2d Air Wing) at Chitose, No. 303 (6th Air Wing) at Komatsu, Nos. 204 and 305 (7th Air Wing) at Hyakuri,



F-15J Eagle, Japan ASDF (Katsumi Hinata)



F-16C Fighting Falcon, Republic of Korea Air Force

and No. 304 (8th Air Wing) at Tsuiki. Six F-15DJs are assigned to the JASDF 5th Air Wing's "aggressor" squadron, also at Tsuiki.

**Contractor:** Mitsubishi Heavy Industries, Japan.  
**Power Plant:** two Ishikawajima-Harima (Pratt & Whitney license) F100-PW-220E turbofans; each 23,830 lb thrust with afterburning.

**Dimensions:** span 42 ft 9¼ in, length 63 ft 9 in, height 18 ft 5½ in.

**Weights:** empty 28,600 lb, gross 58,470 lb.

**Performance:** max speed more than Mach 2.5, ceiling 60,000 ft, T-O run 900 ft, landing run (without brake-chute) 3,500 ft, max range more than 2,530 miles.

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

**Armament:** one JM61A1 six-barrel 20-mm gun in starboard wingroot, with 940 rds. Up to four AIM-9L/M Sidewinders or Mitsubishi AAM-3s, four AIM-7E/F Sparrows, or eight AIM-120A AMRAAMs; or three stations for up to 23,600 lb of bombs, rockets, or other stores.

### F-16 Fighting Falcon and FSX

A late switch from the F/A-18 as South Korea's major combat aircraft for the 1990s, and Japan's choice of an advanced derivative of this fighter as its next-generation equipment, have in recent years given a marked boost to F-16 fortunes in this region. They received a further one when, in 1994, Taiwan decided to buy 150 to offset cutbacks in the program for its domestically produced Ching-Kuo air defense fighter (which see).

The Republic of Korea Air Force received its first 40 Fighting Falcons (30 Block 32 F-16Cs and 10 combat-capable two-seat F-16Ds) in 1986–89, subsequently equipping 10 of them with Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) pods. A further 120 Block 52 F-16s (80 Cs and 40 Ds), with improved weapon delivery systems and AMRAAM capability, comprise 12 more US-built aircraft, delivered from December 1994, after which a Korean industry team led by Samsung Aerospace will assemble 36 from knocked-down kits and then build a final 72 locally.

Earlier model F-16s are in service with the air forces of Indonesia and Singapore, and the Philippine Air Force has recently been discussing a possible purchase. Indonesia's No. 3 Squadron received eight F-16As and four F-16Bs, and No. 140 (Osprey) Squadron of the Republic of Singapore Air Force at Tengah has three As and four Bs. Beginning in 1998, it will replace these with 18 Block 50D/52D aircraft (eight F-16Cs and 10 F-16Ds), nine of which will be allocated to pilot training at Luke AFB, Ariz. The A and B models (120+30) chosen last year by Taiwan for the Republic of China

Air Force are of a unique Block 20 version, which incorporates improvements comparable to those in the current USAF mid-life update. Deliveries are to begin in July 1996.

The FSX fighters and TFSX trainers required by Japan's Air Self-Defense Force are advanced developments of the F-16C/D, funded entirely by Japan but undertaken as a joint development program with Lockheed Martin (originally General Dynamics). Powered by a 29,000 lb thrust class F110-GE-129 engine, the FSX will have a Mitsubishi phased-array radar and a Japanese/US jointly developed fly-by-wire flight-control system. Other design changes include a bigger (36 ft 6¼ in span) wing, stretched fuselage (length 50 ft 1¼ in), and a 48,722-lb gross weight that will include nearly 19,840 lb of external stores. These are expected to include Sparrows as the initial AAM fit, replaced later by the indigenous AAM-3, with Mitsubishi ASM-2s to give an antiship capability. The first of four prototypes (two single-seat and two two-seat), rolled out on January 12, was expected to have flown by the time this "Gallery" appears. Handover to the JASDF is scheduled for Spring 1996, and IOC is planned for 1999. Procurement of about 70 is expected, to replace the Mitsubishi F-1. (Data for Block 30 F-16C.)

**Contractor:** Lockheed Martin Tactical Aircraft Systems (formerly General Dynamics), USA.

**Power Plant:** one General Electric F110-GE-100 turbofan: 27,600 lb thrust with afterburning; or Pratt & Whitney F100-PW-220: 23,450 lb thrust with afterburning. Aircraft of Indonesia, South Korea (first batch), and Singapore (first batch) all have PW engine; Singapore C/Ds to have 29,100 lb thrust F100-PW-229.

**Dimensions:** span 31 ft 0 in, length 49 ft 4 in, height 16 ft 8½ in.

**Weights (PW-220 engine):** empty 18,238 lb, gross 27,185–42,300 lb.

**Performance:** max speed at 40,000 ft more than Mach 2.0, ceiling more than 50,000 ft, typical T-O and landing distance 2,500 ft, combat radius (hi-lo-hi) with six 1,000-lb bombs 340 miles.

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

**Armament:** one M61A1 multibarrel 20-mm gun, with 511 rds, in port side wing/body fairing. One underfuselage and six underwing stations, plus AAM rail at each wingtip. External stores (load limit 12,000 lb) can include wide range of single or cluster bombs, ASMs, rockets, laser-guided and electro-optical weapons and sensors, Pave Penny laser tracker pod, FLIR or jammer pods, or drop tanks.

### F/A-18 Hornet

Australia was the first Pacific operator of the Hornet, of which it acquired 57 single-seat AF-18As and 18 two-seat ATF-18As in 1985–90. The first two ATF-18As were delivered from the US, after which an initial batch of Hornets was assembled from CKD kits by AeroSpace Technologies of Australia (ASTA); the remainder were manufactured in-country by Australian industry. Currently, 71 of these aircraft equip Nos. 3, 75, and 77 fighter ground-attack/air-defense Squadrons, and No. 2 OCU. All are being upgraded with more modern avionics to the standard of the US Navy's F/A-18C/Ds and with provision for carrying a Loral AN/AAS-38 IR tracking and laser designation pod.

A second customer in the region was confirmed in December 1993 when the government of Malaysia signed a contract for eight two-seat F/A-18Ds, deliveries of which are to start in January 1997. Earlier, the Royal Malaysian Air Force had declared a requirement for up to 24 Hornets and in late 1994 requested cost



and delivery information for a possible follow-on batch of 10 or 16. Aircraft for the RMAF will incorporate such recent improvements as the upgraded Hughes APG-73 radar and 17,600 lb thrust (with afterburning) F404-GE-402 enhanced performance engines. (Data for F/A-18C.)

**Contractor:** McDonnell Douglas Corporation, USA.  
**Power Plant:** two General Electric F404-GE-400 turbofans; each approx 16,000 lb thrust with afterburning.  
**Dimensions:** span 37 ft 6 in (27 ft 6 in folded), length 56 ft 0 in, height 15 ft 3 1/2 in.  
**Weights:** empty 23,832 lb, gross 36,710 lb (fighter), 51,900 lb (attack).  
**Performance:** max speed more than Mach 1.8, combat ceiling approx 50,000 ft, T-O run less than 1,400 ft, combat radius (interdiction) 340 miles.  
**Accommodation:** pilot only, on zero/zero ejection seat.  
**Armament:** one M61 six-barrel 20-mm gun in nose, with 570 rds. Nine external stations (one on centerline, two on nacelles, two under each wing, and one at each wingtip) for up to 15,500 lb of stores including AIM-9L Sidewinder, AIM-7 Sparrow, or AIM-120 AMRAAM AAMs; AGM-65 Maverick and AGM-84 Harpoon ASMs; single, cluster, or 2,000-lb laser-guided bombs; air-launched decoys; laser spot tracker/strike camera, FLIR, or other mission pods; or drop tanks.

### F-104G Starfighter

With the Ching-Kuo already in service and deliveries of 210 F-16s and Mirage 2000-5s scheduled to begin next year, the RoCAF in Taiwan can look forward to retirement of more than 90 F-104G Starfighters that have served it well for many years. They include six reconnaissance-configured RF-104Gs. Also in service are 40 two-seat Starfighter trainers, mostly TF-104Gs but believed still to include about six older F-104Ds.  
**Contractor:** Lockheed-California Company, USA.  
**Power Plant:** one General Electric J79-GE-11A turbojet; 15,800 lb thrust with afterburning.  
**Dimensions:** span 21 ft 11 in, length 54 ft 9 in, height 13 ft 6 in.  
**Weights:** empty 14,082 lb, gross 28,779 lb.  
**Performance:** max speed at 36,000 ft Mach 2.2, ceiling 58,000 ft, T-O run 2,960 ft, landing run 2,280 ft, combat radius (max fuel) 745 miles.  
**Accommodation:** pilot only, on ejection seat.  
**Armament:** one M61 Vulcan multibarrel 20-mm gun in forward fuselage. Stations under fuselage (one) and wings (one each side) and at each wingtip for up to 4,310 lb of AIM-9 Sidewinder AAMs, ASMs, bombs, rocket pods, or drop tanks.

### J-8

The original J-8 clear-weather day fighter, first flown on July 5, 1969, was a MiG-21/J-7 derivative powered by two Liyang WP7B turbojets and armed with two 30-mm guns and four wing-mounted PL-2B AAMs. Delayed by China's "cultural revolution," production was not authorized until 1979, but this early version was underpowered and lacked a satisfactory fire-control radar. The latter deficiency was quickly remedied in the J-8 I, which has a twin-barrel 23-mm gun and entered production in 1985, by fitting a Sichuan SR-4 radar in the single intake shock cone. About 100 J-8 Is were built; the comparatively few earlier J-8s were retrofitted with SR-4 radars.

The J-8 II, which first flew on June 12, 1984, is a vastly different aircraft, some 70 percent redesigned. Intended for the dual roles of high-altitude interceptor and ground attack, it features a "solid" avionics-filled nose, twin fuselage-side intakes, more powerful WP13A II engines, and other improvements. Chinese sources claimed "several dozen" (say 40-50) in service by early 1990, with production then continuing only in small economic batches. (Data for J-8 II.)

**Contractor:** Shenyang Aircraft Corporation, People's Republic of China.  
**Power Plant:** two Liyang WP13A II turbojets; each 14,815 lb thrust with afterburning.  
**Dimensions:** span 30 ft 7 1/2 in, length (incl nose probe) 70 ft 10 in, height 17 ft 9 in.  
**Weights:** empty 21,649 lb, gross 31,526-39,242 lb.  
**Performance:** max speed (indicated) 808 mph, ceiling 66,275 ft, T-O run 2,198 ft, landing run 3,280 ft, combat radius 497 miles, range (max) 1,367 miles.  
**Accommodation:** pilot only, on zero/zero ejection seat.  
**Armament:** 23-mm Norinco Type 23-3 twin-barrel gun, with 200 rds, in underfuselage pack aft of nosewheel bay. One station under fuselage and three under each wing for PL-2B infrared or PL-7 semiautomatic radar homing AAMs, launch pods for 57-mm or 90-mm rockets, bombs, or up to three drop tanks.

### MiG-21/J-7

The diminutive MiG-21 fighter promises to become one of those classic aircraft, like the DC-3/C-47, that goes on forever. Israel Aircraft Industries is upgrading 15 late-model MiG-21bis fighters for the reborn Cambodian Air Force, with a HUD, multifunction display,



F/A-18D Hornet, Royal Malaysian Air Force



MiG-21bis, Vietnamese People's Army Air Force (F. G. Rozendaal)

tactical data link, one-piece windshield, HOTAS controls, and modern weapons. China is developing a derivative with MiG-29-type turbofan and advanced avionics. Air forces still flying standard Soviet-built single-seaters (NATO "Fishbed") and two-seaters ("Mongol") include those of North Korea, with about 150 MiG-21PF/PFM interceptors and 10 MiG-21U two-seat trainers, and Laos, with two air defense squadrons of MiG-21PFs at Vientiane. Vietnam is believed to have nearly 200 in seven first-line regiments, many of them advanced versions, including 150 MiG-21PF/bis interceptors and 40 MiG-21MF ground-attack fighters.

China's PLA Air Force is estimated to have at least 500 MiG-21 variants manufactured by its national industry; 30 have been delivered to Myanmar, plus six trainers. Production was initiated in 1961 by a license agreement for the MiG-21F-13 and its Tumansky R-11F-300 turbojet. A small series was assembled at Shenyang, under the designation J-7 (Jianji-7: "Fighter 7"). Progressively improved versions, built at Chengdu and Guizhou, are as follows:

**J-7 I.** First version built at Chengdu for PLA Air Force, from 1967. Second 30-mm gun added. Original Soviet ejection system, with front-hinged canopy that detached with seat to provide blast protection for pilot, was considered unsatisfactory, and few aircraft were accepted.

**J-7 II.** Major production version, first flown December 30, 1978. WP7B (modified Tumansky R-11) engine. Rear-hinged jettisonable canopy and Chengdu Type II zero-height/155 mph ejection seat.

**J-7 III.** Tandem two-seat, combat-capable trainer version of J-7 II, developed and built at Guizhou.

**J-7 III.** All-weather day/night development of J-7 II, equivalent to MiG-21MF, with blown flaps, first flown April 26, 1984; in production and in service with PLA Air Force. Liyang WP13 engine of greater power, giving 29,530 ft/min initial climb rate. Enlarged nose intake and centerbody for JL-7 J-band interception radar. Side-hinged canopy, HTY-4 improved ejection seat. Twin-barrel 23-mm gun under fuselage; four under-

wing hardpoints. New fire-control system, IFF, RWR, ECM, and Beijing KJ-11 autopilot. Additional fuel in deeper dorsal spine. Developed and built in partnership with Guizhou Aviation Industry Corp.

**J-7E.** Improved version of J-7 II. Enlarged (27 ft 3 1/2 in span) redesigned "cranked arrow" wing, 14,330 lb thrust WP7F engine, PL-8 AAMs, air data computer, and HUD. Possibly small number in service.

**Super-7.** Advanced development of J-7, with RD-33 engine of MiG-29, lateral air intakes, modern fire-control radar in ogival nosecone, updated cockpit, and larger wings. First flight scheduled 1996. (Data for J-7 III.)  
**Contractor:** Chengdu Aircraft Industrial Corporation, People's Republic of China.

**Power Plant:** one Liyang WP13 turbojet; 14,550 lb thrust with afterburning.

**Dimensions:** span 23 ft 5 1/4 in, length (incl nose probe) 48 ft 10 in, height 13 ft 5 1/2 in.

**Weights:** empty 11,629 lb, normal gross 17,968 lb.

**Performance:** max speed Mach 2.1, ceiling 59,050 ft, T-O run 2,625 ft, landing run 1,805 ft, range (internal fuel only) 596 miles, with three drop tanks, 1,180 miles.

**Accommodation:** pilot only, on low-speed/zero height ejection seat.

**Armament:** type 23-3A twin-barrel 23-mm gun under fuselage. Four underwing hardpoints for two or four PL-5B AAMs, pods of 12 x 57-mm or 7 x 90-mm rockets, bombs of up to 1,100 lb, or drop tanks.

### MiG-29

The 16 single-seat MiG-29Ns and two two-seat MiG-29NUBs delivered this year to equip No. 17 (Operational Conversion Unit) and No. 19 (air defense) Squadrons of the Royal Malaysian Air Force are export upgrades of the basic MiG-29 (NATO "Fulcrum-A"). Changes include instruments calibrated in Imperial units, English voice warning system, Western IFF and nav aids, radar with two-target engagement, and compatibility with active radar homing missiles.

The North Korean People's Army Air Force has about 30 basic MiG-29s, with single-target RP-29 coherent pulse-Doppler lookdown/shootdown radar (search range 62 miles, tracking range 43 miles) collimated with a laser rangefinder, and anIRST with a fighter detection range of 9 1/4 miles. The system operates in conjunction with the pilot's helmet-mounted target designator for off-axis aiming of AAMs. During takeoff and landing, hinged doors shield the engine air intakes against foreign object ingestion; engine air is then taken in through louvers in the upper surface of the wingroot extensions. "Fences" forward of the dorsal tailfins house flare dispensers. (Data for basic MiG-29.)

**Contractor:** Mikoyan OKB, Russia.

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

**Dimensions:** span 37 ft 3 1/4 in, length 56 ft 10 in, height 15 ft 6 1/4 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 932-1,800 miles.

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

**Armament:** six close-range R-60T ("Aphid"), or four R-60T and two medium-range R-27R ("Alamo-A") AAMs on six underwing pylons; provision for carrying R-73A ("Archer") close-range AAMs; able to carry bombs, submunitions dispensers, and 80-mm, 130-mm, and 240-mm rockets, up to maximum 6,615 lb, in attack role. One 30-mm GSh-301 gun in port wingroot extension, with 150 rds.

### Mirage 2000-5

During 1996, the Republic of China Air Force will begin receiving 48 single-seat Mirage 2000-5Ei and 12 two-seat Mirage 2000-5Di fighters ordered in November 1992. Deliveries will include 1,000 Matra Magic 2 and Mica AAMs.

The 2000-5 was developed by Dassault as an update of the basic Mirage 2000. New equipment includes cockpit multifunction displays of the kind fitted in the latest French Rafale fighters, Thomson-CSF RDY radar and VEH 3020 holographic HUD, a new central processing unit, and an ICMS Mk 2 ECM system compatible with Sabre ECM (jammers), Serval RWR, and Spirale chaff/flare packs. Options include a SNECMA M53-P2 turbofan, uprated four percent to 22,046 lb thrust compared with the standard M53-P2.

**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 37,480 lb.

**Performance:** max speed at height Mach 2.2, at S/L Mach 1.2, ceiling 54,000 ft, range with four 550-lb bombs (hi-lo-hi) 920 miles.

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

**Armament:** two 30-mm DEFA 554 guns in fuselage, each 125 rds; five hardpoints under fuselage and two



under each wing for max external stores load of 13,890 lb. Two Mica and two Magic AAMs for air-defense role. Typical Mirage 2000 ground-attack weapons include 18 x 550-lb retarded bombs or BAP 100 antirunway bombs, 16 Durandal penetration bombs, two 2,200-lb laser-guided bombs, six Belouga cluster bombs, ASMs, and packs of 18 x 68-mm or 100-mm rockets.

### Su-27

China and Vietnam, in a long-standing dispute over possession of the Paracel and Spratly Islands, have both chosen the Su-27 as their newest counterair fighter. To date, Vietnam has only six, delivered this year, but a further six have been funded, with more to follow when money can be found. China began receiving its first 24 single-seat Su-27s (NATO "Flanker-Bs") and two two-seat Su-27UBs ("Flanker-Cs") in 1991. A second order, for 22 Su-27s and two Su-27UBs, was placed this year, and negotiations are under way for license manufacture in China.

The basic Su-27 is a long-range air-defense interceptor with considerable air-to-ground capability. It has four-channel analog fly-by-wire flight controls and a highly advanced, integrated fire-control system. This enables the Phazotron track-while-scan coherent pulse-Doppler radar,IRST sensor, and laser rangefinder to be slaved to the pilot's helmet-mounted target designator and displayed on the wide-angle HUD. A flight refueling probe is optional, and a reconnaissance pack can be carried on the centerline pylon.

**Contractor:** Sukhoi OKB, Russia.

**Power Plant:** two Saturn/Lyulka AL-31F turbofans; each 27,557 lb thrust with afterburning.

**Dimensions:** span 48 ft 2 3/4 in, length (excl nose probe) 71 ft 11 1/2 in, height 19 ft 5 1/2 in.

**Weight:** gross 50,705–72,750 lb.

**Performance:** max speed at height Mach 2.35, at S/L Mach 1.1, ceiling 59,055 ft, T-O run 1,475 ft, landing run 2,035 ft, combat radius 930 miles.

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

**Armament:** one 30-mm GSh-301 gun with 150 rds, in starboard wingroot extension. Up to 10 AAMs, including pairs of R-27R/T/ER/ET ("Alamo-A/B/C/D") or R-33 ("Amos"), and four R-73A ("Archer") or R-60 ("Aphid"). Up to 8,818 lb of 550- and 1,100-lb bombs, 80-mm, 130-mm, and 250-mm rockets, cluster bombs, or 30-mm gun pods in ground-attack role.

### AH-64 Apache

The Republic of Korea Army plans to acquire 37 Apache day/night attack helicopters, plus 775 Hellfire missiles, spares, 70-mm rockets, and 30-mm ammunition. No details of the equipment standard of the Korean helicopters are yet available. Meanwhile, the US Army is converting all of its AH-64A Apaches to AH-64D Longbow Apache standard, with many improvements, including GPS, SINCARS radios, target handover capability, new nav aids, and improved reliability, including new rotor blades. Only 227 will be fitted with Westinghouse mast-mounted Longbow millimeter-wave radar. Added to Hellfire with RF seeker, this will enable them to track airborne targets and see through rain, fog, and smoke impenetrable to TV and FLIR. RF Hellfire will improve effectiveness over close range. Plessey AN/ASN-157 Doppler nav will be standard. (Data for AH-64A.)

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

**Power Plant:** two General Electric T700-GE-701C turboshafts (from 604th AH-64A); each 1,890 shp.

**Dimensions:** rotor diameter 48 ft 0 in, fuselage length, tail rotor turning, 51 ft 0 in, height 14 ft 1 1/4 in.

**Weights:** empty 11,387 lb, gross 14,445–21,000 lb.

**Performance:** max speed at S/L 182 mph, service ceiling 21,000 ft, max range, internal fuel 300 miles, with max external fuel 1,180 miles.

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

**Armament:** turreted 30-mm M230 Chain Gun under front fuselage; four underwing pylons, each for four AGM-114 Hellfire antitank missiles or 2.75-in FFAR rockets in seven-rd M200 or 19-rd M260 packs.

### AS 330L Puma

This workhorse military assault and civilian transport helicopter first flew on April 15, 1965, and Anglo-French production ended in 1989 after 697 had been built. The Indonesian Air Force received eight from this production and seven of the 11 that were assembled locally from knocked-down component kits (Indonesian designation NSA 330) by Nurtanio (now IPTN). Thirteen still equip Nos. 6 and 17 Squadrons. A single Puma has served with a "mixed bag" unit of the Philippine Air Force that carries out special and miscellaneous missions.

**Contractors:** Aerospatiale SNI, France; IPTN, Indonesia.

**Power Plant:** two Turbomeca Turmo IVC turboshafts; each 1,575 shp.

**Dimensions:** rotor diameter 49 ft 2 1/2 in, fuselage length 46 ft 1 1/2 in, height 16 ft 10 1/2 in.

**Weights:** empty 7,970 lb, gross 16,315 lb.

**Performance:** max cruising speed at S/L 160 mph, ceiling 15,750 ft, range 341 miles.

**Accommodation:** crew of two; 16 fully equipped troops, six litter patients and six seated persons, or internal or external cargo.

**Armament:** provisions for side-firing 20-mm gun, two 7.62-mm machine guns, rocket packs, and other weapons.

## Helicopters

### AH-1 HueyCobra/SeaCobra/SuperCobra

Largest Far East/Pacific customer for Cobra gunship helicopters is Japan, which acquired two AH-1Es (Bell Up-Gun AH-1S) for evaluation by the Ground Self-Defense Force, subsequently obtaining a license for Fuji to build the Modernized AH-1S (US Army AH-1F) full-capability TOW version, with a laser rangefinder/tracker, pilot's HUD, digital fire-control computer, Doppler navigation, hot metal and exhaust plume IR suppressor, IR jammer, IFF, and composite rotor blades. Eighty-nine have so far been funded, of which 80 had been delivered by March 1995. Their cockpits are to be made compatible with use of NVGs. The JGSDF has five Cobra antitank squadrons, based at Tokashi, Kisarazu, Metabaru, Akeno, and Hachinohe, plus two support units at Akeno.

South Korea, which received eight twin-engined AH-1J SeaCobras in the late 1970s, followed these with 70 AH-1Fs, deliveries of which were completed in the early 1990s. Latest customer is Taiwan, which in 1993 received the first nine of 18 AH-1W SuperCobras ordered in February 1992. Taiwan has options on a further 24 AH-1Ws. This version has strengthened (Bell 214 type) main and tail rotors and is being fitted with a Tamam (Israeli) laser night targeting system for dual (TOW and Hellfire) day and night capability. (Data for AH-1F.)

**Contractors:** Bell Helicopter Textron, USA; Fuji Heavy Industries, Japan.

**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:** two weapon stations under each stub-wing; outer stations can each carry four TOW antitank missiles, inboard stations each a launch tube for seven to 19 x 2.75-in rockets. Undernose turret for 20-mm three-barrel gun with 750 rds.



AH-1S HueyCobra, Japan GSDF (Katsumi Hinata)



NAS-332 Super Puma, Indonesian Air Force

### AS 332 Super Puma/AS 532 Cougar

The Super Puma differs from the AS 330 Puma in having a new power plant, uprated transmission, and airframe changes to improve crew survivability, payload, performance, and ease of maintenance. The first prototype AS 332 flew on September 13, 1978, and many versions appeared subsequently. They included the basic 20-passenger military AS 332B, and the AS 332L and M, with cabin lengthened by 2 ft 6 in to accommodate up to 24 persons. When their manufacturer, Aerospatiale, merged its helicopter division with that of MBB (now DASA) of Germany to form Eurocopter SA, military versions of the Super Puma were given the new designation AS 532 Cougar. Customers have been China (six VIP), Japan (three Army 332L VIP), South Korea (three Army 332L VIP), and Singapore (four AS 332M and six AS 532UL for SAR; 15 currently of 18 332M transports, most of them assembled in that country by Samaero). IPTN (Indonesia) manufactures the helicopter under license as the NAS-332 Super Puma. It has delivered six transports and one VIP model to that nation's Air Force and four transports to its Navy. The Navy is now acquiring 22 NAS-332Fs, equipped with radar and Exocet antiship missiles. Two NAS-332 transports serve with the Royal Malaysian Air Force. (Data for AS 332L.)

**Contractors:** Aerospatiale SNI, France; IPTN, Indonesia.

**Power Plant:** two Turbomeca Makila 1A turboshafts; each 1,780 shp.

**Dimensions:** rotor diameter 51 ft 2 1/4 in, fuselage length, excl tail rotor, 50 ft 11 in (AS 332B 48 ft 5 in), height 16 ft 1 3/4 in.

**Weights:** empty 9,535 lb, gross 18,960 lb with internal payload, 20,615 lb with slung load.

**Performance:** max cruising speed at S/L 173 mph, ceiling 15,090 ft, range at S/L 394–1,068 miles.

**Accommodation:** one or two pilots; normal seating for 22 passengers; nine or 12 VIP passengers in special interiors with toilet and galley; nine litter patients and three seated persons in ambulance role.

**Armament:** for army/air force missions, alternatives include one 20-mm gun, two 7.62-mm guns, two packs of 22 x 68-mm rockets or 19 x 2.75-in rockets. Naval options include two Exocet missiles, two torpedoes and sonar, or MAD and sonobuoys.

### AS 550 Fennec and AS 350 Ecureuil

The AS 550 Fennec is a military production version of the AS 350 Ecureuil five/six-seat, single-engine, commercial light helicopter. Standard features include sliding doors, a cockpit compatible with night vision goggles, a taller landing gear, airframe reinforcement for weapon carrying, and provision for armored seats. AS 350Bs are used by Australian Army Aviation (18) and AS 350Ss by the Royal Australian Navy (six) for training. Singapore has six AS 350Es for training and became the first operator of the AS 550 Fennec in the Far East/Pacific region in 1992. Its No. 123 "Sunbird" Squadron has nine AS 550A2s, armed with a 20-mm GIAT M621 gun and pods of CRV-7 rockets, and 10 AS 550C2s with TOW 2A antitank missiles. (Data for AS 550 series.)

**Contractor:** Eurocopter SA (Aerospatiale, France, and DASA, Germany).

**Power Plant:** one Turbomeca Arriel 1D1 turboshaft; 732 shp.

**Dimensions:** rotor diameter 35 ft 0 3/4 in, fuselage length 35 ft 10 1/2 in, height 10 ft 11 1/2 in.

**Weights:** empty 2,689 lb, gross 4,960 lb.

**Performance:** max cruising speed at S/L 153 mph, ceiling 15,750 ft, range 414 miles.

**Accommodation:** up to six seats standard.

**Armament:** see above.

### Bell 212/412

More than 50 of these twin-turbine helicopters are in military service or on order by nations in the Far East/Pacific region, most of them as general-purpose or VIP transports, medevac, or SAR aircraft. The lower-powered, two-blade Bell 212 is in service with the Republic of Korea Air Force (seven for VIP and SAR). The Bell 412, which has a four-blade main rotor and uprated power plant, has been supplied to South Korea (three VIP) and the Philippines (two). The Indonesian Army and Navy have each so far received four NBell-412s, built locally by IPTN. (Data for Bell 212, with 412 in parentheses.)

**Contractors:** Bell Helicopter Textron, USA/Canada; 412 also by IPTN, Indonesia.

**Power Plant:** one Pratt & Whitney Canada PT6T-3B (PT6T-3B-1) Turbo Twin Pac turboshaft; flat-rated at 1,290 shp (1,400 shp).

**Dimensions:** rotor diameter 48 ft 2 1/4 in (46 ft 0 in), fuselage length (both) 42 ft 4 3/4 in, height 12 ft 10 in (10 ft 9 1/2 in).

**Weights:** empty 5,997 lb (6,495 lb), gross 11,200 lb (11,900 lb).

**Performance:** max cruising speed at S/L 115 mph (140 mph), ceiling 13,000 ft (16,500 ft), max range 261 miles (408 miles).



**Accommodation:** pilot and up to 14 passengers or equivalent cargo.

**Armament (both):** can include a 12.7-mm or 0.50-in machine gun in ventral turret, plus provisions for externally mounted antitank or antiship missiles, gun pods, or rocket pods.

#### BO 105

More than 1,300 examples of this twin-turbine helicopter have been produced, many of them for police or military work, since the prototype first flew in February 1967. Those in use in the Far East/Pacific are mostly to early 105C or CB (five-seat) standard, although the air wing of the Royal Brunei Armed Forces has a six-seat, VIP 105CBS in addition to its five counterinsurgency CBs. The Philippine Navy has 14 locally assembled 105Cs, including about 10 formerly operated by the country's Air Force. Largest user in the region is Indonesia, whose Army (22), Navy (seven), and Air Force (12) all have IPTN-built NBO-105s, mainly Cs or CBs, for liaison duties. (Data for BO 105 CB.)

**Contractor:** Messerschmitt-Bölkow-Blohm GmbH, Germany (now part of Eurocopter Franco-German consortium).

**Power Plant:** two Allison 250-C20B turboshafts; each 420 shp.

**Dimensions:** rotor diameter 32 ft 3/2 in, fuselage length 28 ft 1 in, height 9 ft 10 in.

**Weights:** empty 2,769 lb, gross 5,291 lb.

**Performance:** max cruising speed at S/L 150 mph, ceiling 17,000 ft, range at S/L 357 miles, at 5,000 ft 691 miles.

**Accommodation:** crew of one or two; three additional seats (four in CBS), two litters, or equivalent cargo, in main cabin.

**Armament:** provision for various weapons, including rocket pods, or six Hot or eight TOW antitank missiles, on cabin-side outriggers.

#### CH-47D International Chinook

Following delivery of two US-built examples and six knocked-down assembly kits, Kawasaki is building the International Military Chinook under license for Japan's Air and Ground Self-Defense Forces, as the CH-47J. This version differs from the US Army CH-47D only in power plant, avionics, and rotor brake installation. Deliveries by April of this year totaled 34 to the JGSDF (of 40 ordered) and 15 (of 16 ordered) to the JASDF. The Republic of Korea received 24 International CH-47Ds between 1989 and early 1992 (Army 18, Air Force six), and Singapore ordered six CH-47Ds last year for 1996-97 delivery. Three Boeing 234MLR Commercial Chinooks are operated, as utility transports, by the Army of Taiwan. These latter aircraft differ in having 4,075 shp AL 5512 engines and a max gross weight of 48,500 lb.

Australia, which retired its 11 CH-47Cs (RAAF designation A15) in 1989, later repented the decision and has had four of them upgraded by Boeing to CH-47D standard. Redeliveries began in May 1995. (Data for International CH-47D.)

**Contractor:** Boeing Defense and Space Group, Helicopters Division, USA.

**Power Plant:** two AlliedSignal T55-L-712 turboshafts; each 3,750 shp.

**Dimensions:** rotor diameter (each) 60 ft 0 in, fuselage length 52 ft 1 in, height 18 ft 11 1/2 in.

**Weights:** empty 23,523 lb, gross 54,000 lb.

**Performance:** (at 44,300 lb gross weight): typical cruising speed at S/L 152 mph, ceiling 10,100 ft, range with 14,857 lb max payload 115-161 miles.

**Accommodation:** crew of two; 44 troops, 24 litters and two medical attendants, or vehicles/cargo.

**Armament:** none.

#### Ka-25

One of the 17 Ka-25PL (NATO "Hormone-A") anti-submarine helicopters delivered to Vietnam in the early 1980s, for operation from shore bases, can now be seen in the nation's military museum; but the majority are thought to continue in first-line service. Of typical Kamov design, with contrarotating coaxial rotors, each carries search radar in a large flat-bottomed undernose radome, dipping sonar, and sonobuoys stored on a rack on the starboard side of the cabin. Lacking autohover capability, they are unable to operate at night or in adverse weather.

**Contractor:** Kamov OKB, Russia.

**Power Plant:** two Mars GTD-3M turboshafts; each 986 shp.

**Dimensions:** rotor diameter (each) 51 ft 7 3/4 in, fuselage length 32 ft 0 in, height 17 ft 7 1/2 in.

**Weights:** empty 10,505 lb, gross 15,873 lb.

**Performance:** max speed 130 mph, ceiling 11,000 ft, range 250-405 miles.

**Accommodation:** crew of two on flight deck; main cabin large enough to contain 12 folding seats.

**Armament:** one 18-in ASW torpedo in underfuselage weapons bay.

#### Ka-28

Vietnam's acquisition of Ka-28PL (NATO "Helix-A") ASW helicopters has been little publicized. Although similar in configuration to the aging Ka-25PL, the Ka-28PL is larger, more powerful, and far more effective, with full day/night capability, and automatic approach and hover on a preselected course, using Doppler. Equipment includes undernose 360° search radar, dipping sonar, MAD, ESM, an IR jammer, chaff/flare dispensers, RWR, and a flotation gear container on each side of the fuselage. Weapons and sonobuoys are stowed internally. Ka-28PLs normally operate in pairs, with one aircraft tracking the target submarine and the other dropping depth charges. Radius of action is 124 miles from base, against submarines cruising at up to 40 knots at a depth of 1,640 ft.

**Contractor:** Kamov OKB, Russia.

**Power Plant:** two Klimov TV3-117V turboshafts; each 2,190 shp.

**Dimensions:** rotor diameter (each) 52 ft 2 in, fuselage length 37 ft 1 in, height 17 ft 8 1/2 in.

**Weight:** gross 26,455 lb.

**Performance:** max speed 155 mph, ceiling 12,000 ft, range 310 miles.

**Accommodation:** crew of three: pilot, tactical coordinator and ASW systems operator; up to 16 persons on folding seats in cabin.

**Armament:** one 18-in ASW torpedo or depth charges in ventral weapons bay.

#### KV107IIA

The first Japanese example of this license-built Boeing (Vertol) Model 107-II made its initial flight in May 1962. Known as the KV107II, it was followed in 1968 by the improved KV107IIA, with uprated turboshafts and better "hot and high" performance; production continued until 1990.

Apart from eight for the Swedish Navy, all military KV107IIs and IIAs were for the Japanese armed services: two IIs and seven IIAs in mine countermeasures configuration for the JMSDF, 42 IIs and 18 IIAs as tactical transports for the JGSDF, and 15 IIs and 35 IIAs for SAR duties with the JASDF. Nearly all remain in service except the JMSDF aircraft, which are now largely replaced by Sikorsky S-80Ms. The JASDF A-5s are long-range variants, identifiable by two large external fuel tanks, which increase total capacity to 1,000 gallons instead of the standard 350 gallons; most are also fitted with an automatic flight-control system. (Data for KV107IIA-4.)

**Contractor:** Kawasaki Heavy Industries, Japan.

**Power Plant:** two Ishikawajima-Harima (GE license) CT58-IH1-140-1 turboshafts; each 1,400 shp.

**Dimensions:** rotor diameter (each) 50 ft 0 in, fuselage length 44 ft 7 in, height 16 ft 10 in.

**Weights:** empty 11,576 lb, gross 19,000-21,400 lb.

**Performance:** cruising speed at 5,000 ft 150 mph, ceiling 17,000 ft, range 222 miles (standard fuel), 682 miles (max fuel).

**Accommodation:** flight crew of two; up to 25 troops or equivalent cargo.

**Armament:** none.

#### McDonnell Douglas 500MD/530MG Defender

Developed from the US Army's OH-6A Cayuse, this small and agile helicopter can carry a useful weapons load. The basic 500MD Scout Defender, powered by a 375 shp Allison 250-C20B turboshaft, can be armed with 14 x 2.75-in rockets and either a 7.62-mm machine gun or a 40-mm grenade launcher. The antitank 500MD/TOW Defender can carry four TOW missiles, with a nose-mounted sight standard or mast-mounted sight as an option. Third major variant is the 500MD/ASW Defender, with nose-mounted radar, MAD bird, and two homing torpedoes.

The Indonesian Air Force has about a dozen 500MDs for counterinsurgency duties; in Taiwan, the Navy has a similar quantity of the ASW model. License production has been undertaken for many years in Japan (by Kawasaki) and South Korea (by Korean Air). More than 150 (of 190 on order), known as OH-6Ds, have been delivered to Japan's GSDF, mainly for observation, liaison, and training; nine others, also for training, were delivered to the JMSDF. The Republic of Korea Army has about 200 Scout and 50 TOW Defenders (locally built MD520MK Black Knights), while the country's Navy employs about 25 ASW Defenders. The Philippine Air Force received an initial 27 500MDs and later ordered 28 of the improved 530MG. North Korea circumvented US export restrictions in 1988 to obtain 87 Scout Defenders (mostly 500MGs), about 70 of which are reported to survive, though maintenance must now be an increasing problem. (Data for 530MG Defender.)

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

**Power Plant:** one Allison 250-C30 turboshaft; derated to 425 shp.

**Dimensions:** rotor diameter 27 ft 4 in, fuselage length 23 ft 11 in, height 8 ft 7 in.

**Weights:** empty 1,979 lb, gross 3,100-3,750 lb.

**Performance:** max cruising speed at 5,000 ft 142 mph, ceiling more than 16,000 ft, range at 5,000 ft 230 miles.

**Accommodation:** pilot and copilot/gunner.

**Armament:** pylon on each side of cabin for twin-round packs of TOW 2 missiles, pods containing two 7.62-mm or one 0.50-in machine gun, and launchers for seven or 12 x 2.75-in air-to-surface rockets.

#### Mi-6

The Vietnamese People's Air Force is believed to have available about 10 of the 15 Mi-6 (NATO "Hook") heavy-lift helicopters that it received from the former USSR. Their military tasks include transport of guns, armor, vehicles, supplies, freight, and troops in combat areas. When the Mi-6 is used as a flying crane, with slung cargo, the fixed wings that offload the main rotor in cruising flight are usually removed.

**Contractor:** Mil OKB, Russia.

**Power Plant:** two 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 93,700 lb.

**Performance:** max speed 186 mph, ceiling 14,750 ft, range with 17,637-lb payload 385 miles.

**Accommodation:** crew of five; normally, 70 combat-equipped troops, 26,450 lb of internal freight, or 41 litters and two medical attendants. Max slung cargo 17,637 lb.

**Armament:** some aircraft have a 12.7-mm gun in the nose.

#### Mi-8/17

Although they exist in many forms, Mi-8s and -17s all have the same basic airframe and share the same NATO reporting name "Hip." The Mi-8 is the original production configuration, with TV2 turboshafts and a starboard-side tail rotor, as described below. The Mi-17 (Hip-H) has more powerful (1,923 shp) TV3-117MT engines in shorter nacelles, and its tail rotor is relocated on the port side.

The basic Mi-8T (Hip-C) is the standard heavily armed assault transport, designed to put down troops, equipment, and supplies behind enemy lines within 15-20 minutes of a nuclear or conventional bombardment/air strike. The Mi-8TV (Hip-F) is even more heavily armed, with a nose machine gun and a triple stores rack on each side of the cabin, able to carry up to 192 rockets in six packs, plus six 9M14 Malutka antitank missiles (NATO "Sagger"). These are the versions most used by non-CIS air forces, including those of China (50, including 24 Mi-17s), Laos (nine), North Korea (20), and Vietnam (60). Cambodia is thought to have 10 Mi-8s and five Mi-17s following recent receipt of two of each from Ukraine. (Data for Mi-8 Hip-C.)

**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 26,455 lb.

**Performance:** max speed at 3,250 ft 161 mph, ceiling 14,750 ft, range 264 miles as passenger transport.

**Accommodation:** crew of two or three; 24 troops on tip-up seats along cabin sidewalls, or 12 litter patients and an attendant, or 8,820 lb of freight or vehicles, loaded via rear clamshell doors and hook-on ramps.

**Armament:** twin rack on each side of cabin for 64 x 57-mm rockets in four packs, or other weapons.

#### Mi-24

The North Korean People's Army Air Force acquired about 50 Mi-24 (NATO "Hind-D") gunships in 1985-86 to equip two of its regiments. Vietnam has at least 30 and Cambodia three. These helicopters have the capability of carrying a squad of eight combat-equipped troops in their main cabin, which is heavily armored, like the crew accommodation. The Gatling-type nose gun is slaved to an undernose electro-optical sighting pod for air-to-air and air-to-surface use. The Falanga (Phalanx) antitank system comprises four 9M17P Skorpion (NATO "Swatter") missiles and an undernose Raduga-F radio command guidance pod. Other stores are carried on pylons under the stub-wings. IFF, RWR, and an IR jamming microwave pulse lamp are optional.

**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 57 ft 5 1/4 in, height 21 ft 4 in.

**Weights:** empty 18,385 lb, gross 24,470-25,350 lb.

**Performance:** max speed 208 mph, ceiling 16,400 ft, normal range 370 miles, range with max external fuel 700 miles.

**Accommodation:** pilot (at rear) and weapon operator in tandem; flight mechanic, and provisions for eight troops or four litter patients, in main cabin.



**Armament:** one YakB-12.7 four-barrel 12.7-mm gun in undernose turret, with 1,470 rds; four 9M17P antitank missiles on wingtip launchers. Alternative loads include 32-rd packs of 57-mm rockets, 20-rd packs of 80-mm rockets, UPK-23-250 pods each containing a GSh-23 twin-barrel 23-mm gun, GUV pods each containing either one YakB-12.7 gun and two 9-A-622 four-barrel 7.62-mm guns or a 30-mm grenade launcher, up to 3,300 lb of bombs, mine dispensers, or other stores, on four underwing hardpoints.

#### OH-58D Kiowa Warrior/Bell 206 JetRanger/Kiowa

The OH-58D Kiowa Warrior light observation helicopter is a development of the original OH-58A, with uprated turboshaft and transmission, strengthened airframe, increased gross weight, SINCGARS radios, RWR, IR jammer, video recorder, integrated weapons pylons, and other changes. First export customer for this version was Taiwan, with orders for 26. The Indonesian Air Force and South Korean Navy each operate two basic commercial Bell 206B JetRangers, from which the military OH-58 was developed, for liaison duties. Under a coproduction deal, Commonwealth Aircraft Corporation assembled the last 44 of 56 206B-1s (similar to the OH-58A, with 400 shp Allison 250-C20B engine) ordered by the Australian government; 22 of them are used, as A17 Kiowas, by Nos. 161 and 162 Reconnaissance Squadrons of the Australian Army and 20 by the School of Army Aviation. The Royal Australian Navy has three, of which one is often embarked on HMAS *Moresby* for survey and utility operations. (Data for Kiowa Warrior.)

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

**Power Plant:** one Allison 250-C30R turboshaft; 650 shp.

**Dimensions:** rotor diameter 35 ft 0 in, fuselage length 34 ft 4 1/4 in, height 12 ft 10 3/4 in.

**Weights:** empty 3,289 lb, gross 5,500 lb.

**Performance:** max speed at 4,000 ft 147 mph, ceiling 15,000 ft, range 257 miles.

**Accommodation:** pilot and copilot/observer/gunner side by side.

**Armament:** four Stinger AAMs or Hellfire ASMs, or two pods of 7 x 2.75-in rockets, or CFD-5000 pods for 7.62-mm and 0.50-in guns, on outriggers on sides of cabin.

#### S-70A/C and UH-60J/P Black Hawk

Sikorsky designation S-70A identifies a military tactical utility export version of the US Army's UH-60A combat transport helicopter. First recipient, in 1984, was the Philippine Air Force (two S-70A-5s). The 39 Australian S-70A-9s (one built by Sikorsky and 38 assembled in Australia by Hawker de Havilland 1987-91) are still maintained by the RAAF but are under Australian Army control. They have Dash 701A-1 engines, a modified SH-60B flight-control system, a 600-lb capacity rescue hoist, main rotor brake, folding tail rotor pylon, and external stores support system (ESSS). Japan's Self-Defense Forces are now receiving a version designated UH-60J (Sikorsky S-70A-12), the JMSDF having 12 on order, of 18 required, powered by T700-GE-401C engines and carrying a crew of four; the JASDF version (18 ordered, of 46 required) has an extra crew member and Dash 701A engines; the JGSDF ordered its first two UH-60JAs (of 80 wanted) in FY 1995. Two S-70A-14s were sold to Brunei as VIP transports, and the Republic of Korea Air Force has three VIP S-70A-22s. The RoK Army received three FMS UH-60Ls (S-70A-18) and is to get a further 77, designated UH-60P, assembled locally by Korean Airlines.

The S-70C is essentially a commercial utility version of the UH-60A, but the designation has also been used for pseudo-civil exports to the air forces of the two Chinas: 14 to Taiwan and 24 S-70C-2s, with undernose radar, to the People's Republic. The latter have been up for sale for several years because of a post-1989 embargo on the sale of spares. (Data for UH-60A.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two General Electric T700-GE-700 turboshafts; each 1,622 shp (1,723 shp GE-701A optional in export versions; 1,800 shp GE-701C in UH-60L).

**Dimensions:** rotor diameter 53 ft 8 in, fuselage length 50 ft 0 3/4 in, height 16 ft 10 in.

**Weights:** empty 11,284 lb, gross 16,500-20,250 lb.

**Performance:** max speed at S/L 184 mph, max cruising speed at 4,000 ft 160 mph, ceiling 19,000 ft, range 368 miles (internal fuel), 1,380 miles (max internal/external fuel).

**Accommodation:** crew of three; 11-14 troops, or 4-6 litters and 1-3 medical attendants, or cargo. Executive configuration for 7-12 passengers. Up to 8,000 lb load on external cargo hook.

**Armament:** ESSS permits more than 10,000 lb of externally mounted stores, including up to 16 Hellfire laser-guided antiarmor, Stinger air-to-air, or other missiles, gun pods, mine dispensers, rockets, or ECM packs on four cabin-side pylons. Two pintle



**Bell 206B-1 JetRanger, Royal Australian Navy (Peter Steinemann)**



**UH-60P Black Hawk, Republic of Korea Army**



**S-70C(M)-1 Thunderhawk, Republic of China Navy**

mounts in cabin, each for a 0.50-in or 7.62-mm six-barrel machine gun.

#### S-70B/C and SH-60J Seahawk/Thunderhawk

First customer for an S-70B export version of the US Navy's SH-60B Seahawk was the Royal Australian Navy, which ordered eight in July 1985 and eight more in May 1986 to fill its role-adaptable weapon system requirement. Eight of these Sikorsky S-70B-2s were US-built, the other eight being assembled by ASTA (AeroSpace Technologies of Australia). Operated by squadron HS-816, whose shore base is at Nowra, New South Wales, they were all delivered by September 1991 and are assigned to the RAN's six FFG-7 (*Adelaide*-class) guided missile frigates, seeing service both before and during the 1991 Persian Gulf War. Equipment includes Super Searcher radar and a Collins avionics suite.

Two US-built XSH-60J prototypes were delivered to Mitsubishi in 1986, for outfitting with JMSDF-specified avionics and equipment. To replace that service's Sea Kings, the Japanese company is now producing the SH-60J (Sikorsky designation S-70B-3), the first Mitsubishi-built example having been delivered in August 1991. Current requirement is for 90, of which 64 had been ordered and 35 delivered by April 1 this year. They equip No. 121 Squadron at Tateyama and Nos. 122 and 123 at Ohmura.

The name Thunderhawk identifies 10 SH-60B ASW Seahawks supplied to Taiwan from 1990. Given the pseudo-civil Sikorsky designation S-70C(M)-1, they entered service in 1993 in the Republic of China Navy's six *Oliver Hazard Perry*-class guided missile frigates. (Data for SH-60B.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two General Electric T700-GE-401C turboshafts; each 1,800 shp.

**Dimensions:** rotor diameter 53 ft 8 in, fuselage length 50 ft 0 3/4 in (folded 40 ft 11 in), height 17 ft 0 in.

**Weights:** empty 13,648 lb, gross 20,244-21,884 lb.

**Performance:** max speed at 5,000 ft 145 mph, ceiling 19,000 ft, range with one h loiter 170 miles.

**Accommodation:** crew of three.

**Armament:** two Mk 46 torpedoes or two AGM-119B Penguin antiship missiles.

#### S-76/H-76 Eagle

The Philippine Air Force was the first military export customer for S-76 Mk II Utility helicopters in 1983. Three of these are now configured for SAR; the other 12 are used either for medevac duties or as armed AUH-76 Eagles for counterinsurgency operations. (Data for S-76 Mk II Utility, except where indicated.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two Allison 250-C30S turboshafts; each 650 shp.

**Dimensions:** rotor diameter 44 ft 0 in, fuselage length 43 ft 4 1/2 in, height 14 ft 9 3/4 in.

**Weights:** empty 5,600 lb, gross 10,300 lb (H-76 11,400 lb).

**Performance:** max cruising speed 178 mph, hovering ceiling 11,200 ft, range with 12 passengers 465 miles.

**Accommodation:** crew of two; up to 12 passengers in main cabin.

**Armament (H-76):** one 7.62-mm gun in each doorway; multipurpose pylon system for pods containing one or two 7.62-mm guns, 0.50-in guns, 2.75-in and 5-in rocket pods, 68-mm rockets, mines, Stinger AAMs, Hellfire, TOW, or Sea Skua ASMs, or Mk 46 torpedoes.

#### S-80M

The S-80M mine countermeasures helicopter is an export counterpart to the US Navy's MH-53E Sea Dragon. Of 12 required by the Japan Maritime Self-Defense Force, 11 have been delivered, under the designation S-80M-1, to replace KV107IIA-3s. Compared with the CH-53E transport, from which they were derived, they have enlarged spools for increased fuel capacity, in-flight refueling capability, an automatic flight-control system (with automatic approach to/depart from hover and automatic tow coupling), and mechanical, acoustic, and antimagnetic systems to deal with all types of sea mines likely to be encountered. On-board systems in the USN version include AN/AQS-14 towed sonar, AN/AQS-17 mine neutralization set, AN/ALQ-141 electronic sweep gear, and an AN/ALQ-166 towed sled for detonating magnetic mines. (Data for MH-53E.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** three General Electric T64-GE-416 turboshafts; each 4,380 shp.

**Dimensions:** rotor diameter 79 ft 0 in, fuselage length 73 ft 4 in, height to top of main rotor head 17 ft 5 1/2 in.

**Weights:** empty 36,336 lb, gross 69,750 lb.

**Performance:** cruising speed at S/L 173 mph, ceiling 18,500 ft.

**Accommodation:** flight crew of three, plus systems operators as required.

**Armament:** none.

#### SA 316/319 Alouette III

The Royal Malaysian Air Force still operates about 24 vintage Alouette III light helicopters, side by side with larger S-61A-4 Nurus. Their duties include utility support, SAR, forward air control, and training, some armed with cabin-mounted guns. Indonesia retains three equipped for counterinsurgency duties. The Republic of Korea Navy, which had 10 available for operation from the stern platforms of its *Gearing*-class destroyers, now has Super Lynx Mk 99s to take over the role. The Air Force of Myanmar has 10 for liaison duties.

The SA 316B Alouette III superseded the original SE 3160 version in 1969. It was followed by the SA 319B, with a 600 shp Astazou XIV turboshaft in place of the earlier Artouste, and this remained in production in France until 1985. License manufacture took place in Romania, Switzerland, and India. (Data for SA 316B.)

**Contractor:** Aerospatiale SNI, France.

**Power Plant:** one Turbomeca Artouste IIIB turboshaft; derated to 570 shp.

**Dimensions:** rotor diameter 36 ft 1 3/4 in, fuselage length (incl tail rotor) 33 ft 4 1/2 in, height 9 ft 9 in.

**Weights:** empty 2,315 lb, gross 4,850 lb.

**Performance:** max cruising speed at S/L 115 mph, ceiling 10,500 ft, range (max) 335 miles.

**Accommodation:** pilot and up to six passengers or equivalent cargo; normally pilot only, or pilot and gunner, in armed versions.

**Armament:** range of possible weapons can include a tripod-mounted 7.62-mm gun with 1,000 rds aft of pilot's seat, or a 20-mm gun with 480 rds, turret-mounted on port side of cabin. Instead of guns, can carry two or four wire-guided missiles on external rails, or 68-mm rocket pods. ASW version can carry two torpedoes, or one torpedo and an MAD bird.

#### SA 321 Super Frelon and Z-8

During 1977-78, the Chinese PLA Navy received 10 Super Frelons, similar to the antisubmarine SA 321G



developed for the French Navy but less fully equipped. Some reportedly have French-built search radar; all were delivered with an early type dipping sonar, but at least three later received more modern Thomson-Sintra HS-12 for an SSBN escort role. To supplement the small number available, China's Helicopter Design and Research Institute developed the virtually identical Z-8. A prototype flew on December 11, 1985, and one Z-8 was delivered to the PLA Navy for service trials in August 1989. Six more had been delivered to that service by the beginning of this year. Equipment options include search radar, sonar and sonobuoys, or minesweeping gear. (Data for Z-8.)

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

**Power Plant:** three Changzhou WZ6 turboshafts; each 1,550 shp.

**Dimensions:** rotor diameter 62 ft 0 in, fuselage length 65 ft 10 3/4 in, height 21 ft 10 3/4 in.

**Weights:** empty 16,645 lb, gross 23,351-26,618 lb.

**Performance:** max cruising speed at S/L 154 mph, ceiling 10,000 ft, range 497 miles.

**Accommodation:** crew of two or three, 27-39 troops, 15 litters plus a medical attendant, or payloads of 8,818 lb (internal) or 11,023 lb (on external hook).

**Armament (ASW Super Frelon):** four homing torpedoes or two Exocet antiship missiles. Z-8 can carry similar weapons and/or eight 550-lb mines.

### Sea King and Nuri

Principal Far East/Pacific operator of Sikorsky's venerable submarine hunter/killer helicopter is the Maritime Self-Defense Force of Japan, which still has just over 100 of the 167 built for it under license by Mitsubishi. These correspond to the basic US Navy SH-3A, although Japan quietly has always identified them by their pre-1962 US designation of HSS-2. None of the original 55 HSS-2s remains, but about 25 improved HSS-2As and 79 HSS-2Bs (equivalent to the USN's SH-3D and SH-3H) continue in JMSDF service. Some are shore-based, but their primary mission is ASW, singly or in three-aircraft flights from destroyers; this role is progressively being assumed by the SH-60Js now being delivered. The Royal Malaysian Air Force received 38 S-61A-4 Nuris from 1968-78, of which 34 remain in service with Nos. 3, 5, 7, and 10 Squadrons and a training unit. These have recently been upgraded by Lockheed and the Malaysian company Airod with Honeywell Primus 500 radar and AN/APN-209(V) radar altimeter, and GEC-Marconi ANV-301 Doppler nav system. A single S-61A is operated as a VIP transport by the Indonesian Air Force.

Westland-built Advanced Sea Kings, with 1,660 shp Rolls-Royce Gnome H.1400-1T turboshafts, more advanced ASW equipment, and other improvements, included 10 Mk 50s in 1974 and two Mk 50As in 1983 for the Royal Australian Navy, of which seven remain in service with No. 817 Squadron. Under a July 1994 contract due for completion in mid-1996, Westland and BAe Australia are extending their service life until 2008 with a major avionics upgrade plus new cargo floors, increased cabin volume, extra seats, and FOD (foreign-object damage) protection. (Data for S-61A.)

**Contractor:** Sikorsky Aircraft, USA.

**Power Plant:** two General Electric T58-GE-8B turboshafts; each 1,250 shp.

**Dimensions:** rotor diameter 62 ft 0 in, fuselage length 54 ft 9 in, height 16 ft 10 in.

**Weights:** empty 9,783 lb, gross 21,500 lb.

**Performance:** cruising speed at S/L 136 mph, ceiling 14,700 ft, range with max fuel 625 miles.

**Accommodation:** crew of four; up to 28 survivors in SAR role.

**Armament (ASW):** provisions for up to 840 lb of weapons, including antiship missiles, up to four homing torpedoes, four depth charges, sonobuoys, smoke floats, marine markers, and other weapons and equipment.

### Super Lynx

This upgraded export version of the multirole Westland Lynx is very like the latest model developed for the Royal Navy. Compared with earlier versions, the Super has advanced technology composites main rotor blades, a reversed-direction tail rotor that reduces noise and improves hovering ability for extended periods at high weights, a higher gross weight, all-weather day/night capability, and extended payload/range performance. Production began in 1988, when a batch of 12 Lynx Mk 99s was ordered by the Republic of Korea for operation in antiship/ASW roles from its ex-USN Sumner- and Gearing-class destroyers and future HDF-3500 class. They were delivered in 1990-91.

Equipment on the Korean helicopters includes Racal Doppler 71/TANS N navigation avionics, 360° GEC-Marconi Seaspray Mk 3 radar, Bendix/King AN/AQS-18 dunking sonar, and Sea Skua antiship missiles.

**Contractor:** Westland Helicopters Ltd, UK.

**Power Plant:** two Rolls-Royce Gem 42-1 turboshafts; each 1,120 shp.

**Dimensions:** rotor diameter 42 ft 0 in, length (main rotor blades and tail folded) 35 ft 7 1/4 in, height (main rotor blades and tail folded) 10 ft 8 in.

**Weights:** empty 7,255 lb, gross 11,300 lb.

**Performance:** max cruising speed 159 mph, radius of action (dunking sonar, one torpedo, 2 h on station) 23 miles.

**Accommodation:** crew of two; secondary capability for carrying up to nine survivors in SAR role, or three litter patients and an attendant.

**Armament:** four Sea Skua or two Penguin antiship missiles. Provision for wide range of podded gun and rocket installations.

### UH-1 Iroquois/Model 205

These single-engine workhorse members of the original "Huey" family seem likely to remain in service for many more years, although the design dates back to 1955, when Bell won a US Army competition for a helicopter suitable for casevac, utility, and instrument training duties. Sole production source is now Fuji in Japan, which has been building the type since 1973. The Japan Ground Self-Defense Force operates more than 25 UH-1Bs and well over 100 UH-1Hs and upgraded UH-1Js, some for minelaying. Other operators, with approx numbers in service, include Australia (Army 25 UH-1H), Indonesia (Army 16 x 205A-1), South Korea (Army 15 UH-1B and 47 UH-1H, Air Force 12 UH-1D/H), Myanmar (12 x 205A-1), New Zealand (Air Force 13 UH-1H), Papua New Guinea (Defence Force five UH-1H), the Philippines (Air Force five 205A-1 and more than 60 UH-1H), Singapore (Air Force seven 205A/A-1 and 17 UH-1H), and Taiwan (Air Force 58 UH-1H, Army 60 UH-1H). The Royal New Zealand Air Force is not only upgrading its fleet with T53-L-22 standard engines, GPS, and improved HF radios, but plans to acquire six more used "Hueys" in 1996-97. (Data for Fuji-built UH-1H.)

**Contractors:** Bell Helicopter Textron, USA; Fuji Heavy Industries, Japan.

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

**Dimensions:** rotor diameter 48 ft 0 in, fuselage length 41 ft 10 3/4 in, height 14 ft 5 1/2 in.



Super Lynx Mk 99, Republic of Korea Navy



UH-1H Iroquois, Japan GSDF



Wasp HAS Mk 1, Indonesian Naval Aviation

**Weights:** empty 5,270 lb, gross 9,500 lb.

**Performance:** max cruising speed 127 mph, ceiling 12,600 ft, range 290 miles.

**Accommodation:** pilot and 11-14 troops, or six litters and a medical attendant, or 3,880 lb of cargo.

**Armament:** normally none.

### Wasp

Of three Far East/Pacific navies that operate Wasp antisubmarine helicopters, only the Royal New Zealand Navy bought some of its aircraft new from Westland. Two acquired in 1966 were augmented later by 10 ex-RN Wasp HAS Mk 1s. The RNZN fleet has dwindled to six, used now by No. 3 Squadron for SAR and communications. The Royal Malaysian Navy acquired six ex-RN HAS Mk 1s in 1988, which it operates for a mix of ASW, maritime reconnaissance, and SAR duties. The third operator is the Indonesian Navy, whose nine Wasps are also secondhand, having been obtained from the Royal Netherlands Navy in 1981. These perform ASW and SAR duties, operating from three Tribal-class frigates.

**Contractor:** Westland Helicopters, UK.

**Power Plant:** one Rolls-Royce Bristol Nimbus Mk 503 turboshaft; derated to 710 shp.

**Dimensions:** rotor diameter 32 ft 3 in, fuselage length 30 ft 4 in, height 11 ft 10 in.

**Weights:** empty 3,452 lb, gross 5,500 lb.

**Performance:** max speed 120 mph, ceiling 12,500 ft, range 270 miles.

**Accommodation:** crew of two; can carry up to three more persons on rear seat.

**Armament:** two Mk 44 torpedoes or up to 550 lb of depth charges. Some Royal Navy aircraft were equipped to carry two AS.12 wire-guided missiles for antiship missions.

### Z-9 Haitun/AS 365N Dauphin

China acquired an Aerospaziale license in 1980 to build 50 Dauphins (completed 1992) for civil and military use. The version built at Harbin is designated Z-9 and has the Chinese name Haitun, also meaning "dolphin." Initial Harbin Z-9s were equivalent to the French (now Eurocopter) AS 365N, later (Z-9A) examples to the improved AS 365N. Military Z-9/9As serve with at least two PLA group armies (Beijing and Shenyang military regions) and are thought to include some equipped for an antitank role; others serve on shipboard duties, and reportedly as commando transports, with the PLA Navy. Chinese production, now with much-increased locally made content (more than 70 percent of the airframe and 90 percent of the engine), is continuing as the Z-9A-100 (first flight January 16, 1992). Taiwan has received two French-built AS 365N Dauphins. (Data for Z-9A.)

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

**Power Plant:** two Zhuzhou WZ8A (license Turbomeca Arriel 1C1) turboshafts; each 724 shp.

**Dimensions:** rotor diameter 39 ft 2 in, fuselage length 38 ft 1 1/2 in, height 11 ft 6 1/2 in.

**Weights:** empty 4,519 lb, gross 9,039 lb.

**Performance:** max cruising speed at S/L 177 mph, ceiling 19,685 ft, range at 161 mph (standard fuel) 534 miles, (with auxiliary tank) 621 miles.

**Accommodation:** up to 10 (normal) or 14 (max) persons, including one or two pilots.

**Armament:** some Chinese Army Z-9/9As equipped with door- or externally mounted machine guns and/or "Red Arrow 8" antitank missiles.

## Reconnaissance and Special Mission Aircraft

### OV-1D Mohawk

In 1993, the Republic of Korea Air Force took delivery of an unspecified number of ex-US Army OV-1D Mohawk battlefield surveillance and target acquisition aircraft. Rapidly interchangeable sensors and cockpit displays enable the OV-1D to be used for either infrared or radar reconnaissance. An on-board processor provides the observer with developed photographs seconds after SLAR (side-looking airborne radar) film has been exposed. Panoramic and serial frame cameras, with 104 upward-firing flares in removable wingroot pods, are standard for night missions. Operation is possible from unprepared fields.

**Contractor:** Grumman Corporation, USA.

**Power Plant:** two AlliedSignal T53-L-701 turboprops; each 1,400 shp.



**Dimensions:** span 48 ft 0 in, length 41 ft 0 in, height 12 ft 8 in.

**Weights:** empty 12,054 lb, gross 17,912–18,109 lb.  
**Performance:** max speed at 5,000 ft 289–305 mph, ceiling 25,000 ft, T-O to 50 ft 1,145–1,175 ft, landing from 50 ft 1,060 ft, range 944–1,011 miles.

**Accommodation:** crew of two, side by side, on ejection seats.

**Armament:** provision for 2,700 lb of underwing ordnance or stores, including fuel tanks and ECM pods.

#### RF-4C/E/J Phantom II

The 20 or so ex-USAF RF-4C Phantoms acquired by the 131st Tactical Reconnaissance Squadron of the Republic of Korea Air Force since 1989 have CAI/Fairchild/Ittek forward, oblique, and high/low altitude panoramic cameras in the nose, plus a TEREK (tactical electronic reconnaissance) system that includes Loral AN/UPD-8 side-looking airborne radar, Texas Instruments RS-700 infrared linescan (IRLS), and Westinghouse AN/ALQ-131 jammer pods. The 14 reconnaissance Phantoms originally acquired by Japan's Air Self-Defense Force, although designated RF-4E, are actually also to RF-4C standard. Operated by the JASDF's No. 501 Squadron at Hyakuri, the 12 survivors are currently being modernized as RF-4EKais with Texas Instruments AN/APQ-172 forward-looking radar, inertial navigation, an IR reconnaissance system, digital displays, and VHF (replacing UHF) radio. In addition, the JASDF plans reconnaissance conversions of 17 of its existing F-4EJ fighters to RF-4EJ standard with digital avionics, radar warning receivers, and radar altimeter. Podded reconnaissance systems include a LOROP (long-range oblique photographic) pod, Israeli-based side-looking radar, and a Mitsubishi Electric elint/ESM system derived from the French Thomson-CSF Astac. These aircraft retain the fighters' internal gun and APQ-120 fire-control radar. (Data for RF-4E.)

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

**Dimensions:** span 38 ft 4 7/8 in, length 62 ft 11 in, height 16 ft 6 in.

**Weights:** empty 28,276 lb, gross 58,000 lb.  
**Performance:** max speed (clean) at 36,000 ft Mach 2.25, at S/L Mach 1.18, ceiling 59,400 ft, combat radius 840 miles.

**Accommodation:** crew of two, in tandem, on zero/zero ejection seats.  
**Armament:** none.

#### RF-5 TigerEye

In addition to its F-5E Tiger II fighters, the Royal Malaysian Air Force has two RF-5E TigerEye day/night reconnaissance aircraft, combining the F-5E airframe with interchangeable nose pallets containing either standard cameras or an IRLS. Eight of Singapore's F-5Es have been converted to the same standard, with up to four vertical and oblique 70-mm cameras, for operation by No. 141 Squadron.

**Contractor:** Northrop Corporation Aircraft Group, 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 1 1/8 in over wingtip AAMs), length (incl nose probe) 48 ft 0 3/4 in, height 13 ft 4 1/4 in.

**Weights and Performance:** essentially as F-5E, except combat radius 282–685 miles.

**Accommodation:** pilot only, on ejection seat.  
**Armament:** one 20-mm M39 gun, with 280 rds; two AIM-9 Sidewinder AAMs and up to three drop tanks.

#### U-125

The Raytheon Hawker 800 is the current production version of the British Aerospace (originally de Havilland) 125 executive jet. In 1989, at about the same time as USAF ordered six as C-29As for a C-FIN (combat flight inspection and navigation) role, Japan ordered three similar aircraft as U-125s, also outfitted by Sierra Research. Delivery of these began in December 1992. The JASDF also plans to acquire 27 Hawker 800MPs, seven of which have so far been ordered, as U-125A search-and-rescue aircraft to replace the Mitsubishi MU-2E. These have a Japanese-built Texas Instruments 360° search radar, a Mitsubishi Electric IR imager in a retractable ventral turret, air-droppable marker flares, a deep "patio" observation window each side of the front fuselage, a small ventral fin, and dinghy/rescue/survival kits. The first three U-125As were handed over in January 1995; deliveries are expected to continue through 2003. (Data for standard Raytheon Hawker 800MP.)

**Contractor:** Raytheon Aircraft Company, USA.  
**Power Plant:** two AlliedSignal TFE731-5R-1H turbofans; each 4,300 lb thrust.

**Dimensions:** span 51 ft 4 1/2 in, length 51 ft 2 in, height 17 ft 7 in.

**Weights:** empty 16,000 lb, gross 27,400 lb.  
**Performance:** max cruising speed at 29,000 ft 525

mph, ceiling 43,000 ft, T-O distance 5,620 ft, landing distance 4,500 ft, range (max payload) 2,969 miles, (max fuel) 3,251 miles.

**Accommodation:** crew of two; up to 14 passengers or equivalent weight of equipment or cargo.

**Armament:** none.

## Transports and Tankers

#### An-2/Y-5

More than 17,900 of these large, anachronistic biplanes have been built in the former USSR, Poland, and China since the prototype flew for the first time on August 31, 1947. Most An-2s are used for agriculture and other civilian tasks, but the Chinese PLA Air Force has about 300 and the Navy at least 24. Others serve with the air forces of Laos (10), North Korea (200), and Vietnam (20). The specification data below apply to the basic AN-2P general-purpose transport. Other versions in military use include the AN-2S ambulance, AN-2TD paratroop transport and training version with six tip-up seats along each side of the cabin, and AN-2V/AN-2M floatplanes. All Chinese versions have the basic designation Y-5 (Yunshuji-5: "Transport 5"). NATO reporting name for An-2s and Y-5s is "Coit."

**Contractors:** WSK-PZL Mielec, Poland, and Shijiazhuang Aircraft Manufacturing Corporation, People's Republic of China.

**Power Plant:** one PZL Kalisz ASz-62IR piston engine (Zhuzhou HS5 in Y-5); 986 hp.

**Dimensions:** span 59 ft 7 3/4 in, length 40 ft 8 1/4 in, height 13 ft 2 in.

**Weights:** empty 7,605 lb, gross 12,125 lb.  
**Performance:** max speed at 5,750 ft 160 mph, ceiling 14,425 ft, T-O run 492–558 ft, landing run 558–607 ft, range 560 miles.

**Accommodation:** crew of two and 12 passengers, 2,735 lb of freight, or six litters plus attendants.  
**Armament:** none.

#### An-24/26/30 and Y-7

The prototype 50-passenger An-24 twin-turboprop airliner (NATO "Coke") flew for the first time in 1960. The An-26 ("Curl") differs little from the An-24 except for its redesigned "beaver-tail" rear fuselage, the addition of an auxiliary turbojet in the rear of the starboard engine nacelle, fewer cabin windows, and more powerful turboprops. It was the first type to use Antonov's unique rear-loading ramp. This forms the underside of the rear fuselage when retracted, in the conventional way, but can be slid forward under the rear of the cabin to facilitate direct loading onto the floor of the hold, or when the cargo is to be airdropped. An extensively glazed nose, to give the navigator a wide field of view, and a raised flight deck identify the An-30 ("Clank"), which carries cameras and equipment in its cabin for aerial survey and other photographic duties.

Manufacture of these aircraft by Antonov has ended; but in China Xian Aircraft Company still produces "reverse engineered" developments of the An-24/26 series under the designation Y-7. The PLA Naval Air Force has a few of the basic passenger transports, but the major military version is the Y7H cargo transport, first flown in 1988 and currently in production. Features include a rear-loading ramp of the kind fitted to the An-26, rough-field landing gear, modern avionics, and 2,790 shp Dongan WJ5E turboprops. Other data are generally as for the An-26.

Military operators of these transports in the Far East/Pacific region include Cambodia (three An-24, one An-26), China (20 An-24/Y-7, 12 An-26/Y7H, eight An-30), Laos (six An-24, three An-26, operated also as national airline), North Korea (12 An-24), and Vietnam (nine An-24, 40 An-26). (Data for An-26.)

**Contractor:** Antonov OKB, Ukraine.  
**Power Plant:** two Ivchenko AI-24VT turboprops, each 2,820 ehp; plus 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 1/2 in, length 78 ft 1 in, height 28 ft 1 1/2 in.

**Weights:** empty 32,518 lb, gross 50,706–52,911 lb.  
**Performance:** cruising speed at 20,000 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; 12,125 lb payload. Provision for carrying 40 paratroops or 24 litters and an attendant.

**Armament:** provision for pylons on the sides of the

fuselage for 4,409 lb of weapons or supply containers.

#### Boeing 707

No. 33 Squadron of the Royal Australian Air Force operates two ex-airline Boeing 707-320Cs as VIP and staff transports; another provides similar capability for the Indonesian Air Force. In addition, Hawker de Havilland received a contract in 1988 to convert the RAAF's four ex-Qantas 707-338Cs into tanker combis, using kits supplied by Israel Aircraft Industries. The upgrade involved structural strengthening and interior refit, and installation of new avionics, a centerline boom-type refueling system, plus a Flight Refuelling Mk 32B hose-and-drogue pod at each wingtip. The converted aircraft can each carry a maximum transferable fuel load of 190,000 lb, equivalent to approx 28,350 gallons. The flight deck upgrade includes Litton LN-92 ring-laser INS, Bendix/King multifunction displays, IFF, and Tacan. One of the tankers was lost in October 1992.

**Contractors:** Boeing Commercial Airplane Group, USA; HDH Victoria, Australia.

**Power Plant:** four Pratt & Whitney JT3D-7 turbofans; each 19,000 lb thrust.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.

**Weights (IAI tanker version):** 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 from 50 ft 6,250 ft, max range 3,625 miles.

**Accommodation:** crew of two or three; main cabin can accommodate up to 219 passengers or combinations of passengers/cargo (max payload approx 89,000 lb) when transferable fuel not carried.  
**Armament:** none.

#### C-1

Designed in the mid-1960s to replace Japan's elderly Curtiss C-46s, the first of two NAMC-built XC-1 prototypes flew in November 1970. Kawasaki, as prime contractor, then completed two preproduction and 27 production C-1s. Deliveries to the Air Self-Defense Force began in December 1974 and ended in October 1981. The last five aircraft were longer-range models, with an additional fuel tank in the wing center-section. Current operators are Nos. 402 and 403 Squadrons. One C-1 was converted as a quiet STOL research aircraft; others have been test-beds for Japanese turbofans and for air-launch of Japanese air-to-surface missiles; and one was delivered in 1986, in EC-1 configuration, to the JASDF's electronic warfare training unit. Equipped with TRDI/Mitsubishi Electric XJ/ALQ-5 ECM, it features bulbous nose and tail radomes, large blister fairings each side of the forward and rear fuselage, and underfuselage antennas. The Japan Defense Agency has launched a C-X competition to find a C-1 replacement.

**Contractor:** Kawasaki Heavy Industries, Japan.  
**Power Plant:** two Mitsubishi-built (Pratt & Whitney license) JT8D-M-9 turbofans; each 14,500 lb thrust.

**Dimensions:** span 100 ft 4 3/4 in, length 95 ft 1 3/4 in, height 32 ft 9 3/4 in.

**Weights:** empty 53,572 lb, gross 85,320–99,210 lb.

**Performance:** econ cruising speed at 35,000 ft 408 mph, ceiling 38,000 ft, T-O run 2,100 ft, landing run 1,500 ft, max range 2,084 miles.

**Accommodation:** crew of five, including loadmaster; main cabin accommodates up to 60 troops or 45 paratroops; 36 litters with medical attendants; artillery pieces or small vehicles; or equivalent palletized or other cargo (payload 17,416 lb normal, 26,235 lb max overload).  
**Armament:** none.

#### C-47 Skytrain/Li-2

First flown as the commercial DC-3 prototype in 1935, the military C-47 version and its Soviet license-built counterpart, the Lisunov Li-2 (NATO "Cab"), have outlived many of their modern successors on day-to-day operations in the Far East/Pacific area. China has the largest fleet, with about 30 Li-2s still flying with the PLA Air Force and nine with Aviation of the People's Navy. More than 20 in Vietnam are thought to be a mix of Li-2s and C-47s. Other C-47 operators are Indonesia's Army and Air Force with a total of nine, the Air Force of the Laotian People's Liberation Army (seven, including at least three AC-47 gunships), and Taiwan's Republic of China Air Force (nine), which also uses an EC-47D for nav aids calibration. (Data for C-47B except where indicated.)

**Contractor:** Douglas Aircraft Company, USA.  
**Power Plant:** two Pratt & Whitney R-1830-90C radial piston engines; each 1,200 hp.

**Dimensions:** span 95 ft 6 in, length 63 ft 9 in, height 17 ft 0 in.

**Weights:** empty 18,135 lb, gross 26,000 lb (normal), 31,000 lb (max overload).

**Performance:** max speed at 10,000 ft 224 mph, ceil-



ing 26,400 ft, T-O field length 4,000 ft, range 1,600 miles.

**Accommodation:** crew of two; up to 27 troops, 18–24 litters, or 10,000 lb of cargo in main cabin.

**Armament (AC-47):** up to three General Electric 7.62-mm Miniguns in main cabin.

### C-119 Flying Boxcar

Fairchild's classic rear-loading (twin-boom/podded fuselage) transport, first flown in 1947, still lingers in service in the Far East. The most-produced version was the C-119G, of which 396 were delivered by Fairchild and 88 by Kaiser at Willow Run, Pa., with others upgraded from C-119Fs. They saw war service in Korea and, notably as gunships, in Vietnam. Forty or more C-119Gs are operated by two squadrons of the Republic of China Air Force 20th Tactical Transport Wing from Pingtung, Taiwan, and are expected to remain in service into the next century. (Data for C-119G.)

**Contractor:** Fairchild Engine and Airplane Corporation, USA.

**Power Plant:** two Wright R-3350-89W piston engines; each 3,400 hp.

**Dimensions:** span 109 ft 3 in, length 86 ft 6 in, height 26 ft 4 in.

**Weights:** empty 39,982 lb, gross 74,400 lb.

**Performance:** max speed at 17,000 ft 296 mph, ceiling 21,580 ft, range 2,280 miles.

**Accommodation:** crew of six, including loadmaster; up to 62 troops, or 35 litters and four attendants, or freight, including vehicles.

**Armament:** none.

### C-123 Provider

One of the first postwar transports to feature a rear-loading ramp/door, the Fairchild (originally Chase) Provider first flew in 1949. Its undistinguished early career improved considerably when its twin-piston-engine power plant was augmented by a pair of small underwing turbojets. Payload capability and short-field performance particularly benefited from this addition, and the C-123 gave valiant service during the Vietnam War. Two Far East air forces are known still to fly the type: Laos (about three) and Taiwan (10). South Korea's Providers have been replaced by recently delivered CN-235s. (Data for C-123K.)

**Contractor:** Fairchild Hiller Corporation, USA.

**Power Plant:** two Pratt & Whitney R-2800-99W radial piston engines, each 2,500 hp; and two General Electric J85-GE-17 turbojets, each 2,850 lb thrust.

**Dimensions:** span 110 ft 0 in, length 76 ft 3 in, height 34 ft 1 in.

**Weights:** empty 35,366 lb, gross 60,000 lb.

**Performance:** max cruising speed at 10,000 ft 173 mph, ceiling approx 25,000 ft, T-O run 1,167 ft, landing distance 1,800 ft, range with max payload 1,035 miles.

**Accommodation:** crew of two; up to 60 troops, 50 litters with six sitting casualties and six medical attendants, or 15,000 lb of cargo, in main cabin.

**Armament:** none.

### C-130 Hercules

Most of the 100-plus Hercules now operating in the Far East/Pacific region are of the C-130H series, introduced in 1964 with uprated engines and more modern avionics. The standard-length C-130H is operated by the air forces of Australia (12), Indonesia (two, plus one maritime patrol C-130H-MP), Japan (15), South Korea (six), Malaysia (six), New Zealand (five), the Philippines (three), Singapore (four, plus four tanker KC-130Hs), and Taiwan (17, including one equipped as an electronic warfare test-bed). Malaysia's three C-130H-MPs have been replaced by specially modified Raytheon (Beech) Super King Air 200Ts.

Stretched Hercules include the 106 ft 1 in long L-100-20 commercial model, and the 112 ft 9 in C-130H-30 and L-100-30. These serve with Indonesia (seven H-30s and one L-100-30), South Korea (four H-30s), Malaysia (one H-30), and the Philippines (two L-100-20s).

Older Hercules in the region include eight C-130Bs and two KC-130B tankers of the Indonesian Air Force, now overdue for replacement, and 12 C-130Es of the Royal Australian Air Force. The RAAF is expected to order new C-130J Hercules IIs as replacements for its E models within the next year or so, and at a later date New Zealand may also select this model to succeed its C-130Hs. (Data for standard C-130H.)

**Contractor:** Lockheed Martin Aeronautical Systems, USA.

**Power Plant:** four Allison T56-A-15 turboprops; each 4,508 shp.

**Dimensions:** span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

**Weights:** empty 76,469 lb, max payload 49,818 lb, gross 155,000–175,000 lb.

**Performance (at 155,000 lb gross weight):** max cruising speed 362 mph, ceiling 26,500 ft, T-O run 4,000 ft, landing run 1,500 ft, range with 40,000-lb payload 2,238 miles.

**Accommodation:** crew of four, plus provision for loadmaster; up to 92 troops, 64 paratroops, 74 litters and two medical attendants, or equivalent weight of vehicles, artillery pieces, or cargo in main cabin.

**Armament:** none.

### CN-235 M/MPA

CASA and IPTN set up Aircraft Technology Industries (Airtech) to handle the joint design and production of this twin-turboprop transport. The CASA prototype flew on November 11, 1983, followed by the IPTN aircraft on December 30. The first production CN-235 was flown for the first time on August 19, 1986, and military deliveries (CN-235 M) began in February 1987. By the beginning of 1995, orders had been received for 166 military examples, of which 95 had entered service.

Main military customers in the Far East are the Indonesian Air Force and Navy, for which six had been delivered, of a total of 24 ordered. Malaysia has six on order from IPTN, with options on 12 more. Fourteen CASA-built examples have been delivered to South Korea (12) and Papua New Guinea (two). The CN-235 MPA is being developed by IPTN for ASW missions, with search radar in a large nose fairing; three have been ordered by the Royal Air Wing of Brunei. CASA is developing a similar ASW version as the CN-235 MP Persuader. All military CN-235s in this region are designated Series 100 (from CASA) or 110 (from IPTN). (Data for CN-235 M Series 100/110.)

**Contractor:** Aircraft Technology Industries (Airtech): CASA, Spain, and IPTN, Indonesia.

**Power Plant:** two General Electric CT7-9C turboprops; each 1,870 shp, flat-rated to 1,750 shp for takeoff.

**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 266 mph, ceiling 26,600 ft, T-O distance 4,235 ft, landing run with propeller reversal 1,306 ft, range 932 miles with max payload, 2,704 miles with 7,826 lb payload.

**Accommodation:** crew of two or three; up to 48 troops, 46 paratroops, 24 litters and four attendants, or 13,227 lb of cargo, loaded via rear ramp. Cabin can be equipped for ASW/maritime patrol, EW, or photographic duties, with seats for systems operators according to mission.



C-47 Skytrain, Republic of China Air Force (Denis Hughes)



KC-130B Hercules, Republic of Singapore Air Force (Peter Steinemann)



CN-235 M Series 100, Indonesian Air Force

**Armament:** three hardpoints for stores under each wing; max weapon load 7,716 lb. Indonesian CN-235 MPA can carry two Exocet antiship missiles.

### DHC-4A Caribou

This first-generation STOL transport first flew in 1958 and has been out of production since 1973, but during the 1960s and 1970s it was used by the US, Canada, and the air arms of a dozen other countries. Its rear-loading ramp, 1,150 cu ft cabin, and full-span double-slotted flaps made it particularly useful for lifting large payloads into and out of unprepared airfields difficult to access by more conventional designs. Australia received the first of 29 Caribou in 1964, and had originally planned to retire its fleet by now, but in a recent reversal of that decision has decided to retain 16 of the survivors until 2004, serving with No. 38 Squadron of the RAAF. Until this year, about 15 Caribou equipped Nos. 1 and 8 Squadrons of the Royal Malaysian Air Force, but their replacement by CN-235 Ms has recently begun. The CN-235, along with Italy's Alenia G222, is expected to be a candidate next year when bids are invited for an eventual replacement for the Australian fleet.

**Contractor:** The de Havilland Aircraft of Canada Ltd.

**Power Plant:** two Pratt & Whitney R-2000-7M2 Twin Wasp piston engines; each 1,450 hp.

**Dimensions:** span 95 ft 7½ in, length 72 ft 7 in, height 31 ft 9 in.

**Weights:** empty 18,260 lb, gross 28,500–31,300 lb.

**Performance:** max cruising speed at 7,500 ft 182 mph, ceiling 24,800 ft, T-O run 725 ft, landing run 670 ft, range 242 miles with 8,740-lb max payload, 1,307 miles with max fuel.

**Accommodation:** crew of two; up to 32 troops, 22 litter patients, or equivalent cargo, including light wheeled vehicles, in main cabin.

**Armament:** none.

### F27 Friendship/Troopship

This twin-turboprop, short-haul transport serves with several world air forces as a VIP or troop/cargo transport. Most military sales were either Mk 200s, similar to the basic commercial airline model, or Mk 400M dedicated military transports. Pacific/Far East operators are Indonesia, Myanmar, and the Philippines. The Indonesian Air Force received 12 Mk 400Ms, seven of which remain in service with No. 2 Squadron. Seven remaining Mk 200s equip the Philippine Air Force's No. 221 Airlift Squadron. Myanmar has four F27s and US-built FH227s. (Data for Mk 400M.)

**Contractor:** Royal Netherlands Aircraft Factories NV Fokker.

**Power Plant:** two Rolls-Royce Dart Mk 552 turboprops; each 2,210 shp.

**Dimensions:** span 95 ft 1¼ in, length 77 ft 3½ in, height 27 ft 11 in.

**Weights:** empty (according to mission) 25,307–26,240 lb, gross 45,900 lb.

**Performance:** normal cruising speed at 20,000 ft 298 mph, ceiling 30,000 ft, T-O distance 2,310 ft, landing distance 1,900 ft, max range 2,727 miles.

**Accommodation:** crew of two or three; up to 46 paratroops, 24 litters with nine sitting casualties/medical attendants, or 13,283 lb of cargo.

**Armament:** none.

### HS 748 and Andover

The Royal Australian Air Force continues to operate all 10 of its HS 748 Series 2s. Based on the standard transport, with 2,105 ehp Dart RDa.7 Mk 531 turboprops, eight serve as aircrew trainers at the School of Air Navigation and two as VIP transports with No. 32 Squadron. Two Series 2As, with RDa.8 Dart engines, are used for EW training by the Royal Australian Navy. The Republic of Korea Air Force uses two standard Series 2As, purchased in 1974, as VIP transports.

The oldest aircraft of the 748 family in the Pacific area are nine Andover C. Mk 1 transports of No. 42 Squadron, Royal New Zealand Air Force, which are undergoing an upgrade that includes GPS and self-protection systems. (The tenth was scrapped in 1993 and became a source of spares for the others.) Built for the Royal Air Force, with which they served from 1966 until 1975, they differ from other 748s in having 3,245 ehp Dart RDa.12 Mk 201C engines, a rear-loading ramp in a lengthened fuselage, and a "kneeling" landing gear to facilitate loading of such vehicles as armored cars and Land Rovers. Some are kept in storage for use at peak periods. Their duties include parachute training, logistic support, and crew training. Two have VIP interiors. (Data for Series 2A.)

**Contractor:** Hawker Siddeley Aviation, UK (now British Aerospace).

**Power Plant:** two Rolls-Royce Dart Mk 532-2L/S turboprops; each 2,280 ehp.

**Dimensions:** span 98 ft 6 in, length 67 ft 0 in, height 24 ft 10 in.

**Weights:** empty 26,700 lb, gross 44,495 lb.

**Performance:** max cruising speed 278 mph, ceiling



25,000 ft, T-O run 2,750 ft, landing run 1,255 ft, max range 1,987 miles.

**Accommodation:** crew of two; up to 58 passengers in main cabin.

**Armament:** none.

#### II-76M

The II-76M (NATO "Candid-B") became the largest transport aircraft in China's PLA Air Force when 15 were bought this year from Uzbekistan, where the type is built. Comparable with USAF's C-141 StarLifters, II-76s are the standard medium/long-range airlifters of the CIS and many other air forces and commercial operators worldwide. A rear-loading ramp and advanced mechanical handling systems facilitate the transport of containerized and other freight. The entire interior can be pressurized, making possible the carriage of 140 troops, 125 paratroops, or perishable supplies. Equipment for all-weather operation, including automatic flight control and automatic landing approach, is standard. High-lift wings and a complex 20-wheel landing gear ensure good field performance.

**Contractor:** Ilyushin OKB, Russia.

**Power Plant:** four Aviadvigatel D-30KP turbofans, each 26,455 lb thrust.

**Dimensions:** span 165 ft 8 in, length 152 ft 10 1/4 in, height 48 ft 5 in.

**Weights:** max payload 88,185 lb, gross 374,785 lb.

**Performance:** cruising speed at 29,500-39,350 ft 466-497 mph, 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, including two freight handlers.

**Armament:** two 23-mm twin-barrel GSh-23L guns in tail turret.

#### Islander

The **Islander** was designed as a simple and easy to manufacture and maintain STOL transport for 10 persons. By the beginning of this year, deliveries totaled 1,194, including military **Defenders** sold to more than 20 export customers. The 22 Islanders supplied to the Philippine Air Force for utility missions, and four flown by the Philippine Navy on transport and SAR duties, were built on a PADC license assembly line at Pasay in Metro Manila. One **Islander** also flies with an Indonesian Army communications squadron.

**Contractors:** Pilatus Britten-Norman Ltd, UK; Philippine Aerospace Development Corporation (PADC), the Philippines.

**Power Plant:** two 260 hp Textron Lycoming O-540-E4C5 or 300 hp IO-540-K1B5 piston engines.

**Dimensions:** span 49 ft 0 in, length 35 ft 7 3/4 in, height 13 ft 8 3/4 in.

**Weights** (300 hp engines): empty 4,244 lb, gross 6,600 lb.

**Performance** (300 hp engines): max cruising speed at 7,000 ft 164 mph, ceiling 17,200 ft, T-O run 866 ft, landing run 460 ft, range 1,220 miles with underwing tanks.

**Accommodation:** pilot, and up to nine passengers, eight parachutists and a dispatcher, three litter patients and two attendants, or freight.

**Armament:** none.

#### N22 Missionmaster

The **Missionmaster** is a military version of the short-fuselage N22B Nomad, for personnel and equipment transport, forward area support, surveillance, and maritime patrol. The only active operator in late 1995 is the Philippine Air Force's 220th Airlift Wing, which has 12 for utility, tactical transport, and weather reconnaissance duties. The Australian Defence Department has grounded all of its **Missionmasters** and is expected to dispose of them. (Data generally as for **Searchmaster**; see "Bombers and Maritime" section.)

#### NC-212 Aviocar

The C-212 twin-turboprop STOL utility light transport was designed and developed by CASA and since 1976 has been manufactured in Indonesia as the NC-212. IPTN in Jakarta built 29 **Series 100s** before switching to the **Series 200** a few years later, and this company produces the **Aviocars** for military operators in South Asia and the Far East/Pacific. The only current operator in the area is Indonesia itself, whose Air Force received 10, Navy 11, and Army four. The IAF aircraft equip Nos. 2 and 4 Squadrons; those of the Navy serve with No. 600 Squadron. Two have been ordered by Myanmar.

The **Aviocar** fuselage incorporates a rear ramp/door that can be opened in flight for LAPES (low-altitude parachute extraction system) and other types of air-drop. The **Series 200**, which first flew in April 1978, has more powerful TPE331 engines and higher max T-O weight than the original **Series 100**. (Data for **Series 200**.)

**Contractor:** Industri Pesawat Terbang Nusantara (IPTN), Indonesia, under license from CASA, Spain.



**N22B Nomads, Philippine Air Force (Peter Steinemann)**



**Y-12 (II), Cambodian Air Force (Terry J. Gander)**

**Power Plant:** two AlliedSignal TPE331-10R-511C turboprops; each flat-rated at 900 shp.

**Dimensions:** span 62 ft 4 in, length 49 ft 8 1/2 in, height 20 ft 8 in.

**Weights:** empty 9,700 lb, gross 16,975 lb.

**Performance:** max cruising speed at 10,000 ft 227 mph, ceiling 28,000 ft, T-O run 1,445 ft, landing run 656 ft, max range 1,094 miles.

**Accommodation:** crew of two; up to 24 troops (or 23 paratroops and a jumpmaster), or 12 litters and four medical attendants, light vehicles, or 5,952 lb of containerized or other cargo, in main cabin.

**Armament:** none.

#### Y-8

Except for more pointed nose transparencies and a rear-loading ramp/door, the Chinese **Y-8**, which first flew in December 1974, is outwardly indistinguishable from the Antonov An-12BP. It is manufactured without a license, and its redesigned Chinese turboprops have a higher rating than the An-12's Al-20K. Shaanxi had delivered about two dozen to the PLA Air Force by early 1989, followed by four to Myanmar in the early 1990s. Basic military version is the **Y-8A**, which can carry helicopters as large as the S-70 Black Hawk. Standard civil versions are the **Y-8B** for passengers and freight and the **Y-8F** livestock carrier. Only the forward cabin of the basic **Y-8** is pressurized, but a fully pressurized 100-passenger **Y-8C**, developed with Lockheed assistance and with 4,550 ehp WJ6A engines, flew on December 17, 1990. Export **Y-8s** are designated **Y-8D**.

The prototype of a maritime patrol version, designated **Y-8X**, with a large, drum-shaped undernose radome, made its first flight on September 4, 1985. Its equipment includes Western avionics, infrared camera, infrared submarine detection gear, and sonobuoys. A **Y-8E** drone carrier has been developed specifically for Chang Hong 1 reconnaissance UAVs. (Data for standard **Y-8A**.)

**Contractor:** Shaanxi Aircraft Company, People's Republic of China.

**Power Plant:** four Zhuzhou WJ6 turboprops; each 4,260 ehp.

**Dimensions:** span 124 ft 8 in, length 111 ft 7 1/2 in, height 36 ft 7 1/2 in.

**Weights:** empty 78,264 lb, gross 134,480 lb.

**Performance:** max cruising speed at 26,250 ft 342 mph, ceiling 34,120 ft, T-O run 4,167 ft, landing run 3,445 ft, range 791 miles with max payload, 3,489 miles with max fuel.

**Accommodation:** crew of five and 14 passengers in pressurized forward section of fuselage; unpressurized main cabin for 96 troops, 82 paratroops, 83 casualties plus three attendants, or two army trucks.

**Armament:** provision for two 23-mm guns in manned tail turret.

#### Y-11 and Y-12

China's PLA Air Force is thought to operate about 15 examples of the Harbin **Y-11**, a small seven/eight-passenger utility transport designed in the mid-1970s and powered by two 285 hp Zhuzhou HS6A radial piston engines. Both the payload (less than a ton) and range (less than 250 miles) of the **Y-11** were disappointing, and only about 40 were completed. Instead, **HAMC** embarked on the **Y-12**, of similar design configuration but substantially larger and powered by turboprop engines. This made its first flight in July 1982, and the **Y-12 (II)** production version received Chinese certification in December 1985. Total orders for the **Y-12 (II)**, which exceed 100, are mainly from civil operators, but military operators include the PLAAF (two or more) and the air force of Cambodia (two). FAA certification earlier this year of an improved **Y-12 (IV)** model, with a further 17 percent increase in payload, is expected to result in additional export orders. (Data for **Y-12 (II)**.)

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

**Power Plant:** two Pratt & Whitney Canada PT6A-27 turboprops; each 620 shp.

**Dimensions:** span 56 ft 6 1/2 in, length 48 ft 9 in, height 18 ft 3 1/2 in.

**Weights:** empty 6,261 lb, max payload 3,748 lb, gross 11,684 lb.

**Performance:** max cruising speed at 9,850 ft 181 mph, ceiling 22,960 ft, T-O run 1,115 ft, landing run with propeller reversal 656 ft, range with max fuel and 45 min reserves 832 miles.

**Accommodation:** crew of two; up to 17 passengers, 15 paratroops, or equivalent cargo in cabin.

**Armament:** none.

#### YS-11

This Japanese-designed twin-turboprop transport first flew in August 1962, the first of 180 production aircraft following in October 1964. Aircraft of the first batch were designated **YS-11-100**, those of subsequent batches being **YS-11A** followed by dash numbers starting at -200. Most production went to commercial customers, but 23 were delivered to the Japanese armed forces. The JASDF received four 60-seat **YS-11Ps** (**YS-11A-100**), one **YS-11FC** (-200), one passenger/cargo **YS-11PC** (-300), and seven all-cargo **YS-11Cs** (-400). Today, nine of these aircraft remain. Principal transport operators are Nos. 402 and 403 Squadrons. One **YS-11C** was converted by Nippi as a **YS-11EA** electronic support measures aircraft, refitted with 3,493 ehp General Electric T64 engines and equipped with J/ALQ-7 ECM, increasing gross weight to 56,659 lb and ceiling to 27,000 ft.

Deliveries to the JMSDF, which ended in February 1974, comprised one -100, four -200s, two -400s, and three -600s. Four are currently allocated to the 61st Squadron at Atsugi for transport duties and have the service designation **YS-11M**. The other six, which serve with the 205th Air Training Wing at Shimofusa and are called **YS-11Ts** by the MSDF, are employed as ASW trainers. (Data for **YS-11A-200**.)

**Contractor:** Nihon Aeroplane Manufacturing Company, Japan.

**Power Plant:** two Rolls-Royce Dart Mk 542-10K turboprops; each 3,060 ehp.

**Dimensions:** span 104 ft 11 1/4 in, length 86 ft 3 1/2 in, height 29 ft 5 1/2 in.

**Weights:** empty 33,993 lb, gross 54,010 lb.

**Performance:** max cruising speed at 15,000 ft 291 mph, ceiling 22,900 ft, T-O field length 3,650 ft, landing field length 2,170 ft, max range 2,000 miles.

**Accommodation:** crew of two; up to 60 passengers.

**Armament:** none. ■



Twenty-five years ago this month, US forces mounted a POW rescue mission deep into North Vietnam.

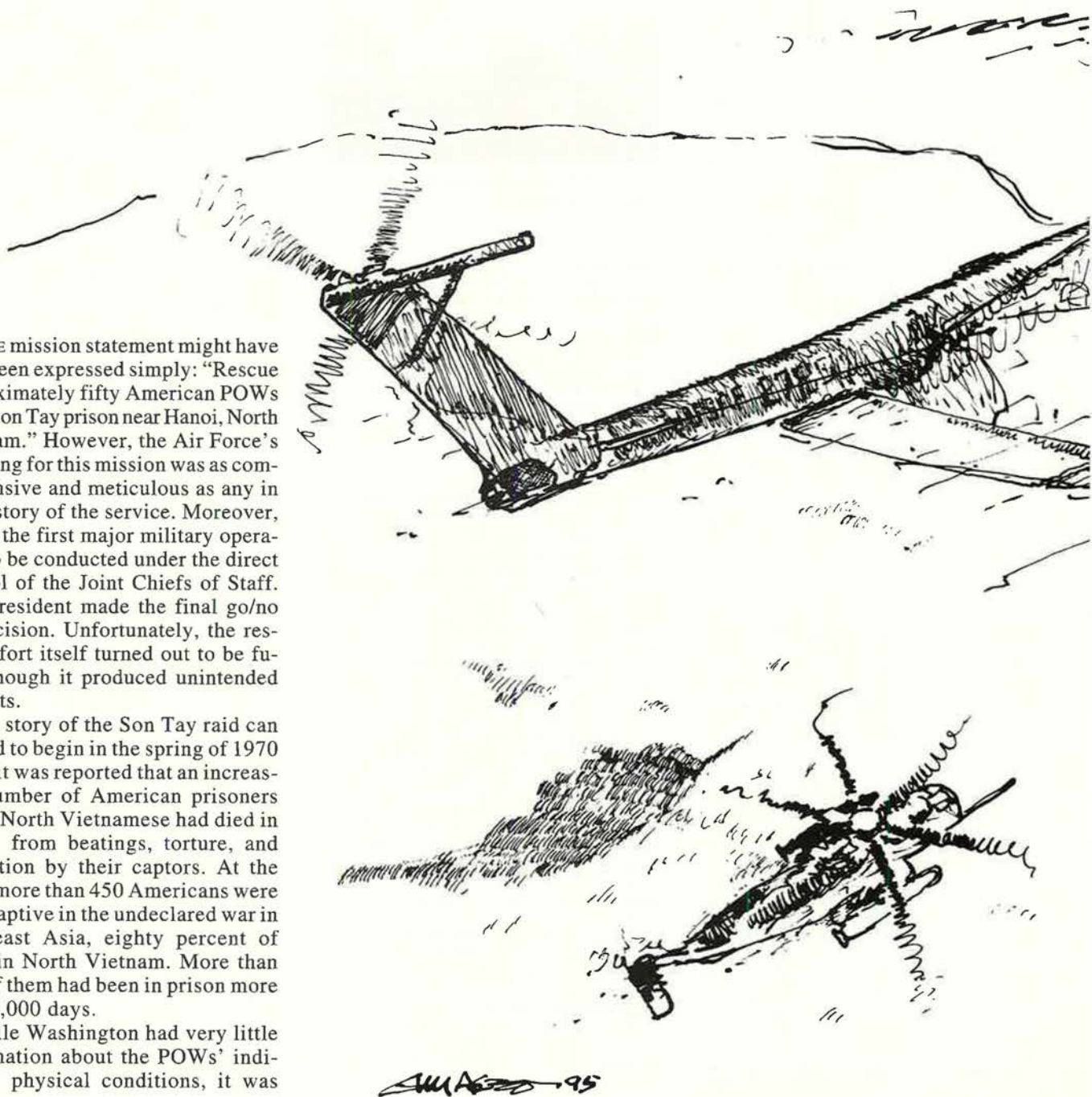
# The Son Tay Raid

By C. V. Glines

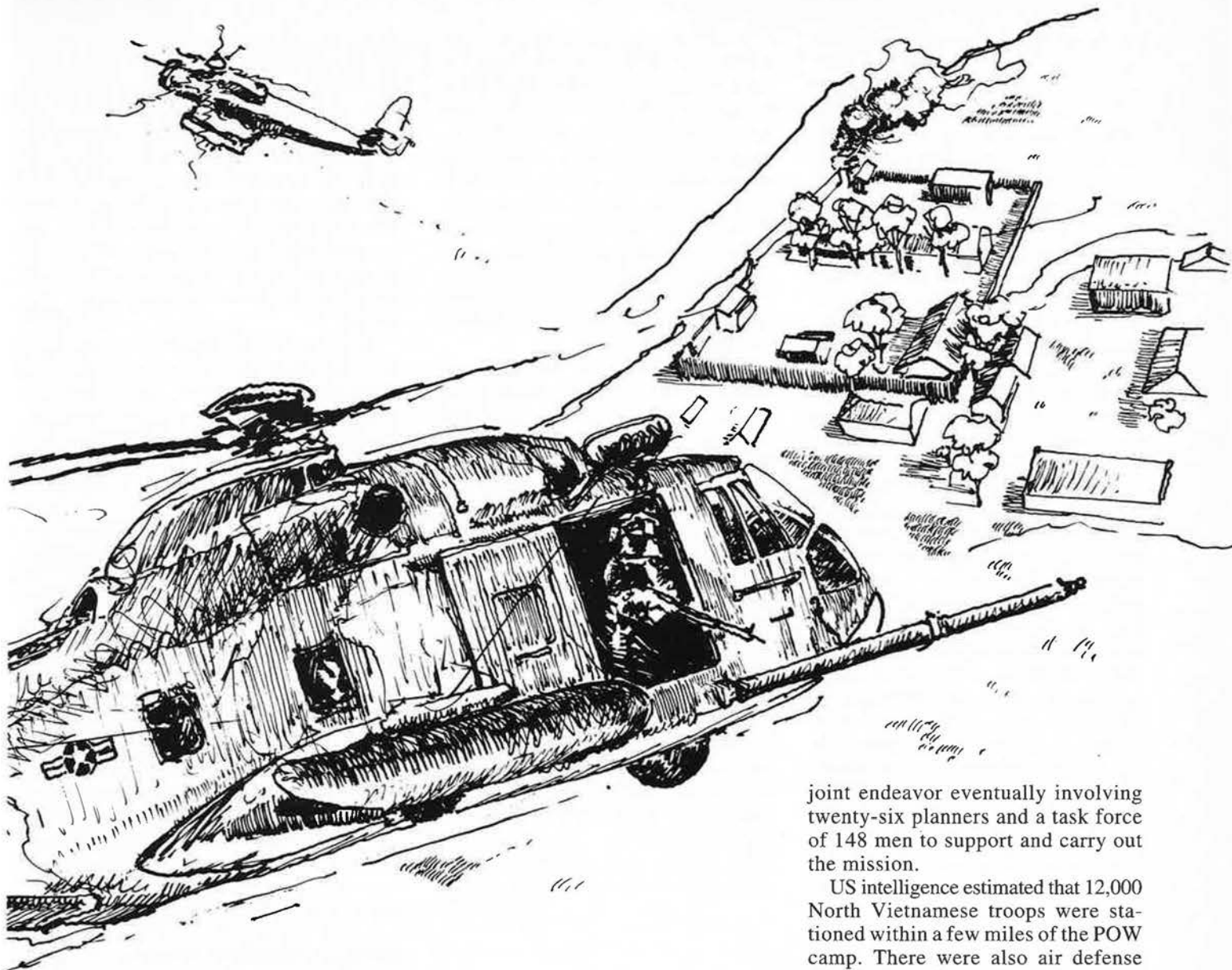
**T**HE mission statement might have been expressed simply: "Rescue approximately fifty American POWs from Son Tay prison near Hanoi, North Vietnam." However, the Air Force's planning for this mission was as comprehensive and meticulous as any in the history of the service. Moreover, it was the first major military operation to be conducted under the direct control of the Joint Chiefs of Staff. The President made the final go/no go decision. Unfortunately, the rescue effort itself turned out to be futile, though it produced unintended benefits.

The story of the Son Tay raid can be said to begin in the spring of 1970 when it was reported that an increasing number of American prisoners of the North Vietnamese had died in prison from beatings, torture, and starvation by their captors. At the time, more than 450 Americans were held captive in the undeclared war in southeast Asia, eighty percent of them in North Vietnam. More than half of them had been in prison more than 2,000 days.

While Washington had very little information about the POWs' individual physical conditions, it was







known that all were being held under the most primitive and inhumane conditions imaginable. Torture was a daily expectation; maintaining their sanity on a meager diet and in solitary confinement was a challenge.

Within the Pentagon, a special, dedicated group was at work, locating and keeping an eye on all POW compounds through frequent aerial reconnaissance. Son Tay, on the Song Con River about twenty-three miles west of Hanoi, was one of the prisons under surveillance. It was believed that at least fifty and possibly as many as 100 prisoners were located in this isolated camp. (It was later established that fifty-seven POWs were held there at that time.) Analysts in Washington focused attention on the possibility that the American prisoners might be “ex-

tracted” from the camp by a specially trained force of Army and Air Force rescue experts.

The idea was forwarded to Army Brig. Gen. Donald D. Blackburn, special assistant for Counterinsurgency and Special Activities under the Chairman of the Joint Chiefs of Staff, Army Gen. Earle G. Wheeler. General Blackburn was given permission to conduct a feasibility study to determine if a rescue was possible.

The General, working with the CIA, the Defense Intelligence Agency, and the National Security Agency, developed a conceptual plan to extract the POWs. It was code-named “Polar Circle.” Although such a bold idea did not “sell” immediately, it was eventually approved by the Joint Chiefs of Staff in July 1970 and given top-secret status. It would be a

joint endeavor eventually involving twenty-six planners and a task force of 148 men to support and carry out the mission.

US intelligence estimated that 12,000 North Vietnamese troops were stationed within a few miles of the POW camp. There were also air defense missile batteries and another compound nearby, labeled “secondary school” by intelligence specialists.

High-altitude photos of the prison were taken frequently by SR-71 “Blackbirds” and low-altitude pictures by Buffalo Hunter reconnaissance drones. The POW camp was not very large and was built in two sections. One was a walled compound where prisoners were located, and the other was an administrative section. There was a small cleared area inside the compound, the size of a volleyball court, surrounded by trees more than forty feet high. A skilled pilot could land a small helicopter there, but it would probably be sacrificed if it struck the trees on descent.

#### **Staging From Takhli**

To hit with total surprise, the raid would be staged from Takhli RTAFB



in central Thailand and launched at night from Udorn, south of the Laotian border. The flight from Udorn to Son Tay and back was a circuitous 687-mile route. It would be a strenuous mission over mountainous jungles at low altitudes. Weather figured strongly in planning.

Adm. Thomas H. Moorer, the new Chairman of the Joint Chiefs of Staff, entrusted the mission to Air Force Brig. Gen. Leroy J. Manor, commander of the USAF Special Operations Group at Eglin AFB, Fla. His deputy was Army Col. Arthur D. "Bull" Simons, a strong, outspoken proponent of unorthodox operations who would lead the actual assault on the compound.

The eventual plan was for an Army assault team to ride in one Air Force HH-3E Jolly Green Giant and five HH-53 helicopters to Son Tay, accompanied by two Air Force MC-130 Combat Talons that would navigate for them and two HC-130s to refuel the helicopters. A flight of five A-1E Skyraiders would provide an umbrella of cover, and ten F-4s would fly a MiG combat air patrol to intercept any enemy fighters that might try to interfere. General Manor later decided to add an F-105 "Wild Weasel" force to the operation to bait the North Vietnamese surface-to-air missile sites and lure their attention away from the assault force.

The HH-3 was to land inside the compound with men who were to alert the prisoners and release them from their cells. The HH-53s would land outside with the rest of the assault force. Some were to secure the area around the compound and fight off any enemy forces that appeared. Others were to blow a hole in the prison wall and lead the POWs to the choppers. Meanwhile, the A-1Es would provide cover and be available to assist against any threatening enemy ground forces.

After loading the prisoners on board the HH-53s, the entire force would depart for Udorn. Since the bombing pause was still in effect at the time, Navy planes would drop flares over the Haiphong area to distract and confuse the enemy defense forces.

The leaders decided that the elite cadre of Air Force and Army specialists, all volunteers, would assemble and be trained at Eglin. Colonel Simons carefully selected 103 Army Special Forces Green Berets for the raid. The ranking man chosen as the ground force deputy was Army Lt. Col. Elliott P. "Bud" Sydnor, who would lead the security group that would land outside the compound, seal off the roads, and secure the guard quarters. Army Capt. Richard J. Meadows would head the assault team that would land inside the

compound. General Manor selected Air Force search-and-rescue veterans for his lead helicopter pilots. They were Air Force Lt. Cols. Warner A. Britton, Herbert E. Zehnder, Royal C. Brown, and John V. Allison and Maj. Frederic M. Donohue, Herbert D. Kalen, and Kenneth D. Murphy. When Colonel Simons asked for a "combat-type" doctor, Army Lt. Col. Joseph R. Cataldo, former chief surgeon for the Green Berets, volunteered.

A replica of the prison was constructed, using two-by-fours and target cloth with windows, doors, and gates cut out. The camp was rolled up and the post holes covered during daylight hours when Cosmos 355, a Soviet reconnaissance satellite, overflew Eglin.

An arsenal was assembled, including assault rifles, grenades, claymore mines, blasting caps, and demolition charges. Break-in tools, such as bolt cutters, machetes, chain saws, axes, and acetylene torches, were collected along with night sights, ropes, fire extinguishers, and radios. Colonel Cataldo, concerned about the physical condition of the prisoners, ordered special medical kits with anesthetics, inflatable splints, and inhalation agents, in addition to cans of water, thermal ponchos, rubber shoes, pajamas, and baby food (in case the just-released POWs could not eat solid food).

### Practice, Practice, Practice

Training began August 20 under strict security. The ground assault team practiced entry into and escape from the fake compound and the POW cell blocks 170 times, mostly at night, perfecting and smoothing out the details. Their training included target recognition, village surveillance,





house search, hand signals, demolition placement, jungle survival, and much night firing. Colonel Cataldo taught them how to treat battle casualties.

Meanwhile, the aerial force practiced night aerial refuelings, night formation flying, and flare-dropping, logging more than 1,000 hours in 268 sorties, without an accident. Major Kalen and copilot Colonel Zehnder made thirty-one practice night descents into the tree-shrouded eighty-five-foot clearing with the HH-3, a feat calling for a superior touch on the controls in unknown ground wind conditions. An HH-53, with Major Donohue at the controls, practiced shooting out the compound's guard towers with the side-firing Gatlings.

There was nothing normal about the flying they would be doing on the three-and-a-half-hour flight to the target area. Two HC-130s would accompany the formation from Udorn and refuel the helicopters en route. Two MC-130 Combat Talons, modified with new infrared navigation systems, would guide the formation on a twisting route at low altitude through the mountains from the refueling point to Son Tay.

The mixture of aircraft types posed the toughest problems for the pilots. A C-130's normal cruise speed is about 250 knots at low level, but for this mission they would have to fly at 105 knots with 70° flaps, barely above stalling speed. The heavily loaded HH-53s and especially the HH-3 would be flying on the high edge of their performance envelopes trying to keep up. They would have to learn to fly at that speed "in draft" behind the C-130s, much as racing drivers and cyclists do to increase speed and conserve fuel.

The A-1Es also had an unusual requirement. Loaded with bombs and rockets, they had to make S-turns and fly at just above stalling speed to stay with a mother ship and not outrun the slower aircraft.

On September 28, the Air Force and Army teams began practicing the assault together, some with tracer ammunition and satchel charges. Now truly a joint operation, the code name was changed to "Ivory Coast."

On October 6, there was a final, full-fledged, live-fire rehearsal. If all went as planned, it would take about twenty-five minutes on the

ground to get all the prisoners loaded and head for Udorn. Two days later, Generals Manor and Blackburn and Colonel Simons went to the White House and briefed Henry Kissinger, President Richard M. Nixon's National Security Advisor, and Brig. Gen. Alexander Haig, Mr. Kissinger's military executive officer, informing them that the mission had a "ninety-five to ninety-seven percent assurance of success."

At this time, those in Washington following the status of the POW compound through air reconnaissance photos reported a "decline in activity" within the Son Tay camp. Weeds were growing where prisoners would have normally walked. On October 3, an SR-71's photos showed no sign of occupants. Some analysts thought that if POWs were still there, they were being punished for some reason and not being allowed outdoors. Later, SR-71 films showed "a definite increase in activity" at Son Tay.

The first contingent of the rescue force departed Eglin AFB November 12 and all had arrived by November 17. The mission was then given its third code name: "Kingpin." President Nixon was briefed and gave the OK; a "red rocket" coded message was sent to General Manor to "execute."

General Manor and Colonel Simons gave a joint briefing to their men at 2 p.m. November 18 in the base theater at Takhli with a schedule to be observed for the following three days. During the next day, weapons and equipment were checked. Some limited test firing was conducted. An escape-and-evasion briefing was given and blood chits were provided. The ground force would consist of fifty-six Army and ninety-two Air Force personnel, but still only a handful knew what their destination was to be.

### Bad News Develops

Bad news developed in Washington when a usually reliable intelligence source in Hanoi stated that the Son Tay prisoners had been moved. Reconnaissance aircraft tried to get last-minute photographs of the camp November 18 but failed. However, another report indicated that the camp was occupied by "someone."

Secretary of Defense Melvin R. Laird was briefed on the possibility that no prisoners were in the camp.

General Blackburn and DIA Director Lt. Gen. Donald V. Bennett recommended the raid proceed, weather permitting. Mr. Laird agreed and so advised the President, who acknowledged that it was worth the risk. The "go" message was sent to General Manor at Takhli.

General Manor laid on the mission for the night of November 20. In the Red River Valley, little cloudiness was expected, as were good visibility and light winds. As the General reported later, "The night of 20/21 November 1970 was the only night for many days before and after that date that launch would have been possible."

Vice Adm. Frederic A. Bardshar aboard USS *Oriskany* was sent his go-ahead planning message, which said simply, "NCA approval received." The aircrews of fifty-nine strike and support aircraft were briefed but not told why they would be flying over the major North Vietnamese port of Haiphong and dropping only flares, not bombs. They were given permission to fire their Shrike air-to-surface missiles and 20-mm ammunition against any enemy radar-controlled SAM defenses that posed a threat to US forces and to support search-and-rescue missions if anyone were shot down.

Although the launch order had not yet been given at the time of a noon briefing at Takhli on November 20, all personnel were issued sleeping pills and ordered to rest from 1 p.m. to 5 p.m. Following chow, all air and ground force personnel were assembled in the base theater where Colonel Simons told the group they were going to rescue as many as seventy American POWs, "something American prisoners have a right to expect from their fellow soldiers," he said. "The target is twenty-three miles west of Hanoi."

The audience was stunned into silence, then a few let out low whistles. Then, they stood up and applauded.

The task force members boarded C-130s for the flight from Takhli to Udorn where the choppers and HC-130s and MC-130s waited; A-1E crews were taken to Nakhon Phanom RTAFB. The C-130s, the HH-3E, and five HH-53s began taking off at 11:10 p.m. Under complete radio silence, they formed up and set course for North Vietnam. By the time they crossed the Laotian border, a total



## A POW's-Eye View of the Raid

Air Force Association President R. E. Smith was one of the prisoners at Son Tay. On October 25, 1967, he was an Air Force major flying out of Takhli RTAFB, Thailand, in an F-105 from the 355th Tactical Fighter Wing when he was shot down by ground fire. His target that day was the Paul Doumer Bridge over the Red River at Hanoi. His right leg was badly injured on bailout and, upon hitting the ground, he was shot twice in the left thigh by a North Vietnamese soldier. Fortunately, no bones or arteries were severed.

His captors immediately undressed him with a machete, wired his hands together, and took him to Hanoi. En route, onlookers threw bricks and stones at him and beat him with sticks. "I was very lucky to have made it into the prison," he says. "I suspect many MIAs were not as lucky after they were caught and were killed by spectators."

While Mr. Smith escaped death at the hands of the spectators, he did not escape the torture, beatings, and solitary confinement that all American POWs suffered from the prison guards.

He spent the next eight months in the Hoa Lo Prison ("Hanoi Hilton"), then was transferred to Son Tay in July 1968. He and fifty-six others were taken from Son Tay in July 1970, four months before the raid, and locked up elsewhere before ending up in the Hanoi Hilton four days after the raid.

Why were the prisoners moved? Mr. Smith believes the North Vietnamese were trying to improve the treatment and conditions of the POWs. He never saw any indication that rising water was the reason for their removal. "Neither is there any intelligence information, to my knowledge, that the Vietnamese knew the US was coming and therefore moved the POWs," he adds. "I think we were moved so that we would all be in a centrally located prison where we could be more easily handled logistically."

About three or four months after the raid, he says, "We got indications that something had happened at Son Tay . . . from the Vietnam *Free Press*, a propaganda rag printed in several languages. It said a bombing raid had been conducted on the town of Son Tay and that many Americans had been killed.

"We were absolutely elated when we learned of the raid. From our standpoint, it was the single most significant event in terms of POW life that happened in North Vietnam. It brought us together; it allowed us to be better organized; it reinforced the belief that the US would go to any length to see that we were returned. Disappointed that the raid did not work? Yes, but so very proud of the men and our country for the effort."

Mr. Smith was repatriated March 14, 1973, and remained on active duty until August 1978. He was elected Air Force Association President in September 1994.

force of 116 aircraft had departed from seven bases in Thailand and the three carriers in the Tonkin Gulf. Five F-105s reached the Son Tay area at high altitudes to keep the SAM batteries from acquiring radar locks on the approaching assault force, while ten F-4Ds from Udorn went into high orbit looking for MiGs.

Rendezvous and refueling of the helicopters with the HC-130P tanker was accomplished over Laos despite an unidentified aircraft flying a reciprocal heading at their altitude, which briefly scattered the formation. The helicopters managed to regain formation with increased separation through occasional clouds. All aircraft were refueled as scheduled.

The official Air Force history of the mission describes what happened next:

"The raiders entered the objective area below 500 feet. The C-130s led the six choppers until Son Tay lay only three and one-half miles ahead.

At that point, the leading C-130 climbed to 1,500 feet followed by two HH-53 choppers: Apple 4, piloted by Lt. Col. Royal C. Brown and Maj. Ryland R. Dreibelbis; and Apple 5 with Maj. Kenneth D. Murphy and Capt. William M. McGeorge at the controls.

"Brown's Apple 4 was the primary flare chopper and one of those designated to haul back the released prisoners. Apple 5 was the secondary flare helicopter. Over the Son Tay compound, the flares worked perfectly, so the choppers flew to a planned holding area on islands in the Finger Lake, seven miles west of Son Tay, while the C-130 circled to drop a firefight simulator (firecrackers with timed fuses) on the sapper [secondary] school. It then released its pallet of napalm before flying off to its designated orbit.

"The second C-130, only a minute behind the first, came in leading the A-1s. After the A-1s pulled away, this

C-130 dropped a napalm marker and then joined the other C-130 in its orbit while the Skyraiders bombed a nearby bridge before taking up their orbit over the flaming pool of napalm."

With this many aircraft involved, it was perhaps inevitable that someone would have a mechanical difficulty. Apple 3, the lead HH-53 flown by Major Donohue and Capt. Thomas R. Waldron, had an apparent transmission failure, indicated by a red warning light. This is enough to cause concern in any helicopter crew and bring a forced landing under normal circumstances. However, warning lights are not always dependable, and Major Donohue chose to ignore it. The helicopter gunners on board blasted two prison guard towers and the guard barracks.

Major Kalen and Colonel Zehnder, following in the HH-3, found the cleared area inside the compound and began the letdown through large trees that were twice as tall as anyone had thought. Tree limbs, leaves, and debris were blasted everywhere as the chopper's blades sliced through them and descended to a landing. The impact caused the right door gunner to be thrown out of the helicopter, but he was unhurt. Colonel Zehnder, Major Kalen, and TSgt. Leroy M. Wright, the HH-3 flight engineer who broke an ankle in the landing, scrambled out to guard the aircraft and ready medical kits for POWs and casualties. Out jumped Captain Meadows, leader of the prison assault group, and his thirteen men.

### No Response

Captain Meadows, carrying the bullhorn, shouted, "We're Americans. Keep your heads down. This is a rescue. We're here to get you out." There was no response as his men raced from cell to cell. The team split up into action elements and reached their assigned cell blocks, eliminating enemy soldiers.

Meanwhile, the helicopter carrying Colonel Simons and his twenty-two-man team had landed by mistake at the "secondary school" 450 meters south of the prison. It was an understandable error. The two compounds looked similar at night, and a canal running alongside the school looked like the Song Con River. The pilot, Colonel Britton, was following the chopper ahead of him and did





not see it change course suddenly while he prepared for his landing. Colonel Sydnor saw the mistake and put an alternate plan into effect: he had his men head for the area outside the prison wall, where he set up his command post.

Colonel Britton offloaded the Simons group and flew to his holding area. The raiders under Colonel Simons were immediately engaged in a furious firefight with what appeared in the darkness to be well-armed Chinese or Russian soldiers. With the advantage of complete surprise, his men killed more than 100 of them within the next few minutes. Colonel Simons hurriedly called Colonel Britton back and reboarded his men for the quick flight to the prison. Remarkably, there were no assault group casualties.

By this time, Captain Meadows and his men had engaged in a firefight and had killed a dozen or more surprised North Vietnamese. The first report of "negative items" (no prisoners) came from one of the two-man teams checking the cells; others quickly followed. Captain Meadows radioed General Manor at his command post: "Search complete. Negative items."

Colonel Sydnor ordered the demolition of the HH-3, and the order was given for all to load up for departure.

The raid had taken twenty-eight minutes, and surprise had been complete. Sergeant Wright had a broken ankle, and one other raider sustained a minor thigh wound. One of Colonel Simons's men had broken his pants belt and had hurriedly grabbed one from a comrade to replace it. It was the only souvenir of the raid.

The men returned to Thailand in disappointed silence. On the way

home, two of the F-105s were attacked by SAMs; one of them was hit, and the two-man crew bailed out over Laos. A C-123 Provider dropped flares where the men were thought to be, and A-1Es "sanitized" the area. Two helicopters from the assault force located them and snatched them to safety.

Despite the successful execution of the raid, public response was negative. Some critics called the assault a "major escalation of the war," while others insisted that the POWs had been endangered by such an attempt to rescue them. The truth was just the opposite. After the raid, prisoners at other locations were quickly transferred to Hoa Lo Prison in downtown Hanoi, nicknamed the "Hanoi Hilton" by the POWs. Their treatment eased; many received letters and parcels. For the first time in many months, most of them had cell mates to talk to. Morale soared. The men organized themselves into squadrons with assigned duties for each, helped each other with medical care, held church services, and conducted math and language classes.

#### "Our Country Had Not Forgotten"

Rep. Sam Johnson (R-Tex.) had been a prisoner since he was shot down in an F-4 Phantom II on April 16, 1966. He and his fellow inmates at Hoa Lo felt sure a raid had taken

place when they heard the ruckus and saw the flares over Hanoi during the early morning hours of November 21, but they had no positive evidence until the summer of 1971. He received some hard candy from his wife, Shirley. "I plopped one in my mouth and sucked on it," he said. "I felt something stiff, like a tiny plastic sliver, stick against the roof of my mouth. When I picked it out with my fingers, I found it to be a tiny brown speck, about the size of a pinhead. I rubbed it between my fingers, and it began to unfold. Amazed, I rubbed some more. In seconds, it had opened to the width of 16-mm film. . . . It was microfilm of the front page of the *New York Times* telling all about the Son Tay raid. Obviously, the Air Force had given the candy to Shirley to send. The young guys with good eyes could read it and gave us the details.

"We knew then that our country had not forgotten us."

One question that has not been fully answered is exactly when or why the prisoners were moved. Some speculate that it was because of rising water of the Song Con River bordering the camp, four months before the raid. Others believe it may have been to consolidate prisoners to save manpower or to prevent knowledge of their whereabouts.

The only certainty is that the POWs benefitted indirectly from the raid. And, as one raider said, "If there had been POWs there, we would have gotten them out." ■

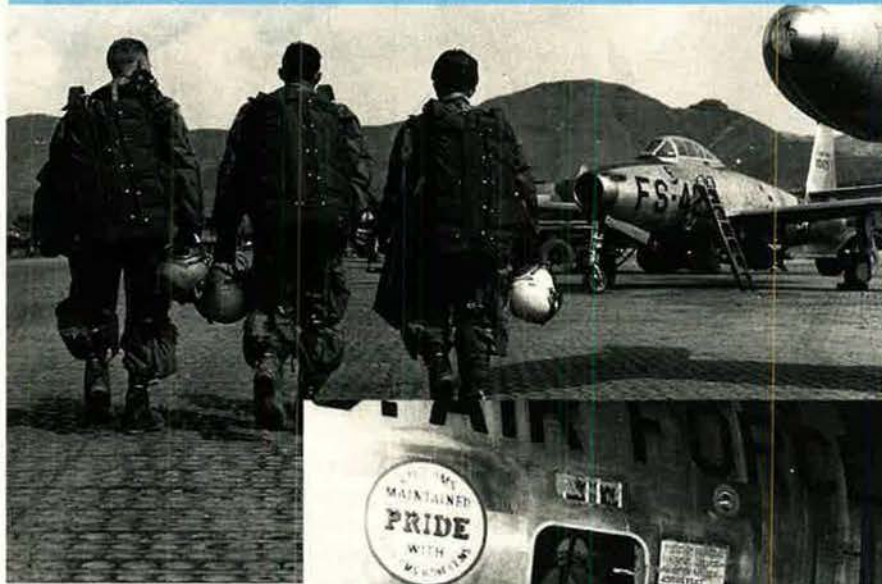
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# The Retired Force

## Growth of the Retired Force



**T**HE following pages contain a variety of statistical material about military retirees—especially Air Force retirees. The data were compiled by Associate Editor Tamar A. Mehuron, from tables contained in the *FY 1994 DoD Statistical Report on the Military Retirement System*. It was provided by the Office of the Actuary, Department of Defense.

Figures appearing in this section may not always agree, principally as a result of different cutoff dates, the effects of rounding, or incomplete reporting. The tables are intended to illustrate trends. All figures are as of September 30, 1994.

### Snapshot of the USAF Retired Force

Retiree and Survivor Numbers

Beneficiary Category	Number
Nondisabled Retirees	540,614
Disabled Retirees	32,875
TERA Retirees	4,653
<b>Subtotal of Retirees</b>	<b>578,142</b>
Survivors of Retirees	55,958
<b>Total</b>	<b>634,100</b>



# Where They Are

## Military Retirees in the United States

### USAF Retirees, 1955-94

Year	Officer	Enlisted	Total
1955	10,416	8,890	19,306
1956	11,242	9,729	20,971
1957	12,346	11,322	23,668
1958	13,726	13,141	26,867
1959	15,053	15,876	30,929
1960	16,752	20,208	36,960
1961	20,693	26,648	47,341
1962	24,385	33,651	58,036
1963	29,461	46,216	75,677
1964	35,794	58,672	94,466
1965	42,377	71,084	113,461
1966	48,168	84,770	132,938
1967	53,878	100,816	154,694
1968	59,701	118,854	178,555
1969	64,864	134,882	199,746
1970	73,135	151,534	224,669
1971	80,237	171,094	251,331
1972	85,493	195,318	280,811
1973	90,943	219,218	310,161
1974	95,717	240,315	336,032
1975	100,300	263,401	363,701
1976	105,066	279,103	384,169
1977	111,073	297,155	408,228
1978	116,008	307,076	423,084
1979	121,397	317,118	438,515
1980	126,810	326,011	452,821
1981	130,909	332,247	463,156
1982	135,336	338,317	473,653
1983	139,531	343,352	482,883
1984	143,782	349,020	492,802
1985	146,774	354,545	501,319
1986	148,131	359,221	507,352
1987	149,919	363,312	513,231
1988	152,384	369,585	521,969
1989	155,044	375,922	530,966
1990	157,383	381,239	538,622
1991	159,815	389,033	548,848
1992	162,517	397,371	559,888
1993	164,882	403,182	568,064
1994	166,532	406,957	578,142 <sup>1</sup>

Figures represent former members receiving retired pay. Excludes survivor family members and those given honorary retirement status.

<sup>1</sup> Includes 4,653 persons who left USAF under the Temporary Early Retirement Act. Data not separated into officer and enlisted.

Location	All Services		USAF Only	
	Number	Annual Payroll	Number	Annual Payroll
Alabama	40,896	\$646,428,000	13,701	\$227,328,000
Alaska	6,158	90,228,000	3,464	52,068,000
Arizona	39,911	682,260,000	20,079	354,084,000
Arkansas	21,039	317,952,000	9,478	150,372,000
California	186,306	3,172,020,000	60,955	1,099,320,000
Colorado	38,508	701,388,000	19,101	377,196,000
Connecticut	9,506	140,520,000	2,007	29,712,000
Delaware	5,566	83,664,000	3,410	53,808,000
District of Columbia	3,878	58,860,000	1,246	17,676,000
Florida	151,830	2,672,376,000	59,588	1,080,492,000
Georgia	60,687	964,944,000	17,399	277,620,000
Guam	1,659	23,400,000	423	6,216,000
Hawaii	12,144	215,772,000	3,074	57,372,000
Idaho	8,410	131,988,000	3,947	64,068,000
Illinois	26,714	391,200,000	10,356	169,200,000
Indiana	17,305	238,824,000	5,650	80,796,000
Iowa	7,926	103,068,000	2,567	35,772,000
Kansas	16,258	246,828,000	5,741	88,512,000
Kentucky	19,214	275,292,000	4,257	63,372,000
Louisiana	24,057	361,320,000	10,607	166,980,000
Maine	9,517	140,784,000	3,340	48,912,000
Maryland	35,682	640,704,000	10,266	180,276,000
Massachusetts	18,365	251,952,000	5,832	87,024,000
Michigan	19,818	265,056,000	7,154	100,092,000
Minnesota	12,151	162,720,000	4,087	58,584,000
Mississippi	20,202	297,012,000	9,086	139,140,000
Missouri	27,890	407,100,000	9,772	148,320,000
Montana	5,667	86,064,000	2,680	42,048,000
Nebraska	10,485	173,820,000	6,979	124,848,000
Nevada	20,003	326,988,000	10,732	179,556,000
New Hampshire	8,171	134,592,000	3,652	62,964,000
New Jersey	20,023	286,584,000	4,913	72,468,000
New Mexico	17,493	309,204,000	9,756	180,144,000
New York	29,733	380,088,000	9,686	132,900,000
North Carolina	56,578	905,568,000	14,891	238,428,000
North Dakota	2,848	38,832,000	1,776	25,188,000
Ohio	32,807	478,980,000	15,538	254,076,000
Oklahoma	28,040	420,528,000	11,966	186,288,000
Oregon	17,885	270,192,000	6,017	96,612,000
Pennsylvania	38,327	552,348,000	10,699	153,624,000
Puerto Rico	6,429	66,180,000	681	7,716,000
Rhode Island	5,213	82,836,000	803	10,584,000
South Carolina	42,036	673,908,000	14,323	236,508,000
South Dakota	4,163	61,752,000	2,438	38,052,000
Tennessee	35,238	528,336,000	10,551	162,636,000
Texas	150,134	2,584,620,000	71,308	1,298,412,000
Utah	9,149	151,620,000	4,716	83,088,000
Vermont	2,616	37,992,000	839	12,600,000
Virginia	98,200	2,087,664,000	21,156	458,448,000
Virgin Islands	246	4,080,000	40	828,000
Washington	57,876	960,396,000	18,463	322,044,000
West Virginia	8,104	109,896,000	2,556	35,196,000
Wisconsin	12,788	164,736,000	4,094	55,440,000
Wyoming	3,386	51,840,000	1,962	30,864,000
<b>Total</b>	<b>1,565,235</b>	<b>\$25,613,292,000</b>	<b>569,802</b>	<b>\$9,715,872,000</b>



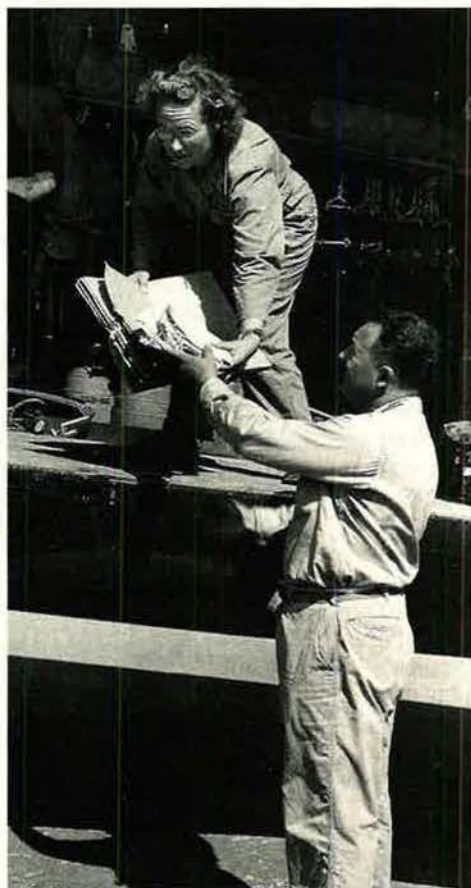
## Major Overseas Concentrations

Countries with 100 or more military retirees in residence.

Country	All Services		USAF Only	
	Number	Annual Payments	Number	Annual Payments
Australia	368	\$6,432,000	138	\$2,448,000
Belgium	189	4,272,000	72	1,584,000
Canada	591	8,964,000	249	3,828,000
France	289	5,184,000	87	1,524,000
Germany	7,887	129,648,000	1,879	32,196,000
Greece	198	3,288,000	137	2,244,000
Italy	713	12,444,000	207	3,648,000
Japan	1,839	30,780,000	653	10,452,000
Mexico	186	2,940,000	78	1,368,000
Netherlands	212	3,552,000	146	2,436,000
New Zealand	124	2,136,000	27	552,000
Panama	571	8,712,000	143	2,196,000
Philippines	3,493	42,204,000	345	4,932,000
Samoa	213	2,544,000	6	96,000
Saudi Arabia	945	19,248,000	623	11,676,000
South Korea	1,169	19,212,000	346	5,748,000
Spain	643	10,632,000	355	5,688,000
Thailand	309	5,292,000	176	2,760,000
Turkey	144	2,472,000	136	2,328,000
United Kingdom	2,491	40,896,000	1,966	31,272,000
Other Foreign	1,692	30,420,000	571	10,272,000
<b>Total</b>	<b>24,266</b>	<b>\$391,272,000</b>	<b>8,340</b>	<b>\$139,248,000</b>

## USAF Retirees, by Years of Active Service

Does not include USAF reserve retirees.



Years of Service	Officers	Warrant Officers	Enlisted	Total
less than 1	19	0	231	250
1	88	0	485	573
2	143	1	698	842
3	167	3	901	1,071
4	144	1	813	958
5	135	0	451	586
6	103	0	401	504
7	123	0	491	614
8	102	0	416	518
9	122	0	405	527
10	116	0	373	489
11	106	0	374	480
12	109	0	442	551
13	117	0	425	542
14	116	0	465	581
15	190	0	638	828
16	266	0	882	1,148
17	307	0	1,124	1,431
18	205	0	1,691	1,896
19	246	1	1,611	1,858
20	40,890	270	200,491	241,651
21	11,534	101	33,723	45,358
22	9,811	120	32,584	42,515
23	6,982	84	20,372	27,438
24	6,377	103	14,693	21,173
25	5,266	84	6,727	12,077
26	6,812	196	20,818	27,826
27	4,845	149	6,616	11,610
28	4,850	126	5,874	10,851
29	3,848	142	3,399	7,390
30	3,876	289	6,495	10,662
31	1,610	1	821	2,433
32	924	2	310	1,236
33	505	0	194	700
34	314	0	14	328
35	363	0	4	367
36	214	0	0	216
37	110	0	0	110
38	57	0	0	57
39	31	0	0	31
40	13	0	0	14
41	12	0	0	12
42	1	0	0	1
43+	6	0	0	6
Unknown	18,311	1,312	25,973	45,596
<b>Total</b>	<b>130,486</b>	<b>2,985</b>	<b>392,425</b>	<b>525,905</b>



# Composition of the Retired Force

## USAF Retirees, by Age at Retirement

Age	Officer	Warrant Officer	Enlisted	Total
17	0	0	0	0
18	0	0	15	15
19	0	0	98	98
20	4	3	301	308
21	51	15	513	579
22	135	20	732	887
23	231	16	822	1,069
24	303	31	707	1,041
25	406	17	572	995
26	409	15	544	968
27	398	9	463	870
28	366	14	499	879
29	337	4	470	811
30	266	3	496	765
31	205	2	510	717
32	205	3	487	695
33	188	3	508	699
34	164	2	635	801
35	155	2	695	852
36	177	1	1,219	1,397
37	337	10	10,287	10,634
38	1,350	49	39,258	40,657
39	3,287	125	62,970	66,382
40	5,292	139	61,527	66,958
41	5,997	176	46,990	53,163
42	10,751	169	35,267	46,187
43	15,111	178	27,715	43,004
44	13,449	195	22,776	36,420
45	11,209	204	19,072	30,485
46	9,338	182	14,934	24,454
47	7,967	164	10,892	19,023
48	7,503	212	8,433	16,148
49	7,168	252	6,481	13,901
50	6,439	190	4,524	11,153
51	5,834	145	3,235	9,214
52	4,860	117	2,327	7,304
53	3,830	81	1,722	5,633
54	2,428	74	1,220	3,722
55	1,574	58	991	2,623
56	935	43	631	1,609
57	672	24	406	1,102
58	415	12	217	644
59	277	9	96	382
60	33,865	225	18,084	52,174
61	126	3	140	269
62	101	13	91	205
63	26	0	39	65
64	30	0	25	55
65	17	0	17	34
66	7	0	5	12
67	4	0	0	4
68	4	0	6	10
69	1	0	2	3
70+	0	0	5	5
Unknown	6	1	51	58
<b>Total</b>	<b>164,210</b>	<b>3,210</b>	<b>410,722</b>	<b>578,142</b>

## By Grade at Retirement, End FY 1994

Grade	All Services	USAF
E-1	950	121
E-2	3,667	359
E-3	8,424	1,387
E-4	19,880	4,618
E-5	79,142	40,223
E-6	285,807	119,543
E-7	426,588	164,069
E-8	179,156	49,323
E-9	87,556	31,079
W-1	2,034	540
W-2	13,246	404
W-3	18,543	619
W-4	21,273	1,647
W-5	16	0
O-1	3,045	777
O-2	10,659	2,209
O-3	40,872	12,255
O-4	119,332	45,305
O-5	170,799	71,922
O-6	92,073	29,577
O-7	2,692	1,047
O-8	2,824	837
O-9	716	211
O-10	175	61
Unknown	32	9
<b>Total</b>	<b>1,589,501</b>	<b>578,142</b>

## USAF Average Monthly Retired Pay

Grade	Total Number	Average Monthly Gross	Average Monthly Net
O-10	61	\$6,822	\$6,334
O-9	211	6,500	5,905
O-8	837	5,008	4,609
O-7	1,047	3,965	3,651
O-6	29,577	3,646	3,370
O-5	71,922	2,391	2,221
O-4	45,305	1,886	1,757
O-3	12,255	1,741	1,606
O-2	2,209	1,161	1,050
O-1	777	924	845
<b>All Officers</b>	<b>164,201</b>	<b>2,436</b>	<b>2,259</b>
W-5	0	0	0
W-4	1,647	2,375	2,122
W-3	619	1,503	1,381
W-2	404	1,164	1,062
W-1	540	1,032	969
<b>All Warrant Officers</b>	<b>3,210</b>	<b>1,829</b>	<b>1,652</b>
E-9	31,079	1,961	1,783
E-8	49,323	1,522	1,397
E-7	164,069	1,201	1,107
E-6	119,543	981	898
E-5	40,223	804	723
E-4	4,613	540	422
E-3	1,387	414	314
E-2	359	345	269
E-1	121	378	286
<b>All Enlisted</b>	<b>410,722</b>	<b>1,183</b>	<b>1,083</b>
<b>Unknown Rank</b>	<b>9</b>	<b>4,229</b>	<b>3,843</b>
<b>All USAF Retirees</b>	<b>578,142</b>	<b>\$1,542</b>	<b>\$1,421</b>



# Disabled Retirees

## Disabled Retirees, by Grade

Grade	All Services	USAF
E-1	887	105
E-2	3,602	343
E-3	7,954	1,310
E-4	15,543	3,322
E-5	17,263	5,187
E-6	17,253	4,522
E-7	14,881	4,154
E-8	6,062	1,417
E-9	3,237	1,062
W-1	427	181
W-2	832	25
W-3	712	54
W-4	869	207
W-5	0	0
O-1	2,577	590
O-2	6,967	1,443
O-3	9,110	2,187
O-4	5,752	2,003
O-5	6,252	3,009
O-6	4,232	1,672
O-7	167	84
O-8	229	96
O-9	69	28
O-10	22	9
Unknown	10	0
<b>Total</b>	<b>124,909</b>	<b>33,010</b>

## USAF Disabled Retirees, by Age at Retirement

Age	Number	Age	Number
17	0	44	1,100
18	15	45	1,149
19	98	46	1,088
20	308	47	910
21	579	48	869
22	887	49	866
23	1,069	50	745
24	1,041	51	693
25	995	52	671
26	968	53	503
27	870	54	404
28	879	55	262
29	811	56	187
30	765	57	122
31	717	58	80
32	695	59	44
33	688	60	42
34	730	61	16
35	672	62	5
36	714	63	3
37	936	64	3
38	1,413	65	2
39	1,680	66	0
40	1,723	67	0
41	1,481	68	0
42	1,290	69	0
43	1,222	70	0
<b>Total</b>	<b>33,010</b>		

## USAF Members Retiring in FY 1994

Grade at Retirement	Number
E-1	7
E-2	17
E-3	80
E-4	307
E-5	2,185
E-6	4,656
E-7	6,535
E-8	1,700
E-9	963
W-1	0
W-2	3
W-3	1
W-4	0
W-5	0
O-1	2
O-2	16
O-3	722
O-4	1,924
O-5	2,276
O-6	911
O-7	45
O-8	28
O-9	9
O-10	3
<b>Total</b>	<b>22,390</b>





# The Latest Class

## 1994 Military Retirees, by Gender

All Services	
Officer, Male	17,516
Enlisted, Male	45,283
Officer, Female	1,084
Enlisted, Female	3,393
<b>Total</b>	<b>67,276</b>

USAF	
Officer, Male	5,584
Enlisted, Male	15,029
Officer, Female	372
Enlisted, Female	1,576
<b>Total</b>	<b>22,561<sup>1</sup></b>

<sup>1</sup> Includes 171 not receiving retired pay.

## 1994 USAF Retirees, by Age

Age at Retirement	Officers	Warrant Officers	Enlisted	Total
17	0	0	0	0
18	0	0	1	1
19	0	0	2	2
20	0	0	19	19
21	0	0	17	17
22	0	0	24	24
23	0	0	34	34
24	3	0	34	37
25	5	0	31	36
26	1	0	34	35
27	4	0	34	38
28	5	0	34	39
29	2	0	37	39
30	2	0	41	43
31	6	0	51	57
32	3	0	42	45
33	4	0	50	54
34	4	0	112	116
35	3	0	217	220
36	12	0	417	429
37	22	0	712	734
38	82	0	1,627	1,709
39	198	0	2,406	2,604
40	216	0	1,888	2,104
41	234	0	1,513	1,747
42	422	0	1,210	1,632
43	549	0	1,126	1,675
44	490	0	898	1,388
45	531	0	630	1,161
46	479	0	530	1,009
47	444	0	319	763
48	332	0	223	555
49	274	0	123	397
50	211	0	71	282
51	135	0	67	202
52	80	0	46	126
53	46	0	19	65
54	37	0	8	45
55	20	0	15	35
56	23	0	7	30
57	26	0	3	29
58	8	0	3	11
59	9	0	7	16
60	985	4	1,750	2,739
61	10	0	11	21
62	10	0	5	15
63	2	0	2	4
64	2	0	0	2
65	2	0	0	2
66	0	0	0	0
67	1	0	0	1
68	1	0	0	1
69	0	0	0	0
70+	0	0	0	0
Unknown	1	0	0	1
<b>Total</b>	<b>5,936</b>	<b>4</b>	<b>16,450</b>	<b>22,390</b>





# CONVENTION '95 ▶

## The Outstanding Airmen

By Tamar A. Mehuron, Associate Editor



*These are the best of USAF's enlisted force for 1995 (from left): SrA. Dale Overholts, SSgt. Claudine Jaramillo, MSgt. Frank Koskosky, MSgt. Alejandra Gasper, SrA. Robert Andrews, TSgt. Frederick Green, TSgt. Paul Venturella, MSgt. Debra Shaffer, SSgt. Jesse Goerz, MSgt. Telia Hughes, SSgt. Garth Hauger, and TSgt. Oscar Mackin.*

**D**EPLOYED to Uganda for Operation Support Hope, the Rwanda relief mission, **SrA. Robert D. Andrews** of the 25th Intelligence Squadron, Hurlburt Field, Fla., translated for Docteurs Sans Frontiers, an international medical aid organization. His expert language skills smoothed coordination between the doctors and Air Mobility Command personnel performing transport duties at refugee camps in Rwanda, Zaire, and Tanzania.

**MSgt. Alejandra Gasper**, an aerospace/propulsion systems instructor, taught engine maintenance to Latin American officers from seventeen countries at the Inter-American Air Forces Academy at Lackland AFB, Tex. She also procured from NASA—at no cost to IAAFA—a fully functional General Electric J85-5 afterburning jet engine, a \$250,000 training aid that greatly enhanced engine maintenance courses. When the Mexican Air Force needed assistance for a new course for F-5 J85-21 engine mechan-

ics, Sergeant Gasper initiated and coordinated acquisition of necessary equipment. She is assigned to the 318th Training Squadron at Lackland.

As a pararescue journeyman with the 56th Rescue Squadron, NAS Keflavik, Iceland, **SSgt. Jesse W. Goerz** battled forty-foot waves, heavy snow, and severe icing to rescue six Icelandic sailors from a partially submerged boat. He saved their lives at great risk to his own. He also flew more than forty hours in combat support missions during two voluntary rotations to support Operation Southern Watch.

**TSgt. Frederick W. Green** of the 772d Civil Engineer Squadron serves as noncommissioned officer in charge of the Area C Maintenance Zone Carpenter Shop at Tinker AFB, Okla. He reduced backlogged job orders by sixty-five percent, and when air shafts for the Oklahoma City Air Logistics Center Computer Megacenters required repair, he and his staff acted to keep dust particles from

contaminating the computer system, saving the Air Force more than \$100,000.

Assigned to the Air Force Pentagon Communications Agency as an administrative assistant to the first sergeant, **SSgt. Garth P. Hauger** automated and updated an antiquated Dependent Care Program. He also worked with the Army to create a computerized system on details performed in a joint-service dormitory at Fort Myer, Va., and designed and implemented a database that tracks dorm residents. Sergeant Hauger's training plan for all tasks assigned to his position set an agency precedent and is now used as a guide by the agency training office.

**MSgt. Telia A. Hughes**, assigned to USAF's 52d Fighter Wing at Spangdahlem AB, Germany, managed the planning and installation of a wing command-and-control system, giving expanded C<sup>4</sup> capabilities to wing commanders, operations personnel, and theater battle managers. Although





**CMSAF David J. Campanale (above) had words of congratulations for this elite group, and Air Force Secretary Sheila Widnall also expressed her appreciation. Below, she shakes hands with Sergeants Green (right) and Goerz (center).**

Spangdahlem was last on the list to receive WCCS, her speedy acquisition of deployable kits made the 52d the first wing in USAFE to deploy WCCS in an exercise.

Assigned to the 150th Fighter Group (ANG), Kirtland AFB, N. M., as personnel relocation journeyman, **SSgt. Claudine M. Jaramillo** drafted and implemented operating instructions that resulted in an error rate of less than two percent, setting a new standard of excellence for the relocation office. She completed enlistment, reenlistment, and extension paperwork with less than one personnel action-related error per eighty documents processed.

Handpicked by Pacific Air Forces logistics leaders to become PACAF's engine manager, **MSgt. Frank J. Koskosky's** management skills saved more than \$15 million in operations and maintenance funds and earlier prevented a crippling shortage of F-15 engines in his outfit, the 18th Wing, Kadena AB, Japan. His streamlining of a computer database updating process reduced mailing, transmittal, and resource costs for PACAF units. Under his leadership, USAF personnel were able to slash database errors by seventy-five percent at Osan, Kunsan, Hickam, Yokota, and Kadena ABs, and tenant units.

**TSgt. Oscar D. Mackin** serves as superintendent, Information Security, for the 9th Security Police Squadron, Beale AFB, Calif. He eliminated a backlog of 175 Nondis-



Photos by Paul Kennedy

closure Agreements by creating and providing a monthly roster to each unit security manager. His rewrite of an information security training course put the base's security managers on the cutting edge of classified security program administration.

**SrA. Dale L. Overholts II** of the 305th Component Repair Squadron serves as primary technician for repairing and calibrating radio frequency wattmeters for the Precision Measurement Equipment Laboratory at McGuire AFB, N. J. His mastery of the field made him lead technician on AN/UPM-145 radar test sets, which require some of the most demanding calibrations in the lab. De-

ployed to Willow Grove JRB Training Base, Pa., Airman Overholts performed a one-day, high-priority calibration of an AN/APM-427 Improved Radar Simulator for the 111th Fighter Group (ANG), facilitating the on-time sortie generation of A-10 aircraft. His dedication to duty has helped his unit win "Best in the Command" for four straight years.

When an ICBM launcher closure door jammed, **MSgt. Debra G. Shaffer** led her refurbishment section from the 30th Maintenance Squadron at Vandenberg AFB, Calif., in a hazardous welding task and made repairs smoothly. When an ICBM suspension system required alignment, her leadership enabled the team to make repairs despite the fact that the task had never before been accomplished on a missile in a launch

facility. Her acquisition of a new three-ton bridge crane cut equipment loading times by fifty percent, decreasing the potential for accidents.

**TSgt. Paul Venturella** and other members of his combat control team formed the first US unit to set foot in Haiti for Operation Uphold Democracy. Tasked to establish air traffic control, he handled the first wave of more than 600 aircraft delivering security forces to Haiti. For more than twenty-seven hours, Sergeant Venturella's leadership and skill ensured the safety and success of continuous air traffic control operations. He is assigned to the 24th Special Tactics Squadron, Pope AFB, N. C. ■



# CONVENTION '95 ▶

## Aerospace Technology Exposition

By Peter Grier



Staff photo by Guy Aceto

*The 1995 Aerospace Technology Exposition brought together nearly eighty industrial exhibitors, giving them a forum to display and discuss technology. Shown at left is a model of Northrop Grumman's B-2 Stealth bomber.*

**T**HE shattered Scud missile casing might well have been the exhibit that best exemplified the military advances on display at AFA's Aerospace Technology Exposition, held September 18–20 at the Association's National Convention in Washington, D. C.

The missile had been blown up in a test of Boeing-TRW airborne laser (ABL) technology at White Sands Missile Range, N. M., a demonstration of the power of the systems emerging from today's aerospace research and development. The display underlined the diversity and deadliness of the threats that US forces will face in regional wars.

Innovation and flexibility, therefore, were the watchwords for exhibitors at the Exposition, which this year offered a look at everything from big, flying, laser weapons to the smallest of avionics packages.

Most exhibitors seemed to have already received the message Air

Force officials were delivering in their speeches to attendees: Air Force combat capability at the beginning of the twenty-first century will have to be flexible. Cost-efficiency and ability to defend against missile proliferation around the world will be key factors in allocating Air Force budgets of the future.

The ABL program is a joint theater missile defense project of the Air Force, Boeing, TRW, and Lockheed Martin. An ABL would allow the US to destroy enemy missiles as they take off, as the remnants of the Scud target attested. Its range would permit laser attacks while the ABL aircraft circled over adjacent friendly territory.

ABL proponents say the system could be deployed quickly anywhere in the world and would be a powerful deterrent signal, comparable to E-3 Airborne Warning and Control System (AWACS) planes or aircraft carriers.

Airframe exhibits—elaborate eye-catchers in past years—were relatively modest at the 1995 AFA show. Communications gear and other information-handling equipment, by contrast, seemed to be around every corner.

### Battlespace of the Future

Boeing, for instance, presented its battle-management systems and underlined its role in the F-22 fighter, the Joint Advanced Strike Technology (JAST) program, and the ABL. Its vision of the "battlespace of the future" featured data from updated E-3 AWACS aircraft, unmanned aerial vehicles, and other platforms, fused into information usable by individual warfighters and quickly disseminated via satellite networks.

A rooftop satellite dish fed a direct broadcast signal to Boeing's booth, permitting the firm to show a live demonstration of its Phased-Array Communications Antenna System.



The small size of the antenna "would allow satellite communications for any mobile platform on the battlefield," said a Boeing spokesman.

Big aircraft programs were not entirely absent from this year's Exposition. With the C-17 advanced airlifter facing a key Defense Acquisition Board review of the aircraft's future this fall, contractor McDonnell Douglas was doing its best to promote the Globemaster III as the nation's most capable airlift system. The company's exhibit featured the 1994 National Aeronautic Association Collier Trophy, awarded to the C-17 team for achievement in aeronautics.

The C-17 was declared operational earlier this year, and the 437th Airlift Wing is now flying all eighteen of its assigned C-17s. The airlifter has already taken part in operational flights from the US to Europe and the Middle East. This summer, the airplane aced a month-long flight evaluation test staged by the Air Force.

DoD could well opt for a mix of additional C-17s and off-the-shelf commercial freighters, most likely "militarized" Boeing 747-400s. Boeing was busy displaying this aircraft as the best example of the so-called Nondevelopmental Airlift Aircraft alternative.

Elsewhere, Northrop Grumman's B-2 bomber exhibit was relatively low-key. The company's booth featured a tilting model designed to emphasize the Stealth bomber's



McDonnell Douglas gave the C-17 (shown here as a model) center stage at the Exposition. The company also displayed the Collier Trophy awarded to the C-17 team for achievement in aeronautics.

Staff photo by Guy Accio

weapons-carrying capacity, among other capabilities.

Northrop Grumman officials made the case to visitors that the Air Force needs continued B-2 purchases. They emphasized the bomber's range and cost-effectiveness compared to strategic alternatives. Some powerful members of Congress agreed with this assessment and pushed for B-2 funding in the Fiscal 1996 Air Force budget, though the issue had not been settled by the time the show closed.

"At this point we're just waiting for Congress to act," said one Northrop official.

### The Backbone

The backbone of the conventional bomber force in coming years will be the Rockwell B-1B aircraft. A \$2 billion upgrade is converting the B-1B from a weapon focused on the nuclear mission to one equipped for conventional theater combat operations.

In its new role, the B-1B will add "massive, accurate firepower to Air Force composite strike forces," said Rockwell's exhibitors, allowing US commanders to destroy the bulk of their critical targets early in any theater conflict.

The V-22 Osprey went on display again at this year's Exposition. Though long opposed by the Pentagon's civilian leadership, the hybrid tilt-rotor aircraft is now part of the military's plans, thanks to the work of its supporters in Congress and in the Marines. Bell-Boeing had an extensive display that included computerized simulations of typical Osprey missions.

Today, plans call for the Air Force to receive fifty CV-22s fitted for special operations, with an initial operational capability in 2005. The Air Force CV-22 will be "perhaps the most survivable aircraft ever built," claimed one Bell-Boeing official at the AFA show. Ninety percent of the hardware in the CV-22 and the Marine Corps's standard MV-22 will be common.

Recent Expositions have seen extensive displays from the firms com-



Photo by Paul Kennedy

The Air Force Chief of Staff, Gen. Ronald R. Fogleman (at right), cut the ribbon in a ceremony to officially open the new USAF-sponsored exhibits at the Aerospace Technology Exposition.



peting for the contract to produce the Joint Primary Aircraft Training System (JPATS), a projected \$7 billion program that promised to be one of the Pentagon's few contract plums of the mid-1990s. This year's show included only one JPATS exhibit—that of the Raytheon-Beech Pilatus PC-9, the winner of the joint Navy-USAF program competition.

A cockpit mockup of the PC-9 showed off highly adjustable seat and foot controls, which adapt to suit pilots who range in height from just under five feet to those who are six feet two inches tall. The two-seat, single-engine turboprop is based on an aircraft designed by the Switzerland-based Pilatus Aircraft Ltd., but the US military version will be "manufactured one hundred percent in Wichita, Kansas," said a JPATS official from Beech.

Among the most popular and well-attended displays were the F-16 cockpit simulators scattered around the large Lockheed Martin display area. The computerized mock cockpits allowed users to try out different F-16 configurations and weapons.

Last year marked the twentieth anniversary of the YF-16's first flight, and the now-venerable aircraft has become a staple of air forces around the world. Among other developments, Singapore recently named the F-16 winner of a fighter aircraft flyoff, and the F-16 coproduction line in Turkey has begun turning out aircraft for other countries.



**The entire Raytheon-Beech Pilatus PC-9 couldn't come to the Exposition, but enough of the Joint Primary Aircraft Training System was on hand to give visitors an idea of why it won the JPATS contract.**

The C-130 is another airframe that just keeps going and going. The Lockheed Martin area at the AFA expo also featured models of the new C-130J, scheduled to begin rolling off the production line later this year. The UK has already decided to replace half of its fleet of older C-130s with the new J model, and USAF has asked for funds to begin a similar upgrade.

#### **Future Attack Aircraft**

The future of tactical attack aircraft was represented by models of aircraft that could emerge from the

JAST program over the next several years. JAST is still in its early conceptual stages. Engineering and manufacturing development contracts are not scheduled to be awarded until 2000.

However, several contractor teams plan to produce an affordable, next-generation weapon adaptable to Air Force, Navy, and Marine Corps needs. The Marine Corps wants its JAST aircraft to have short takeoff and vertical landing capability. One team of designers decided that the Marine version will have two engines—a forward engine for lift and a rear one for thrust.

C<sup>3</sup>I systems and high-tech components heavy on electronics seemed to be the heart of the AFA Exposition this year. For one thing, with information warfare concepts becoming increasingly important to the Air Force leadership, many firms joined Boeing in talking about their ability to pull together, process, and deliver rivers of data.

For example, Hughes displayed ideas being developed as part of Global Broadcast Services, a Defense Department program investigating possible military uses of the existing commercial broadcast infrastructure. Hughes's satellite and antenna technology could help deliver mission map updates, bomb-damage assessments, and a common tactical intelligence picture directly to pilot cockpits, according to company spokesmen.

Photo by Paul Kennedy



**Air Commodore D. K. Norriss, RAF, Great Britain's air attaché to the US, speaks with a representative from TAAS-Israel Industries, Ltd. This year's Exposition attracted several visitors and exhibitors from other nations.**



# Aerospace Industry in Review

Companies represented at the 1995 AFA Aerospace Technology Exposition

**Aerospace Industries Association** Trade association representing manufacturers of commercial, military, and business aircraft, helicopters, aircraft engines, missiles, and spacecraft

**Aerospaiale, Inc.** Cougar/Horizon complement to Joint STARS, command-and-control and simulation technology, composite materials advances, and advanced missiles technology

**AIL Systems Inc.** "Lancer Plus" series of effective, low-cost upgrades for the B-1B defensive system

**Alliant Techsystems, Inc.** Tactical Munitions Dispensers, guidance systems, Combined Effects Munitions, medium-caliber ammunition, warheads, EELV, Titan 4, Delta, variable-flow ducted rockets, and AAR-47

**AlliedSignal Aerospace** Propulsion engines, advanced avionics communication equipment, and various hardware

**Allison Advanced Development Co.** Technologies in direct support of IHPTET, JAST, and other fighter engine programs, as well as expendable engine programs

**Allison Engine Co.** Allison AE 2100 engine, AE 3007 engine, and Rolls-Royce Spey Tay engines

**Atlantic Research Corp., Propulsion Division** Variable-flow ducted rocket and propulsion system rocket engine

**Autometric, Inc.** Interactive visualization for space management, theater battle, and tactical situations and newly released EDGE

**Boeing Company, The, Defense and Space Group** Defense system emphasizing performance, flexibility, adaptability, and capability

**Bombardier Inc. Canadair Business Aircraft Division** Global Express Aircraft, USAF's Special Air Mission aircraft

**British Aerospace Defence** ASRAAM, ASTOVL/JAST, Terprom (navigation), Harrier, T-45, Eurofighter 2000, Typhoon, CASOM (Apache), and Gripen (JAS 39)

**CMS, Inc.** Autonomous Freeflight Dispenser System

**Cognition Corp.** Cost Advantage and Mechanical Advantage software products that allow engineers to explore cost and performance tradeoffs

**Daimler-Benz Aerospace AG, Military Aircraft Division** Maintenance and upgrade programs for large military aircraft, such as NATO AWACS, German Air Force C-160 Transall, and Br. 1150 Atlantic

**Dowty Aerospace** C-130J composite propeller and T-1A hydraulic valve and reservoir packages

## DRS

**Photronics Corp.** Multiplatform Boresight Equipment system, combining accuracy, speed, ruggedness, versatility, and low life-cycle costs

**Precision Echo, Inc.** Data collection and storage systems including analog and digital recorders tailored for single or multichannel applications

**ECC International Corp.** Training tools reflecting technological sophistication of modern weaponry

**E-Systems, A Raytheon Co.** Electronics systems and products

**Fisher House Foundation, Inc.** National not-for-profit organization supporting houses (known as "Fisher Houses") for families of hospitalized GIs and veterans

**GE Aircraft Engines** Aircraft engines displaying tactical developments and emerging initiatives that address mission requirements

**Gencorp Aerojet** Propulsion, electronic systems, smart munitions, and armament

**General Atomics/General Atomics Aeronautical Systems, Inc.** High-tech R&D from prototype through full-scale development

**BFGoodrich Aerospace** Sensors, avionics, fuel, landing gear, lighting, and safety systems

**GTE Government Systems Corp.** Data Fusion System, threat simulators, Easy fax product line (both Tempest and non-Tempest), Digital Imagery Exploitation and Production System (commercial-off-the-shelf software), Integrated Imagery Exploitation, and Production Products

**Gulfstream Aerospace Corp.** Large-cabin business jets, such as the Gulfstream IV-SP, for government and military missions

**Harley-Davidson, Inc., Contracts Division** MT500 military motorcycle for Air Force CCT units

**Hughes Aircraft Co.** Space, missile, airborne radar, processors, and simulator programs that support USAF

**Jane's Information Group Marketing Division** Defense, aerospace, and transportation information

**Kaiser Electronics** Cockpit displays for fighter and trainer aircraft: T-38 HUD, AMLCD for the F-22 and F/A-18E/F, and helmet-mounted cueing systems for the F-15, F-16, and F-22

## Litton Industries

**Data Systems** Virtual reality, real-time miniature image recognition system, noncooperative target identification for command-and-control systems, and automated decision support for tactical ballistic missile defense

**Guidance & Control Systems Division** LN-100G lightweight Zero-Lock Laser Gyro Inertial Navigation Unit with embedded GPS, Fiber Optic Global Guidance Package, IFF interrogator/transponder, and general avionics computer

**Litton Systems Canada Ltd.** Multifunctional flat-panel LED and AMLC displays, airborne radar, flight inspection systems, and system engineering

**Lockheed Martin Aircraft**, electronics, information systems, space and missile systems, and a broad range of services to US and international government and commercial customers

**Loral Corp.** Systems integration, C<sup>3</sup>I, training and simulation, and electronic combat

**Lucas Aerospace** Flight-control systems, engine-control systems, and electric power generation and management

**Magnavox Electronic Systems Co.** Airborne and ground tactical communications, SATCOM systems, data fusion, and combat ID systems

**Martin-Baker Aircraft Co. Ltd.** MkUS-16LA ejection seat as installed in the new JPATS; Navy Aircrew Common Ejection Seat 2000

**Matra Aerospace, Inc.** Air-to-air missiles, air-defense very-short-range missiles, air-to-ground weapons, countermeasures, and UAVs

**McDonnell Douglas Corp.** Aerospace programs, including the C-17 Globemaster III, Delta launch vehicles, single-stage-to-orbit technology, BPI, and F-15; JAST and JDAM

**McGraw-Hill Companies, Inc., The, Aerospace Daily** Daily worldwide market intelligence and hard news for the defense and space industries

**Messier-Dowty** Landing gear

**Motorola GSTG, Government Space & Technology Group** Secure telecommunications terminals, cellular and facsimile equipment, network encryption systems, and tactical missile fusing equipment

**Northrop Grumman** Precision weapons, electronic countermeasures, battle-management systems, acoustic and infrared sensors, automated testing systems, and systems integration capabilities

**OSC Fairchild Defense** Data transfer, ground support, weapons management, memory storage, reconnaissance management, data management, and mission planning systems

**Per Udsen Co. Aircraft Industry A/S, TERMA Elektronik AS** F-16 PIDS chaff/flare dispenser system integrated in a weapon pylon for the Air National Guard

**Photonics Systems, Inc.** AC gas plasma flat-panel monochrome and full-color displays ranging in size from six inches to sixty inches

**Photo-Sonics, Inc.** Photo-optical instrumentation and airborne tape recorders, including the Super SVCR-V301 AVTR

**Racal Communications Inc.** Smallest handheld SINCGARS radio available, the new miniature, secure, handheld AN/PRC-139 radio system, and a handheld data radio version of the AN/PRC-139

**Raytheon** Commercial and defense electronics, engineering and construction, aviation, and major appliances

**Recon/Optical, Inc.** CA-860 IR line scanner, currently on Army's Airborne Recce Low Platform, and the Solid-State Stabilization System

**Reflectone, Inc.** Aircrew and maintenance training devices and deployable containerized training devices

## Rockwell International Corp.

**Autonetics Electronic Systems Division** Low-cost guidance, navigation, and control systems, represented by an all solid-state digital quartz IMU, and Miniature Integrated GPS/INS Tactical Systems

**Collins Avionics and Communications Division** Precision lightweight GPS receiver and advanced airborne communications systems, including ECCM models

**North American Aircraft Division** B-1B Lancer and X-31 Enhanced Fighter Maneuverability Aircraft

**North American Aircraft Modification Division** Capabilities in all areas of aircraft modernization

**Rocketdyne Division** RS-27A and MA-5A booster engines, advanced propulsion systems for the Expendable Launch Vehicle, and Airborne Laser System

**Space Systems Division** Spacecraft production and operations including the Global Positioning System

**Tactical Systems Division** GBU-15 and AGM-130 precision standoff weapon systems and the Mk. 82 tailkit/GPS precision munition

**Sargent Fletcher Inc.** Aerial refueling tank system

**Smiths Industries Aerospace** Advanced avionics systems solutions, fiber optic gyros, and compass/altitude heading and reference systems

**Southwest Mobile Systems Corp.** 60K aircraft cargo loader

**Spectra Systems Inc** Exterior and interior military aircraft lighting equipment

**TAAS-Israel Industries, Ltd., Technologies Division** F-16 600-gallon fuel tanks, bomb racks, dedicated/special pylons, missile launchers, power supplies, air-to-ground missiles, air-launched decoy systems, rocket motors, and chaff and flares

**Teledyne Ryan Aeronautical** High-Altitude Endurance Unmanned Aerial Vehicle—the Tier II Plus

**Texas Instruments Inc., Defense Systems & Electronics Group** JSOW, HARM, Paveway, second-generation airborne FLIRs, JAST, and other programs for F-16 and F-22 fighter aircraft

**Textron Defense Systems** Sensor-fuzed munitions systems and mobile microwave landing systems

**Thiokol Corp.** New and existing solid propulsion technologies, including STAR and Castor motors supporting GPS, commercial, and EELV programs, and the Minuteman Propulsion Replacement Program

**Titan Linkabit** Engineering, communications equipment, defense electronics systems, and DAMA SATCOM systems

**TRW Space and Electronics Group** Space and software systems for the twenty-first-century Air Force, including space systems for early warning, theater defense, communications, and satellites for operational missions

## United Technologies Corp.

**Chemical Systems Division** Propulsion technology

**Pratt & Whitney Canada** PT6 engine for a broad range of military applications

**Pratt & Whitney, Government Engines & Space Propulsion** F100-PW-229, F117-PW-100, F119-PW-100 turbofan engines that power USAF F-15, F-16, F-22, and C-17 aircraft

**Virtual Prototypes, Inc.** Scenario Toolkit and Generation Environment, a flexible simulation and training environment for aerospace and defense applications

**Vista Controls Corp.** FCNU and SCORE GPS

**Westinghouse Electronic Systems** Comprehensive defense electronics for USAF missions

**XTRA Lease Government Semitrailer Leasing Booth** Rental or leasing of semitrailers, dry vans, reefers, drop flats, flatbeds, extendables, lowboys, goosenecks, converter gear, and pup trailers





One prominent exhibit at the show was Lockheed's full-size model of the Joint Direct Attack Munition. Lockheed presented its version of the JDAM as a low-cost way to build up the inventory of precision guided weapons.

Ballistic missile defense would require large investments in cutting-edge electronics, and TRW featured its involvement in the space and missile tracking system (SMTS), a constellation of spaceborne sensors "geared to track the threats of the twenty-first century," according to the firm.

SMTS plans call for deploying fourteen to twenty-four low-Earth orbit satellites capable of tracking attacking missiles from launch to reentry. Location and speed data would be passed to ground commanders, who could then warn targeted cities or troops, aim groundbased radars, and retaliate with missile interceptors.

Planned interceptors could increase the footprint of their effective coverage by a factor of five using the information from spacebased systems, according to TRW.

### Rave Reviews

The Northrop Grumman booth, meanwhile, proudly displayed photos and information on the Joint Surveillance and Target Attack Radar System (Joint STARS), the airborne eye on the ground that won rave reviews during Operation Desert Storm and since.

It has been a decade since Grumman began work on Joint STARS full-scale development. Current plans call for the first production E-8C Joint STARS aircraft to be delivered

in 1996. The Pentagon has approved the purchase of twenty, but officials have indicated that the US may eventually buy as many as forty.

One of the stars of the 1994 AFA Exposition was missing this year: the AGM-137 Triservice Standoff Attack Missile (TSSAM). The stealthy secret missile was declassified only days before the 1994 show and thus drew much attention. TSSAM has since been terminated, a victim of tight budgets, escalating costs, and continuing technical glitches. Until a follow-on standoff missile can be developed, the Air Force may purchase additional AGM-142 Have Naps, a precision guided air-to-ground weapon derived from Rafael's Pop-eye. The AGM-142 was featured at the 1995 AFA technology show, at the exhibit of its US contractor, Lockheed Martin.

Another project for which Lockheed Martin is competing is the Joint Direct Attack Munition (JDAM), which promises a low-cost solution to the need for large stocks of precision guided weapons.

JDAM is a kit intended to turn existing Air Force and Navy gravity bombs into PGMs by equipping them with fins and guidance units

capable of receiving target information from Global Positioning System satellites. JDAM is in the middle of Phase 1 development. Eventually it could "support B-2 mission objectives to destroy several high-value targets in a single pass," claimed Lockheed.

In years to come, Air Force aircraft will have to be increasingly efficient at multiple kills of tanks and other smaller targets as well as high-value bunkers and communications sites. One advance shown at the Exposition was Northrop Grumman's Brilliant Antiarmor Technology, an evil-looking Army submunition intended to burst from a larger missile and home in on the sound and heat emitted by armored vehicles.

Meanwhile, the Air Force is still searching for a successor to the aging AIM-9 Sidewinder.

Hughes, Raytheon, and British Aerospace promoted their entries in the next-generation AIM-9X race, which could be lucrative to the winner. The US Air Force alone will likely purchase thousands of AIM-9Xs. Flight testing of the winning design is scheduled to take place in 1997.

### Soviets Long Gone

The days when aerospace contractors featured Soviet adversaries in their displays and brochures are long gone. Videos at this year's show featured clips of angry terrorists or gun camera footage from Desert Storm or from Bosnia-Herzegovina.

Those who were once political adversaries are in some cases now commercial partners. At the AFA Exposition, Aerojet was offering a Russian-designed rocket engine as "the most logical propulsion choice for the next generation of US expendable launch vehicles." The AJ26-NK33A, said the company, was designed by "one of the world's most revered gas turbine design bureaus." Its simple design "eliminates exotic materials . . . and complex manufacturing processes"—another way of saying it is less sophisticated but cheaper and more reliable. ■

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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, "The C-17 Makes Its Point," appeared in the October 1995 issue.*



# CONVENTION '95

## Looking Back, Looking Ahead

By Peter Grier



Photo by Paul Kennedy

*Air Force Secretary Sheila Widnall saluted the veterans of World War II and here meets with some modern-day heroes, Capt. Scott O'Grady (middle), who evaded capture after being shot down over Bosnia in June, and Capt. Thomas Hanford, the pilot who made the first radio contact with O'Grady. Captains O'Grady and Hanford received AFA Special Awards at the Convention.*

**I**N HER remarks to AFA's National Convention in Washington, D. C., Secretary of the Air Force Sheila E. Widnall struck a note of respect for veterans of World War II.

"Fifty years ago," she said, "nearly two and a half million young men and women joined the Army Air Forces during World War II. These were ordinary people asked to perform extraordinary tasks. They came from their homes, from farms and factories. They were asked to become pilots, bombardiers, gunners and radio operators, typists and teachers, mechanics and engineers.

"They were asked to put their futures on hold—to leave their loved ones, their families, their friends—and to take up arms in the defense of freedom. They were asked to fly in harm's way, so that future generations would not have to."

These individuals, Secretary Widnall concluded in her September 19 address, earned lasting respect—and

not only that. They also "set a lasting standard" for all airmen, she said, down to those serving today.

For today's Air Force, 1996 promises to be a busy and productive year, reported Air Force Chief of Staff Gen. Ronald R. Fogleman. Major distractions caused by the post-Cold War drawdown and restructuring should be nearing an end, he told Convention attendees. Service modernization programs are on track, and progress is being made on key quality-of-life issues.

The main task now, explained General Fogleman, is to maintain a flexible combat capability that can handle the varied threats of the post-Cold War world. The General pointed with pride to such innovations as USAF's new unmanned aerial vehicle reconnaissance squadron, the airborne laser program, and the information warfare squadron established at 9th Air Force, Shaw AFB, S. C.

At the Convention, General Fogleman unveiled another innovation, revealing he had created a long-range planning office to conduct an eighteen-month-long examination of the Air Force.

Headed by Maj. Gen. John A. Gordon, the office will determine what the Chief of Staff called "alternative futures" for the service. It will integrate various planning efforts and produce a coherent vision for the future Air Force, he said.

"I truly believe that the United States Air Force is the economy-of-force service," said General Fogleman. "Air- and spacepower will increasingly be seen as the great enabler."

The development and use of high technology have made the Air Force what it is today, said several Convention speakers. From World War II to the Persian Gulf War and in the years since, USAF's path "has always been on the cutting edge of



science and technology," said Secretary Widnall.

### Phenomenal Accuracy

This year's Convention opened only days after NATO began a bombing campaign in the Balkans, one in which dozens of American and European aircraft bombed rebel Serb positions in Bosnia-Herzegovina. Deputy Secretary of Defense John P. White told Convention-goers that the performance of the US Air Force was "stellar."

In Bosnia, he said, USAF attack aircraft used only precision munitions, with phenomenal accuracy.

"I wish I could bring some of the [post-strike] pictures to show you," Secretary White remarked. "There are no holes in the ground; all the holes are in the targets. . . . We're beyond selecting targets. They are now selecting aimpoints within targets."

Five years ago, few in the Air Force would have believed that they would soon be engaged in combat operations in a Balkan war. In today's world, though, unpredictable regional problems will continue to erupt, and the Air Force will need to be ready to deal with them.

Secretary White, the Pentagon's second-ranking civilian official, said that such preparation will require modernization—innovative and effective modernization.

"We have to build in a force that, in fact, has enhanced combat capability, that operates efficiently, and

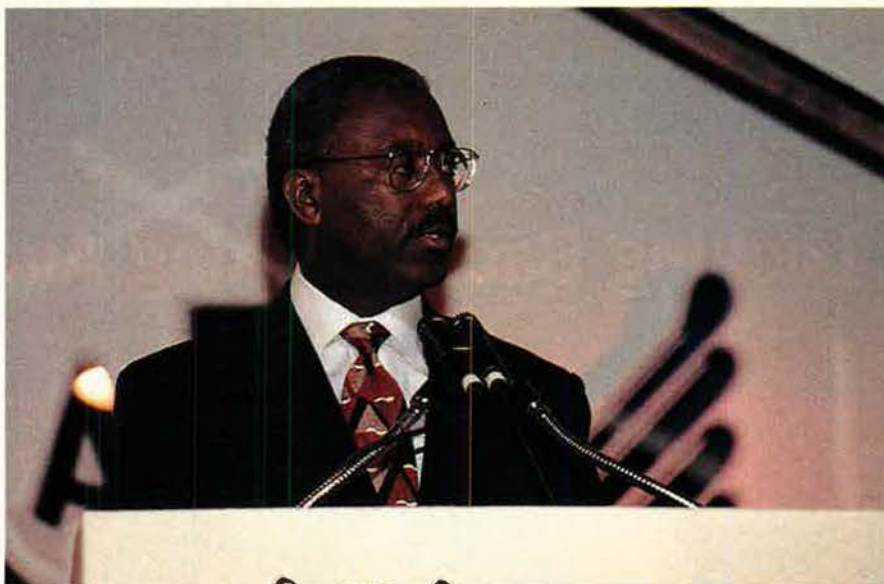


Photo by Paul Kennedy

**"We must not balance the budget and pay for a tax reduction on the backs of veterans," said Secretary of Veterans Affairs Jesse Brown in a well-received address to the Convention.**

most importantly, is innovative, so it is flexible and able to meet new requirements," he said.

In Secretary White's view, the US military needs the C-17 transport to ensure that the nation has enough airlift. The US also needs the new F-22 fighter's stealthiness and maneuverability to ensure air superiority, he continued. It needs new manufacturing techniques, computer-aided design, new alloys and composites, and other technological breakthroughs to stay ahead of global military competitors.

The Pentagon needs to modernize its ground forces as well, he added,

with such "homely stuff" as tactical communications gear, trucks, and ammunition.

"Frankly, we need these kinds of capabilities more than we need additional B-2s," asserted the Secretary.

Mr. White's statement referred to the Air Force's advanced, radar-foiling bomber, twenty of which have already been ordered and funded. The House defeat of a Senate-House compromise bill that would have funded additional B-2s had thrown the contentious issue into question once again at press time.

The Administration has claimed that new production of B-2s was not only unaffordable but also unnecessary. However, Secretary White's statement mentioned only cost, seeming to signal a shift on his part and that of Defense Secretary William J. Perry.

He said, "I—and the Secretary—would love to have more B-2s, but, given the budgets that we have, we want to make sure that the forces we have are capable."

In a later question session, Secretary White added, "We're not up on the Hill threatening vetoes over the B-2. We're up on the Hill explaining that we can't afford it."

The Secretary added that modernization means more than merely buying new weapons. It also means greater cooperation and trust among the services—that is, joint visits, joint doctrine, joint planning, and joint training. The Army, Navy, Air Force,

Photo by Paul Kennedy



**Deputy Secretary of Defense John P. White described the Air Force's performance during the bombing of rebel Serb positions in September as "stellar." He also spoke to the Convention on the importance of modernizing USAF.**



## Shortchanging the Veteran

Veterans who defended the United States against its enemies must now defend themselves against attacks on their government benefits, warned Jesse Brown, Secretary of Veterans Affairs, in an address to the Air Force Association's National Convention in Washington, D. C., in September.

"During the history of our nation, our citizen-soldiers have answered the call to duty time after time," he said. "Over forty million men and women have served this nation in uniform. And today, over twenty-six million are alive. And it is those twenty-six million veterans and their families for whom we must now answer the call to duty."

The quest for a balanced budget, lower taxes, and increased defense spending are all noble goals, said Secretary Brown.

However, he said, "we must not balance the budget and pay for a tax reduction on the backs of veterans. . . . We must stay alert because we have hypocrites in the land. They say nothing is too good for veterans. Then they turn around and do just that—*nothing*."

According to the Secretary, VA budget levels considered in Congress this year might not allow for the construction of badly needed VA hospitals in Florida and at Travis AFB, Calif. Older VA facilities in need of renovation might not get the funds they need.

A proposal to stop compensation to some legally incompetent veterans is "insulting," according to the VA chief. A World War II veteran who suffered brain damage because of a gunshot wound to the head, might find his government compensation stopped if he has more than \$25,000 in his estate, claimed Secretary Brown.

"That is not fair. It is nothing but a means test—and it will push these . . . veterans into poverty."

If Congress follows through on its worst-case VA budget blueprint, the department might have to fire 61,000 health-care workers over the next seven years, said Secretary Brown. He warned that the VA would have to close forty-one hospitals and deny care to more than one million veterans.

"They keep telling me that we need to eliminate some VA hospitals because the veteran population will continue to decline," he continued, "but, I keep telling them, 'They ain't dead yet.' . . . They must understand that we earned those hospitals, and we are not going to give them up without a fight."

VA compensation should not vary according to the amount of money recipients earn from other sources, the Secretary added. He used the hypothetical example of a World War II veteran who opens up a small store and becomes successful, despite battle-wound disabilities. Should he lose his government check?

"It is not right to take away compensation from a man who left parts of his body on the field of battle," said Secretary Brown. "I say to you, if they are going to do it, then give him back his eyesight. Give him back his legs and his arms."

Neither would taxing compensation and pension benefits be fair, he said. Elimination of compensation for veterans rated ten and twenty percent disabled would be a shame on the United States.

"This nation does not fight cheap wars. And we cannot allow nickel-and-dime politics to cut the heart out of our veterans' programs."

and Marines need to ensure that all their systems work together.

Secretary White noted that a lack of systems integration kept F-16 pilot Capt. Scott F. O'Grady from receiving certain intelligence information that could have helped him avoid being shot down over Bosnia this past June.

"We are, unfortunately, still too 'stovepiped,' and we need to work on that," he said.

Finally, he continued, US forces need to make sure they develop combat capability to counter their likely adversaries. The proliferation of weapons of mass destruction, for example, may represent a greater threat to US national security than do some foreign nation's

fighter planes or submarines, he warned.

Said Secretary White, "We want to be very careful that we simply don't look at mirror images of ourselves."

### More Modernization Money

DoD's modernization program accounts are scheduled to rise from \$39 billion in Fiscal 1996 (which started October 1) to \$67 billion in FY 2001. Finding dollars for such a hefty increase will require more efficient operations, according to Secretary White.

Base closures, more purchases of commercial goods, and privatization of some depot maintenance will be necessary to make modernization a reality.

On a key personnel issue, the Secretary repeated the Administration's opposition to a proposal in the House that would have recalculated retirement benefits of some service members now on active duty. The proposal, called "High One" [see *"High One Is a Low Blow,"* October 1995 *"Editorial,"* p. 2], was eventually killed in both the House and Senate.

Secretary White, explaining why he and other Pentagon officials fought against the measure, said, "We want to protect what people deserve."

Innovation is critically important to DoD efforts to become more flexible, he said. Officials must make use of fast-changing information technology and simulation training aids.

The Department of Defense must evolve "so it's specifically responsive to change and adaptive to change," concluded Secretary White.

In recent years, modernization has not always run smoothly. Big programs kept running into obstacles, from technical troubles for the C-17 to budget cuts for the F-22.

Things are now looking up in this regard, Secretary Widnall told Convention attendees. "We have in hand the modernization programs needed to preserve our core competencies." The C-17 has "moved from the intensive care room and is back on track." A recent extensive evaluation produced a ninety-eight percent on-time takeoff rate. "The aircraft shattered virtually every performance standard set for it," said Secretary Widnall.

The F-22 program continues to progress, with the contractor unveiling a concept demonstrator for display in the Washington area. Regarding the F-22, Secretary Widnall said, "This year we've had good congressional support, although we need to stay on track."

The Air Force is working aggressively to improve the precision guided munitions capability of the B-1 and B-2 bombers and is moving ahead on such key space modernization programs as the space and missile tracking system.

"And we are looking beyond these programs toward new world vistas . . . and revolutions in warfare brought into being by incredible capabilities





*In his address, Gen. Ronald R. Fogleman, USAF Chief of Staff, told the Convention that the service's main task now is to maintain a flexible combat capability to handle the varied threats of a post-Cold War world.*

in processing and disseminating data," the Secretary added.

For instance, the Air Force now has a fully operational constellation of Navstar Global Positioning System satellites. According to the Secretary, the E-8 Joint STARS, E-3 Airborne Warning and Control System, U-2, and RC-135 Rivet Joint aircraft all produce data that feed into "an amazing situation awareness picture."

### Cooperation and Privatization

All this new equipment is being purchased through programs managed much differently from the way they were in the past. Tight budgets and fast-paced change demand a responsive, agile procurement system. "So we've revolutionized the process of bringing new technology into the force," said Secretary Widnall.

Cooperative programs with the other services have increased in number. The whole acquisition process has been streamlined. One example cited by the Air Force Secretary was limits placed on military specifications. Combined with other management changes, they have helped save \$300 million on the projected cost of the new Spacebased Infrared satellite program.

Air Force officials are taking a hard look at privatization for everything from Air Force computers to depot maintenance.

"By breaking down the barriers between the 'defense' and 'commer-

cial' sectors of the economy that emerged during the Cold War, we can make better use of the nation's resources," she said.

The Air Force Secretary told the Convention that she had recently returned from a trip to central Europe, where she visited NATO headquarters and countries that have joined NATO's Partnership for Peace. Everywhere, she found leaders wrestling with such fundamental questions as the role of the military in a democratic society. In Poland, the Czech Republic, and elsewhere, she found a yearning for integration with the West.

"Those new friends become allies with a common purpose, and our shared values serve as a force-multiplier for peace throughout the world," she said.

All in all, said service and defense officials, the Air Force is pulling out of the long drawdown, which has seen the service shrink by one-third. Things look brighter for the future, with the force structure stable for 1996 and the promise of increased procurement funds glimmering, however faintly, on the horizon.

Of today's approximately 400,000 Air Force personnel, about 83,000 are based on foreign soil, noted General Fogleman. On the day he addressed the Convention [Septem-

ber 20], precisely 9,641 airmen were temporarily deployed overseas in support of a contingency operation.

General Fogleman said he is worried about the effect of a fast-paced operations tempo on the quality of life for Air Force people. Some categories of personnel continue to be deployed on temporary duty in excess of the 120-day maximum, he admitted. However, "we are well on our way to fixing the optempo issue" for most members, he claimed.

Concerning other personnel matters, the Chief of Staff said he continues to push to make more single rooms available to unaccompanied enlisted troops, and he has initiated a new process for picking group and wing commanders to give candidates currently serving in joint positions due consideration.

### Applying Technology

"The Air Force has always been a leader in the application of technology," continued General Fogleman. The service's first unmanned aerial vehicle squadron stood up at Nellis AFB, Nev., last July. The 9th Air Force's information warfare squadron is an attempt to get a head start in a fast-developing area of conflict.

Information warfare "is not a mission that is the sole purview of the Air Force," noted General Fogleman. In fact, it's still an undefined area.

Which information systems does the US need to target? Which of its own systems does it need to protect, and how? What is the line between information warfare and information peace?

"At what point do you get the authority to get into somebody's banking system?" mused General Fogleman at a meeting with reporters during the Convention.

Plotting attacks on computers and phone systems might seem strange for planners accustomed to thinking about more conventional military targets, but it's all part of readying the Air Force for the next century, he said.

"The US Air Force exists for one reason: to fight and win America's wars when called on to do so," he said. ■

*Peter Grier's report on the 1995 Aerospace Technology Exposition appears on p. 78.*



# CONVENTION '95 ▶

## Wartime Warriors at Center Stage

By Tamar A. Mehuron, Associate Editor



Photo by Paul Kennedy

*For defending freedom during World War II, Army Air Forces veterans were honored with the H. H. Arnold Award, AFA's highest honor in national security to a member or members of the armed forces. John R. Alison accepted it, on behalf of fellow veterans, from AFA National President R. E. Smith.*

**I**N THIS fiftieth anniversary of the end of World War II, it is fitting that we honor those veterans of that mighty struggle who took to the air and pushed beyond the limits of aerospace technology of their day. . . . Their heroic achievements mark a definitive period in the history of airpower and aerospace technology. AFA salutes these gallant men and women whose dedication to duty, courage, and sacrifices helped turn the tide of the war and secure freedom for themselves and for generations to come."

With these stirring words, the Air Force Association paid tribute to the veterans of the World War II Army Air Forces, presenting them with the H. H. Arnold Award during the Anniversary Dinner festivities September 19 at AFA's 1995 National Convention. On stage with the veterans, and accepting the award on their behalf, was John R. Alison, Fourteenth Air Force "Flying Tigers" ace and former AFA National President. World War II-era music provided

by the Singing Sergeants and the US Air Force Band, and a slide show featuring World War II photos, punctuated the celebration.

Other highlights of the evening included the Special Awards given to USAF Capt. Scott F. O'Grady and Thomas Hanford—the first to make radio contact with the downed pilot—and the Navy/Marine Corps rescue team from the 24th US Marine Expeditionary Unit, USS *Kearsarge*. The award recognized the joint-service rescue of Captain O'Grady with these words, "Our nation has always been willing to put many lives on the line to save one."

The September 18–20 Convention was the scene of major addresses by Secretary of the Air Force Sheila E. Widnall, USAF Chief of Staff Gen. Ronald R. Fogleman, Deputy Secretary of Defense John P. White, and Secretary of Veterans Affairs Jesse Brown. USAF Vice Chief of Staff Gen. Thomas S. Moorman, Jr., spoke at the Outstanding Airmen of the

Year dinner. The three-day Aerospace Technology Exposition featured seventy-eight exhibiting companies and more than 8,500 visitors.

### Election of Officers

R. E. Smith of West Point, Miss., was reelected President of the Air Force Association for a second term. James M. McCoy of Omaha, Neb., was reelected Chairman of the Board for a second term. Mary Anne Thompson of Oakton, Va., was reelected National Secretary, and Charles H. Church, Jr., of Lenexa, Kan., was elected National Treasurer for a first term.

The more than 8,500 attendees took part in one or more of the Convention-related activities at the Sheraton Washington Hotel. The 362 registered delegates, from forty-seven states and the District of Columbia, were joined by senior military and government officials for the Aerospace Technology Exposition, speeches, and social events. On hand to cover the Convention



were 142 reporters and other news media representatives.

Meeting concurrently with the Convention were trustees of the Aerospace Education Foundation and USAF major commands' Senior Enlisted Advisors, as well as AFA's Air National Guard Council, Civilian Personnel Council (now the Civilian Advisory Council), Enlisted Council, Junior Officer Advisory Council, Reserve Council, Veterans/Retirees Council, and the Air Force Memorial Foundation.

There was also a joint meeting of the National Executive Boards of the Arnold Air Society and the Angel Flight/Silver Wings Society.

### **Constitutional Changes**

The delegates made several amendments to the AFA Constitution and bylaws. Calling a special meeting of the Board of Directors now requires a written request of the Chairman or of at least one-third of the members of the board. Previously, the request of five members of the board was sufficient. According to Julian B. Rosenthal, AFA founding member and author of the original Constitution and bylaws, the founders intended the board to meet when a quarter to one-third of the members felt it necessary. The provision that five members could call a meeting was based on the fact that there were eighteen directors at the time.

The 1995 Convention also voted to change the name of the Civilian Personnel Council to the Civilian Advisory Council and decided that, to be elected, "Under Forty" national directors must receive "the highest number of votes of at least a quorum of the voting members of the Board of Directors." Previously, election required more than fifty percent of the votes.

### **Congressional Activity**

Thirty-eight state delegations sponsored twenty-four congressional breakfasts on Tuesday and Wednesday of Convention week. Seventy-eight members of Congress participated. Among them were Sens. Strom Thurmond (R-S. C.), chairman of the Senate Armed Services Committee (SASC), Ted Stevens (R-Alaska), chairman of the Senate Appropriations Committee Defense Subcommittee, and Rep. Bob Livingston (R-La.), chairman of the House Appropriations Committee. Other SASC members

attending breakfasts were Sens. J. James Exon (D-Neb.), James M. Inhofe (R-Okla.), Carl M. Levin (D-Mich.), Kay Bailey Hutchison (R-Tex.), Rick Santorum (R-Pa.), and John W. Warner (R-Va.). Sen. Sam Nunn, the ranking Democrat on the Senate panel, attended the Georgia congressional breakfast, where he was presented with the Carl Vinson Excellence in Government Award. Many members of the House National Security Committee also joined AFA delegates at the morning gatherings. These included Reps. Jane Harman (D-Calif.), Joel Hefley (R-Colo.), Saxby Chambliss (R-Ga.), J. C. Watts (R-Okla.), Ike Skelton (D-Mo.), Pete Geren (D-Tex.), Pete Peterson (D-Fla.), Van Hilleary (R-Tenn.), John S. Tanner (D-Tenn.), Walter B. Jones, Jr. (R-N. C.), and Herbert H. "Herb" Bateman (R-Va.).

Secretary Widnall and General Fogleman played active roles in the congressional breakfast program this year. Secretary Widnall visited the Massachusetts, Virginia, South Carolina, and Florida breakfasts, among others. General Fogleman visited nearly three-quarters of the breakfasts, among them the Texas, Georgia, California, New York, South Carolina, Virginia, and Florida delegations' breakfasts. Air Combat Command Commander Gen. Joseph W. Ralston, 9th Air Force Commander Lt. Gen. John P. Jumper, and other senior Air Force officials also participated.

### **Other Elections**

Six new National Vice Presidents were elected, and six National Vice Presidents were reelected.

Newly elected are Anton D. "Tony" Brees (Great Lakes Region), Samuel M. Gardner (Midwest Region)—who was appointed earlier to complete the term of Donald D. Adams—James E. Callahan (Northeast Region), I. Fred Rosenfelder (Northwest Region), Dan Hendrickson (Rocky Mountain Region), and J. E. "Red" Smith (Southeast Region).

Elected to the Board for three-year terms were Lt. Col. James G. Clark of Springfield, Va., William D. Croom, Jr., of Colorado Springs, Colo., Tommy G. Harrison of Apopka, Fla., Harold F. Henneke of Indianapolis, Ind., Capt. John B. Steele of Fairborn, Ohio, and Cheryl L. Waller of Lompoc, Calif.

Three new Under-Forty Directors joining the AFA Board are Capt. James R. Beamon of Dyess AFB, Tex., Capt. Jodi Callahan of Langley AFB, Va., and Eric D. Vander Linden of Lees Summit, Mo.

For a complete list of National Vice Presidents and Directors, including those reelected, see "This Is AFA," p. 98.

### **Aerospace Education Foundation**

A video on "Our Best Community Service Project" won the Foundation's annual contest for presentations by Air Force Junior ROTC cadets. For the second straight year, the winning entry was from Unit CA-863 at Del Campo High School in Fair Oaks, Calif. The topic was civil engineering improvements at school. For next year's contest, cadets will submit a video on the same topic.

Barbara Walters-Phillips, nominated by the Central Florida Chapter, won the Christa McAuliffe Memorial Award for Teachers as the year's outstanding aerospace science, math, and computer science teacher. Dr. Phillip Brieske, nominated by AFA's Hawaii Chapter, received the Sam E. Keith, Jr., Aerospace Education Award of Excellence. The award is named for the late AFA leader and former National President and Board Chairman from Fort Worth, Tex.

### **Acknowledgments**

Parliamentarian for the AFA National Convention was Martin H. Harris. David L. Blankenship was Sergeant at Arms. Inspectors of Elections were Charles G. Durazo (Chairman), Charles A. Nelson, and Dr. Phillip J. Sleeman. Robert J. Cantu chaired the Credentials Committee, serving with Henry W. Boardman and John B. Steele.

The Association is particularly grateful to a corps of volunteers who assisted the staff in Convention support: Stacy Arigo, Cecil Brendle, Laura Ann Campbell, Jimmy Canlas, Evie Dunn, Charles and Mary Lucas, Mike Maloney, Jenifer Petrina, Glenda R. Shepela, Greg and Debbie Snyder, Daren Sorenson, Dana Steinhauer, and Janet Voltz. Cadets Kendra Chase, Lisa Meade, Lisette Ruch, and Ngozi Uzogara also assisted.

The 1996 Air Force Association Convention will be held at the Sheraton Washington Hotel, Washington, D. C., September 16-18. ■



## Congressional Breakfasts

*Thirty-eight state delegations sponsored congressional breakfasts during the Convention. At one of them, Sen. Strom Thurmond (R-S. C., left foreground), Senate Armed Services Committee chairman, greeted Air Force Secretary Sheila Widnall, in the company of (l-r in the background) AFA National President R. E. Smith, Air Combat Command Commander Gen. Joseph Ralston, and John A. Shaud, who became Executive Director of AFA and AEF on October 1.*



Photos by Paul Kennedy

Photos by Susan Kennedy



*Rep. Cynthia McKinney (D-Ga.) was among the seventy-eight members of Congress who attended the breakfasts, giving Dr. Dan Callahan (middle), then Southeast Region National Vice President, and Bob Freaney, South Carolina's Swamp Fox Chapter president, a chance to discuss defense issues with her.*

*At a congressional breakfast, Secretary Widnall talked informally with Rep. John Mica (R-Fla.) about issues important to the Air Force. Mr. Mica chairs the House Government Reform and Oversight Committee's Civil Service Subcommittee.*



Photos by Paul Kennedy



# CONVENTION '95 ▶

## Awards



Photo by Paul Kennedy

*In recognition of his leadership and lasting contributions, Monroe W. Hatch, Jr., who retired October 1 as Executive Director of AFA and AEF, received the Exceptional Service Award at the 1995 AFA Convention from Air Force Chief of Staff Gen. Ronald R. Fogleman (left). He was also named a permanent member of the Association's Board of Directors.*

### Crew Awards and Special Citations

Award	Recipient(s)	Achievement	Accepted by
Lt. Gen. Claire Lee Chennault Award	Maj. Arnold W. Balthazar, ANG Hickam AFB, Hawaii	Best aerial warfare tactician	Maj. Arnold W. Balthazar, ANG
Brig. Gen. Ross G. Hoyt Award	An aircrew of the 905th Air Refueling Squadron (KC-135R), Grand Forks AFB, N. D.	Best air refueling aircrew	Capt. Mark Lane
Gen. Curtis E. LeMay Award	Crew R-26 (B-1B), 9th Bomb Squadron, Dyess AFB, Tex.	Best bomber aircrew	Capt. Mark Schlichte
Gen. Jerome F. O'Malley Award	Cobra Ball Crew, 45th Reconnaissance Squadron and 97th Intelligence Squadron, Offutt AFB, Neb.	Best reconnaissance crew	Capt. Thomas A. Floring and SSgt. Sherolyn Hallmark
Verne Orr Award	4th Wing, Seymour Johnson AFB, N. C.	Most effective use of human resources within USAF	Brig. Gen. Lance L. Smith
Gen. Thomas S. Power Award	Crew R-145, 742d Missile Squadron, 91st Missile Group, Minot AFB, N. D.	Best missile crew	Capt. Andrew S. Kovich III
Space Operations Award	2d Space Operations Squadron Centurion Flight (Charlie Crew), Falcon AFB, Colo.	Best space operations crew	Capt. James Cashin
Lt. Gen. William H. Tunner Award	A C-5 aircrew of the 22d Airlift Squadron, 60th Air Mobility Wing, Travis AFB, Calif.	Best air mobility crew	Capt. Robert Svetz
USAF Test and Evaluation Team of the Year	F-15 Keep Eagle Integrated Product Team, Wright-Patterson AFB, Ohio	Best test team	C. Douglas Ebersole



## National Aerospace Awards

Award	Recipient(s)	Achievement
<b>H. H. Arnold Award</b> <i>AFA's highest honor in national security to a member of the armed forces</i>	World War II Army Air Forces Veterans	Defending freedom in the skies over Europe and the Pacific during World War II; heroic achievements marking a definitive period in the history of airpower and aerospace technology; dedication to duty, courage, and sacrifices that helped turn the tide of the war and secure freedom for generations to come. <i>Accepted by:</i> John R. Alison, on behalf of World War II USAAF veterans.
<b>W. Stuart Symington Award</b> <i>AFA's highest honor in national security to a civilian</i>	Dr. Sheila E. Widnall, Secretary of the Air Force, Washington, D. C.	Outstanding leadership as Secretary of the Air Force; superb management of scarce resources; strong efforts on behalf of readiness and modernization, and tireless advocacy for men and women in uniform.
<b>John R. Alison Award</b> <i>AFA's highest honor for industrial leadership</i>	C. Michael Armstrong, Chairman and CEO, GM Hughes Electronics Corp., Los Angeles, Calif.	Innovative and dynamic leadership in the defense industry; forward-looking management, strong advocacy, and commitment to national defense, helping sustain critical sectors of the industrial base, improve efficiency, advance defense technology, and strengthen our armed forces.
<b>David C. Schilling Award</b> <i>outstanding contribution in flight</i>	C-17 Air Force/Industrial Team	Superb operational performance by the Air Force's active-duty and Air Force Reserve airlift units, test community, and industry team, resulting in the setting of twenty-two world flight records, proving the C-17's utility, effectiveness, and outstanding capabilities. <i>Accepted by:</i> Gen. Ronald R. Fogleman, USAF, and Harry C. Stonecipher, President and CEO, McDonnell Douglas Corp.
<b>Theodore von Kármán Award</b> <i>outstanding contribution in science and engineering</i>	Maj. Gen. Kenneth R. Israel, Hq. USAF, Washington, D. C.	Superb leadership in reconnaissance and information technologies, as director, Defense Airborne Reconnaissance Office; outstanding coordination of requirements and technologies, development of an innovative system architecture, and superior management of limited resources, leading to a program with exceptional potential.
<b>Gill Robb Wilson Award</b> <i>outstanding contribution in arts and letters</i>	John T. Correll and AFA's <i>Enola Gay</i> Action Team (Monroe W. Hatch, Jr., Stephen Aubin, Jack Giese, Ken Goss)	Planned and implemented a highly effective communications campaign to raise public awareness of the National Air and Space Museum's plan to exhibit the <i>Enola Gay</i> in a way that lacked balance and historical context; publishing a series of articles in <i>Air Force Magazine</i> and making numerous contacts with the media and Congress to help bring pressure on the museum, resulting in a completely revised exhibit, free from bias and distortions.
<b>Hoyt S. Vandenberg Award</b> <i>outstanding contribution in aerospace education</i>	Lt. Gen. Jay W. Kelley, Air University, Maxwell AFB, Ala.	Distinguished and inspirational leadership as commander; strong guidance of all levels of Air Force education, from Air Force Junior ROTC to senior-level policy study; leading Air University to the forefront and making significant contributions to the advancement of airpower theory and doctrine.
<b>Thomas P. Gerrity Award</b> <i>outstanding contribution in logistics</i>	Lt. Col. Robert J. Sherrill, Yokota AB, Japan	Strong leadership, superior performance, and dedication to duty as chief, Traffic Management and Airlift Section, Logistics Division, Readiness and Support Directorate, Hq. USAFE, and as commander, 374th Transportation Sq., 374th Logistics Group, 374th Airlift Wing, Hq. PACAF.
<b>Department of Veterans Affairs employee of the year</b>	John P. Hackett, VA Regional Office, Des Moines, Iowa	Outstanding professional performance as Vocational Rehabilitation and Counseling officer, VA Regional Office, Des Moines, Iowa; innovative ideas, dogged determination, and ability to organize a regional job opening network for disabled veterans.

**A Convention highlight was AFA President Smith's (center) presentation of AFA Special Awards to Capt. Scott O'Grady (second from left) who was shot down over Bosnia-Herzegovina, and Capt. Thomas Hanford (far left) and representatives of the Navy/Marine Corps Rescue Team, 24th US Marine Expeditionary Unit, who performed the daring rescue.**



Photo by Paul Kennedy



## Citations of Honor

<b>Recipient(s)</b>	<b>Achievement</b>
Quentin Aanenson Bethesda, Md.	Exceptional dedication in writing and producing a three-hour documentary, based on his own experiences, "A Fighter Pilot's Story," which has won acclaim for portraying the events and battles in the European theater during World War II seen through the eyes of a P-47 fighter pilot. Viewed by millions, his documentary has contributed to a greater public understanding of the role of airpower in World War II.
TSgt. David A. Breeden Yokota AB, Japan	Outstanding innovative leadership as a trainer and educator, as chief of the Base Training Office at Yokota AB, Japan; looked to for guidance and assistance across the spectrum of this important duty.
Capt. Craig A. Breker and crew McChord AFB, Wash. <i>Accepted by:</i> Captain Breker	Distinguished participation in the Bosnian relief effort, especially when their aircraft was hit by a barrage of ground fire, necessitating an immediate emergency takeoff; demonstrating extraordinary airmanship, instrumental in saving lives and valuable Air Force assets.
Capt. Sandra J. Lawrence Scott AFB, Ill.	Outstanding service as chairman, DoD High-Frequency Consolidation Working Group, leading more than 100 Air Force, Army, Navy, and Coast Guard personnel in developing and implementing a plan to consolidate high-frequency facilities into one global network; recommendations are estimated to eliminate 280 manpower spaces and save more than \$10 million annually, while providing warfighters instant access to information.
Capt. Kenneth A. McKellar Kelly AFB, Tex.	Outstanding achievement as the F-117 engine program manager, Propulsion Directorate, Kelly AFB, Tex; extraordinary professional skill, knowledge, and leadership in the development of the support system for the C-17 engine.
Randy W. Townsend Shaw AFB, S. C.	Outstanding service as an Air Force Engineering and Technical Services representative for the 726th Air Control Squadron, 20th Fighter Wing, Shaw AFB, S. C.; stellar leadership and technical expertise that contributed to the squadron's conversion to advanced modular control equipment; accomplishing the conversion in a timely manner, increasing maintenance capability 170 percent, with significant monetary savings.
Maj. Daniel S. Yinger US Air Force Academy, Colo.	Outstanding service as deputy squadron commander for Operations, US Air Force Academy, Colo.; creative work in cadet and public multimedia education; producing multimedia shows for cadet education and Academy visitors.
Air Force Checkmate Division Hq. USAF, Washington, D. C. <i>Accepted by:</i> Col. Robert Plebanek	Developing, prototyping, and fielding the Air Force Campaign Planning Tool—innovative software design improving airpower planners' and educators' ability to react to global real-world and exercise taskings through the rapid visualization and development of military options on the strategic, operational, and tactical levels.
Navstar Global Positioning System Joint Program Office Los Angeles AFB, Calif. <i>Accepted by:</i> Col. John Clay	Outstanding accomplishments in the development, launch, and integration of the Global Positioning System, one of the largest and most successful satellite programs in DoD history; superb efforts in overcoming serious obstacles through technical innovation in production and launch.
US Air Force Honor Guard Bolling AFB, D. C. <i>Accepted by:</i> Maj. Keith Anderson and MSgt. Robert H. Price	Outstanding representation of the US Air Force and the nation, providing ceremonial support for national and international occasions and serving the protocol requirements of the White House, Congress, DoD, foreign dignitaries, and the American public at military funerals; performing valuable community activities, such as mentoring local school children and leading the community drug awareness program.
37th Communications Squadron Lackland AFB, Tex. <i>Accepted by:</i> Capt. Christopher Walker	Bringing advanced technology and world-class twenty-first century command, control, communications, and computer systems to Lackland AFB in a manner that is recognized command-wide as the benchmark for customer service.

## Management, Environmental Achievement, and C<sup>4</sup> Excellence Awards

<b>Award</b>	<b>Recipient</b>
<b>AFMC Management</b>	
AFMC Executive Management Award	Col. Charles L. Johnson, Robins AFB, Ga.
AFMC Middle Management Award	Lt. Col. David G. Shaw, Wright-Patterson AFB, Ohio
AFMC Junior Management Award	1st Lt. Jeffrey D. Farmer, McClellan AFB, Calif.
<b>Environmental Achievement</b>	
Gen. Edwin W. Rawlings Award for Environmental Excellence (Management)	Maj. Michael Kelly, Peterson AFB, Colo.
Gen. Edwin W. Rawlings Award for Environmental Excellence (Technical)	SMSGT. Steven A. Snodgrass, Whiteman AFB, Mo.
<b>C<sup>4</sup> Excellence</b>	
Gen. Billy Mitchell Award	Maj. John Pericas, Hq. USAF, Washington, D. C.



## Professional, Civilian, and Educational Awards

Award	Recipient
Christa McAuliffe Memorial Award for Teachers Sam E. Keith, Jr., Aerospace Education Award of Excellence	Barbara Walters-Phillips Dr. Phillip R. Brieske
Crew Chief of the Year	TSgt. Christopher A. Hargis, RAF Lakenheath, UK
Paul W. Myers Award for Physicians	Lt. Col. Thomas W. Travis, Brooks AFB, Tex.
Juanita Redmond Award for Nursing	Capt. Cynthia Wright, Travis AFB, Calif.
Stuart R. Reichart Award for Lawyers	Col. Ralph J. Capio, Scott AFB, Ill.
Personnel Manager of the Year	Jean E. Breeden, Hq. USAF, Washington, D. C.
Civilian Wage Employee of the Year	Karl K. Kiessling, Dover AFB, Del.,
Civilian Program Specialist of the Year	Richard S. Anderson, Falcon AFB, Colo.
Civilian Program Manager of the Year	Bruce R. Varnum, Patrick AFB, Fla.
Civilian Senior Manager of the Year	Martha T. Evans, Hanscom AFB, Mass.
AFROTC Cadet of the Year	Brian P. Afflerbaugh, University of Michigan, Ann Arbor, Mich.
CAP Aerospace Education Cadet of the Year	Kristopher Kimmerling, Farmington, Minn.
Diane O'Malley Angel of the Year	Kim A. Porter, Embry-Riddle Aeronautical University-West, Prescott, Ariz.
Joan Orr Award for Air Force Spouse of the Year	Patricia G. Peek, Scott AFB, Ill.

Photo by Paul Kennedy



*AFA President Smith leads the applause for William N. Webb (right), named 1995 Member of the Year. Mr. Webb, of Midwest City, Okla., served for several years as AFA National Treasurer.*

## Air National Guard and Air Force Reserve Awards

Award	Recipient(s)	Achievement	Accepted by
CMSgt. Dick Red Award	CMSgt. Robert L. Heinrich Ellington Field, Tex.	Leadership and technical expertise in aircraft maintenance	
Earl T. Ricks Award	Capt. Gregory D. Carr and his C-130H aircrew 166th Airlift Group (ANG), New Castle County Airport, Del.	Outstanding airmanship in the Air National Guard	Capt. Gregory D. Carr
Air National Guard Outstanding Unit	193d Special Operations Group (ANG), Harrisburg IAP, Pa.	Outstanding ANG unit of the year	Col. W. Reed Ernst II
Air Force Reserve Outstanding Unit	512th Airlift Wing (Associate), Dover AFB, Del.	Outstanding Reserve flying wing	Brig. Gen. Michael J. Quarnaccio
President's Award for the Air Force Reserve	Crew of the 300th Airlift Squadron, 315th Airlift Wing, Charleston AFB, S. C.	Outstanding Reserve aircrew	Capt. David Kratzer



## This Is the Aerospace Education Foundation

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Linda Swan

**Programs Assistant**  
Denise Kessler

## 1995 Unit Activity Awards

**Donald W. Steele, Sr., Memorial Award:**  
**AFA Unit of the Year**  
Baton Rouge Chapter, La.

**Outstanding State Organization**  
AFA Florida

**Outstanding Chapters**  
General B. A. Schriever Los Angeles, Calif.  
(more than 900 members)  
Harry S. Truman, Mo. (401-900 members)  
Longs Peak, Colo. (151-400 members)  
Sal Capriglione, N. J. (20-150 members)

**Exceptional Service Awards**  
Robert H. Goddard Chapter, Calif. (Aerospace Education)  
Grissom Memorial Chapter, Ind. (Best Single Program)  
Florida Highlands Chapter, Fla. (Communications)  
Carl Vinson Memorial Chapter, Ga. (Community Relations)  
Donald W. Steele, Sr., Memorial Chapter, Va.  
(Overall Programming)  
Paul Revere Chapter, Mass. (Veterans' Affairs)

## Arthur C. Storz, Sr., Membership Award

AFA's most prestigious awards are named for Arthur C. Storz, Sr., a former permanent AFA National Director, a Life Member, and a principal founder of the Ak-Sar-Ben Chapter. The Storz Membership Awards, made possible through a generous endowment to the Association by his son Art Storz, Jr., have been awarded for membership excellence based on criteria approved by AFA's Board of Directors for the year ending March 31, 1995.

### Individual Award

Presented to the AFA member or members who have done the most to promote AFA membership during 1994-95.

James S. Strickland

*The 356-member Baton Rouge (La.) Chapter received the Donald W. Steele, Sr., Memorial Award as AFA unit of the year. Chapter President Michael Cammarosano (left), who has since become Louisiana AFA president, accepted the honor from National President Smith.*



Photo by Paul Kennedy



## 1995 AFA Membership Awards

The following chapters have qualified for these awards based on their recruitment of new members during the twelve-month period ending March 31, 1995.

**Membership Achievement Award: 20% new members**  
Total Force, Pa.  
Northern Shenandoah Valley, Va.

**Special Award: 15% new members**  
John W. DeMilly, Jr., Fla.  
Lawrence D. Bell Museum, Ind.  
Longs Peak, Colo.  
New Jersey Public Affairs, N. J.



Photo by Paul Kennedy

*James S. Strickland (center) received the Arthur C. Storz, Sr., Membership Award from AFA Board Chairman James McCoy (left) and President Smith.*

## Named in Memorial Tribute

USAF and AFA leaders and supporters and aviation pioneers who died during the past year

Donald D. Adams  
L. J. Andolsek  
Les Aspin  
Col. Richard C. Banbury  
Lt. Col. Warren S. Barnes  
Eugene R. Barnett  
Lt. Gen. Leo Benade, USA (Ret.)  
Capt. Hans H. Bewersdorf  
Loftur Bjarnason  
1st Lt. Paul M. Bowers  
Brig. Gen. Harold W. Bowman, USAF (Ret.)  
Capt. Geoffrey Boyd  
R. Benton "Bun" Bray  
Col. Harold R. Brown, USAF (Ret.)  
Lt. Col. Robert R. Buckhout  
Capt. Paul Carey  
Bob Caron  
James D. "Doug" Catington  
Col. Donald S. Clark, Jr.  
Col. Jack Clark II  
Jean Clark  
Robert E. Combs  
Maj. Gen. William L. Copeland, USAF (Ret.)  
M. Lee Cordell  
Dola L. Cordoni  
Lt. Gen. Leighton I. Davis, USAF (Ret.)  
2d Lt. Lance Dougherty  
Col. S. Nelson Drew  
Maj. Gen. George W. Edmonds, USAF (Ret.)  
Robert C. Eichhorst  
Howard Eichner  
Laurence F. Farrell  
Clark G. Fiester  
Maj. Hubert B. Fisher  
James O. Fiske, Jr.  
Col. Walter H. Flint, USAF (Ret.)

Mary Elsie Fox  
Robert C. Frasure  
Abraham Greenbaum  
George D. Hardy  
Maj. Warren V. "Jack" Hastings, USAF (Ret.)  
Capt. David Hawken  
Maj. Gen. Fred J. Higgins, USAF (Ret.)  
Maj. James K. Horne, USAF  
Brig. Gen. James H. Howard, USAF (Ret.)  
Woody Ishmael  
MSGT. Jay Kemp  
Maj. Gen. James F. Kirkendall, USAF (Ret.)  
John P. E. "Jack" Kruse  
Col. Joseph J. Kruzal, USAF  
Col. Jean K. Lambert  
Jessie E. Leonard  
Capt. Kenneth W. Levens  
Brig. Gen. James W. Little, USAF (Ret.)  
Maj. Donald G. Lowry, Jr.  
Maj. Clarence T. Marsh III  
Brig. Gen. Henry J. McAnulty, USAF (Ret.)  
Maj. Gen. Frank T. McCoy, Jr., USAF (Ret.)  
MSGT. Joseph R. McDowell, USAF (Ret.)  
Col. William J. McGinty, USAF (Ret.)  
Maj. Max Orval McClrath  
Priscilla G. "Pat" Moore  
Col. Tipton P. Mott-Smith  
Jacqueline Kennedy Onassis  
Lt. Col. D. R. Palmer, Jr., USAF (Ret.)  
Mary Frances "Bobby" Pauly  
Edward J. Pennington  
Carlotta Peterson

Leon M. Pliner  
Brig. Gen. Robert E. Preston, USAF (Ret.)  
Maj. Gen. Glenn A. Profitt II  
Albert S. Randall  
Martha Raye  
Richard S. Reid, Sr.  
Lt. Col. William J. Reslie  
Ben R. Rich  
Lt. Col. Frank A. Roper  
Maj. Gen. Marshall S. Roth, USAF (Ret.)  
John M. Rule  
Steve Saliga  
SSgt. Michael L. Scheideman  
Janice Sieloff  
Maj. Gen. James E. Simon, USAF (Ret.)  
Col. Raymond S. Sleeper, USAF (Ret.)  
Hon. Margaret Chase Smith  
CMSgt. William N. Starnes, USAF (Ret.)  
Hon. John C. Stennis  
Lt. Col. John W. "Bill" Stevenson, USAF (Ret.)  
Jerry M. Syverson  
MSGT. Wayne S. Tarkington  
John E. Taylor  
Ed Tepoorten  
Marion T. Thomas  
Maj. Gen. James B. Tipton, USAF (Ret.)  
Col. James W. Twitty  
CMSgt. Jimmie D. Vail  
Maj. Gen. Donald L. Werbeck, USAF (Ret.)  
Capt. Dennis M. White  
Col. Hubert A. "Hub" Zemke, USAF (Ret.)



## 1995 Individual Activity Awards

### Member of the Year

William N. Webb

### Special Awards

John O. Gray

Capt. Scott F. O'Grady,  
USAF

Navy/Marine Corps Rescue  
Team, 24th US Marine  
Expeditionary Unit, USS  
*Kearsarge*

Capt. Thomas "T. O."

Hanford, USAF

Tinker AFB, Okla.

### Presidential Citations

Don Casteel

Baldwin "Dom" Domingo

Mary E. Frey

Tommy G. Harrison

Geraldine Jones

Robert M. Kuhns

Larry L. Miller

Lee W. Niehaus

Dr. Phillip J. Sleeman

### Special Citations

130th Airlift Group (ANG)

419th Fighter Wing (AFRES)

Brig. Gen. Morgan S. Tyler

Scholarship Fund, Inc.,

Fla.

Hill Aerospace Museum, Hill  
AFB, Utah

W. Burr Bennett

Georgia M. Franklin

Lt. Gen. Eugene "Gene" E.

Habiger, USAF

Richard B. Harper, Jr.

Homer E. Hayes

Andy and Madeline Heath

Richard Herman, Jr.

Bill Lamar

Clifford H. Long

Brig. Gen. Gregory S.

Martin, USAF

Christine H. Moe

Clem and Margaret Moore

Maj. Marcus T. Moss, USAF

James L. Mulligan

James D. Neilson, Jr.

Herman N. Nicely II

Raymond B. Nuckles

Hon. William Richardson

Pat Stearn

Charlotte A. Storm

Richard M. Wray

### Exceptional Service Awards

Maj. (Lt. Col. selectee)

Henry L. Andrews, Jr.,

USAF

John D. Bailey

Kaye H. Biggar

Eddie D. Brown

Edward M. Bullard

James E. Callahan

William C. Carey

Enrico Carnicelli

Dodie Coleman

Donald L. Dandurand

Richard DeLong

William B. Divin

John R. Dyas

Theodore O. "Ted" Eaton

Danny Edwards

Arthur C. Ericson

Allen P. Feeback

John P. Gaffney

Richard G. Galloway

Winston S. Gaskins

Art Gigax

Robie Hackworth

William J. Holden

Joyce M. Hons

C. N. "Buster" Horlen

Robert C. Hudson

Bob Kapperman

John J. Kelly, Jr.

Robin M. Kozelka

Gerald D. Loos

Dennison R. Love

Steven M. Mallon

Edwin R. Mansberger

John F. McCormack

Ivan L. McKinney

Michael A. Moran

AnnMarie Neilan

John W. Newman

MSgt. Kay A. O'Brien, USAF

Brig. Gen. Andrew J. Pelak,

Jr., USAF

Wayne K. Penley

Donald E. Persinger

Sam Rich

John W. Roach

Sean Ryan

Vic Seavers

Michael E. Sheehan

Thomas G. Shepherd

Clair J. Smith

John B. Steele

James O. Trew

Leonard R. Vernamonti

Gordon E. Williams

Louise M. Young

Carl B. Zimmerman

### Jack B. Flaig

#### Communications Award

Marylyn V. Zywan

### Medal of Merit

Donald L. Adams

Donald P. Adee

Lt. Col. Chris A.

Anastassatos, USAF

James E. Anderson

Capt. James R. Beamon,

USAF

Roger M. Blanchard

Theodore C. Beckett

James Beninato

Debby Boe

Sara J. Bonilla

Andrew M. Bostock

Roy Boudreaux

Robert Braverman

Mason S. Botts

J. Ward Boyce, Jr.

Patrick A. Briggs

Donald C. Brown

Tom Browning

Maj. Timothy S. Burke, USAF

Joan B. Burns

John L. Burrow

Michael Buss

Bonnie B. Callahan

Michael F. Cammarosano

CMSAF David J.

Campanale, USAF

Col. Newton I. Carpenter,

Jr., USAF

Kathryn G. Chapman

Carmen Cifelli

William S. Clayton

William F. Cocke

Lt. Col. Davis Cooper, USAF

Thomas Costello

Brad Davis

M. Linda Davis

Angelo DiGiovanni

Albert S. Dodd III

Albert E. Eardensohn

Barbara Edwards

Col. James A. Evans, USAF

Maj. Steven J. Filo, USAF

David W. Frutchey

Jennifer Frye

Stephen B. Frye

Stewart R. Gable

Ron Garcia

Kevin F. Gilmartin

Carol Glasgow

William R. Gommel

Joseph A. Gosselin

Wayne R. Gracie

MSgt. Edna O. Green, USAF

Jim Greenfield

Barry H. Griffith

Robert M. Grover

Bill Gunkel

Gary Hale

Miles W. Hall

Charles R. Harker

Alan M. Hart

1st Lt. Heidi L. Heilhecker,

USAF

Lt. Col. John R. Henninger

III, USAF

Sandra L. Henninger

Robert J. Herculson, Jr.

Tamera C. Horine

Lee F. Hudson, Jr.

Ted Huff, Jr.

James K. Iwamura

Kevin Jackson

Col. Paul L. Jacobs, USAF

Dr. Annie Jeter

Charles W. Johnson

Marcy L. Johnson

Doug Kaczmarck

Vern Karlin

James C. Kasperbauer

Photo by Paul Kennedy



**A statue of Gen. James H. Doolittle—aviation pioneer, war hero, and AFA founder—was dedicated at AFA headquarters before the Convention.**



William A. Kehler  
 Robert B. Kennedy  
 Edward E. Kirkham, Jr.  
 Ray Klosowski  
 Edward H. Kranz  
 Lt. Col. James Lacey, USAF  
 Flavio J. LaManna  
 Jan LaMotte  
 J. B. Langley  
 Robert E. Largent  
 Malvin Larsen  
 Gary Maitland  
 Frank E. Mancuso  
 Benjamin J. Mansfield  
 Carol Mansfield  
 James H. Marshall  
 Celso Martinez  
 Dennis F. Mathis

Marc McBride  
 John W. McCance  
 James R. "Russ" McCarthy  
 Robert G. McCullough  
 Kent D. McElhattan  
 Ray V. McManus  
 Linda E. Meyer  
 Thomas M. Meyer  
 Ronald W. Mielke  
 William W. Miller  
 Tom Molloy  
 Bill F. Myers  
 Clinton Null  
 Joseph "Skip" O'Hara III  
 CMSgt. Gail Paich, USAF  
 Brig. Gen. Michael J. Peters,  
 USAF  
 Al Plotnik

John J. Politi  
 Col. Ronald T. Rand, USAF  
 John R. Ransome  
 James W. Rau  
 Robert A. Reyling  
 CMSgt. Michael C.  
 Reynolds, USAF  
 I. Fred Rosenfelder  
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 Norman H. Runge  
 Ned Sanders  
 Richard E. Schankel  
 Dennis L. Sexton  
 LaVern Shaw  
 Howard G. Sholl  
 James M. Snyder  
 Fran Soczik  
 Cathy Sparks

Capt. Robert G. Steele, Jr.,  
 USAF  
 Elwood N. Stein  
 Thomas D. Stevenson  
 Charles L. St. Sauver  
 Joseph D. Sylvester  
 CMSgt. James T. Tanner,  
 Jr., USAF  
 Herman F. Thompson  
 Raymond Turczynski, Jr.  
 Lt. Col. Dan Turgeon, USAF  
 Richard P. Wallace  
 John White  
 Tate Williams  
 William A. Williams  
 J. Christopher Wilt  
 Lt. Col. Lance Young, USAF  
 Frederick R. Zehrer III

Photo by Paul Kennedy



*Warmest welcome of the Convention went to Sue Noerr, whose husband, David C. Noerr, AFA's long-time Director of Volunteer and Regional Activities, has been away for health reasons since last year. Shown here are (l-r) Chaplain Dick Carr, National Director Bob Carr, Sue Noerr, and AFA Director of Membership Operations Max Keeney.*

## 1995 Community Partner Membership Awards

These awards are presented to chapters with significant community outreach and are based on March 31, 1995, chapter membership totals.

### President's Award

This award recognizes the chapter that has recruited the greatest percentage of Community Partners (in terms of chapter membership). Chapters must have a minimum of fifteen Community Partners to qualify.

Lloyd R. Leavitt, Jr., Mich.

### Gold Awards

These awards recognize chapters that have a total number of Community Partners equal to or greater than three percent of overall chapter membership, with a minimum number of Community Partners to qualify. The minimum number is determined by the chapter size.

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 Carl Vinson Memorial, Ga.  
 Enid, Okla.  
 John W. DeMilly, Jr., Fla.  
 Llano Estacado, N. M.  
 Lloyd R. Leavitt, Jr., Mich.  
 Longs Peak, Colo.  
 Pope, N. C.  
 Richard S. Reid, Ariz.

### Achievement Awards

These awards recognize chapters that have a total number of Community Partners equal to or greater than one percent of their overall chapter membership, with a minimum number of Community Partners to qualify. The minimum number is determined by the chapter size.

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 Ark-La-Tex, La.  
 Cape Canaveral, Fla.  
 Central Florida, Fla.  
 Central Oklahoma (Gerrity), Okla.  
 Cheyenne Cowboy, Wyo.  
 Colonel H. M. "Bud" West, Fla.  
 Concho, Tex.  
 Contrails, Kan.  
 Dacotah, S. D.  
 David D. Terry, Jr., Ark.  
 Delaware Galaxy, Del.  
 Eagle, Pa.  
 Fairbanks Midnight Sun, Alaska  
 Florida Highlands, Fla.

General B. A. Schriever Los Angeles, Calif.  
 Gen. Charles L. Donnelly, Jr., Tex.  
 General David C. Jones, N. D.  
 Grissom Memorial, Ind.  
 Inland Empire, Wash.  
 Jackson, Miss.  
 Joe Walker—Mon Valley, Pa.  
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 Langley, Va.  
 Lubbock, Tex.  
 Morgan S. Tyler, Fla.  
 Northeast Texas, Tex.  
 On Wings of Eagles, Fla.  
 Richard D. Kisling, Iowa  
 Robert H. Goddard, Calif.  
 Scott Berkeley, N. C.  
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 Total Force, Pa.  
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# National Report

## AFA Recognized for Guard and Reserve Support

The National Committee for the Employer Support of the Guard and Reserve recently recognized the Air Force Association for its support of the men and women who serve in the Guard and Reserve. The Committee, which was chartered in 1972 by the Department of Defense to help resolve the conflicts between part-time military duties and full-time civilian career opportunities, cited AFA for "meritorious leadership and initiative in support of the men and women who serve America in the Guard and Reserve."

Throughout the year, AFA works closely with its Guard and Reserve Councils to develop positions on issues and legislation affecting AFA members who serve in the Guard and Reserve. AFA, an active supporter of the Guard and Reserve for many years, was instrumental in helping found the National Committee for the Employer Support of the Guard and Reserve. Internally, AFA is proud of its own staff hiring practices supporting members of the Guard and Reserve. In fact, one AFA staffer recently spent a year on a peacekeeping mission in the Sinai.

Further information on the National Committee for the Employer Support of the Guard and Reserve is available from its headquarters, (800)-336-4590.



Photo by Susan Kennedy

(From left, Air Force Secretary Sheila Widnall discusses Air Force issues with AFA President R. E. Smith and Air Combat Command Commander Gen. Joseph Ralston at the South Carolina congressional breakfast held during AFA's National Convention in September. In another record year, 38 state delegations sponsored 24 congressional breakfasts on Tuesday and Wednesday of Convention week, attracting more than 70 members of Congress and numerous staffers.

## AFA Display at Wright-Patterson Museum

During the National Convention, AFA unveiled a new display devoted to the history and current activities of the Air Force Association. The display features panels about AFA's history, *Air Force Magazine*, Recognition Programs, Aerospace Education, and the Association's work on Capitol Hill. It was designed to become a permanent fixture at Wright-Patterson's US Air Force Museum, where it is now housed.

## Visit AFA in Cyberspace

Since the last National Report, AFA has expanded and refined the design of its World Wide Web home page on the Internet. Our goal is to continually add material and improve the page. Let us know what you think.

Air Force Association  
AFA's Enola Gay Page  
Aerospace Education Foundation

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## AFA Broadcast Fax Service

AFA's 24-hour-a-day fax broadcast service exists to better serve AFA members. The service leads the caller through a series of prompts and then faxes selected documents directly to the fax number the caller specifies. The documents and information available are listed on an index. To use the service and to order the index, please call (800) 232-3563.





By Frances McKenney, Assistant Managing Editor

## Aloha for the President

When President Clinton visited Hawaii in September to commemorate the end of World War II, the **Hawaii Chapter** and its state organization felt the world's attention focusing on them.

State President Norm Baker said AFA members in the fiftieth state attended the President's speech at the National Cemetery of the Pacific and participated with him in a veterans parade through Waikiki and in a "Hawaii Remembers" ceremony near the beach, at the Waikiki Shell open-air theater.

After the President left the islands, there was still work and fun ahead. AFA members manned two booths that promoted the Association and the chapter's sale of World War II fiftieth-anniversary commemorative silver, gold, and bronze coins.

The first booth was set up at one of three "Hangar Dances" held on Oahu. At these celebrations—held on USS *Carl Vinson*, at the US Army's Schofield Barracks, and at Hickam AFB—guests dressed in 1940s clothing and danced to swing music.

The second AFA booth was set up for an open house held at Hickam AFB. "Thousands and thousands of people were there," Mr. Baker said. "It was a very, very successful open house, and we had a great day selling commemorative coins."

## When the War Is Over

"Dig out your old uniform (snug as it may be)," read the promotional flier. That's how the **Grissom Memorial (Ind.) Chapter** announced its celebration of the fiftieth anniversary of the end of World War II.

The celebration took place at Grissom ARB August 12 and took as much joint-service coordination as a real-world military operation. Chapter Vice President (Aerospace Education) Ben Franklin said the Air Force and Army Reserves, Army National Guard, Civil Air Patrol, Army retirees, and several community sponsors and clubs worked on the event.

The day began with a golf tournament. Next came a fly-in with a PT-



At a 341st Missile Wing meeting, Lt. Col. John Henninger III, USAF, then **Big Sky Chapter President**, presented Donna Whitman with one of the first Air Force Spouse Scholarships awarded by the Aerospace Education Foundation.

19, PT-24F, PT-17, T-34A, T-28, an AT-6, J-3s, two UPF-7s, two Indiana National Guard helicopters, and a KC-135 from the 434th Air Refueling Wing, the host unit at Grissom.

In keeping with the World War II theme, more than 550 visitors entered the exhibit by passing two Army National Guard soldiers manning a .50-caliber machine gun and were processed through a checkpoint to collect an "ID tag." They then inspected a Jeep and its modern counterpart, the Humvee. The visitors also checked out a Tube-launched, Optically-tracked, Wire-guided missile, a 150-mm howitzer, antique vehicles and guns, and World War II military uniforms, posters, and cartoons. A dinner dance with big band music capped the day.

Mr. Franklin, the USAF-Civil Air Patrol liaison at Grissom, said the celebration raised funds to send a local youth with cancer to summer camp and to sponsor six classrooms in the "Visions of Exploration" program. AEF cosponsors the "Visions" program with *USA Today* to encourage youngsters with an interest in science and technology.

## Spouse Scholarships Awarded

The odds were about one in fifty. More than 500 spouses of Air Force active-duty and Guard and Reserve service members competed for the first ten \$1,000 Air Force Spouse Scholarships awarded by AEF. Given those odds, no wonder the **Big Sky (Mont.) Chapter** was thrilled to see College of Great Falls student Donna J. Whitman, from its area, among the winners.

Lt. Col. John R. Henninger III, USAF, then Chapter President, made the presentation at a 341st Missile Wing stand-up at Malmstrom AFB, Mont. Wing Commander Col. Timothy J. McMahon and all the unit commanders attended the ceremony. Mrs. Whitman, a senior majoring in education, is the wife of TSgt. Donald E. Whitman of the 341st Missile Maintenance Squadron.

The **Lt. Erwin R. Bleckley (Kan.) Chapter** also proudly honored scholarship winner Christine Bartholomew from its area. An undergraduate English major with a 4.0 GPA at Wichita State University, Mrs. Bartholomew is married to Capt. Bruce Bartholomew, flight commander for the Fuels



Management Flight, 22d Supply Squadron, at McConnell AFB.

Other scholarship recipients were Susanna Ayers and Dorothy Smith from Geilenkirchen AB, Germany; Krista Becker from Columbus AFB, Miss.; Jamie Cushenbery, Elmendorf AFB, Alaska; Maria Del Pilar Palte, Aviano AB, Italy; Sally Moretti, Los Angeles AFB, Calif.; Debra Wagner, Dyess AFB, Tex.; and Laura Webb, Robins AFB, Ga.

**Desert Storm Firsthand**

A-10 pilot Capt. Bradley J. Whitmire, from the 358th Fighter Squadron at Davis-Monthan AFB, Ariz., recalled his Operation Desert Storm experiences at a meeting of the **Cochise (Ariz.) Chapter**.

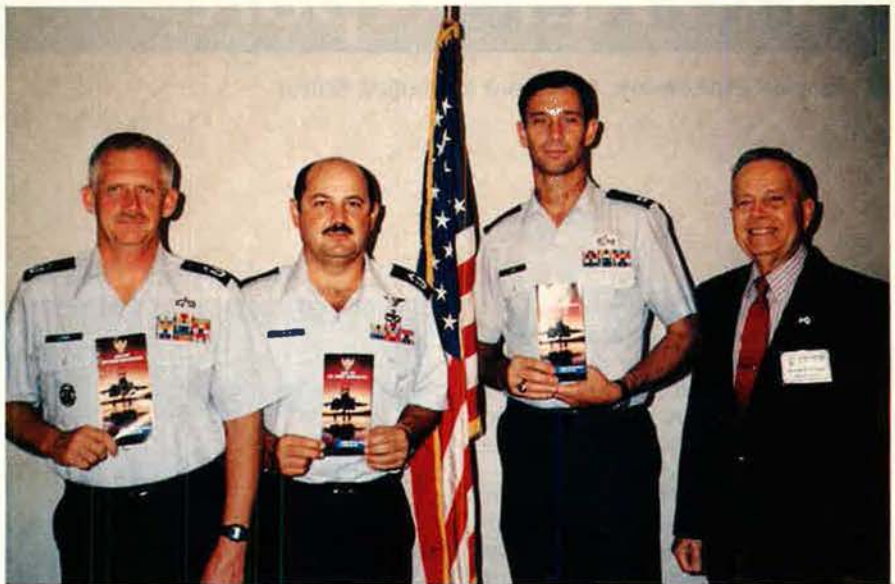
Captain Whitmire was stationed with the 511th Tactical Fighter Squadron at RAF Alconbury, UK, when Desert Storm began and in Saudi Arabia was based at King Fahd Airport in Dhahran. To highlight the tank-killing ability of the A-10, he passed around a 1.5-pound bullet from the Thunderbolt II's 30-mm gun. He also showed the audience maps and a notebook of battle staff directives that included statistics on ammunition expended and photos of Scud missile damage to a runway.

Chapter President Robert W. Hazlett, who flew B-24s in World War II, F-80s in the Korean War, and the "Puff the Magic Dragon" FC-47 gunship in Vietnam, said of Captain Whitmire's speech, "A lot of the things he said, I can relate to very easily"—especially the "Warthog" pilot's description of being shot at.

**Fifty-Three in Florida**

**Central Florida Chapter's** Richard A. Ortega is keeping count.

The chapter sponsors seven AFJROTC units, one AFROTC unit, and nine CAP cadet squadrons. Florida



*Central Florida Chapter's Vice President (Membership) Richard Ortega (far right) boosted chapter membership by signing up (l-r) MSgt. Raymond Luther, SMSgt. Mauricio Forero, and Capt. Kenneth Long, the cadre from a new AFJROTC unit in Altamonte Springs, Fla.*

leads the nation with fifty-three active AFJROTC units, Mr. Ortega said.

August saw the activation of the newest one, the 250-member Lake Brantley High School AFJROTC Detachment in Altamonte Springs, Fla. Chapter President Tommy G. Harrison presented \$700 to Capt. Kenneth Long, SMSgt. Mauricio Forero, and MSgt. Raymond Luther, aerospace instructors who worked on the unit's activation. The donation will equip a color guard and drill team.

Chapter Vice President (Membership) Mr. Ortega also worked in a little recruiting and persuaded the three detachment leaders to join AFA.

**"Fore!" Stars**

A golf tournament at the Colorado State Convention included some high-ranking players.

He didn't note their handicaps, but Larry Fortner, then Colorado State president, reported that: Gen. Joseph W. Ashy, commander in chief of North American Aerospace Defense Command and US Space Command and commander of Air Force Space Command, 14th Air Force Commander Maj. Gen. David L. Vese y from Vandenberg AFB, Calif., and Maj. Gen. John A. Gordon, then operations director at Air Force Space Command, Peterson AFB, Colo., were among those on the fairway in Colorado Springs. Attending the AFSPC commander's conference, they also took time for some of the convention activities, hosted by the **Colorado Springs/Lance Sijan Chapter**.

General Ashy presented Col. Owen E. Jensen, vice commander of 14th Air Force, and Capt. Thomas C. Dunham, from 14th Air Force's 4th Operations Squadron, Falcon AFB, Colo., with the 1995 Operational Excellence Award. **Longs Peak Chapter** received the Chapter of the Year Award, and Chapter President James S. Strickland was named Colorado's AEFer of the Year. In another highlight, former AFA Executive Director Monroe W. Hatch, Jr., received a \$500 AEF Fellowship.

**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. ■

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## Unit Reunions

**Air Weather Ass'n (USAF/USAAF)**, which includes meteorology cadets and instructors assigned to Chanute AFB, Ill., and Keesler AFB, Miss. May 1-5, 1996, in Hampton, Va. **Contact:** Clifford D. Kern, 1879 Cole Rd., Aromas, CA 95004-9617.

**Red River Valley Fighter Pilots Ass'n.** May 8-12, 1996, in Atlanta, Ga. **Contact:** Gordy Tushek, 224 Columns Lane, Peachtree City, GA 30269. Phone: (404) 631-4615.

**4th Ferrying Group Ass'n, Air Transport Command (World War II).** May 16-18, 1996, San Diego, Calif. **Contact:** Raoul Castro, 911 St. Andrews Dr., Upland, CA 91786. Phone: (909) 985-9316. Fax: (909) 988-0271.

**26th Bomb Squadron, 11th Bomb Wing.** April 19-21, 1996, at the Ramada Inn in Altus, Okla. **Contact:** Col. Herbert H. Kamm, USAF (Ret.), P. O. Box 381608, Duncannon, TX 75138. Phone: (214) 296-0407.

Mail 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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#F-11 **Flag Pin.** American and AFA flags, side by side. **\$1.50**

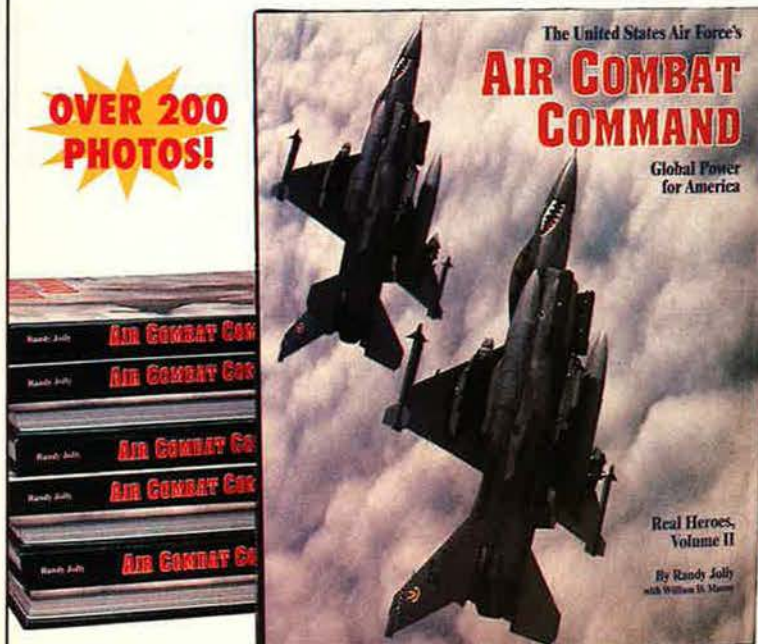
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