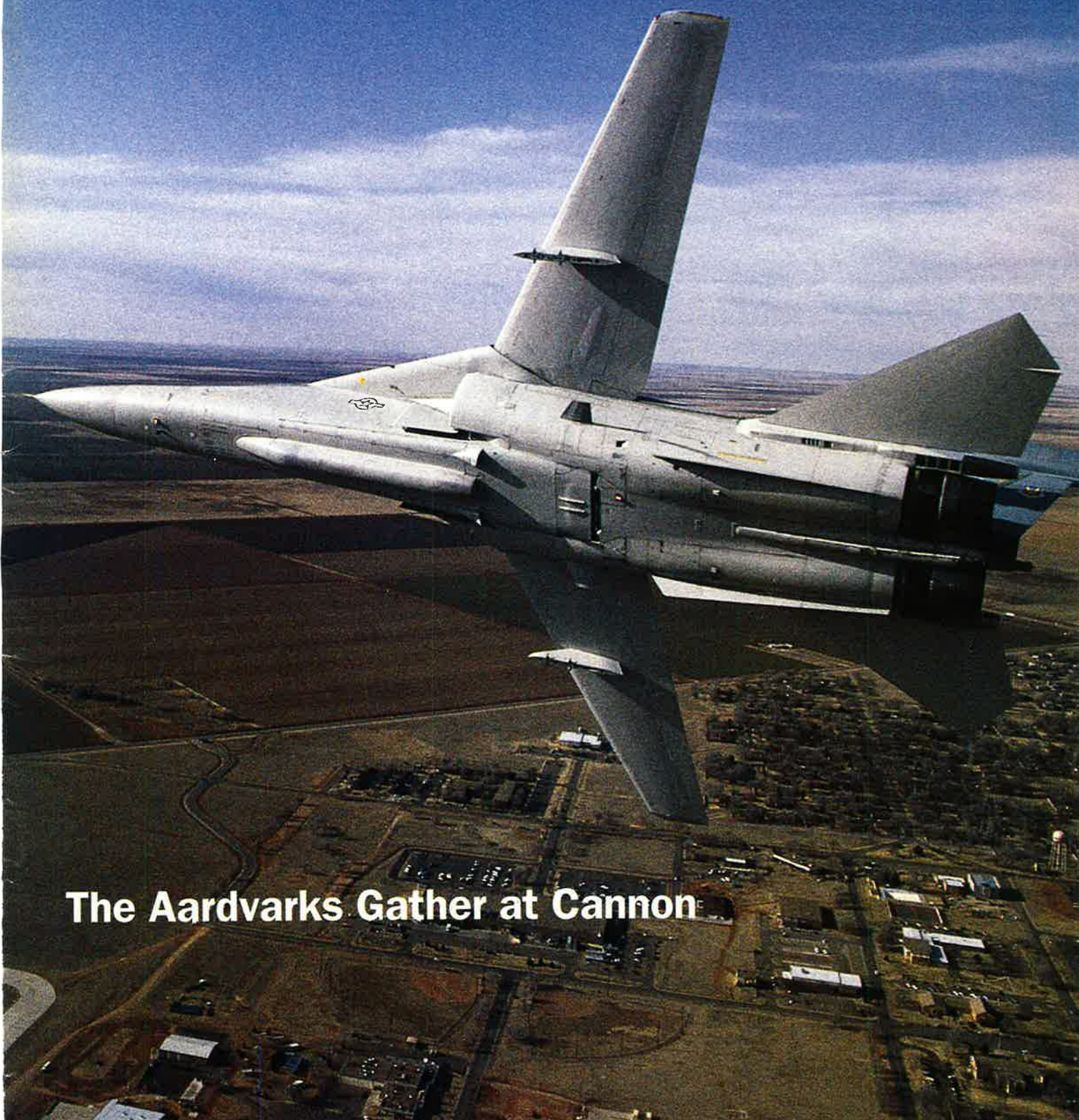


APRIL 1993/\$3

AIR FORCE

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MAGAZINE



The Aardvarks Gather at Cannon



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Editorial

By John T. Correll, Editor in Chief

One Air Force

MARSHAL Ferdinand Foch, who went on to become the supreme allied commander in World War I, declared in 1911 that airplanes "are interesting toys, but of no military value." We remember his words in the 1990s only as a classic mistake in judgment.

A nation's military might today is measured first by its airpower. Ground forces are hugely dependent on airpower. Naval combat forces are defined largely by the airpower they can put over the beach. Airpower is the first capability considered when confronting a crisis, the first thing a commander worries about in the enemy's order of battle.

For all of that, the questions persist. Are air forces a discrete element of military power, comparable to armies and navies, or are they an adjunct to something else? The US Air Force has been a separate service since September 1947. Forty-five years and seven months later, some people continue to grieve about this.

Frank Uhlig of the *Naval War College Review* remarked recently that all the services "need airplanes to help them do their job. One of them calls itself the Air Force. The others all had their names before the Wright brothers did their thing." The point of this little speechlet, we take it, is that airpower—like nylon, aspirin, and corn flakes—is so generic that no service should hold a special trademark on it.

Last July, Sen. Sam Nunn (D-Ga.), chairman of the Senate Armed Services Committee, recalled former Sen. Barry Goldwater's assertion that we have "the only military in the world with four air forces." Presidential candidate Bill Clinton picked up the phrase in his campaign, noting with concern that "We have four separate air forces."

The *New York Times* took the cue and raised the ante in an editorial that asked, "Who needs four Air Forces?" That drew a quick answer from James M. McCoy, president of the Air Force Association, who said that "no one does." We need *one* Air

Force, which is precisely the number of air forces the United States happens to have.

This is not to claim a monopoly on airplanes. As it says in US Air Force basic doctrine, "aerospace power is not the sole domain of the Air Force." The other services have—and should have—aviation capabilities. Typically, they complement the capabilities of the Air Force.

attributable to people who thought of air operations as a primary instrument of power, not as a sideline to something else. Seapower and land power are comparatively mature capabilities. Airpower has room to grow. Who knows what else military forces may eventually prove possible in the open arena of air and space?

At a more workaday level, we need a full-service Air Force with integrated



The other services have aviation arms that support their assigned warfighting roles.

Their primary purpose, though, is to perform roles that are extensions of basic Army, Navy, and Marine Corps functions. Carriers, for example, provide air support for naval campaigns and amphibious operations. In the Navy's new white paper, "From the Sea" the emphasis for carrier-based airpower is on the littorals, along and over the coastlines of the earth.

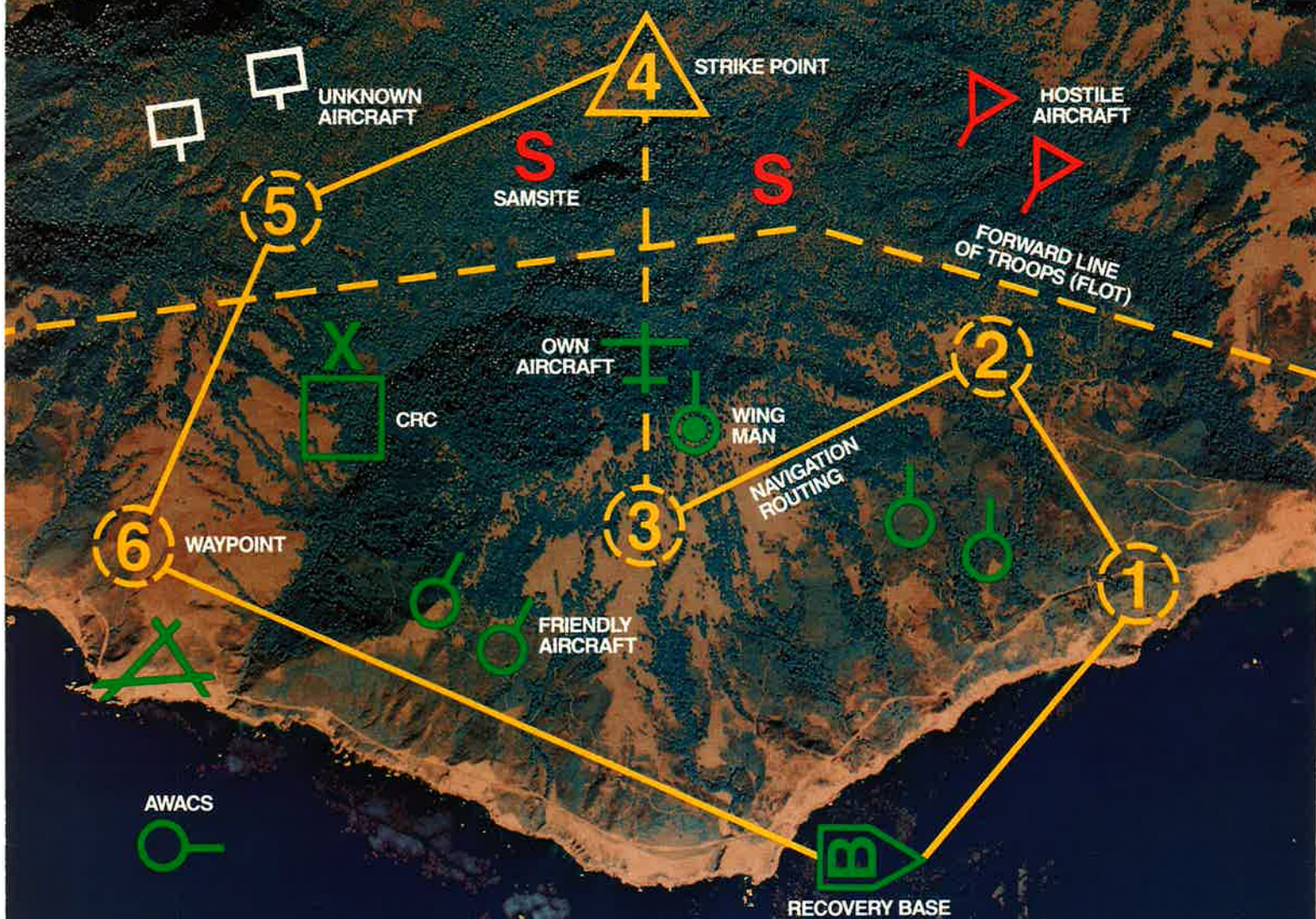
The reason everybody wants airplanes today is that their capabilities have developed in ways that would amaze Marshal Foch as well as the early aviators who pushed the cause before it got popular. The last twenty years alone have brought enormous gains in the ability to strike deep by day or night with surprise, precision, and effect.

These developments are largely

capabilities that include airlift, aerial refueling, long-range bombardment, air superiority, close air support, deep interdiction, air defense, search and rescue, electronic combat, reconnaissance, and airborne command and control. The organization that can do all this doesn't just call itself the Air Force. It is the Air Force.

Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff, got it exactly right in his February 1993 report on roles, missions, and functions of the armed forces. "America has only one air force, the United States Air Force," the report said. "The Army, Navy, and Marine Corps each have aviation arms essential to their assigned warfighting roles. Each air arm provides unique but complementary capabilities. They work jointly to project America's Air Power." ■

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The Optimal Force Mix

As a crew chief on RF-4Cs in the Nevada ANG, I get a firsthand look at Total Force operations and recognize the impact of defense budget reductions on those operations. After reading "Tinkering With Deadly Force" and "The Force Mix Fight Heats Up" [January 1993, p. 67], I believe several points are relevant.

Compare the US military establishment to a small-town fire department. The firehouse employs several full-time fire fighters, enough to handle a kitchen fire or small brush fires. They could be compared to the active-duty military force of the United States. The volunteer fire fighters might be considered the town's "Reserve" and "National Guard." While most of the time these public servants will be training to maintain fire-fighting proficiency and polishing the fire engine, the mayor and town council would not diminish the manpower, in case of a fire. Likewise, the President and Congress should not decimate the armed services to an ineffective level, in case of a military conflict.

I fully support streamlining the bureaucracies of the military and eliminating redundancies among the services. The recent consolidation of Air Force wings and commands has been realistic and, though painful for some, tolerable. Such proposals as Option C by Rep. Les Aspin (now Secretary of Defense) have less merit. The "Alternative III" proposal by the Congressional Budget Office is total insanity.

Alternative III calls for making museum pieces of the aircraft and those who pilot them. The aircraft will become hangar queens, and the pilots will be "armchair aviators," lacking the operational experience to be effective in combat. In the estimated 720 days it would take to retrain these "banked" pilots, seven Desert Storm conflicts could take place. A newly commissioned pilot selectee could complete undergraduate pilot training, be flying in an operational unit, and be ready for deployment in this two-year period. In effect, the US would be starting an Air Force from scratch.

It is essential to make sacrifices and rational financial decisions during times of national economic hardship, but tampering with US warfighting capability is nothing short of playing with fire.

A1C Joshua M. Flatley,
Nevada ANG
Reno, Nev.

Once again hard issues are at hand. It seems that the active-duty Air Force has taken its fair share of hits. Now it's time for the Air National Guard to take its cuts [*"The Force Mix Fight Heats Up"*]. There was a time when ANG officials screamed for front-line equipment so they could fight along with the active-duty units they were supposed to augment in the big war. If the units that they were supposed to join have been eliminated, it does not take a rocket scientist to figure out that the augmentees should go too.

There are currently twelve ANG units pulling alert. For what threat? With regard to those units bordering Canada, whom are we kidding? These are sacred cows of ANG that must go and go soon. They are wasting tax dollars defending the US against a threat that does not exist. If a threat shows its face, put a couple of aircraft carriers along with their long-range F-14/Phoenix missile system out there to do the job. Carriers should and would do the job if called on by DoD. To keep paying for ANG units for coastal and border defense is waste, fraud, and abuse at the highest level.

When it comes to navigators on KC-135 tankers, they too must be

eliminated. The Global Positioning System can do the job far more cheaply than any navigator and much more accurately. The cost in training alone is staggering. The KC-10 does the job fine without navigators. The GPS is jam-proof and readily available. The Air Force did a great job by installing the CFM56 engine on the KC-135, making it lean and efficient. Let's complete the job by installing a low-cost GPS and do away with the 1950s-era navigator. . . .

The bottom line is, if the Air Force can take the cuts, so can the Air National Guard. The taxpayer can no longer afford military pork-barreling. Lean and mean is the way to go.

Maj. Clarence J. Romero, Jr.,
USAF (Ret.)
Gretna, La.

The B-1's Capabilities

With reference to "The Vulnerable Bone" [February 1993 "Letters," p. 8], I contend that the lieutenant who wrote the letter cited a bunch of historical poppycock that has nothing to do with the current capabilities of the B-1 or the future capabilities of the F-22. He wrote that the F-22 will be able to "get" a B-1 because it will have "supercruise speed at altitudes and should be outstanding down low." The author of this letter also made it sound as if AMRAAM were the Holy Grail of all weapons and would be able to shoot down anything, anytime.

I submit that this individual has never flown in a B-1 or the F-22 and has no idea of either aircraft's real capabilities. Current fighters already have excellent low-level performance and AMRAAM. The keys are sustained performance down low and the limitations of radar missiles (even AMRAAM) to find and lock on to a target that is traveling at high speed and low altitude, protected by ground clutter, bad weather, and a trained crew.

Anytime this lieutenant would like to race my B-1 from New York to Los Angeles at 200 feet in the middle of the night with his AMRAAM-equipped F-22, my crew and I will be happy to oblige. He can refuel as often as he wishes and make as many attempts

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



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John T. Correll

Executive Editor
Robert S. Dudney

Senior Editor
James W. Canan

Associate Editors
Tamar A. Mehuron, Frank Oliveri

Contributing Editors
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Advertising

Advertising Director
Patricia Teevan
1501 Lee Highway
Arlington, Va. 22209-1198
Tel: 703/247-5800
Telefax: 703/247-5855

Manager, Industry Relations
Elizabeth B. Smith • 703/247-5800

Sales Manager
By Nicholas • 203/357-7781
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Letters

to "get" us as he likes. While he's supercruising somewhere over Ohio, we'll be riding Space Mountain at Disneyland!

The real issue here is not B-1 vs. F-22. As a bomber crew member, I train to do my job: bombs on target, anywhere, anytime. Perhaps Lieutenant Van Decar should worry a little less about shooting down a B-1 and worry a little more about shooting down a future enemy. We are all on the same team.

Capt. Brian P. Donahoo,
USAF
Grand Forks, N. D.

The B-1's Limitations

I would like to commend Captain Liebman for his spunk and determination in his effort to defend the "Bone" [*"B-1, Second to None," February 1993 "Letters," p. 6*]. However, I think he had better review the facts and figures on both the B-1 and the B-52. If the B-1 is the only weapon system we have that can respond rapidly over intercontinental distances with conventional or nuclear weapons, why were B-52s launched from Barksdale AFB, La., to deliver conventional ALCMs in the opening moments of the Gulf War? I suppose the B-1 could have been sent, if it were capable.

It sounds as though Captain Liebman thinks the B-1 is a lone penetrator. In a conventional theater of action, anything going in to strike a major target will be in a force package to optimize the strengths of each weapon system. Whether the strikers are B-52s, B-1s, or B-2s, the package will be relatively the same because of the value of preserving any long-range heavy bomber.

I congratulate him on his BS in aerospace engineering and more than 1,200 hours in B-52s and B-1s. I have a BS in physics and more than 3,300 hours' total flight time. To one with this experience and knowledge, the idea of B-52 performance being "equivalent" is ridiculous. Granted, the "BUFF" is definitely slower than the "Bone." However, equivalent firepower during a long-term, sustained, heavy attack is something else entirely.

On a strike mission flying 1,000 miles from a forward operating base to the target and back, a B-52 carrying a full load of fifty-one weapons can fly two sorties a day, including turnaround time for fuel and weapons. It takes about twelve hours to load a B-1 with weapons at a forward operating base, which means the airplane is effectively capable of one sortie per day. Assuming the B-1 has

removed the semipermanent fuel tank from its forward weapons bay to bring its weapons load from fifty-six to eighty-four, that would make the per-day total 102 to eighty-four in favor of the B-52. Ten airplanes, two weeks, 14,280 vs. 11,760. With the fuel tank: 14,280 vs. 7,840. You get the point.

Who was "minding the store" while everybody was out of town? If there were even ten B-1s on alert at the time of the Gulf War, I would be surprised. Somewhere around thirty percent of the ninety-five B-52Hs plus the nondeployed B-52Gs works out to about fifty B-52s vs. ten B-1s on alert, "minding the store." This in no way leaves out those manning our ICBM force, who, I'm sure, did not pack their bags, take a vacation, and idly watch the world go by.

Granted, every weapon system has its growing pains. We all need to know more about each other's jobs in the armed services so we can do our own jobs that much better. It is foolish to squabble about the performance and capabilities of our respective weapon systems. Each system has advantages over the others in various respects. This is what allows our commanders to employ us to the maximum benefit to accomplish the objective. Rivalry does have its place, as long as it brings out the best in all of us. . . .

Capt. Brian C. Fenelon,
USAF
Castle AFB, Calif.

Tradition for All

Fantastic article on unit heraldry in "Squadrons" [*December 1992, p. 48*]. Unit history and tradition are emotional and important parts of our military organizations. There are sad and even bitter feelings on the part of those who have had their units deactivated. I empathize with them. I, too, love unit tradition, and I'm glad to see the Air Force take a concerned attitude toward it, all the way up to Air Force Chief of Staff Gen. Merrill A. McPeak. However, the Air Force leadership needs to apply its standards across the board. Here's an example of how it was applied to our unit, the 95th Reconnaissance Squadron "Kick-in' Asses" (not "Mules" as you printed on p. 50).

Whoever designed the 95th's emblem years ago was no artist. It is ugly, and nobody in the 95th seems to care for it. People called it "the constipated donkey" and "donkey at the proctologist's" due to its design. About two years ago, a few people got together and created a new emblem that maintained the donkey tradition

in a better style and in accordance with all Air Force regulations. It was disapproved by General McPeak's staff because they wanted to retain the original design for tradition. No problem; we understood and respected the decision. Tradition is important.

The rule of tradition seemed to change just recently. The 95th RS flies the U-2. The U-2 program has always been tiny but has a colorful thirty-eight-year history. Two emblems emerged after the U-2's first flight in 1955. The "Dragon Lady" patch (seen on p. 48 of "Squadrons") is only given to pilots who have soloed in the U-2, who numbered less than 350 in 1989. The other was the "Toward the Unknown" patch.

When we were a SAC squadron, SAC allowed us to wear the patches because of their unique background. They are an immense source of pride, even to U-2 team members who don't fly.

When SAC deactivated, we became an ACC squadron. Shortly thereafter, Hq. ACC sent down a message that, after it reviewed special unit patches, only the Fighter Weapons School patch was authorized. Why? Our two U-2 emblems were nearly twenty years old when the FWS was founded. The FWS patch is worthy of such an honor, but it isn't the only one.

If ACC is serious about getting rid of the image that "if you're not a fighter pilot in ACC, you're nothing," they goofed on this one. It seems that heraldry and tradition were not considered when this decision was rendered.

I'm sure we're not the only folks with a gripe about losing special emblems for the sake of standardization, and, like true professionals, we'll play by the rules. Standardization is important, but let's keep a little of the flavor and unit personality that makes USAF unique and fun. I'll bet the guys at Kelly Field, Tex., eighty years ago would have.

Capt. Jon Huggins,
USAF
RAF Alconbury, UK

Willing to Trade

"Shooting With Style at William Tell" [February 1993, p. 32] provided first-hand insight into this intense weapons competition. The 102d Fighter Wing was proud to represent Cape Cod, Mass., and the Air National Guard F-15 force at the competition.

It should be noted, however, that the 102d flies F-15As in our mission of air defense. The article noted on several occasions that F-15Cs were flown by the 102d. While we are certainly willing to trade our A models for C models with any willing unit, we are

happy to have our A models and are proud of the admirable performance of our pilots, weapons, and maintenance crews at William Tell.

Troy B. G. Clarkson
Otis ANGB, Mass.

January Issue Questions

After reading that Cessna, Williams, and FlightSafety International are teaming up to become the seventh entry in the JPATS competition [*"Aerospace World," January 1993, p. 17*], I had to wonder: Why don't we just build the F-20 Tigershark—with two seats, of course—and be done with it? It's exactly what we need.

Second, the September GAO report on F/A-18 software problems [*"Aerospace World," January 1993, p. 20*] coupled with other well known F/A-18 deficiencies [*"The Tomcat's Merits," January 1993 "Letters," p. 4*] makes me wonder if anyone really believes the F/A-18 can fill the shoes of the A-10 "Warhog" as an effective tank-killer. An avionics upgrade for the A-10 would be far more cost-effective. If the airframes are at the end of their service life, entirely new A-10s with upgraded avionics would still be less expensive while providing superior performance in their particular role.

Third, I note that RFP development is commencing on "modern, long-range, high-volume" replacements for the VC-137 aircraft used to ferry the Vice President and others around [*"A Checklist of Major Aeronautical Systems," January 1993, p. 56*]. The existing aircraft are essentially Boeing 707s and have served the needs of government well for many years. I wonder if our new Administration will show some cost-cutting leadership by making sure that these "high-volume" replacements are no larger than a 737. Certainly, nothing larger than a 737 should be tolerated. If necessary, the news media can buy their own plane tickets. My copy of the Constitution doesn't say that taxpayers are responsible for the cost of transporting the press.

V. Roy Page
Brookshire, Tex.

Restore Hope Omissions

The 916th Air Refueling Group was omitted from the "Forces of Restore Hope" list published in *"Aerospace World"* [February 1993, p. 18]. The members of the 916th ARG (77th ARS), flying the KC-10 Extender, are proud of our participation in every national contingency operation since the inception of the unit. Because of that extensive involvement, the 916th ARG was named the 1992 winner of



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Letters

the Ellis Trophy and the recipient of the 1992 Grover Loening Award and the Air Force Outstanding Unit Award for exceptionally meritorious service from August 1, 1990, to July 31, 1992.

Our host, the 4th Wing (911th ARS and 344th ARS), was also omitted from the list, yet together we provided a major portion of the KC-10 airlift for Restore Hope, with six to eight aircraft continuously in the flow between Seymour Johnson AFB, N. C., and Mogadishu, Somalia.

Crews from the 916th were involved from day one, airlifting more than 475 tons of cargo. You can be sure we will be heavily involved when the return airlift starts. We are part of the Total Force and proud to be a part of what the Reserve is all about—serving our country whenever and wherever the need arises.

Col. John O. Miller,
AFRES

Seymour Johnson AFB, N. C.

The list of Restore Hope units inadvertently neglected to mention the 380th Air Refueling Wing, Plattsburgh AFB, N. Y.

Since December 8, 1992, the men

and women of the 380th ARW have provided the crucial first air refueling link in the 10,000-mile air bridge to Somalia. The wing, which consists of the 310th and 380th Air Refueling Squadrons at Plattsburgh AFB, the 509th ARS at Griffiss AFB, N. Y., and the 42d ARS at Loring AFB, Me., has flown 345 refueling missions over the Atlantic Ocean in support of this operation, offloading 20,078,100 pounds of fuel.

Harsh winter weather, long hours, and fluid tasking schedules challenged our aircrews and maintainers, who achieved a 100 percent mission effectiveness rate to date—never missing a Restore Hope sortie.

Col. James E. Andrews, USAF
380th Air Refueling Wing
Plattsburgh AFB, N. Y.

■ *The list was compiled using documents released by the Air Force News Agency on December 7, 1992. Any omissions were unintentional.*—THE EDITORS

When describing the Operation Restore Hope airflow in "Operational Realities" [*Washington Watch*, February 1993, p. 13], Mr. Dudney left out

the initial launching base of McGuire AFB, N. J. McGuire's maintenance prepared the aircraft, and its stage management controlled the aircrews and airflow departing McGuire for various North American locations, not just March AFB, Calif.

Mr. Dudney also incorrectly stated that the return flights from the "primary staging base" went nonstop to March AFB. With few exceptions, the mighty StarLifters, after an aerial refueling or two, returned to McGuire once again to receive maintenance, enter crew rest, and get follow-on taskings from the "Stateside stage."

Lt. Col. F. J. Driver,
USAF
McGuire AFB, N. J.

RIFs for the Navigators

I was extremely surprised to learn that the Air Force has been able to avoid a RIF of rated officers [*Career Paths in the New Air Force*, February 1993, p. 54]. Navigators as well as pilots are rated, although seldom as well, and bore a large brunt of the FY 1992 RIF.

Lt. Col. Ronny C. Smith,
USAF
Abilene, Tex.

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By Brian Green, Congressional Editor

Down Another \$126.9 Billion

The CBO proposals show how devastating such a cut would be.

As it has done for several years, the Congressional Budget Office prepared a menu of federal program cuts that, if enacted, could reduce the deficit. CBO's new list of potential cuts and cancellations touches every critical Air Force strength—from air-superiority fighters to long-range airlifters, from strategic missiles to space surveillance satellites.

These proposals might be taken seriously this year, given President Clinton's intention to cut defense expenditures. In the first month of his administration, the President outlined a plan to make a five-year cut in budget authority of \$126.9 billion. The reductions would be applied to budgets that President Bush and Congress scoped out in 1990 for Fiscal Years 1994–97. Later, President Bush agreed to reduce these budgets by \$113.5 billion. President Clinton's cuts come on top of this.

The need to realize the old Bush cuts as well as to impose the additional Clinton cuts will force a hard look at every program. The study examined a wide range of options and invited lawmakers to choose among them until they reached a desired level of savings. Devastating consequences could result from the budget cuts required to realize even modest savings.

For example, in its list of candidate cuts, CBO offered virtually all fighter modernization programs. Targets included the Air Force's top-priority F-22 Advanced Tactical Fighter, the Navy-USAF A/F-X stealthy strike fighter, and the Navy's F/A-18E/F strike fighter. These proposed cuts follow last year's efforts to restructure tactical aviation programs.

Elsewhere, CBO analysts raised the prospect of again chopping USAF force structure. They proposed reducing the number of fighter wings from twenty-six (the number in the Bush Base Force) to eighteen. The latter number is consistent with "Op-

tion C," a force plan proposed by Defense Secretary Les Aspin in 1992 when he chaired the House Armed Services Committee.

Projected five-year savings from these four draconian steps: only \$24 billion—less than one-third of the latest cut the White House seeks from defense.

Other possible measures examined by CBO: canceling the C-17 airlifter, retiring "excess" KC-135 tankers, canceling the kinetic energy antisatellite weapon, canceling the National Aerospace Plane, reducing military space activities, cutting the number of carrier battle groups from twelve to ten, and eliminating four Army light divisions.

Because of the evaporation of the Soviet threat, the CBO scrutinized strategic force programs. Its list of force options included the following:

- Retire all of the Air Force's Minuteman ICBM fleet (at present, the Pentagon plans to keep 500 operational) and thus, in effect, eliminate the ICBM leg of the strategic triad.

- Refocus Strategic Defense Initiative work to emphasize theater defenses or defense within ABM treaty limits.

- Retire all but a few B-52 bombers.
- Scale back Energy Department "production and maintenance" activities to support 4,000 nuclear warheads.

- Cancel the Follow-On Early Warning System satellite.

The projected savings of all of these measures add to some \$37 billion from Fiscal 1994 through 1998.

CBO analysts speculated that the nation may no longer need to maintain a strategic triad of missiles, bombers, and submarines, in light of "the fundamental change in the basic political relationship between the nuclear superpowers."

The study said that submarine-based strategic missiles have become more accurate and that submarines at sea are virtually invulnerable to preemptive attack. In another assertion that remains open to challenge, the study claimed that SSBN crews can communicate effectively with na-

tional command authorities in the US. CBO analysts found no reason to doubt that "bombers based in the interior of the United States remain capable of escaping a surprise attack when on runway alert."

This analysis seems consistent with the thinking of the new Defense Secretary. At his confirmation hearings, Mr. Aspin said he would keep an open mind about the need for a triad of forces. "You don't need a triad against a country that doesn't threaten you," he said, "and I think we'll just have to wait to see how that relationship [between the US and pieces of the old USSR] develops" before deciding whether or not to dismantle the traditional strategic nuclear force.

CBO also claimed that large savings—\$22 billion over five years—might be achieved by cutting intelligence activities without seriously affecting the nation's ability to collect critical information. The study suggested that the cuts could be achieved by reorganizing and drastically reducing the services' intelligence agencies, reducing systems that focus heavily on the Soviet threat, and cutting personnel.

As for the military personnel account, CBO's report offered the option of limiting military pay raises, a move that could save \$3.5 billion over five years. This was consistent with President Clinton's proposal to freeze federal pay, including military pay, and limiting future cost-of-living raises to less than the amount of inflation.

Other possible personnel actions, in CBO's view, include making use of the fifteen-year retirement option authorized by Congress last year, making deeper cuts in the reserve components of the armed forces, restructuring reserve compensation, making new cuts in the officer corps, and applying a higher charge for military health-care services to non-active-duty users.

CBO argued that "all of the [January 1992 Bush Administration procurement] cutbacks and more might be needed if Congress decides to control or even reduce the federal deficit through cuts in defense spending." ■

The Chart Page

By Tamar A. Mehuron, Associate Editor

Starting Points for the New Defense Budget

In January, outgoing Secretary of Defense Dick Cheney approved this proposed budget for Fiscal Years 1994 through 1999. Based on overall budget levels set by President Bush, it was consistent with previous budget agreements. It served as the baseline for the Clinton Administration's defense budget decisions. Deeper cuts are expected to emerge in the congressional budget process. The **direct program** (DoD activities only) for FY 1994 called for \$266.0 billion in budget authority and \$267.9 billion in outlays.

Funding levels can be expressed in several ways. Totals are most frequently stated as **budget authority** (the value of new obligations, including some to be met in later years, which the government is authorized to incur) or **outlays** (actual expenditures, some of which are funded by budget authority from previous years).

Another difference concerns the value of money. When funding is in **constant dollars** or **real dollars**, the effect of inflation has been factored out to make direct comparisons be-

tween budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars. When funding is in **current dollars** or **then-year dollars**, no adjustment for inflation has taken place. This is the actual amount of dollars that has been or is to be spent, budgeted, or forecast.

The charts below address only the direct program, which does not include some Energy Department programs. Numbers may not sum to totals shown because of rounding.

Budget Topline

	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
Budget authority (current \$ billions)	281.5	259.1	266.0	269.9	270.4	274.6
Budget authority (constant FY 1993 \$ billions)	292.4	259.1	256.2	250.4	241.8	237.5
Outlays (current \$ billions)	286.6	275.5	267.9	269.9	271.4	273.7
Outlays (constant \$ billions)	297.2	275.5	258.0	250.3	242.5	236.6

Cutting the Pie

(Budget authority in constant FY 1993 \$ billions)

	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
Military personnel	84.8	76.4	69.7	66.6	63.9	63.2
Operations and maintenance	97.1	85.8	87.9	84.9	82.5	80.0
Procurement	65.1	53.8	49.7	52.9	54.1	52.8
Research, development, test, and evaluation	37.8	38.6	41.6	40.9	37.9	35.9
Military construction	5.5	4.5	6.0	4.6	3.4	3.3
Family housing	3.8	3.9	3.9	3.8	3.6	3.5
All other (includes revolving funds)	-1.6	-3.7	-2.5	-3.3	-3.7	-1.3
Total	292.4	259.1	256.2	250.4	241.8	237.5

Force Structure Changes

	FY 1990	FY 1995
Army divisions	28 (18 active)	18 (12 active)
Aircraft carriers	15	12
Carrier air wings	15 (13 active)	13 (11 active)
Battle force ships	546	429
Air Force tactical fighter wings	36 (24 active)	26 (15 active)
Strategic bombers	268	176

Service Shares

(Budget authority in constant FY 1993 \$ billions)

	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
Amount						
Air Force	85.4	78.7	78.4	76.3	74.8	73.6
Army	76.3	63.6	61.7	60.3	57.5	54.7
Navy	93.7	82.6	78.9	80.8	78.1	75.4
Defense agencies	36.9	34.2	37.1	33.1	31.4	33.8
Total	292.4	259.1	256.2	250.4	241.8	237.5
Percentages						
Air Force	29.2	30.4	30.6	30.5	30.9	30.9
Army	26.1	24.5	24.1	24.1	23.8	23.0
Navy	32.0	31.9	30.8	32.3	32.3	31.8
Defense agencies	12.6	13.2	14.5	13.2	12.9	14.2

Manpower Losses

(End strength in thousands)

	FY 1987	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
Air Force	607	470	450	427	409	408	400	406	400
Army	781	610	588	558	538	521	522	522	522
Marine Corps	199	185	182	176	170	165	159	159	159
Navy	587	542	526	502	490	489	489	488	487
Total active-duty	2,174	1,807	1,746	1,663	1,607	1,583	1,570	1,575	1,568
Selected reserves	1,151	1,114	1,080	930	911	908	907	907	907
Civilians	1,133	1,006	964	931	904	886	884	877	876

Under the Bush plan, total active-duty military personnel in FY 1999 would have numbered 1,568,000, down 606,000 from the FY 1987 post-Vietnam peak. By FY 1999, the 876,000 civilian work force would have reflected a twenty-three percent reduction from its 1987 high of 1,133,000.

Funding for Major Air Force Systems

(Current \$ millions)

	FY 1994	FY 1995	FY 1996
Aircraft Procurement			
B-2A	939	697	609
C-130H	318	328	346
C-17	3,011	4,025	4,041
F-16	832	822	886
F-22	—	—	88
T-1A trainer	166	189	58
JPATS	44	164	231
E-8 Joint STARS	447	655	768
Missile Procurement			
AGM-130	78	83	149
AMRAAM	592	523	544
Targets	33	35	46
Missile modifications	126	145	290
Other Procurement			
Sensor-fuzed weapons	99	108	153
Space boosters (Titan, Delta, & Atlas rockets)	675	473	738
Global Positioning System	240	203	140
Defense Meteorological Satellite	31	31	32
Defense Satellite Communications System	34	32	28
Major R&D Programs			
F-22	2,347	2,504	1,931
Milstar satellites	1,171	973	975
DoD Joint Program R&D			
Strategic Defense Initiative	3,884	4,528	4,570
Theater Missile Defense Initiative	2,257	2,512	2,518

Research and Development and Procurement, Other Services

(Current \$ millions)

	FY 1994
Army	
UH-60 helicopter	457
RAH-66 helicopter	445
Navy/Marine Corps	
DDG-51 destroyer	2,783
F/A-18 (E/F)	1,488
A/F-X	872
Strategic Defense Initiative Organization	4,068

Washington Watch

By James W. Canan, Senior Editor

The Instrument of Airpower

The Air Force held its own, and then some, in General Powell's roles and missions report. The debate, however, is far from over.



All things considered, the Air Force more than held its own in the latest round of the running battle over military roles and missions. USAF came away with its special nature and leading role in the application US airpower stoutly reaffirmed.

The vehicle for this was the report "Roles, Missions, and Functions of the Armed Forces," issued in mid-February by Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff. It is not the last word on roles and missions issues, which will almost certainly wax hotter at the Pentagon and on Capitol Hill as military budgets, forces, and options continue to shrink. Even so, the Powell report makes a case for Air Force airpower that looks built to last.

The report was prepared by the Joint Staff in consultation with Pentagon staffs of the uniformed services through many months of analysis, dialogue, and fine-tuning. Issued under General Powell's signature, it reflects the thoughts and thrusts of all the service chiefs. In it, they join forces against critics who question why each of the four military services should be allowed to continue to own and operate aircraft in hard times and absent the Soviet threat.

"The claim that America has four air forces, implying that it has three more than it needs, makes a wonderful sound bite but distorts the facts," the report declared. "In fact, America has only one air force, the United States Air Force, whose role is prompt and sustained offensive and defensive air operations. The other services have aviation arms essential to their specific roles and missions but which also work jointly to project America's airpower."

General Powell elaborated on that point at a press conference. He described USAF as the "first and foremost" instrument of US airpower and called it "the best in the world. It dominates the skies and space over any battlefield that American troops may have to set foot on."

The Nation Is "Well Served"

The JCS Chairman did not slight the other services by comparison. "The nation is well served by each one of our services' having an air component," he declared. "The real issue is not whether to get rid of one or more of those components" but to "make sure that we have not overinvested in any."

The four-air-forces issue has been around awhile. Sen. Sam Nunn (D-Ga.) raised it again and with gusto last year in a landmark Senate speech. The influential chairman of the Senate Armed Services Committee called attention to a number of alleged redundancies and overlaps of missions, weapons, and forces. He said the nation can no longer afford them, and he exhorted General Powell to conduct a "no-holds-barred" roles and missions review to identify and eliminate them.

At the time, the Joint Staff's roles and missions review that would culminate in the Powell report was already well under way, mandated by the Goldwater-Nichols Department of Defense Reorganization Act of 1986. That law requires each JCS Chairman to reevaluate military roles and missions and issue a report once every three years. Senator Nunn's purpose was to light a fire under the review. Its results left him cold. He faults the Powell report for not coming to grips with major issues and says he will raise them again as part of his committee's hearings on the defense budget.

Near the end of last year, in its Fiscal 1993 defense authorization bill, Congress directed the Pentagon's roles and missions reviewers to take a hard look at possible tradeoffs among different types of long-range landbased and seabased aircraft and among the

missions they perform or are destined to perform. This directive addressed the central question in the roles and missions arena insofar as the Air Force and the Navy are concerned. As Senator Nunn framed it: "What is the best and most effective way to provide air interdiction in the future—with long-range bombers from the United States or with large numbers of aircraft carriers with medium-range bombers on their decks?"

At stake in that question are the fates, in terms of numbers and missions, of all major Air Force and Navy aircraft now being planned, developed, produced, or modified. They include the Air Force's B-1 bomber, B-2 bomber, F-22 fighter, and possible multirole fighter, as well as the Navy's proposed carrier-based F-18E/F strike fighter, upgraded F-14 strike plane, and A/F-X multirole fighter, a plane originally seen solely as a deep-attack plane to succeed the A-6.

It seems ever less likely that both services will be able to afford all such aircraft, which is why Congress pushed them to reexamine air roles and missions with an eye to reducing the types and numbers of planes. The Powell report left the issue up in the air, but General Powell said at his press conference that it remains under study and that it must be resolved.

"Obviously, we're going to have fewer airplanes, a lot fewer, and . . . we have to be sensitive to the mix of airplanes," he said. As forces are cut, the number of "aircraft will be cut, other things will be cut. . . . We want to make sure we take down the right mix of capability."

Not Enough Dollars

Moves to cut "specific numbers of wings" and to do other things in the name of efficiency and economy would show up in the Defense Department's Fiscal 1994 budget, General Powell said. "The kinds of dollars that we have to generate to make our contribution to the President's program and the President's emphasis on the economy and the budget can't be dealt with just by roles and missions changes," he asserted.

The JCS Chairman indicated that naval air roles are being reassessed more rigorously than are those of the Air Force. "We have to take a hard look at the investment mix with regard to deep-strike aircraft coming off carriers, as opposed to what the Air Force can do."

"I think the Navy does have a role to play in deep strike," General Powell said. The major questions, he said, are "how much investment should be put in that role and what the proper mix of aircraft should be." The Navy would respond to them in its Fiscal 1994 budget, he said, "and I would not . . . wish to prejudge what the Navy might want to do."

The report discussed the long-range airpower issue under the heading "theater air interdiction," or TAI. Its summary: "Sufficient numbers of land- and seabased bombers and attack aircraft need to be forward deployed or rapidly deployable to provide quick response to short-notice crises. Strategic bombers, previously dedicated to cold war nuclear missions, are now available to support TAI. Therefore, in the determination of total aircraft required for TAI, it is necessary to consider the contributions of both bombers and attack aircraft."

Close air support (CAS) of ground troops has long been regarded as a classic air-role issue. Should the Air Force, with its fixed-wing aircraft, or the Army, with its attack helicopters, be assigned all, or top, command responsibility for CAS? The Powell report acknowledged that "perhaps no aspect of roles and missions has spawned more debate . . . than the question of close air support."

So saying, it proceeded to court even more controversy by parceling out CAS among the services, officially acknowledging, for the first time ever, a CAS role for Army and Marine Corps helicopters. The JCS recommendation: "Include attack helicopters as CAS assets and realign and clarify functions and doctrine to include CAS as a primary mission area for all services." As its primary and collateral CAS missions, the Air Force would continue to "provide fixed-wing CAS to the Army and other forces as directed" and "provide fixed-wing CAS to amphibious operations," respectively.

In the apparent absence of an inter-continental bomber threat, the Powell report recommends "eliminating or drastically reducing" the numbers of Air National Guard squadrons long responsible for continental air defense. There are twelve such squadrons with about 180 fighter aircraft. Their mission could be carried out by CONUS active-duty squadrons primarily con-

cerned with other matters, said the Powell report.

Among other things, the report recommends combining Air Force and Navy primary fixed-wing flight training and requiring both services to use the same primary trainer. It proposes to retire Air Force EC-135 nuclear-war command-and-control aircraft and to shift their mission to Navy E-6A Take Charge and Move Out planes with common purpose.

Senator Nunn had raised the possibility of dispensing with USAF's forty or so EF-111 area-jamming planes and having the Navy's 133 EA-6Bs perform that mission for both services. The Powell report rejected the suggestion, noting that the Air Force and Navy planes have "similar but specialized capabilities" that "give military commanders a range of options in combat, complicate any enemy's air defense, and reduce aircraft attrition."

"If, for example, only EA-6Bs were in the inventory, Air Force bombers would be restricted in the way they could be employed to attack enemy targets as part of a 'strike package,'" the report declared.

In a broader vein, the JCS moved to give the Air Force something it has long coveted: greater control over all US military space operations. Subject to further study, the JCS proposes to eliminate the unified US Space Command created in 1987 and reassign its military space mission to the unified US Strategic Command that came into being last June 1.

This would strengthen USAF's hold over military space programs. Although it would do away with a unified command that has been—but need not have been—commanded by an Air Force four-star, it would keep in business two companion commands that the Air Force has had under its wing—North American Aerospace Defense Command and Air Force Space Command.

Since 1992, NORAD, USSPACECOM, and its component AFSPACECOM have been commanded by the same Air Force general. As proposed by the Powell report, this arrangement would remain in effect minus USSPACECOM. The AFSPACECOM commander would be responsible for the operations of all US space systems and intercontinental ballistic missiles. His boss would be the commander in chief of USSTRATCOM, also an Air Force four-star.

Multiple Organizations

Separate space commands now run by the Army and the Navy may well disappear. "Even with the cold war

over," says the Powell report, "our national security depends on a robust space capability. But we can no longer afford to allow multiple organizations to be involved in similar, independent space roles and functions."

The Army and Navy would retain space components but at diminished levels. The Powell report proposes to assign "small Army and Navy components . . . to CINCSTRAT" and to space program and planning offices "to ensure that space systems [are] developed to support all services' needs." The Air Force, though, would be responsible for the development of all future military space systems.

The Air Force would also be designated the lead service to coordinate with NASA in operating and utilizing Landsat remote earth-sensing satellites. AFSPACECOM would take charge of all Defense Department functions at NASA.

There is more for the Air Force. Says the report, "To streamline military satellite communications operations, all operational responsibilities for the Defense Satellite Communications System (DSCS) will transfer from the Defense Information Systems Agency to the Air Force. Responsibilities for the Navy's Fleet Satellite communications (FLTSATCOM) system will also transfer to the Air Force. Both DSCS and FLTSATCOM will remain under the combatant command of CINCSTRAT."

The Air Force set the stage earlier for combining space and strategic operations under USSTRATCOM. It said it will transfer 20th Air Force, which was created in 1992 to own and operate landbased ICBMs, from Air Combat Command to Air Force Space Command.

ICBMs once belonged to, and were synonymous with, Strategic Air Command. When SAC went out of existence last year, the strategic nuclear missiles were moved to Air Combat Command, successor to both SAC and Tactical Air Command, but they have seemed out of place in the ACC world of warplanes. The ICBMs would seem more at home in AFSPACECOM, where launching payloads on big boosters, some derived from ICBMs, comes naturally.

Regardless of which command maintains ICBMs, STRATCOM has final call on them. Established at SAC's former Offutt AFB, Neb., headquarters last year as a unified strategic combatant command, STRATCOM would control and operate all Air Force and Navy strategic nuclear weapons in crisis or in war. Under the previous arrangement, it would have been necessary to chop ICBMs from ACC to

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the unified Strategic Command. Under the proposed arrangement, they would stay put in AFSPACECOM, a STRATCOM component command.

Similar Jobs

AFSPACECOM will take from ACC six ICBM wings with roughly 1,000 missiles in silos at six operational sites west of the Mississippi River, plus an ICBM training and testing center at Vandenberg AFB, Calif., headquarters of 20th Air Force. Gen. Charles A. Horner, boss of US military space operations, sees the move as "fitting," because "launching satellites and ICBMs is basically the same job" and there are common grounds for training, equipping, and organizing crews for each job.

Air Combat Command is involved in a key recommendation of the Powell report: to combine in a single unified command the CONUS-based combatant forces of all four services—those in ACC, the Army's Forces Command (FORSCOM), the Navy's Atlantic Fleet (LANTFLT), and the Marine Corps' Marine Forces Atlantic (MARFORLANT).

Asserts the Powell report, "The time has come to merge these forces under a single CINC whose principal purpose will be to ensure their joint training and joint readiness. Units already accustomed to operating jointly will be easier to deploy. Overseas CINCs will be able to focus more on in-theater operations and less on deployment and readiness concerns."

The report called USLANTCOM at Norfolk, Va., "particularly well-suited to assume this new mission" because it already embodies LANTFLT and MARFORLANT and works closely with ACC and FORSCOM. The command would "shift from a predominantly maritime orientation to a more balanced combatant command headquarters." Its four-star CINC could be drawn from any of the services, not just from the Navy as is now the case, and "we would probably rename" it to reflect its different focus and makeup.

LANTCOM's "cold war mission, to defend the Atlantic sea-lanes and undertake offensive operations against the Soviet Union, has fundamentally changed," says the Powell report. "While continuing to perform a vital NATO mission, it has the capacity to undertake . . . additional responsibility in keeping with the revised military strategy." The proposed unified command "would facilitate the training, preparation, and rapid response of CONUS-based forces," would support and train forces for United Na-

tions peacekeeping operations, and would stand ready to respond to natural disasters.

ACC would gain warfighting status as the air component of the proposed unified combatant command, just as Pacific Air Forces (PACAF) and US Air Forces in Europe (USAFE) are air components of US Pacific Command and US European Command. At present, ACC has no theater combatant status or responsibilities. It now exists, as did Tactical Air Command, only to train, equip, and provide forces for theater CINCs.

General Powell was asked whether the Navy is unhappy about losing its longtime dominion over the Atlantic theater and being forced to share its CINCLANT four-star billet with the other services. "The Navy is on board the [new] CINCLANT concept," he replied. "They see merit in it. It's an exciting idea."

It clearly did not come easy. The JCS Chairman described the proposal for the new unified command as "one of the most controversial of all the issues" in the roles and missions review. He said it had been under study "for two and a half years, and we finally reached the point of maturity where we think we can go forward with it."

General Powell emphasized that the services kept joint operations uppermost in mind throughout the review. "We've brought a new sense of jointness to the armed forces," he declared. "We emphasize that we're now fighting as a team."

Adaptive Joint Packages

From this approach came a recommendation for "adaptive joint force packages"—flexible, quick-response, combined-arms forces for which Air Combat Command, with its fighters, bombers, and combat support aircraft, and Air Mobility Command, with its tankers and transports, seem tailor-made [see "The Air Force Sharpens Its Aim," p. 24].

Such force packages would contain "a mix of air, land, special operations, space, and maritime forces tailored to meet the supported CINC's requirements, potentially at lower cost than today's [overseas] deployments," the Powell report declared. They would help the US to maintain potent a "forward presence" around the world even as forward-stationed forces are sharply cut back.

The success of those forces deploying abroad could very well depend on the effectiveness of theater air defense (TAD), a mission now

shared by the Air Force and the Army, both of which want it all. The Powell report finessed this issue, recommending further review of TAD "requirements, capabilities, and deficiencies" to come up with "the appropriate mix and quantities of air and missile defense systems."

There is a school of thought at the Pentagon and on Capitol Hill that the Powell report went as far as it could reasonably have been expected to go in shaking up the *status quo*, given its unfortunate timing. The White House and the Pentagon changed hands just as the JCS finished working on the report. General Powell made the point that he ordered up the roles and missions review under one set of civilian leaders and delivered the report to another. He claimed that politics had nothing to do with the report, made no apologies for it, and noted that roles and missions remain under review as "an ongoing process," with more recommendations to come.

They had better come fast. Those who are satisfied with, or tolerant of, the Powell report seem solidly outnumbered by its critics. The Pentagon is under increasing outside pressure to come up with dramatic and far-reaching changes. President Clinton, intent on his domestic agenda and looking for every dollar he can reasonably cut from defense, has made it clear that he stands with Senator Nunn and like-minded lawmakers intent on roles and missions reforms.

Rep. Ronald Dellums (D-Calif.), new chairman of the House Armed Services Committee, is notable among them. He leaves no doubt that he will focus on roles and missions issues much more sharply than did his predecessor, Les Aspin, who left the committee chairmanship in January to become Secretary of Defense. Mr. Dellums says he had "hoped that the Powell report would present a more in-depth review and would recommend more substantial changes than it does." He joins Senator Nunn in calling for a "bottom-up review" aimed at restructuring the armed forces.

This may be the year in which roles and missions issues and budgetary issues finally converge and become indistinguishable from one another on Capitol Hill. Congress is poised to exert indirect but lasting influence on roles and missions by virtue of decisions on weapon systems and force structures. Such king-size questions as the mix of combat aircraft among and within the services—the four-air-forces issue—could be ripe for resolution at the wrong hands. ■

Aerospace World

By Frank Oliveri, Associate Editor

Defense Budget Heads South

With his first statement on military budgeting, President Clinton erased any doubts that he would slash national defense funds far below what would have been the case in a second Bush term.

Long before the March release of the official Clinton defense spending blueprint, the Office of Management and Budget signaled that the White House would chop an additional \$126.9 billion over five years from the Fiscal 1994-98 levels set in 1990. The OMB figures, released last February, came on top of President Bush's cuts, which already lowered spending by \$113.5 billion in those years. In the 1992 presidential campaign, Mr. Clinton said the proposed Bush reductions were not enough. He said he could find additional savings.

OMB's preliminary projections, in current dollars, were as follows: Fiscal 1994, \$263.7 billion (-\$11.8 billion); Fiscal 1995, \$262.8 billion (-\$15.2 billion); Fiscal 1996, \$253.8 billion (-\$24.5 billion); Fiscal 1997, \$248.4 billion (-\$36.2 billion); Fiscal 1998, \$254.2 billion (-\$39.2 billion).

First Banked Pilots Requalified

The first class of "banked" Air Force pilots has graduated from a requalification training course.

Banked pilots are those who qualified to fly but for whom there were no available cockpits and who therefore were assigned to nonflying jobs temporarily. All told, thirty-three of these pilots have graduated and will begin to fly aircraft.

The forty-five-day course, which began in January, focused on re-familiarizing pilots with the T-38 trainer. The Air Force expects to hold about fifteen such courses every year. Classes started at Laughlin AFB, Tex., but will also be held at Reese AFB, Tex., Vance AFB, Okla., and Columbus AFB, Miss.

The Air Force started banking pilots in February 1991. About 1,100 such pilots are awaiting seats in aircraft.

Marrow Donation Saves a Life

Air Force SSgt. John Ramsey of Francis E. Warren AFB, Wyo., made possible a bone-marrow transplant that saved the life of a forty-seven-year-old man suffering chronic leukemia.

The patient's type of bone marrow exists in only one out of every 10,000 in the general population, and thus Sergeant Ramsey's marrow was a rare match with the patient's. The Sergeant said he became interested in becoming a bone-marrow donor after reading about transplant "recruiting" in his base newspaper.

"I started donating blood a few years ago after a lot of peer pressure from my co-workers," he said. "Then I read the article . . . about bone-marrow donors and knew that it was something I wanted to do. I can't help organizations like these financially, so I thought I'd give my marrow."

When Sergeant Ramsey's bone marrow matched that of a patient, he and his wife were flown to Washington, D. C., where the operation was to take place at Georgetown University Hospital. The two-hour operation involved using a syringe to extract marrow from Sergeant Ramsey's hips. Then the marrow was fed into the patient intravenously.

Sergeant Ramsey was a little sore after the operation but said it was no worse than giving blood. The body replaces marrow in a few weeks. Sergeant Ramsey stayed in the hospital overnight and checked out the next day. The patient is said to be recovering well.

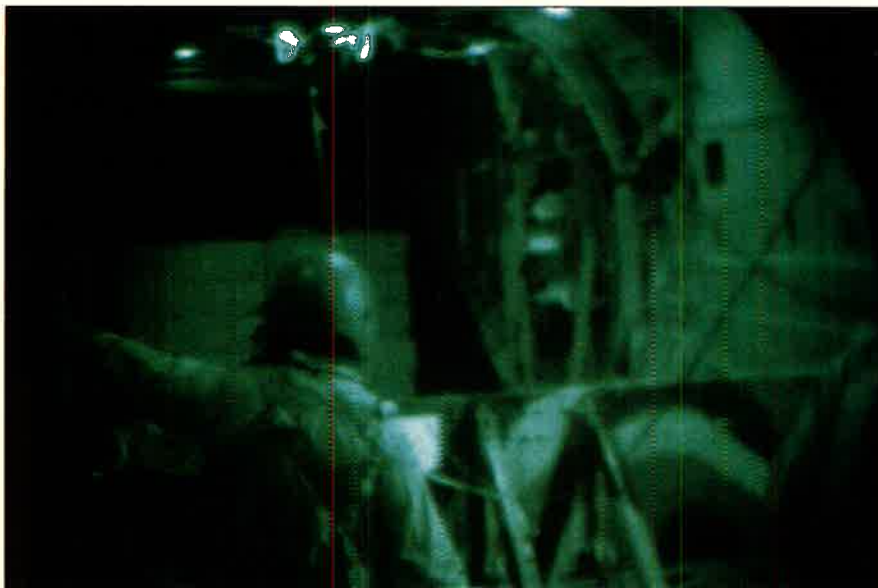
The B-2 Hits 1,000 Flight Hours . . .

The B-2 development flight-test program reached the 1,000-hour flight plateau in February. Six aircraft have taken part in a total of 217 flights.

Air Vehicle 2 broke the 1,000-hour mark with a six-hour flight. The test has helped extend the B-2 to its full flight envelope, with altitudes and speeds up to 100 percent of those expected under operational conditions. B-2s successfully released simulated B61 and B83 nuclear and Mk. 84 conventional bomb shapes from a rotary launcher.

The first operational B-2 will be delivered to Whiteman AFB, Mo., in the final quarter of this year. Upcoming tests will examine the performance of the B-2 in cruise, on wet runways, and in rain and ice during flight. Experts

USAF photo by SMSgt. Bob Wickley



USAF C-130s dropped humanitarian supplies in February to Bosnian Muslims besieged by Serbian forces. The drops were deemed necessary by President Clinton when UN relief convoys were held up by intense fighting in that region.

will examine its air-to-air imaging ability and armament.

. . . As Does the C-17

The C-17 transport surpassed 1,000 flight-test hours in February. The five-ship test fleet amassed 1,011.5 hours in 291 missions. C-17 "T-1" reached the 1,000-hour milestone during a 3.1-hour mission at Edwards AFB, Calif.

T-1 has flown 497.5 hours in 146 missions. The plane continues to test the latest incrementally updated flight-control software, which was delivered to the Air Force in early January. This flight-control software will be on the C-17 when Air Mobility Command begins to take delivery of operational planes late this year.

The "P-1" aircraft underwent complete load testing of the sixty-five-ton M1 Abrams main battle tank. It was picked up at the Marine Corps base at Twentynine Palms, Calif. P-1 also has begun airdrop testing. "P-3" is undergoing climatic hangar testing, in which it will be exposed to temperatures from 120° Fahrenheit to -65° Fahrenheit. "P-4" is at Fort Hood, Tex., where officers are testing its ability to take on equipment it would carry on a mission. By March, "P-5" had flown three acceptance flights and was to undergo electromagnetic compatibility testing.

Training at One-Tenth the Cost

The Air Force Reserve is developing a Multitask Trainer (MTT), which resembles a full F-16 cockpit complete with all switches and gauges. This system permits head-up performance of emergency procedures and basic intercepts at a fraction of the cost of flying these missions in F-16 trainers.

The MTT will allow instrument training and will be able to network with existing Air Interceptor Trainers for team training.

The trainer is completely self-contained, said Maj. Milt Miller of AFRES's 302d Fighter Squadron, Luke AFB, Ariz. It requires three twenty-amp circuits and houses all the systems, including computers, instruments interface, pilot/instructor control station, and cooling. The MTT uses F-16C operational flight trainer code along with aircraft systems' line replaceable unit software. Major Miller said that actual aircraft code was used to ensure high-fidelity avionics.

The system will be validated by July 1993. Each MTT would cost about \$1 million, a figure that Major Miller claims is one-tenth of the current full-function simulator costs. The trainer weighs 1,500 pounds and can be transported by aircraft.



In February, McDonnell Douglas delivered the 10,000th military jet produced at its St. Louis, Mo., plant—an F/A-18C Hornet. Pictured here, flying in formation for the first time, are the T-45 Goshawk, AV-8B Harrier II, F-15E Eagle, and F/A-18C.

Perry Returns to DoD

The Clinton Administration tapped William J. Perry, a highly regarded defense industrialist and technologist, to become deputy secretary of Defense, the Pentagon's second-ranking post.

Traditionally, deputy secretaries have had wide authority to manage the Defense Department's day-to-day operations.

During 1977-81, Mr. Perry served as Under Secretary of Defense for Research and Engineering under Defense Secretary Harold Brown. In that post, he played a major role in the development of such critical high-technology systems as the F-117 Stealth fighter, the B-2 Advanced Technology Bomber, and various types of cruise missiles.

Since 1981, Mr. Perry has been managing partner of a California high-technology investment firm and has served on the faculty of Stanford University.

Aspin Issues Rules on Homosexuals in Military

After negotiations with congressional leaders, Defense Secretary Les Aspin issued instructions for administrative separation procedures for reasons of homosexuality.

The Clinton Administration and Congress agreed to postpone firm policy actions regarding gays in the military for six months while conducting studies and hearings. Mr. Aspin will submit a draft executive order by July 15. The Department of Defense will no longer question potential recruits concerning their sexual orientation.

Commanders will continue to process cases under the current law. Cases involving homosexual conduct will be processed in accordance with current policy. When a case involves homosexual status and the person requests a discharge, the person will be released from active duty.

Cases involving acknowledged homosexual status that are being contested by the individual will be processed through all applicable stages, including notice of the basis for separation, a hearing before a board of officers, and review of the board's recommendations by the Separation Authority.

If the Separation Authority determines that separation is warranted in a case involving status, the case will be referred to the Attorney General. The Attorney General may then direct that discharge on basis of status be suspended until the President acts on the recommendations of the Defense Secretary regarding current policy. An individual whose discharge has been suspended will be put on standby reserve and will have the option to return if policy should change.

AFMPC Sizes Up the Force

The Air Force's Military Personnel Center released demographic figures revealing new details about the force of some 455,000 active-duty USAF personnel. The Air Force has 89,000 officers and 366,000 enlisted personnel; 17,600 pilots and 8,200 navigators; 284 female pilots and 120 female navigators; 41,300 nonrated line officers in Grades O-5 and below; an average age of thirty-five for officers;

an average age of twenty-nine for enlisted members; and fifteen percent African-American personnel.

The AFMPC study showed that sixty-eight percent of the force is married and that active-duty members support approximately 734,000 dependents. About twenty-three percent of the force serves in foreign nations.

Fifty-four percent of the officer force has graduate or professional degrees. Ninety-nine percent of the enlisted force has at least a high school diploma, and four percent of the enlisted force holds college or university degrees.

Cause of B-1B Crash Reported

In late November, a B-1B bomber out of Dyess AFB, Tex., crashed on a training mission, resulting in the deaths of all of its crew [see "Aerospace World," February 1993, p. 18]. The accident occurred because, just prior to the crash, crew members manually interrupted the B-1's "generated flyup" feature, part of the bomber's terrain-following system. (This feature causes an automatic, rapid climb away from the approaching terrain.) Such was the conclusion of an Air Force investigation report released in February.

The bomber was on a routine, low-level, night sortie that was to entail air-refueling training and instrument approach and landing practice. On the low-level route, the crew was to carry out terrain-following tactics and conventional bombing procedures.

Conditions were clear, and the aircraft's engines, flight controls, and automatic terrain-following system were functioning normally prior to impact. These facts were gleaned from analysis of a crash data recorder recovered at the scene.

The crew was flying parallel to and several hundred feet below the rim of an extended ridge in Texas. For reasons known only to the crew, the B-1 started a left turn in the direction of the ridge twenty-eight seconds before impact. The plane rolled into a fifty-degree bank. At thirteen seconds before impact, the terrain-following system generated a flyup. Three seconds later, the crew overrode the flyup command while slowly rolling out of the bank. Within seconds, the bomber flew into the ridge.

USAF Selects Test Pilots

Thirty-four Air Force officers and one civilian were selected for test pilot school, USAF said in February.

A selection board reviewed 157 applicants. Most of the pilots will attend the USAF Test Pilot School at Edwards AFB, Calif. One student will attend the Navy school at NAS Patuxent River, Md. Two others have been chosen to participate in the Air Force Institute of Technology/USAF Test Pilot School program starting in September. They will complete AFIT school at Wright-Patterson AFB, Ohio, then move to Test Pilot School at Edwards in January 1995.

Sixth B-2 Completes First Flight

The sixth B-2 bomber made its first flight, staying airborne for two hours over the California desert.

In February, the aircraft took off from its final assembly area at Air Force Plant 42 in Palmdale, Calif., and flew over the desert, where it underwent routine initial flight tests. It then returned to Plant 42.

The preplanned landing at Plant 42 aimed to verify the production vehicle acceptance profiles and procedures. This verification ensured that acceptance procedures would work smoothly for the first bomber that will be delivered to Whiteman AFB, Mo., in 1993.

USAF Wins Environmental Quality Award

The White House announced that the Air Force received its first Federal Environmental Quality Award. The award, to be given yearly, cites the Air Force's environmental program for excellence in implementing the National Environmental Policy Act.

The White House said that the Air Force "demonstrated a particularly strong commitment to the goals and requirements of NEPA, which requires federal agencies to encompass all environmental values in their planning." Some examples are the service's development of quieter aircraft engines, toxin-free methods to strip paint from aircraft, and new and more efficient ways to clean contaminated sites.

Korean Cashes In Blood Chit

Lt. Gen. Eugene E. Habiger, vice commander of USAF's Air Training Command, presented a check for \$100,000 in January to Yu Song Dan, a Korean national. The money was given in recognition of the part Mr. Yu and his family played in the rescue of seven US B-29 crew members shot down during the Korean War.

The award was given under the "blood chit" program. It is the policy of the US government to reward those who help American forces escape capture by the enemy. Washington

USAF photo by TSgt. Fernando Serna



Lt. Gen. Eugene E. Habiger (left) displays a blood chit like that recently redeemed by Yu Song Dan (right). Mr. Yu received a \$100,000 check through the blood chit program for the role his family played in the rescue of seven US B-29 crew members shot down during the Korean War.

honors blood chit claims, no matter how old they may be.

On July 12, 1950, the eighteen-year-old Mr. Yu and his father, Yu Ho Chun, came upon the seven downed US airmen. They looked over the blood chit—a silk scarf with an American flag and several Asian messages printed on it—and decided to help the Americans.

The Yus helped the airmen across enemy territory, talking their way past Communist patrols. It took four days to cover 100 miles. The US airmen were picked up by the British frigate HMS *Alicrity* on July 16.

Back at his home, the elder Mr. Yu hid but was later betrayed by a neighbor, and the Yu family was rounded up by Communist soldiers. The younger Mr. Yu said that he and his family were brutally tortured and that his father and five other villagers were killed for helping the airmen. Mr. Yu said his father was killed by bayonet.

"We who wear the uniform of the military are expected to make the supreme sacrifices in time of war," General Habiger said, "but civilians, like Mr. Yu's father, do not have that same obligation. Mr. Yu was one of one million South Korean civilians who died in that war, but I cannot imagine many that were more selfless or more compassionate."

The Air Force said the payment was made forty-two years after the fact because Mr. Yu, who moved to Texas in 1988, had not realized the value of the chit. He had kept it as a memento of the experience. When he learned of the chit's value, he wrote a letter to President Bush.

Reserves in Somalia

By the beginning of February, Air Force Reserve airlift crews had delivered 9,400 passengers and 11,728 tons of cargo in support of Operation Restore Hope, the humanitarian mission in Somalia.

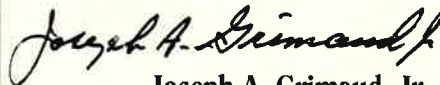
Air Force refuelers had transferred more than seventy-seven million pounds of fuel to aircraft in support of the operation. The service as a whole had transported 32,720 passengers and 31,759 tons of cargo to Somalia by February 26. These figures do not include the more than 15,000 passengers and 2,644 tons of cargo flown to Somalia by commercial aircraft chartered by the Pentagon.

JPATS Clears Hurdle . . .

The Pentagon approved Milestone 0 for the Joint Primary Aircraft Training System (JPATS) and designated the Air Force the lead organization in the program. The decision, made by Under Secretary of Defense Donald

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Yockey, was announced in January. It was one of Mr. Yockey's last decisions before he left office during the administration transition.

In his acquisition decision memorandum, Mr. Yockey also approved Milestone 1, contingent upon "approval of the test and evaluation master plan, the submission of a cost and operational effectiveness analysis, and the submission of a finalized integrated program summary." In addition, he said, the service had to present an acquisition strategy report and a final version of the updated aircraft trainer master plan.

Milestone 2 will be considered prior to contract award.

. . . While T-1A Completes Tests

The Air Force completed flight testing of its newest operational trainer, the T-1A Jayhawk, in January.

The Air Force wanted to know how the aircraft would react to certain common—and some not-so-common—errors made by student pilots. The testing, conducted at Aeronautical Systems Center, Wright-Patterson AFB, Ohio, and Edwards AFB, Calif., is unusual because typically the Air Force would pay a contractor to build an aircraft and spend five or six years

developing and testing it. However, the Air Force acquired the T-1A "off the shelf."

Maj. Tom Schipper, primary test pilot and test program manager for the T-1A, said, "During source selection, we did an operational evaluation on the T-1A to make certain the aircraft chosen would be tolerant of student pilots. That still didn't tell us what the aircraft would do in certain situations."

Nonetheless, the testing was considered successful. The first objective was to investigate the T-1A's behavior during a delayed recovery in a stall, a typical situation new student pilots must learn to handle. Second, the service wanted to test the plane's performance during a simulated, single-engine emergency approach to landings or go-arounds with misapplied rudder controls.

Early Phaseout for A-6E?

The Navy is studying a range of options that could lead to an earlier-than-anticipated phasing out of the A-6E carrier-based medium bomber. The aircraft could be retired by 1999, roughly six years earlier than would otherwise be the case, according to Navy officials.

By phasing out the A-6E, the Navy would save about \$3 billion in spending on upgrades over the 1994-98 defense plan. The Navy would likely use this money to modify the F/A-18 and the F-14 to carry precision guided munitions.

Navy officials voiced concern that the A-6E will be thirty years old by the time it is removed from service. They said the Navy would save money by flying only two types of combat aircraft—the F/A-18 and F-14.

While it is likely that both the F/A-18 and the F-14 will get laser designation equipment so that they can drop laser-guided bombs, the prospects for an F-14 reengining program are not good. Navy officials cite high cost as the reason for holding off on such a venture.

Crew Chief of Distinction

SSgt. Rodney J. Merritt of the 37th Airlift Squadron, Rhein-Main AB, Germany, was named the base's Dedicated Crew Chief of the Year in February.

Since June 1991, Sergeant Merritt has been assigned to Rhein-Main, where he supervises and coordinates all maintenance on one of eighteen C-130E Hercules aircraft assigned to the 435th Airlift Wing.

Sergeant Merritt, a technical sergeant selectee, has earned Excellent ratings during inspections and has been recognized as Crew Chief of the Month in February, March, April, June, and November 1992. He was also selected as the squadron's Noncom-

missioned Officer of the Month in September 1992 and NCO of the Quarter in the third quarter of 1992.

US, Partners Agree on F-16 MLU

US and European representatives of the F-16 multinational fighter program steering committee met in January and hammered out an agreement on the number of kits for the Midlife Update program and the date for signing the Letters of Offer and Acceptance (LOAs).

Member nations are Belgium, Denmark, the Netherlands, Norway, and the US. The meeting focused on the defense budget cuts in Belgium and the Netherlands and the subsequent reductions in the number of kits those countries would require. LOAs are to be signed in June 1993. The actual number of kits was not disclosed.

Aspin Reshapes DoD

Defense Secretary Les Aspin moved quickly after his confirmation to reorganize and streamline upper-level policy and management structures at the Pentagon.

In a background briefing in late January, defense officials outlined a plan that would reshuffle the current organization of twenty-six assistant secretaries into one of four basic components headed by under secretaries.

The four new under secretaries would head four distinct components of the defense structure: defense policy, personnel and readiness, technology and hardware, and financial management. They would report di-

rectly to Mr. Aspin and Deputy Secretary of Defense William J. Perry.

The technology and hardware portfolio will be considered the third highest account in the department, as it long has been. Acquisition matters would come under the purview of the under secretary for technology and hardware.

The general counsel and heads of legislative affairs and public affairs would serve in an advisory role to Mr. Aspin and Mr. Perry. The under secretary for defense policy would have a deputy, who in turn would oversee six assistant secretaries. The six would handle duties relating to regional security, economic and environmental security, democratic security, nuclear security, strategy and resources, and plans and policy.

AGM-130 Scores Hit

In its first production verification test flight, the Air Force AGM-130 missile scored a direct hit on a billboard target from 14.5 miles away, Rockwell International said.

In a January announcement, the company said that the missile was launched from an F-111F aircraft at Eglin AFB, Fla., from an altitude of 2,000 feet and that the television-guided weapon scored a direct hit.

The primary objectives of the flight-test program are to demonstrate the weapon's launch parameters, terminal accuracy, range, and, in later flights, tactical employment. The current program includes nine television and infrared production versions of the AGM-130, which will be launched from the F-111F and the F-15E.

The Air Force plans to procure about 4,000 missiles.

P&W, Allison Team on A/F-X Engine

General Motors' Allison Gas Turbine Division and United Technologies' Pratt & Whitney signed a teaming agreement in February to develop the propulsion system for the Navy-USAF A/F-X program. The announcement came from P&W, which will be the lead contractor overseeing the development of the powerplant.

The teams' candidate will be the PW7000 engine. The engine's turbo machinery incorporates technologies developed from the F119-PW100 engine, the Integrated High-Performance Turbine Engine Technology, the Advanced Turbine Engine Gas Generator programs, and other advanced research programs.

The PW7000 is the propulsion candidate for all five weapon system con-



The Huygens space probe is to visit Titan, Saturn's largest moon, in 2002. Parachute deployment and drag performance were verified on a model of the probe (above) in a wind tunnel test at Arnold Engineering Development Center, Arnold AFB, Tenn.

tractor teams competing to build the A/F-X. The engine is in the 19,000- to 30,000-pound-thrust range. Higher-thrust versions will use an afterburner.

B-1B Could Take On Mobile Targets

The Air Force is considering using the B-1B bomber to test Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) components and a Sensor Management System (SMS) to evaluate the ability of an SMS to assist an aircrew in detecting, locating, identifying, and attacking a mobile target, according to Gen. George Lee Butler, former Strategic Air Command commander in chief and current CINC of US Strategic Command.

General Butler's statements answered questions posed last year by the Senate Appropriations Committee's Defense Subcommittee. The committee recently declassified the statements.

General Butler said that aircraft currently equipped with LANTIRN, such as the F-15E and the F-16C, could not accommodate the SMS because of its size and weight. SAC was once required to be able to attack mobile targets, a mission that now rests with Air Combat Command. General Butler said the B-1 was being considered for the temporary modification. However, no funding has been approved for it.

News Notes

■ The daily management of the Air Force's ICBM force will transfer from Air Combat Command to Air Force Space Command on July 1, USAF said in February. The actual execution of the ICBM force's strategic nuclear attack mission remains with US Strategic Command, based at Offutt AFB, Neb.

■ The Air Force will conduct Selective Early Retirement Boards on May

Senior Staff Changes

RETIREMENTS: M/G Alexander K. Davidson, L/G Charles J. Searock, Jr.

PROMOTIONS: To be **Major General:** George K. Anderson, George T. Babbitt, Jr., Richard C. Bethurem, William B. Davitte, Lee A. Downer, Ralph E. Eberhart, Richard N. Goddard, Joseph E. Hurd, Kenneth R. Israel, Eldon W. Joersz, William E. Jones, Lester L. Lyles, James E. McCarthy, David W. McIlvoy, Kenneth A. Minihan, Jimmey R. Morrell, John M. Nauseef, Lloyd W. Newton, Tad J. Oelstrom, Charles T. Robertson, Jr., Eugene D. Santarelli, Richard T. Swope, Arnold R. Thomas, Jr., Thomas W. West.

To be **Brigadier General:** David L. Young.

To be **ANG Major General:** Eugene R. Andreotti, Michael J. Bowers, Michael S. Hall, Wallace D. Hegg, Gene A. Katke, Lawrence A. Maciariello, David J. Rist.

To be **ANG Brigadier General:** Larry K. Arnold, Douglas Burnett, Charles D. Burnfield, John T. Byrd, John J. Crawford, Jr., Samuel G. deGeneres, George A. Demers, Thomas H. Despain, Gary W. Felstead, Jon C. Heaton, Gary E. Kaiser, Stephen G. Kearney, Emmett L. McCutchin, James McIntosh, Melvyn S. Montano, Donald L. Powell, Thomas W. Powers, Wilbur E. Rose, Victor R. Schwanbeck.

CHANGES: Col. (B/G selectee) Claude M. Bolton, Jr., from IG, Hq. AFMC, Wright-Patterson AFB, Ohio, to Cmdt. Def. Sys. Mgt. Col., Fort Belvoir, Va. . . . B/G (M/G selectee) William B. Davitte, from JCS Rep. for Conf. on Confidence and Security Building Measures and Disarmament in Europe, J-5, Joint Staff, Washington, D. C., to Special Ass't to DCS/Personnel, Hq. USAF, Washington, D. C. . . . Col. (B/G selectee) Robert A. Hoffmann, from Dir., Criminal Investigation and Counter-Intelligence, Ofc. of the IG, OSAF, Washington, D. C., to Cmdr., Hq. AFOSI, Bolling AFB, D. C., replacing retiring B/G Francis R. Dillon . . . Col. (B/G selectee) Thomas J. Scanlan, Jr., Vice Dir. of Plans, Hq. USSPACECOM, Peterson AFB, Colo., to Dir., Space Sys., Ass't Sec'y of the Air Force for Space, Hq. USAF, Washington, D. C. . . . M/G Arnold R. Thomas, Jr., from DCS/Ops., 2d ATAF, AAFCE, NATO, Rheindahlen, Germany, to DCS/Ops., 2d ATAF, AACE, and Dep. Dir. ACE Reaction Force Air Staff, NATO, Rheindahlen, Germany.

SENIOR EXECUTIVE SERVICE (SES) RETIREMENT: John W. Boddie, William D. Ernst, Samuel P. Greenwood, Richard F. Shomper.

SES CHANGES: Jackie R. Crawford, from Ass't Auditor General (Acquisition and Logistics Audits), Hq. AFAA, Wright-Patterson AFB, Ohio, to Auditor General of the Air Force, OSAF Washington, D. C., replacing John W. Boddie . . . Alan B. Goldstajn, from Dir., Plans and Programs, DCS/Science and Technology, Hq. AFMC, Wright-Patterson AFB, Ohio, to Principal Ass't, DCS/Plans and Programs, Hq. AFMC, Wright-Patterson AFB, Ohio, replacing James C. Wallin . . . James C. Wallin, from Principal Ass't, DCS/Plans and Programs, Hq. AFMC, Wright-Patterson AFB, Ohio, to Dir., Depot Maintenance, Hq. AFMC, Wright-Patterson AFB, Ohio, replacing Samuel P. Greenwood. ■

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3 for approximately 900 captains and 1,200 majors, potentially selecting up to thirty percent of those eligible. It will conduct a SERB on May 17 for about 900 colonels.

■ Thomas P. Stafford, who piloted a lunar module to orbit the moon and was part of the US crew that rendezvoused in space in 1975 with a Soviet spacecraft, was awarded the Space Medal of Honor in January. The award, presented by Congress, is the highest honor given for space exploration. Stafford retired from the Air Force in 1979 as a lieutenant general.

■ As Stateside air rescue units joined Air Combat Command on February 1, three of the units deployed to southwest Asia to support operations there. Elements of the 66th and 71st Air Rescue Squadrons from Nellis AFB, Nev., and Patrick AFB, Fla., and the 741st Consolidated Aircraft Maintenance Squadron from Patrick deployed to the Gulf region in support of Operation Southern Watch.

■ McDonnell Douglas claims that the Air Force's F-15 is strong enough to have a structural service life of at least thirty-two years. The aircraft has surpassed by a wide margin the most stringent airframe durability tests that the government requires for fighters, the company said. There have been no failures that would limit the economic life of the airframe.

■ Community appreciation sales held in commissaries throughout Europe in September netted \$371,000 in contributions for local morale, welfare,



Clark Smith (left), the first student to graduate from pilot training at Williams AFB, Ariz., shakes the hand of the final student to graduate, 2d Lt. Corey Wormack of Class 93-04, the final UPT class. Williams is scheduled to close September 30.

and recreation (MWR) activities, according to the Defense Commissary Agency. Commissaries voluntarily reduced prices on a variety of products. Each sale of featured merchandise generated a donation to MWR funds from local, regional, and national manufacturers of the product.

■ The Clinton Administration's lifting of the elective abortion ban means that military hospitals overseas are again open to patients seeking pre-paid abortions, DoD said in February.

■ A team of engineers from Rome Laboratory's Photonics and Optics Division was awarded an Air Force Materiel Command Science and Technology Achievement Award in January. The team of Dr. Raymond K. Boncek, Steven T. Johns, Mark F. Krol, and John L. Stacy was honored for its work in high-speed photonic devices and circuits for optical networks.

■ TSgt. Carol E. Jackson and A1C Ian G. Schneller were selected as Air Force Intelligence Command's Ambassadors for 1993, the service announced in January. Sergeant Jackson directs ceremonial activities for the command headquarters as a member of the AFIC Protocol Office. Airman Schneller is a communications computer system programmer. They will represent AFIC at numerous activities throughout the coming year.

■ Loral Vought Systems will produce Multiple Launch Rocket Systems for Japan. An agreement between the US and Japan was concluded in January. The deal will be worth about \$250 million over four years. Japan plans to buy thirty-six launchers, more than 1,300 tactical and practice rockets, and forty-seven launcher trainer pods.

■ Sea-level testing of the first production-configured F119-PW100 F-22 engine got under way in January at Pratt & Whitney's West Palm Beach, Fla., facility.

■ Rockwell International/Deutsche Aerospace's Fan Ranger jet-powered trainer successfully completed its maiden flight in January at the Manching, Germany, flight test center of

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Deutsche Aerospace. The aircraft flew for one hour and twenty-eight minutes. The Fan Ranger is in competition for the Joint Primary Aircraft Training System contract.

■ The Air Force Reserve implemented a USAF directive in March to eliminate the chief of staff and deputy chief of staff designations at all levels except at Air Force headquarters.

■ In January, the Federal Quality Institute selected Arnold Engineering Development Center at Arnold AFB, Tenn., as the winner of the 1993 National Quality Improvement Prototype award. The award was created to recognize federal organizations that have adopted total quality management principles and successfully improved the quality, timeliness, and efficiency of their services.

■ Orbital Sciences Corp.'s Pegasus air-launched space booster successfully conducted its third mission in February, placing the government of Brazil's first spacecraft, an environmental data-collection and relay satellite, into precise low-Earth orbit near the equator. Pegasus was launched from a NASA B-52 aircraft.

■ Of twenty-nine NASA programs the General Accounting Office surveyed, nearly all required substantially more funding than the initial estimates given to Congress projected, according to a December GAO report. The change from initial estimates to actual costs amounted to a median increase of seventy-seven percent.

Obituaries

Lt. Gen. Elwood "Pete" Quesada, USAF (Ret.), first commander of Tactical Air Command, died of heart failure in February at his home in Hobe Sound, Fla. He was eighty-eight. General Quesada enlisted as a private in the Army in 1924 but quickly became a flying cadet and a commissioned officer. He left the service in 1951 at the age of forty-seven.

General Quesada was on the 1929 flight of *Question Mark*, a trimotor Fokker that stayed aloft for days to demonstrate the utility of aerial refueling. He flew many combat sorties during World War II. General Quesada also headed the Federal Aviation Administration under President Eisenhower. Survivors include his wife of forty-six years, the former Kate Davis Pulitzer, two daughters, and two sons.

Lt. Gen. George Lennox Monahan, Jr., USAF (Ret.), former director of the Strategic Defense Initiative Organization, died of heart failure in February in San Jose, Calif. He was fifty-nine. His home was in Falls Church, Va. The General headed SDIO during 1989-90 and worked for Loral Corp.

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at the time of his death. He served thirty-five years before retiring from the Air Force in 1990. He is survived by his wife, the former Mary Rockwell, four sons, a daughter, his mother Clara Weber Monahan, a sister, two brothers, and four grandchildren.

Purchases

The Air Force awarded General Dynamics a \$27.4 million face-value increase to a fixed-price incentive

firm contract for Fiscal 1992 and Fiscal 1993 supplemental long lead for seventy-two F-16C/D aircraft (forty-eight for FY 1992, twenty-four for FY 1993). Expected completion: September 1994.

The Air Force awarded McDonnell Douglas a \$62.8 million fixed-price incentive firm contract for advanced buy/long lead funding for eight Lot VI C-17 aircraft. Expected completion: August 1996. ■

Still more adjustments are coming as budgets slip and force structure slides.

Staff photo by Guy Acato

The Air Force Sharpens Its Aim

By John T. Correll, Editor in Chief

THE TALK at home was of troop cuts and budget reductions, but, as the new year began, the Air Force was operating at a strenuous tempo abroad, engaged simultaneously in three regional contingencies.

In Iraq, the Air Force has had most of the action, enforcing no-fly restrictions on Saddam Hussein's aircraft in the north and the south and protecting the Kurds from attack by their own government. "All told, we've flown over 139,000 sorties since Desert Storm to support operations in Iraq," Gen. Merrill A. McPeak, Air Force Chief of Staff, told an Air Force Association Symposium in Orlando, Fla., in February. "No misprint, 139,000. That compares to 80,000 we flew during the war."

Through January, the Air Force had flown nearly 700 relief sorties into the area that used to be Yugoslavia, and the number of airlift and aerial refueling missions in the Somalia operation was approaching 4,000. Operation Restore Hope is a UN effort, but—to no one's surprise—the critical contribution is from the United States. Ten nations depended on the US Air Force to transport their troops and materiel to Somalia, thus "dem-



USAF photo by TSgt. Hans Delfner

Air mobility forces, such as these C-130s, always critical to an air campaign, sometimes are the air campaign. Operation Restore Hope reinforced the case for the C-17, which the Air Force says it urgently needs. F-16s (opposite) will not be replaced until sometime after 2010.



CAPT DAVE TIG TEAM

RESCUE



Gen. Merrill A. McPeak believes that the Air Force has its programs "pretty well phased" and that the F-22 (above, the YF-22 prototype) is critical. "Between now and the turn of the century," he says, "we're looking at one program: the F-22."

onstrating once again that we are the air force of first and last resort," General McPeak said.

Meanwhile, the Air Force was also sustaining a commitment to the anti-drug campaign that Gen. John Michael Loh, commander of Air Combat Command, described as "massive."

As operations continued at a rapid clip, the Air Force was scrambling to implement its share of a defense cut in the \$10 billion range ordered by the Clinton Administration for Fiscal Year 1994 and bracing for more reductions in a comprehensive budget review this summer and fall.

The force has absorbed reductions steadily since 1986, and further savings are difficult to find. Asked about his minimum requirements, Gen. Robert C. Oaks, commander in chief of US Air Forces in Europe, joked grimly that "we several iterations ago passed through our minimum requirement."

The Year of Equipping

General McPeak has declared 1993 "The Year of Equipping." (This follows the sequence of a plan laid down earlier, in which 1991 was the Year of Restructuring and 1992 the Year of Training.)

Mindful of funding realities, the Air Force had kept its shopping list modest. Now, however, the budget is dropping again, toward new and uncertain levels. "My concern is that current cost trends may prevent any serious modernization whatsoever," General McPeak said in

Orlando. "If you think I'm overstating the case, try figuring out how many F-22s and C-17s will fit into a \$200 billion defense budget."

Among the Air Force's half dozen or so major modernization programs, the C-17 airlifter seems least vulnerable. Almost everybody, including the Clinton Administration and Congress, is sold on the value of airlift and the need for more of it.

Controversy centers on tactical aviation. A draft paper circulating in the Pentagon last winter said there might not be enough money to cover four big aircraft programs—the Air Force's F-22 fighter, the Navy's improved F/A-18 variant, the Navy's A/F-X interdiction aircraft, and the Air Force's Multirole Fighter.

As General McPeak noted in Orlando, though, the Air Force has its programs "pretty well phased." USAF intends to buy midproduction models of the A/F-X, but no earlier than 2010, and the Multirole Fighter to replace the F-16 would come after that. "Between now and the turn of the century, we're looking at one program: the F-22," General McPeak said.

A complicating factor is that the Clinton Administration may resurrect the V-22 tiltrotor Osprey, much desired by the Marine Corps but canceled by the Bush Administration. If the V-22 is back and competing for funds, General McPeak said, "there'll be another contender in there, and that won't help."

The pressure may be hardest on the Navy, which is still recovering from the demise of its A-12 interdiction aircraft program. Until recently, its get-well plan was to retire all F-14 fleet defense fighters and A-6 medium bombers and equip the carrier wings strictly with two multirole fighters: the improved F/A-18 variant and the A/F-X, to be developed jointly with the Air Force.

Demand for a strike version of the F-14—this one dubbed "the Bombcat"—has resumed in recent months. In Orlando, Adm. Paul David Miller, commander in chief of US Atlantic Command, said that no matter "what they have put on their little sheets" in "the halls of OPNAV," the A-6 will have a place in the air wings of the future.

The Force Structure Problem

Going into 1993, the nominal projection for the armed services was the "Base Force" configuration, drawn up during Dick Cheney's tour as Secretary of Defense. After reductions were complete, it would have left the Air Force twenty-six fighter wings (eleven of them in the Guard and Reserve) and 184 operational bombers.

The Base Force projection was going to be cut, no matter who won the election, but the new Secretary of Defense, Les Aspin, came to the Pentagon with a strong predisposition. When he was chairman of the House Armed Services Committee, he devised "Option C," an alternative configuration that took eight more fighter wings from the Air Force. In a speech February 12, Mr. Aspin said he would take another look at all the numbers, including his own.

With the drawdown, General Loh said in Orlando, "most of our combat power—in fact, ninety percent of it—will be based in the United States yet must be immediately responsive to all of the theater commanders' needs." Of the 26.5 general-purpose fighter wings, 11.25 are in the Guard and Reserve and seven are overseas, leaving 8.25 wing equivalents active in Air Combat Command. Not counted in these numbers are 2.5 wing equivalents of air defense fighters in the Air National Guard.

"That means that, in the States, we have sixty-three percent of ACC's fighter force in the Guard and Reserve and only thirty-seven percent in the active force," General Loh said. "Those 8.25 wings of fighters—or

twenty-five active-duty squadrons—are bearing the brunt of all the deployment activity going on today.” In some squadrons, according to General Loh, aircrews are spending 150 days or more a year on deployments.

The force structure is beginning to look thin all over. USAFE once had thirty fighter squadrons in Europe. The total is dropping toward ten, and it may go lower than that. General Oaks told the Orlando gathering that, with every reduction, it becomes increasingly difficult for him to maintain a balance in capability and regional distribution of forces.

The Air Force still hopes to hold to its projection for a bomber fleet of 210, with 184 of them in the operational lineup on any given day. It announced on January 19 the intention to assign some of the conventional bombers, the B-1s and the B-52s, to the Guard and Reserve.

In a roles and missions report published February 12, Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, recommended that the continental air defense wings—a force of more than 180 Air National Guard aircraft—be eliminated or sharply reduced. Their mission has “largely disappeared,” he said, and general-purpose fighter forces from the active-duty and reserve components can handle any requirement that remains.

Providing for Deep Strikes

Most of the heavy bombers have



Staff photo by Guy Aceto

Among the proposals to maintain capability in the face of shrinking budgets is one that would transfer some B-1s (above) and B-52s to the Guard and Reserve. The Air Force hopes to keep 184 bombers in the operational lineup.

already switched to conventional missions. The B-1, fast becoming the backbone of the bomber fleet, no longer counts as a nuclear platform in strategic arms negotiations.

“Its sole role will be as a conventional penetrator with a capability to attack the bulk of time-critical targets early in the campaign,” said Lt. Gen. John E. Jaquish, principal deputy assistant secretary of the Air Force for Acquisition. “The B-1 will also add mass and precision to composite strike packages to sustain the theater campaign.”

To complete the transition, the Air Force will—provided funding holds—make a number of modifications to the B-1, giving it improved electronic countermeasures and more precision in both the direct attack and standoff modes.

The twenty B-2 Stealth bombers may also be employed in nonnuclear missions, but they would be held for “time-critical targets, which, if not destroyed in the first hours or days, will allow unacceptable damage or unacceptable challenges,” General Jaquish said.

The Air Force is well satisfied with the latest results from B-2 testing and expects to receive the first aircraft deliveries at Whiteman AFB, Mo., in December. Test results also look good for the Triservice Standoff Attack Missile (TSSAM), a conventional cruise missile with stealth features that will be a key piece of armament for the B-2.

General Jaquish said the Air Force “remains committed” to the A/F-X program (previously known as the A-X), on which the Navy has lead responsibility. The plan is to buy mid-production models of this aircraft, sometime after 2010, to replace the F-117, the F-111, and the F-15E in medium-range, all-weather interdiction tasks. “There are no requirements in the A-X that are unique to the Air Force,” General Jaquish said. “Our goal is to buy a mature, off-the-shelf A-X to the maximum extent possible.”



Staff photo by Guy Aceto

“I don’t have enough [F-15Es],” said ACC Commander Gen. John Michael Loh. He added that he needs more of the air-to-ground platforms to flesh out the existing force structure, not to add more squadrons.



Increasingly, Air Force assets are being concentrated in the continental US. Every operational F-111 in the inventory is now stationed at Cannon AFB, N. M., easing training and maintenance and reducing the need for overseas bases.

In the meantime, the Air Force would like to resume production of the F-15E, curtailed in a budget exercise several years ago. The objective, General Loh explained, is not to add more F-15E squadrons to the lineup but to flesh out the existing force structure.

"I don't have enough [F-15Es] now to operate the force I have at ops tempo," he said. "I'm short on those that are normally allocated to be in maintenance or for attrition reserve. We're talking about thirty-six to forty-eight airplanes, maybe twelve a year."

Spotlight on Mobility Forces

The latest edition of the Air Force's concept paper, "Global Reach, Global Power," notes that air mobility forces, always critical to an air campaign, sometimes *are* the air campaign. In Orlando, General McPeak said that "the success of almost every contingency hinges on theater airlift."

Operation Restore Hope, the relief mission to Somalia, was a case in point. US Central Command had only a few days to plan and prepare before the first troops landed on December 8. As commander of Air Mobility Command and commander in chief of US Transportation Command, Gen. Ronald R. Fogleman was in the middle of it from the start.

"We understood clearly that it was a country with absolutely *no* infrastructure," he said. "We knew that we were going to have to go in and open ports and airports before we could

even start to flow our forces in there."

The first step was to reposition a Marine amphibious group off the Somali coast near Mogadishu. "Their function was to go in and secure the airfield and the port so that we could then come in and build the infrastructure to bring in the follow-on forces," General Fogleman said.

As additional units prepared to deploy from the US, maritime prepositioning ships steamed from Diego Garcia with the supplies and equipment to sustain the Marines for twenty

to thirty days. Timing was critical. If the ships arrived too far ahead of the Marines, they would not be able to dock and unload. If the Marines arrived before the ships did, there would be no food or supplies for them.

Army units would follow the Marines and be the sustaining force. The first of the fast sealift ships with supplies for the Army would not arrive for about a month, though. In those early days, the transport of troops and materiel was up to Air Mobility Command. "Airlift was expected to sustain the force for the first thirty-two days," General Fogleman said.

The airlift began with a single airfield open in Somalia. "We opened a second airfield, but it lasted for less than a week before it broke up," General Fogleman said. "The lesson is that the Russians [who were previously active in the area] didn't build very good airfields."

Difficult as it was to operate with only one and a half airfields, a bigger problem was fuel. None was available in Mogadishu. Air Mobility Command tankers created the bridge, refueling the airlifters aloft as they transported troops nonstop from several Stateside locations to staging bases in Egypt and Saudi Arabia where relief crews took over for the final leg into Somalia. The tankers were also waiting to refuel the airlifters on the way out.

In Operation Desert Shield, General Fogleman said, "we averaged fifteen to seventeen million ton-miles



Almost everybody, including the Clinton Administration and Congress, is sold on the value of airlift and the need for more of it, making the C-17 the least vulnerable of the Air Force's modernization programs.

per day into Saudi Arabia—after we had activated the Guard and Reserve, after we had called up the CRAF [Civil Reserve Air Fleet], and using anywhere between five and ten highly developed airfields. During the critical seven-day period of the buildup in Somalia, operating out of one and a half airfields, we averaged 9.5 to ten million ton-miles per day.” A preliminary survey of the operation, he said, yields several conclusions:

“Our active C-130 force is undersized, and it is in great demand. Our strategic airlift fleet is tired.

“Our tanker force is more of a force multiplier than we ever realized.

“We are highly dependent on Air National Guard volunteers as well as on commercial lift, even in a nonmobilized scenario like we just executed.”

Operation Restore Hope further reinforced the case for the C-17 air-



USAF photo by SSgt. Tony Lambert

Operation Restore Hope showed the Air Mobility Command leadership that tankers, such as the KC-10 (above) and the KC-135 (below), are “more of a force multiplier than we ever realized.”

Staff photo by Guy Aceleo



lifter, which carries twice the payload of a C-141, can (like the C-5) handle outsized cargo, and will be able to land on smaller ramps and airfields. The first C-17 will be delivered to Charleston AFB, S. C., this spring. General Fogleman will take as many of them as he can get.

Packages for the CINCs

As a consequence of its restructuring in the past two years, the Air Force of 1993 is well positioned to respond to an evolving national defense strategy that emphasizes “adaptive joint force packaging.”

This is a relatively new concept—or

a new term, anyway—that recognizes the increasing dominance of theater commanders in chief (CINCs) in the employment of forces in their areas of responsibility (AORs). CINCs already have broad discretion about how to organize, configure, and employ the forces of all services within their AORs.

In adaptive joint force packaging, the individual services are storehouses of capability from which the CINCs can tailor a combination of air, land, and maritime forces suited to the contingency at hand. “From the nation’s total joint military kit,” Admiral Miller explained, the CINCs “should be able to draw the specific joint capabilities

they need positioned in their AORs at any given time.”

In February, General Powell said that Joint Task Forces, built as adaptive joint force packages, “will become the common organization for peacetime forward presence operations.”

With its fighters, bombers, and combat support aircraft together in Air Combat Command and its airlifters and tankers consolidated in Air Mobility Command, the Air Force should be able to move smoothly into this new approach.

The other services are making changes too. Admiral Miller said it was a jarring moment for the Navy, for example, when he took the antisubmarine helicopters and about a tenth of the sailors off the carrier *Roosevelt* to make room for 600 Marines and their equipment, including a squadron of F/A-18s, because that’s what the force package required.

General Loh said that Air Combat Command is “making all of [its] large-scale training exercises and ranges, such as Red Flag, Green Flag, and Blue Flag, available for putting together and training adaptive joint force packages.” In the near future, Air Combat Command will probably become part of a new unified command, which will also incorporate the Army’s Forces Command, the Navy’s Atlantic Fleet, and Marine Forces Atlantic.

In the future, Admiral Miller believes, “our forces will be shaped more by the capabilities they contribute than by the threats they can counter.” ■

With General Horner at the helm, space forces are tuning up to feed satellite data into cockpits and foxholes.

Space Support for the Shooting Wars

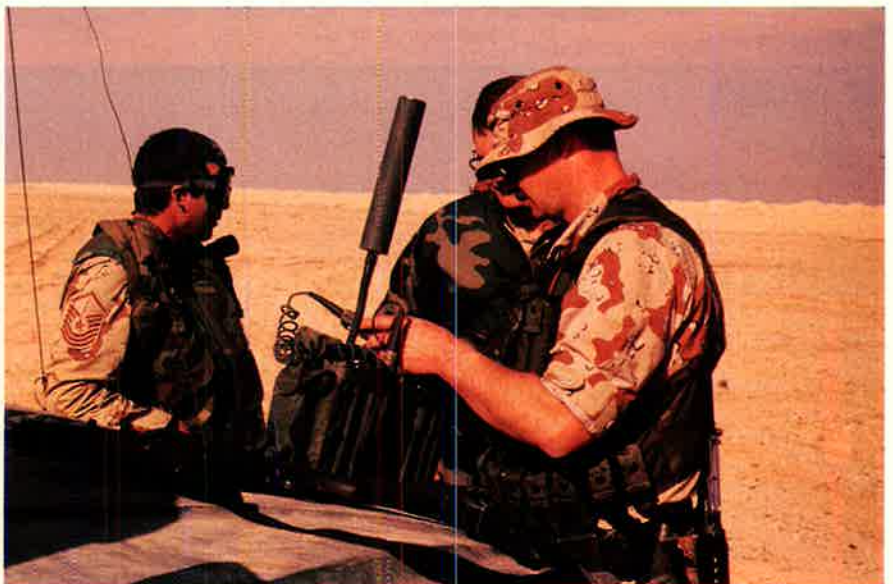
By James W. Canan, Senior Editor

THE four-star boss of US military space operations may very well be their severest critic. Gen. Charles A. Horner finds much to fault in those operations as well as much to admire. He insists that they must do a better job of supporting combat forces at lower cost and with greater dispatch.

General Horner comes on strong. "I mean to be provocative," he declares. "We are at a turning point with space. We have to make changes, get on with it. We have to make space efficient and responsive to wartime needs. We have to provide space data directly to the forces who are fighting the war."

Examples? "Ballistic missile warning [signals] should go from satellites to foxholes, not from satellites to Colorado Springs. . . . Anything from space that can be presented in a usable way for aircrews should go directly into their cockpits," most notably images from spy satellites.

General Horner has it going as the three-hat commander in chief of multi-service US Space Command, commander of its component Air Force Space Command, and CINC of binational North American Aerospace Defense Command, all in Colorado Springs, Colo. He is not the first leader



USAF forward air controllers use a portable Global Positioning System (GPS) receiver to pinpoint their location on the featureless desert during the Persian Gulf War. As the Gulf War air commander, Gen. Charles A. Horner became convinced that space operations, which he now heads, must provide even better combat support.

of military space to focus on its failings. Others have called attention to many of the same shortcomings, including the high cost and unresponsiveness of space-launch operations, the technological—as opposed to operational—bias in setting requirements for space satellites and in custom-crafting each, and the institutional impediments to the wholesale dissemination of space data to air, sea, and ground forces.



There is a striking difference between General Horner and those who preceded him, however. "I have an edge," he acknowledges.

It stems from his operational background and experience. He came by it not as a career space officer but as a theater air commander and former combat fighter pilot with a thoroughly tactical upbringing. He went to war in Operation Desert Storm knowing, by his own admission, almost nothing about space, and he had to learn it literally from the ground up. As the three-star air component commander of US Central Command (CENTCOM) and of allied coalition air forces, he had a crash course in how to use diverse data from all sorts of satellites in waging a major air campaign. He found out the hard way what space could and could not do to help win the war.

A Stunning Payoff

General Horner notes that space systems came through for coalition forces in the Persian Gulf War, often with stunning results, in such arenas as navigation, weather, surveillance, missile warning, and communications. He salutes his pathfinding forerun-

ners in the military space leadership and pronounces himself "in awe of what the pioneers of space have done."

"It paid off in Desert Storm," he declares.

He warns, however, against exaggerating air and space accomplishments in that war. The Air Force "won the game ball" but "didn't do it perfectly," he says.

"The only way we are going to be a better Air Force is by having the courage to take an honest look at what we did, and the same goes for space," General Horner asserts. "We can do better than we did in Desert Storm, where we had the luxury of a six-month buildup to develop procedures and develop equipment."

With his Gulf War lessons fresh in mind, General Horner reported to the US space/continental defense complex in Colorado Springs last year determined to pull off some things that every CINCSPACE before him had tried to do—make space an integral, everyday part of the training and operations of all combat forces and set about feeding much more data from satellites straight to the forces with the firepower in all operational regimes.

"The real heart of the matter," Gen-

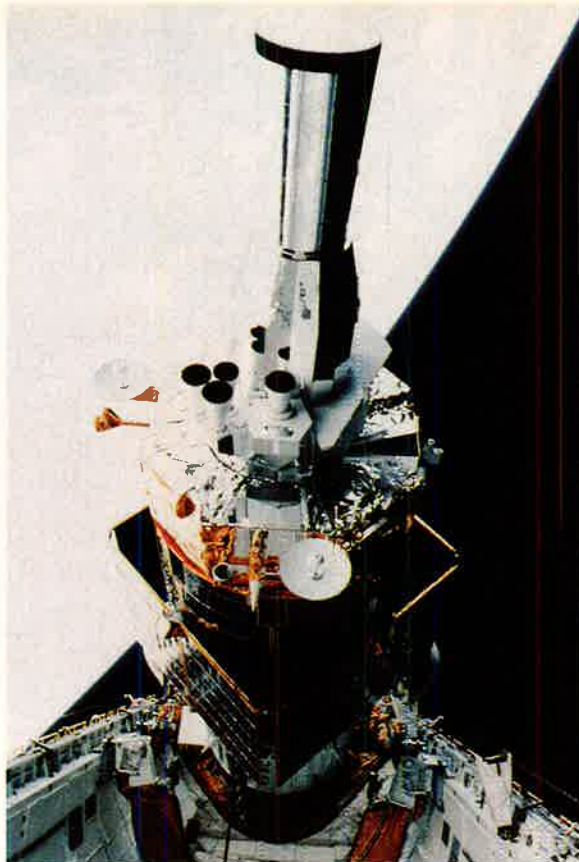
eral Horner declares, "is that there's an awful lot of information available from space that we don't do a good job of exploiting. We don't manipulate it properly. We've got to make some leaps of faith—exploit what space can do for us."

In the Air Force space community, where his bluntness and bustle quickly earned him the sobriquet "Hurricane Charlie," General Horner is widely regarded as the right man at the right time. Martin C. Faga, former assistant secretary of the Air Force for Space, maintained that General Horner's "operational experience with space gives him enormous credibility. He's been there. He leads from the perspective of the [space] user. The operational forces have confidence in him."

"I Should Have Known"

General Horner recalls that "Desert Storm was an awakening—a shock—for the operational Air Force on what space could do for us." He was anything but savvy about space at the start. To illustrate, he tells one on himself, citing the Desert Storm role of Defense Support Program (DSP) early warning satellites designed solely for cold war sentry duty, detecting

A Defense Support Program early-warning satellite is deployed from a space shuttle. During the Gulf War, the DSP system was diverted from its cold war strategic mission to provide tactical warning of Scud missile launches. Tactical requirements drive the development of follow-on satellites.



launches of nuclear intercontinental ballistic missiles against North America.

"I was already aware of the danger from [Iraqi] Scuds before we went to the Gulf," General Horner recalls, "but it never occurred to me to use DSP to provide warning of Scud attacks, because I was ignorant of space. The space guys figured they could help, and they sent a team to CENTCOM and set up a Scud warning system for us. It turned out to be gravy, a beautiful system. But shame on me. I should have known."

As a matter of fact, hardly anyone knew, not even in the military space community. Lt. Gen. Thomas S. Moorman, Jr., who commanded Air Force Space Command during the war, recalls that "we never thought of DSP as a tactical system until Desert Storm."

Now the Air Force is moving to develop the Follow-On Early Warning System (FEWS) of advanced satellites to take the place of DSP satellites. "The tactical need for FEWS is what really drives that program," General Moorman explains. He points out that weather conditions, time for preparation, and other factors were conducive to changing the job descriptions of

DSP satellites and employing them as Scud-watchers. It is "not likely," he says, that DSP satellites would do anywhere near as well the next time out.

Nothing concerns General Horner more than the threat of ballistic missiles armed with mass-destruction nuclear, biological, or chemical warheads. He claims that seventeen countries now have or will soon possess such missiles to put US forces, and perhaps the US itself, at risk.

General Moorman, now the deputy commander of Air Force Space Command, says General Horner "is more bullish on missile defense than anyone I know, because he has lived it. He was the air commander in the first war ever to threaten our forces with ballistic missiles. It is the shape of the future, and we have to deal with it."

In dealing with it, detection and warning come first. Detection of ICBMs and of theater missiles from space works basically the same way. Warning should not, General Horner claims.

Early warning satellites now transmit signals to ground stations around the globe to be relayed to NORAD deep inside Cheyenne Mountain near Colorado Springs. NORAD then alerts

the national command authorities and the nation's nuclear deterrent force, once managed by Strategic Air Command and now by the unified US Strategic Command.

False Alarms

The system works in a roundabout way, explains General Horner, "because it was designed to support strategic nuclear warfare—we wanted to have very tight constraints on the [warning] data so we wouldn't respond to a false alarm."

As a result, signals from DSP satellites during the Persian Gulf War had to go first to NORAD and then from NORAD to CENTCOM's headquarters at Riyadh. In General Horner's view, a satellite warning network for theater missile defense should bypass NORAD and send signals directly to the troops in the field, for example.

This will happen, General Horner says, "if we can get away from the idea that we have to be absolutely sure that the data [from space] is true data—in other words, that we can live with false alarms."

He points out that false alarms can serve a purpose. Last year, as Saddam Hussein began acting up once again, a DSP satellite spied a heat-spot flare-up in Iraq and classified it as a Scud launch. NORAD relayed the alarm to allied Operation Southern Watch headquarters in Saudi Arabia, where it was found to be false. NORAD operators were chagrined, but those on the lookout for Scuds around the Gulf took a different slant.

"They said it was great for them," General Horner recalls, "because it gave them a chance to check out their warning net within the theater. The fact that it wasn't a Scud launch after all made them feel pretty good."

He maintains that advances in manipulating data with modern software now make it possible to disseminate warning signals from space in diverse ways for different purposes, with one network devoted to the strategic nuclear arena and others to various tactical settings.

"What we have to do," insists General Horner, "is change our emphasis from strategic war to theater war. We have to get over the cold war and make sure that we're equipping and training and organizing to fight the kind of war that's probably going to be thrust upon us. All of us in the space community must concentrate

our thinking on how we can directly support the warfighters.”

In this vein, he looks forward to the day when “every infantryman will carry in his pocket a pencil with a little light bulb on the end of it, and when a satellite picks up a launch, a red light comes on, telling him to take shelter. Seven minutes later, if the missile hasn’t hit nearby, he steps out.”

This sort of thing is already happening. Individual soldiers in the field can now receive ultraprecise navigational, position-fixing signals from Global Positioning System (GPS) satellites. Army Space Command, part of US Space Command, made it happen by developing small GPS receivers, each light enough for a soldier to tote. They came into play in the Gulf War, as did GPS terminals in some combat tanks and aircraft, all with stunning effectiveness in precision of firepower. Miniaturization is the name of the game. Next-generation terminals called PLGRs—precision lightweight GPS receivers—are in development.

After the Gulf War, the Air Force added \$400 million to its budget to move faster in equipping combat aircraft with GPS terminals. General Horner calls GPS “the wave of the future” in all military operations and asserts, “It ought to be in every single airplane we fly.”

Reducing Fratricide

He sees GPS as the key to reducing fratricide, a much-publicized blot on allied operations in Desert Storm. Friendly fire casualties among ground troops most often occur when planes in air-to-ground operations mislocate those troops and identify them as hostile. With GPS in widespread use, such fatal errors are much less likely.

General Horner foresees GPS satellites working in concert with surveillance satellites to give aircrews a tremendous advantage in future operations. The idea is to display terrestrial images in cockpits in combination with their precise locations.

To make his point, he uses the example of an unclassified imaging satellite: “Say a Landsat takes an image of a certain GPS coordinate on land. There’s no reason in the world why we couldn’t develop processing equipment that searches through the Landsat signal and finds that image and feeds it to the cockpit’s multifunction display. Or the image could go to the

TACC—the tactical air control center—where they would say, ‘Oh, would you look at *this*,’ and then punch a button and send it on up to the aircrews.”

In many instances, he says, it might be better to relay such images through ground control centers. “There’s so much information available, we’ve got to manage it. We don’t want to overload the pilot or the ship captain or the tank commander. We want to provide them with the latest available information from all sources.”

Feeding data from satellites directly into cockpits “is obviously easier to do with signals than with images,” he says.

The Air Force has been working on doing it both ways ever since the Gulf War. Experiments at Nellis AFB, Nev., in a program called Talon Sword, have demonstrated that data from imaging satellites can be transmitted to aircraft via standard data links, down from space or up from ground stations, and displayed on large screens characteristic of modern “glass cockpits.”

Mr. Faga, who was also director of the National Reconnaissance Office, steward of spy satellites, recently described the technique as “imagery on a display.” He said it involves “feeding the [satellite] data right into the stream” of all data being received by the aircraft’s multifunction terminals.

He predicted that “it won’t take very long” to make such a system fully operational “because all the equipment is essentially in place.” Interfacing that

equipment electronically in an avionics black box is nearly all that needs to be done, he said.

High Promise

The project at Nellis holds high promise for the future situational awareness of aircrews en route to and within combat zones. If it pans out as expected, it will give aircrews, especially those deploying on short notice to distant places, a big advantage in seeing and preparing for what lies ahead.

This alluring prospect is said to be a big reason why Gen. Merrill A. McPeak, Air Force Chief of Staff, has become one of the USAF space program’s most enthusiastic supporters.

Would the downing of a plane in enemy territory breach the security of the satellite sending it images? Mr. Faga said it would not, because there would be nothing more than an empty display screen for the enemy to see. The plane would have received its satellite data as part of its regular data stream and not by means of a dedicated receiver too precious to compromise.

During the cold war, most data from reconnaissance satellites described as “national overhead assets” never got to the armed services. The Central Intelligence Agency and other intelligence outfits kept clamps on the data for their own purposes, such as strategic intelligence and monitoring of arms-control agreements.



British forces took advantage of the GPS in the Gulf War by equipping Puma helicopters with commercially available GPS receivers. General Horner says GPS is “the wave of the future” and “ought to be in every airplane we fly.”



Communication satellites networking with ground receivers are indispensable instruments of modern war. General Horner calls space systems "more and more critical to military operations" and says they must be made more responsive.

Now the formerly all-black world is showing shades of gray. More and more spy satellite data are being disseminated to military forces by such means as the Tactical Exploitation of National Capabilities Program (TEN-CAP), which presumably will come into play in routing reconnaissance imagery to TACCs and to combat aircraft. Such imagery has reportedly been displayed in certain intelligence-gathering aircraft for some time.

General Horner starts with the needs of combat forces in his approach to just about everything that his space commands do—establishing requirements and drawing up specifications for satellites, boosters, and terminals, setting timetables for launches, and reshaping and refurbishing the space launch infrastructure.

He has been outspokenly critical of the high cost and sluggish pace of launches ever since he set foot in space headquarters. General Moorman attests to that, noting that "launch is a subject my boss, General Horner, is beating on very hard. He brings a fresh outlook to the space community, and he has us thinking about on-time launches or, in airplane parlance, on-time takeoffs."

"That's a new thought to us and a welcome emphasis, because we had become self-satisfied with the old and tremendously costly ways of doing business," General Moorman declares.

Those ways have had their day, General Horner insists. "They have to

change because space has changed," he asserts.

Since the dawn of the space age, it has been standard practice first to design satellites, then launch systems to conform to the satellites, and finally launch control facilities to conform to the launch systems. General Horner believes the process should begin with a determination of operational requirements and go from there to design of launch systems and, finally, of satellites. "The launch infrastructure is every bit as important as the booster or the payload," he declares.

Cut Cost, Increase Efficiency

Last year, Congress scrapped the USAF-NASA proposal for the \$10.5 billion National Launch System (NLS), a new family of advanced but technologically proven space boosters. A congressional report at year's end exhorted the space community to "find ways to reduce the cost and increase the efficiency of satellite design, acquisition, launch, and operation."

General Horner is all for that. He says the US space community must "get our act together." He maintains that the NLS went sour on Capitol Hill because "the various space organizations could not come up with a common set of requirements." Time is running out, he says, warning that US commercial and civil space operations are in imminent danger of losing out to less costly, more efficient foreign competitors.

The US space community now has a second chance to come together on a next-generation launch system—Spacelifter, a set of boosters recently recommended by a White House advisory panel on space under the direction of former Air Force Secretary Edward C. "Pete" Aldridge, Jr. General Moorman, who had a leading role in the panel's two-month study, says Spacelifter "is getting a lot of support in the Air Force."

Spacelifter boosters would be designed to launch payloads of 20,000 to 50,000 pounds, including king-size classified satellites, into low-Earth orbit "within a few days, not months" after operational forces call for them, General Moorman claims. "That's very important," he continues. "We are not capable now of launching on demand if we get into a hot war. It's as simple as that. Desert Storm worked well because we had a robust constellation of satellites [already in space]. We might not have that luxury in the future."

General Horner notes that the US is "preeminent in satellite design but losing ground rapidly in launch" and declares, "Space is more and more critical to military operations. . . . Right now, if we wanted to put some kinds of satellites in orbit, it would take us a year to do it."

Space requirements and training also leave a lot to be desired, in General Horner's opinion. He notes that users have a big say in setting requirements for aircraft but not for space systems. "Unfortunately, our history in space is that we go from technology to technology" without much thought of customers, he says.

A big reason for this, he acknowledges, is that, by and large, the operational users of space systems have not learned enough about them to say what they need from them. Training is the answer, and it is a two-way street, with space officers and NCOs joining other kinds of operational units to learn their operations and find out first-hand how space can help them.

General Horner says he has found his space personnel "bright, aggressive, enthusiastic, and proud of what they do" but believes they have been "kind of sheltered from the rest of the Air Force too long." He says they "need to be on the staffs" of warfighting commands "to bring an awareness of space to the guys who drop the bombs, shoot down the airplanes, and drive the ships." ■

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The F-111 isn't old. It's mature. More important, it still gets the job done.

The Aardvarks Gather at Cannon

By Frank Oliveri, Associate Editor



NORTH Vietnamese troops, encountering the F-111's power firsthand, coined a name for the big fighter-bomber; they called it "whispering death." In the Persian Gulf War, Iraqi tank crews learned not to sleep in or near their tanks; they didn't even hear a whisper. For them, the F-111 was death, period.

The power of this generation-old aircraft is on display at Cannon AFB, N. M., where the Air Force has organized five squadrons into the 27th "super" Fighter Wing, bringing together all the remaining aircraft of the type. The Air Force is investing hundreds of millions of dollars in the 27th FW to keep the F-111 and EF-111 serviceable for years to come. This is seen as a controversial move, given that the average age of the F-111 exceeds twenty years.

The reason for this action can be boiled down to one word: capability. No other aircraft in the inventory can deliver so many laser-guided bombs, at night, in all weather, accurately, with the F-111's range and speed. The EF-111, the F-111's electronic warfare stablemate, is seen as the most capable jammer in the Air Force's bag of tricks.

Cannon AFB is now the home of the F-111 "Aardvark" in all its forms. Out at Cannon, as at many other F-111 bases over the years, operators are sensitive to any perceived slights. When told the plane is old, they respond that it is "mature." When asked, "What's

sexy about an F-111?", they have a ready answer. "Bombs on target," said one pilot. "That's what's sexy."

Official Persian Gulf War assessments reported that fleets of F-111s destroyed dozens of bridges, hardened aircraft shelters, military buildings, and hardened command bunkers. F-111s zapped at least a quarter of all known Iraqi tanks, plus hundreds of armored personnel carriers and artillery pieces. The aircraft also attacked mobile missile launchers.

"Every airfield anywhere in southern Iraq we hit and pretty much obliterated," said Capt. Wylie Lovelady, an instructor pilot with the 428th Fighter Training Squadron who flew thirty-five Desert Storm missions for a total of 138 hours.

For the F-111, this was nothing new. Throughout its operational life, the -111 has shown perhaps the greatest precision strike capability of any USAF fighter. Whether hugging a Vietnamese mountain slope to attack a SAM site, flying a nonstop, round-trip bombing mission between Britain and Libya, or attacking an Iraqi bridge from medium altitude with a laser-guided bomb, the F-111 does the job like few others.

One Fighter, Many Missions

F-111F missions are many and varied—deep interdiction, battlefield air interdiction, even some close air support. Because it is equipped with the AIM-9M short-range attack missile,

the F-111F has a limited air-to-air capability, used almost exclusively for self-defense.

In Desert Storm, no F-111F mission was more successful or unexpected than "tank plinking." Much has been made of the tank-killing prowess of the A-10, the F-16C, and other fighters, but the F-111F killed more tanks in the Gulf War than did all other aircraft combined.

"With our seventy jets, we did more armor destruction than anybody," asserted Captain Lovelady. "We did more destruction of armor than A-10s, all the F-16s, all the F-15Es, [that] were at the front. That was one of their dedicated missions."

Captain Lovelady said he and his fellow F-111F pilots had demonstrated the power to knock out tanks at will, while pilots of other aircraft were having some problems.

"We have a mature weapon system," said the captain, speaking of the F-111's Pave Tack infrared and laser-aided target designator. "Pave Tack has been around for a long time, and we know how to use it. LANTIRN is brand-new, and there are a lot of things that [its users have] to learn about it. We are very good at doing what we do, and they are just learning now."

Captain Lovelady admits that Pave Tack isn't perfect. "To get a hit with those things [Pave Tack pods], you've got to have clean air," he said. Clouds or ground smoke could obscure targets from the infrared Pave Tack system. If you can't see, you can't use your lasers, and your smart bombs become ignorant.

Aircrews say that some of the credit for the F-111F's success against tanks must go to air liaison officers who provided intelligence on the location of enemy tanks. An F-111 crew would find the target, the Weapon System Officer (WSO) would pick it up on the IR screen, the computer would generate a release point, and the bomb would glide to the target. There were some complex operations, too. "We did a lot of coordinated stuff," said Captain Lovelady.

The whole of northern Kuwait and southern Iraq was divided into what commanders called kill boxes—large square areas that were part of a map grid covering the region. Captain Lovelady's squadron was ordered to focus on Republican Guard divisions. A four-ship formation of aircraft would

Staff photo by Guy Aceto



The EF-111A Raven (this one is from the 430th Electronic Combat Squadron, Cannon AFB, N. M.) carries ten jammers internally and can fly with a strike package on the deck, at high speeds, and to extreme ranges.



An F-111F from the 423d Fighter Squadron, also at Cannon, shows its stuff in the skies over New Mexico. This Pave Tack-equipped fighter is carrying two 2,000-pound precision guided munitions, an ECM pod, and AIM-9P Sidewinder missiles.

be assigned a kill box for fifteen to thirty minutes at a time. Each F-111F would carry four 500-pound GBU-12 laser-guided bombs. A four-ship could be assigned four or five kill boxes.

A Battalion Here, a Division There

"We would cycle through all these points so as not to fly the same spot over and over again where guys could pick us up on the ground and eventually start shooting at us," Captain Lovelady explained. "So we hit a tank battalion here, another tank battalion there. Maybe an artillery division here, and maybe a headquarters or air defense unit there.

"You might find a spot where there are several tanks. . . . There might be ten or eleven tanks in a horseshoe shape, a defensive situation, or retted up where they push a bulldozer in and put tanks in there. You just look at them, find a good target to hit, and designate him. Get updated steering to it, release the weapon, then you have to delay a lase on those things.

"There is a little bit of finesse involved. There's a whole lot of crew coordination. If you listen to the tapes you can hear us talking. 'Hey, you've got something there?' 'Am I cleared to release on this one?' If the WSO was not confident, you went on to the next one."

The captain said that the F-111s would use the same three or four kill

boxes all night, sometimes sending forty jets into the area to attack tanks.

"We normally didn't hang around one tank unit and do a circle on him and keep hammering him," said Captain Lovelady. "We just continued to press on. It works a lot better for our protection, and you can imagine what it must be like for the guy on the ground to all of a sudden see his buddy on his left just disappear. He's thinking, 'Maybe I'm next.' You don't know. You never heard an airplane. You never heard a bomb fall. Boom!

He's gone. And maybe fifteen minutes later the guy on your right is gone. That's got to be terribly demoralizing."

Long after the end of the war, the F-111 continues to make its presence felt in the Middle East. Several are on hand for Operation Provide Comfort, where they fly armed patrols over the UN-enforced no-fly zone encompassing most of northern Iraq.

Capt. Bob Silva is an F-111 pilot with the 524th Fighter Squadron and a veteran of Provide Comfort. "We'd fly over the area, reconnoiter the sites that they would give us to look at, check for enemy activity, and see if there was any kind of buildup," he said. Officials then "would use the information to determine what they were up to."

He said he typically flew in two-ship elements, twice a day. "We'd take off and enter the AOR [area of responsibility], and we would have areas that we would look at for concentrations of enemy defenses, fly low over those targets, and get a visual recognition and report what we saw. We would fly over the area at low altitude with one person in front low and the other high in a wedge-trail position watching for threats.

"It's a no-fly zone, but we didn't monitor the air at all. AWACS [the E-3 Airborne Warning and Control System aircraft] is watching the air, and there were F-16s and F-15s providing air cover."



The F-111 is the only USAF fighter with side-by-side seating. Pilot and Weapon System Officer are expected to communicate constantly to ensure that proper procedures are being followed and to improve overall situational awareness.

Staff photos by Guy Aceto



The last of the "Century Series" is represented by an EF-111A (430th ECS), an F-111F (423d FS), and an F-111G (428th FTS). The EF is easily recognized by the pod atop its stabilizer; the F-111F's Pave Tack pod hangs from its weapons bay.

Composite Force Exercises

F-111s forward-deployed in the Middle East regularly conducted composite force exercises with USAF F-117s, F-15Es, and F-16s, British Jaguars, and French Mirage F1s. They had preplanned simulated targets. Aircraft were fully armed, and missions were carried out above 10,000 feet to prevent confrontation with AAA fire.

The 27th Fighter Wing comprises the F-111D, E, F, and G models, plus EF-111 jammer aircraft. The wing is retiring the D and G models (the G is an upgraded FB-111) from active squadrons and replacing them with the F-111E and F models. Some of the older planes will be used primarily for training.

The EF-111A provides electronic countermeasures support for tactical air forces. It functions particularly well in harness with the F-111F because they have similar flying capabilities.

The heart of the wing is the F-111F, which saw heavy use during Operation Desert Storm. At the heart of the F-111F is Pave Tack. It allows aircrews to perform precise, single-pass bombing against high-value targets, using gravity bombs or laser-guided munitions. The Pave Tack pod is an aerodynamic structure mounted in the weapons bay of the F-111F.

When flying at low level, the aircraft is directed by a terrain-following radar, which has triple redundancy. If

the system should fail, the aircraft automatically pulls itself into a 2.4-G climb.

The F-111F can reach an astounding Mach 2.5—and Mach 1.2 on the deck. Providing the F-111's power are two Pratt & Whitney TF30-P-111 turbofan engines, which together produce 25,100 pounds of thrust with afterburner. Because it can be refueled, the range of the F-111F is limited only by the endurance of its crews. It can fly about 2,900 miles unrefueled.

Air Force officials are quick to

acknowledge that the F-111F is not problem-free. Heading the list of shortcomings are its high maintenance and support costs, measured in both dollars and time.

It's not hard to see why supportability costs so much. To look at an F-111F's cockpit is to travel back in time to an era when analog systems were considered the state of the electronics art. The sight of dozens of glass gauges and switches overwhelms an onlooker familiar with the cockpits of today's newer fighters.

Brig. Gen. Rick Goddard, commander of the 27th Fighter Wing, conceded that it costs significant amounts to maintain the F-111 avionics and engine subsystems. The Air Force regularly—and automatically—replaces certain F-111 engine and avionic subsystems, whether or not they have failed, simply because the systems have proven so unreliable. Ground crews work long hours to keep the "Aardvark" flying.

The Air Force has initiated a two-step plan to deal with such problems.

A Two-Step Plan

The first step was the adoption of the super wing concept, which the 27th Fighter Wing embodies. The 27th, when fully organized, will have about 140 F-111s and is likely to be USAF's largest wing, said General Goddard.

"It's pretty clear that the ability to support a total mission-series airplane



The TF30-P-111, regarded by some as a dinosaur, requires extensive maintenance, but it powers the F-111F to a phenomenal Mach 2.5. Talented Air Force personnel keep the thirty-year-old engines running.



The "Aardvark" is an old warrior and sometimes requires a little TLC before it is ready to fly. Here, maintenance crews of the 423d FS work to fix a small problem while pilot and WSO patiently go about their preflight regimen.

at one place reduces the redundancy," he said. "If you have multiple bases, you have multiple pieces of support equipment, . . . multiple test stations, avionics support, and all those things that support airplanes."

The Air Force can bed down all F-111s at one base because they are relatively few in number. For one base, however, the number of aircraft is quite large. "When you look at our ramp out there," declared General Goddard, "and consider that we will have assigned to us in the neighborhood of about 140 airplanes, . . . that's a large number of planes by any wing's standard."

The second step in the get-well-and-stay-well program is to apply an upgrade program called "Pacer Strike."

Under this program, eighty-four F-111Fs will be modernized to extend their service lives to at least 2010. Plans call for ripping out analog electronic systems and replacing them with digital ones, installing a ring-laser gyro inertial navigation system, and installing Global Positioning System satellite terminals. New software will be added. Integrated cockpit displays will replace dials and switches.

The "avionics modernization program . . . changes all those old black boxes and systems to the new, state-of-the-art systems," General Goddard explained. "We're not changing the capability, because the capability is



Staff photos by Guy Aceto

wonderful. We're changing the reliability and the supportability" of the F-111.

The first Pacer Strike variant of the F-111F went aloft in late 1992. That flight was the first of twelve that will be conducted by Rockwell contractor personnel before the airplane is turned over to the Air Force. Installation of Pacer Strike systems in all eighty-four aircraft is scheduled to be completed in Fiscal 1998.

Maintenance support is critical to keeping the F-111s flying. CMSgt. Mike Loniewski, who helps run the intermediate engine shop at Cannon, said that soon the wing will eliminate

intermediate maintenance in USAF's pursuit of two-level maintenance. The base is not far from Oklahoma City Air Logistics Center at Tinker AFB, Okla., where most of the work on the TF30-P-111 will be done. The shop currently has seventy or so engines in different stages of repair. Keeping the TF30 running is a challenge, with most of the engines pushing thirty years.

The Hotter Afterburner

Trouble spots for the engine are found primarily in the afterburner, which runs much hotter than more modern engines do. Chief Loniewski said that a T5 limiting system has been added to the engines so that in peacetime it can run cooler. In wartime, performance can be stepped up to add an additional 2,000 pounds of thrust.

In the mid- to late 1990s, the Pacer repair program will seek to upgrade all older parts with new, more efficient engine parts. The afterburner will likely be upgraded at that time. Chief Loniewski said that moving aircraft to Cannon, rather than to RAF Lakenheath, UK, will also reduce wear on the engines and prolong their lives. The salt air at Lakenheath corrodes the TF30s.

Setting up the wing at Cannon is no easy task. While the rest of the Air Force is shrinking, Cannon is growing. General Goddard said about \$163 million in construction is going on at Cannon. About 700 houses



The -111 in all its forms (above, an EF-111 and an F-111F) continues to provide effective interdiction. With Pacer Strike upgrades planned for the near future and Cannon AFB as its new home, the F-111 will fly beyond 2000 without a murmur.

are being built for personnel and families. "As you bring all of this together in one place, you encounter many problems," the General said. "We're having to work around a number of problems. Not enough airplane hangars, not enough housing for our folks."

The super wing also brings great benefits, one of which is having a training squadron for the F-111 right on base. The 428th Fighter Training Squadron is teaching pilots and WSOs to fly and fight with the F-111F. "Having the customers of the training squadron right here on base means we get quick feedback from the training perspective," said Col. Tom Runge, deputy commander of the 27th Operations Group.

It takes about seventy hours of academics, simulator work, and flying to make a brand-new lieutenant proficient in an F-111F.

Pilots and WSOs still spend lots of time training at low level because of the inherent protection low-level flight affords a nonstealthy fighter. In addition, there is the difficulty of training a WSO to find a target with the Pave Tack system, which has been compared to "looking at the world through a soda straw." Doing this while flying at low level is the most demanding profile the WSO will ever face. Since the Persian Gulf War, a greater emphasis is being placed on medium-altitude missions, which are easier and safer.



A Master Stroke

Basing both EF-111As and F-111Fs at Cannon AFB has proven to be a master stroke. "We have just started up programs to integrate EF-111s with our F-111Fs," said Colonel Runge, "but, by integrating the training mission on a local level, we can have the EF guys teach the F model guys about their capabilities and limitations, and the F model guys do the same things, which is really helping us if we had to go do something as a team."

Sen. Sam Nunn, the Georgia Democrat who chairs the Senate Armed Services Committee, last year pro-

posed giving the standoff and escort jamming mission for all services to the Navy, which would use its EA-6B in support of Air Force and Navy strike missions. The fate of the EF-111s was left fuzzy, though dropping them from the force presumably was one possibility.

"You're comparing apples to oranges" in pitting the EA-6 against the Raven, said EF-111 Electronic Weapons Officer Lt. Col. Curt Seebaldt. "They're two different aircraft with two different missions. [The EF-111] carries ten jammers internally all the time. It shows up with them. It doesn't have to download a drop tank and upload a jammer. It has two people vs. four [on the EA-6B]. It can go right with the strike package at 540 knots on the deck or faster if they want. EA-6s can't do that.

"The roles are different. They do

relatively the same thing, but the job of the EF is to go deep and travel with the strike package, embedded in the strike package. The strike package doesn't have to slow down to an EA-6 airspeed at 480 knots. Plus, it [the Navy's jammer] doesn't have the range that the EF-111 has."

Air Force planners think the EF-111 and its interdiction version—the F-111F—will be around for quite a while. Given the combined combat punch of the F-111F/EF-111A duo, observed General Goddard, Cannon AFB will be the home of "the most significant combat force in the Air Force, in my judgment." ■

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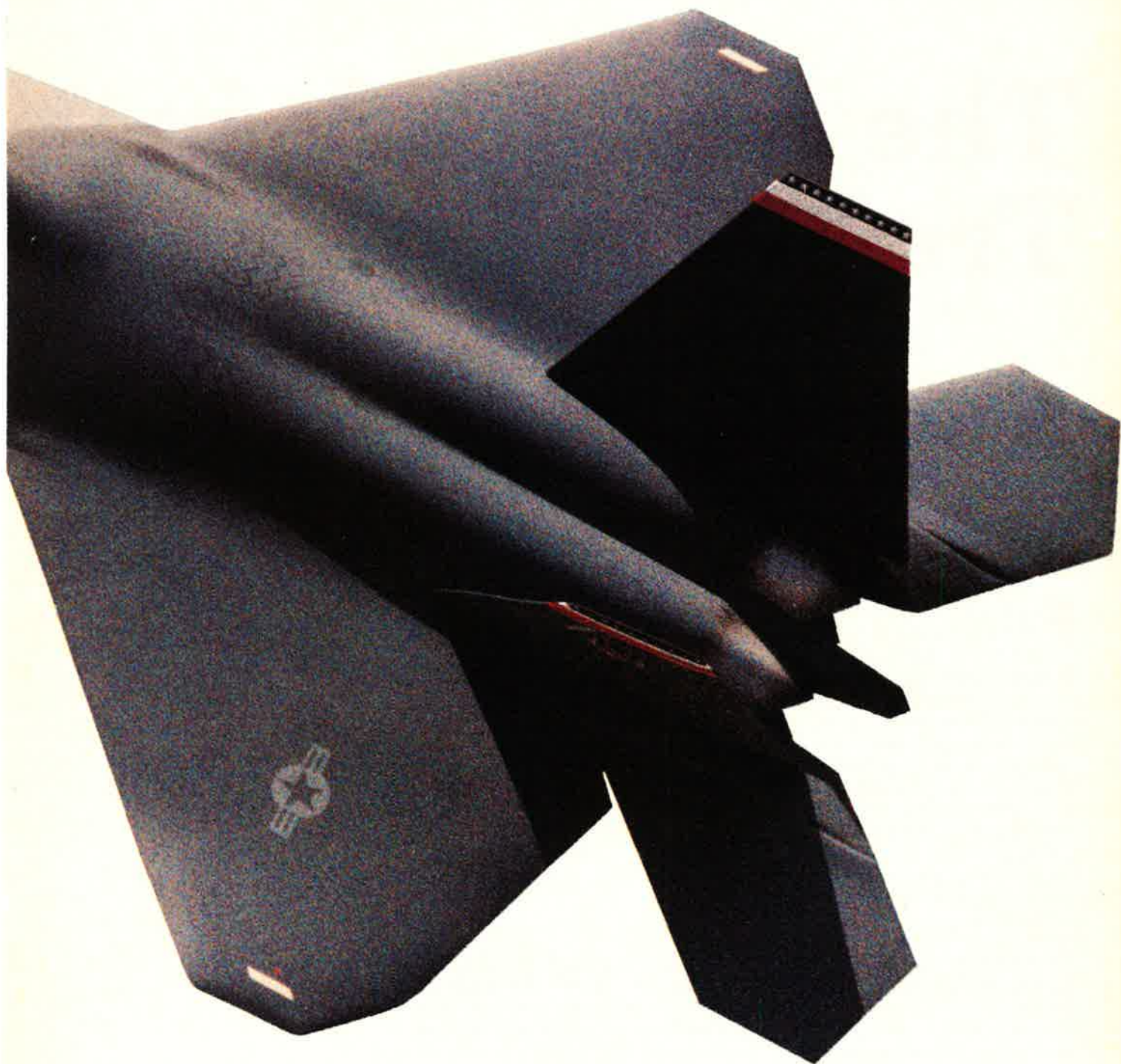
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One outcome of the big training study in 1992 will be the establishment of Air Education and Training Command this summer.

The New Look in Training

By Peter Grier

Randolph AFB, Tex., will be home to Air Education and Training Command's 19th Air Force, which will oversee flying training. Opposite, a nighttime view of the main building at Randolph, a major training center since 1930.

FOR the Air Force, 1992 was the "Year of Training." Per order of USAF Chief of Staff Gen. Merrill A. McPeak, senior officials spent much time and effort studying how well the service prepares people to do their jobs. Task groups looked at the training process from top to bottom, with simple questions in mind: What was the instruction trying to achieve? Who should do it? Where should it be done?

That year-long effort is over. Air Force training is undergoing fundamental reorganization to reflect new governing concepts and higher standards, according to General McPeak. He told the Air Force Association's Air Warfare Symposium in Orlando, Fla., last February, "The Year of Training has produced changes that will take years to implement and refine."

The year of poking around and asking about the basics showed that training had become quite diffused. Instruction in initial skills went on throughout the Air Force, from Lackland AFB, Tex., to the flight line of every wing in the service. To a certain extent, training should be part of everyone's business, but skills instruction had become so spread out and informal that quality control was being lost.

"There wasn't really a central focus on what we wanted our Air Force training to be and do," said Gen. Henry Viccellio, Jr., commander of Air Training Command (ATC), who also addressed the AFA symposium.

The first big change to come out of the Year of Training is a major shuffle in structure. On July 1, ATC and Air University will merge and become a new organization, Air Education and Training Command (AETC). General McPeak refers to this organization as "ETC." It will be a four-star command, and General Viccellio is slated to be its first commander.



USAF photo by Maj. R. Toothaker

From Thirteen, Nine

This merger will bring about a number of organizational improvements, according to the Chief of Staff. For one thing, it continues the trend toward fewer commands and less money spent on headquarters overhead. When General McPeak took office, the Air Force had thirteen major commands; after July 1, there will be nine.

The merger will also place a four-star general in charge of USAF's whole education and training effort. These functions had been separate because they are not the same thing: Training teaches people how to do their job, while education improves their ability to think. This distinction is becoming less important as responsibility is pushed lower in the ranks in today's Air Force, say senior Air Force officials. The goal of overall improvement demands that everyone be able to both think and do.

AETC will have a structure similar to that of a combat command, with four main components. Two of the four components will be numbered air forces: 19th Air Force at Randolph AFB, Tex., which will oversee flight training; and an as-yet-unnumbered air force at Keesler AFB, Miss., to run

technical training. AETC's other two parts will be Air University at Maxwell AFB, Ala., and Wilford Hall Medical Center at Lackland AFB, Tex. AU will handle professional education programs, as well as Officer Training School and ROTC. Where the Air Force Academy will fit in the new service structure has yet to be decided in any permanent way.

The Chief of Staff said that the order of the words in the new command's name—"education" first, and then "training"—is significant. He said this was done because "we wanted it understood that we are not subordinating education to training."

A second major Year of Training structural change is the assignment of most weapon systems crew training to AETC. This kind of instruction, now handled by Air Combat Command and Air Mobility Command, involves such tasks as checking out new pilots in particular aircraft, formation flying, and qualification in firing particular weapons.

Until the 1960s, ATC performed such combat crew training. The task will return to its successor organization, AETC, in two phases. Responsibility for F-15s, F-16s, C-5s, C-141s,

KC-135s, intercontinental ballistic missiles, and rescue and special operations training will transfer to AETC on July 1. Responsibility for A-10, OA-10, C-12, C-21, and C-130 training will switch over at some undetermined point shortly thereafter. The combat commands will keep responsibility for crew training of some systems, such as the F-117 and F-111 fighters.

To enable the new command to handle the work load, the Air Force will shift control of Luke AFB, Ariz., Tyndall AFB, Fla., and Altus AFB, Okla., to the AETC commander.

The Year of Training looked at more than organization. Among its other changes is a USAF-wide shift to higher standards. Mileposts in enlisted training will require more experience. For example, to reach the craftsman seven level, candidates will have to make a second trip to technical training school. Professional military education will impose more stringent requirements on students, and the coursework will have to be performed in residence. Correspondence courses are being eliminated.

"When someone hears that Captain Smith or Sergeant Jones is Air Force—

trained, they'll pay attention," said General McPeak.

Five New Directions

Big revisions from the Year of Training have pushed the Air Force training structure to take a hard look at the way it does business. The result, said General Viccellio, will be hundreds of individual changes grouped in five major directions: refocusing initial skills training, standardizing the training pipeline, revamping the continuation training program, synergizing education and training, and burnishing the image of the new AETC.

The point is to "add more quality, consistency, and rigor to our programs," said General Viccellio, who described the five directions in detail.

Initial skills training. For the Air Force, the problem is that everyone wants a slice of the skills training pie. Contenders include ATC, the operating commands, and even the functional fiefdoms of engineers, medics, communicators, and the like.

This situation, say Air Force officers, has developed at least partly because ATC has not been doing its job. General Viccellio said that, during his two stints as a wing commander, he spent twenty-five to thirty percent of his time and resources teaching new assignees the skills they were supposed to know.

Pilots would need up to forty sorties before they were ready to fly even as wingmen. Enlisted personnel would arrive without having seen the airplane part for which they would be responsible or the test equipment they would have to use. Among the workarounds that arose to deal with this shortfall were field training detachments, which at the height of their popularity numbered ninety-seven.

The new goal is to make sure people are useful on the job as soon as they arrive at their first operational assignment. Warfighting commands would thus be freed of the burden of initial training augmentation, which detracts from their primary purpose. The addition of Luke, Tyndall, and Altus AFBs will be a big help in this regard, providing a location and airplanes for hands-on systems skills training.

Another improvement that already has been put in place is specialized undergraduate pilot training (SUPT).

By splitting pilot candidates into bomber-fighter and tanker-transport tracks following primary training in the T-37, the SUPT system allows an earlier focus on skills needed to fly specific systems.

The name for this new approach is the "Lackland to Langley" continuum, as it applies to those in the enlisted ranks, and "Reese to Ramstein," as it applies to those in the pilot force, said General Viccellio. "It's really a pillar supporting the other changes we're making."

Standardization. A by-product of diffused initial skills training was a lack of standardization. In many specialties, trainees were sent out of boot camp in hopes that somewhere they would run into an NCO or officer who could teach them what they were supposed to do and perhaps what the Air Force had to offer them.

Adequate initial training will give everyone the same understanding of how to do specific jobs and what the service is all about. "They'll not only learn what they'll do in the Air Force, but they'll learn the way their function contributes to the total effort," said General Viccellio.

Continuation training. To get ahead in today's USAF, individuals need to keep up with technical developments and learn how to handle increased responsibility. That often involves continuation training—follow-on instruction involving a brief return to school. Maintenance workers need to understand how to work on the latest composites, for example; firemen need to understand new chemical fire-suppressant systems.

Participation in these programs has been determined haphazardly, often at the local level. In the new AETC, technical updating will be more systematic. All NCOs will go back to school for refresher courses as they prepare to assume seven-level responsibilities—in other words, when they get ready to make supervision a major part of their jobs.

Individuals participating in this training will receive not only technical updates but managerial and motivational instruction as well.

Education and training synergy. Among other things, the Year of Train-

ing revealed that education and training had become quite distinct entities. Education was carried out primarily by Air University, training by ATC. Nobody was looking to see if their courses meshed.

The result was a training system that left many individuals only half-prepared for their jobs. The review discovered many Air Force people who were highly interested in education and who had been allowed to focus on that alone—receiving many diplomas at the expense of on-the-job training. The reverse was also true. The review identified many airmen who quickly gained skills, responsibilities, and stripes with little formal education.

The new goal is for a more balanced blend of know-how and supervisory and leadership skills, to ensure that key people are fully ready to lead others. The merger of ATC and Air University is intended to create synergy in this regard.

One of AETC's first tasks will be to complete training and education "roadmaps" for every career field in the Air Force. These maps will tie together such key career steps as skill ratings, grade, education, and qualification milestones. "These roadmaps will define what our people need and when they need it," said General Viccellio.

Command image. The final departure for AETC will be an attempt to change the way trainers are perceived throughout the Air Force. Too often, according to General Viccellio, training activities are viewed as separate by the rest of the service. He said that instruction is seen as something run by "those training commandos down in Texas" who are concerned with their own priorities and not those of the warfighting force.

The head of the new AETC wants his command activities to be recognized as part of the Air Force mainstream and his product a key part of every warfighter's concern.

Taken together, the changes are sensible and indicate a vast change in philosophy, according to General Viccellio. "It may not quite be training's equivalent of moving from props to jets, but it may be pretty close," he said. ■

Peter Grier is the Washington, D. C., defense correspondent for the Christian Science Monitor and a regular contributor to AIR FORCE Magazine. His most recent article, "Warner Robins, Inc.," appeared in the March 1993 issue.

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The UK defines itself as a medium-size country with global influence but not global power.

Britain's Defense Shakeup

By Stewart M. Powell

BRITAIN'S armed forces are in the throes of what may prove to be the most far-reaching shakeup in their history. In a recent white paper, the Defence Ministry states that its goal remains "protection and security" of Britain and its dependencies "against any major external threat." The defense establishment itself, however, will see dramatic change.

The United Kingdom's 324,000-member, all-volunteer forces are undergoing a painful, eighteen percent cut in size, an ambitious internal restructuring, and a shift in the allocation of funds toward procurement of more highly advanced weapons in lesser quantities. The government is taking these steps in an effort to build a force that the Defence Ministry calls "smaller but better."

This year, London will commit the equivalent of about \$35 billion to sustain a force that it hopes will be able to protect British interests and guarantee the UK a major role in world affairs. Britain's strength has waned, but it continues to see itself as a major power with worldwide economic, commercial, and security interests, requiring fifty-five million Britons to underwrite a major military force.



It is a military, says Defence Minister Malcolm Rifkind, that is properly sized for "a medium-size country with global influence but not global power."

In sheer numbers, British forces are not large; many Third World nations put more troops in the field. However, Britain has one of the world's largest *competent* armed forces. It is extremely well-trained and well-equipped. Britain, states Foreign Minister Douglas Hurd, will always be a nation whose military delivers "a punch above its weight."

British forces are also among the world's most active. This winter, for example, they were embroiled in operations in the Persian Gulf, Bosnia, and Northern Ireland. British forces participate annually in nearly three dozen military exercises around the globe.

Worldwide Presence

British soldiers, sailors, and airmen are deployed at thirty-one worldwide locations, from Ascension Island in the South Atlantic to Yugoslavia and Hong Kong. The British Army and the Royal Air Force continue to have front-line duties in the defense of Europe, a commitment that once drew 67,000

Britons to Germany but now is carried out with far fewer troops.

London's commitments stretch beyond western Europe to the South Pacific, where the Five-Power Defense Pact gives Britain an on-call security role in Australia, New Zealand, Singapore, and Malaysia. Britain maintains garrison forces in the crown colonies of Hong Kong (6,500 troops) and Gibraltar (1,000 troops). Another 1,600 British soldiers are on duty in the dependent territory of the Falkland Islands. Under separate arrangements "at the specific request" of local governments, 900 British forces serve in oil-rich Brunei on the north coast of Borneo, and some 1,200 troops serve in the Central American nation of Belize, a former colony once known as British Honduras.

At temporary RAF bases in Turkey, British warplanes fly reconnaissance missions throughout the so-called "no fly" zone in northern Iraq. These bases also deploy aircraft to support the Britons backing the UN Special Commission in its campaign to find and destroy Iraq's capability to build or deploy weapons of mass destruction.

Britain continues to be a force on

the high seas. The Royal Navy maintains the long-standing Armilla Patrol in the Persian Gulf, where its warships defend the 600-mile waterway to provide confidence for British shipping.

British troops remain with the UN force separating factions in the former British colony of Cyprus, as well as in UN-run operations along the Iraq-Kuwait border. They are standing duty in Western Sahara, Cambodia, and parts of former Yugoslavia.

The government of Britain openly declares its intention to continue such far-flung operations in support of a global defense and political strategy. It will try to do this with forces of more modest size than in many decades.

Philip A. G. Sabin, a faculty member at King's College, Cambridge, who took a look at British strategic priorities in the 1990s for the London-based International Institute for Strategic Studies, thinks the Defence Ministry is still trying to preserve much of Britain's cold war clout.

"One of the most notable features of the British defense cuts planned for the 1990s is that no type of military capability is to be abandoned entirely," says Mr. Sabin. "Instead, the force

structure as a whole is to be slimmed down into a smaller version of that which exists at present."

The Ministry of Defence readily concedes that Britain will try to preserve a broad capability. "Britain's armed forces are our insurance against the uncertainties of a rapidly changing world," says the white paper. "As with any insurance policy, we must ensure that, within the resources available, the cover is right for the nature and the scale of the risks we may face."

Forces in Upheaval

Within the armed forces, however, change appears overpowering at times. The British Army, rich with regimental traditions stretching back centuries, is in upheaval. The turbulence is caused by steep reductions in the force that will slash the Army from 155,500 to 116,000 by the mid-1990s. The Defence Ministry, whose plan drew a critical review from Parliament's Select Committee for Defence, may restore 5,000 to 6,000 troops, leaving the Army at about 122,000 soldiers in the mid-1990s.

Just how deeply the Army is being cut is evident with the reductions under way in the fall-back force assigned to protect the British Isles. Plans call for cutting this home-based force by nearly one-third, to fifteen battalions, by the mid-1990s.

Despite the cutbacks, British combat forces continue to stretch to fulfill security obligations in Northern Ireland—a commitment described by the Defence Ministry as the nation's "highest priority" in peacetime. Now in its twenty-second year, the British Army occupation force rotates about 18,000 service personnel per year through Northern Ireland. Force levels depend on the scale of activities by the Provisional Wing of the Irish Republican Army and the Irish National Liberation Army.

The RAF is also being trimmed, with the force level slated to decline from 89,000 in 1990 to 75,000 by 1995. Britain's air defense now relies on seven squadrons of Tornado F. Mk. 3 day-and-night, all-weather interceptors, augmented in wartime by some fifty armed Hawk trainers. A squadron of US-built E-3 Airborne Warning and Control System aircraft provides an over-the-horizon look for the Integrated Air Defense System.

Other on-call forces in Britain in-

clude two squadrons of Tornado GR. Mk. 1A reconnaissance aircraft, three squadrons of Jaguar fighter-bombers, and one squadron of Harriers. Two squadrons of Tornado GR. Mk. 1s equipped for antiship strike missions will have a secondary mission of over-land attack.

The Royal Navy is faring somewhat better than its sister services during this age of cutbacks. The numerical strength of the Royal Navy

The Royal Navy is faring somewhat better than its sister services during this age of cutbacks. The force will be trimmed only marginally, dropping to 60,000 by 1995.

stood at 64,650 in 1991, a figure that included 7,000 naval aviators and 7,700 Royal Marines. The force will be trimmed only marginally, dropping to 60,000 by 1995. The active fleet will be backed by about 30,300 reserves.

The remaining forces are forming up in different ways. For example, more than 200 Army units are being restructured, disbanded, or merged. The British Army of the Rhein is being slashed from four divisions to two. A 3,000-member British Army contingent in Berlin is being withdrawn.

It is only a matter of time until similar British Army withdrawals occur in Hong Kong, where London is reducing the force in phases before it turns the colony over to China in 1997.

Beefing Up for NATO

Elsewhere, the Army will be beefing up its presence. Britain will provide 55,000 troops to the Allied Command Europe Rapid Reaction Corps, to be augmented by 35,000 British regulars during wartime mobilization. Britain will provide the permanent commander, a large share of the headquarters infrastructure, and some combat support.

The RAF's profile in Germany is changing dramatically. Its four main operating bases are to be consolidated

into only two: RAF Brüggen and RAF Laarbruch. The two bases will serve four squadrons of Tornado GR. Mk. 1 strike-attack aircraft, two squadrons of Harrier GR. Mk. 5/7 support planes, and a composite squadron of Chinook and Puma support helicopters.

The squadron of Victor tanker aircraft at RAF Marham, UK, will be withdrawn by the end of this year to be replaced with TriStar and VC10 aircraft. The remaining five VC10 transports are being converted to tanker capability.

The Defence Ministry made the decision to phase nuclear gravity bombs out of the aircraft inventory. That, and the US decision to end development of the standoff Tactical Air-to-Surface Missile system, will reduce the RAF's present and future role in nuclear deterrence. Thirteen squadrons of dual-capable aircraft—eleven of Tornados and two of Buccaneers—are being cut to eight Tornado squadrons—four in Britain and four in Germany.

London has retained three medium-size, jump-jet-type carriers to give Britain the ability to project a modest amount of power beyond its shores. The decks will serve the Royal Navy's forty-two vertical takeoff Harriers and 245 naval helicopters, which include 134 long-range Sea Kings, used for everything from sea rescue to anti-submarine warfare.

Slated to take the biggest hit is the Royal Navy's one-time fleet of twenty-seven attack submarines, which will be cut to only sixteen boats. Britain will hold on to twelve nuclear-powered attack submarines of the *Swiftsure* and *Trafalgar* classes and four *Upholder*-class diesel-powered subs.

The smaller Army hopes to offset force cutbacks with improved combat effectiveness stemming from new weapons. The Ministry of Defence argues that improved equipment will increase the combat capability of the 1st Armored Division by "more than one-third by the year 2000." British calculations show that, despite a fifty percent cut in the number of British soldiers in Europe, equipment upgrades will hold the reduction of actual combat power to twenty percent.

Plans call for equipping two tank regiments with 127 Challenger II tanks. Reliability trials on the first wave of tanks are due this year. The 420 1970s-technology Challenger I tanks, such as those that saw action in the Persian

Gulf War, are being upgraded as well, with a new, more powerful cannon. The 870 Chieftain tanks that were the backbone of the cold war force are being withdrawn.

The Army continues to receive shipments of Warrior armored combat vehicles. The Multiple Launch Rocket System is being upgraded with ammunition that disperses antitank mines at a range of thirty kilometers. Artillery is also undergoing improvement. The Army is inviting proposals from industry for antiarmor attack helicopters to replace the Lynx.

The House of Commons Defence Committee was quick to claim that armored units will "constitute a strikingly well-equipped" force by the time the upgrades are complete.

A Modernized RAF and Royal Navy

The RAF's hopes of modernizing its fighter fleet has become complicated by problems with the multinational European Fighter Aircraft project. The RAF initially hoped to buy 250 of the advanced multirole fighters, but the four-nation effort that consumed \$11 billion in development funds has been slowed by the withdrawal of Germany and reticence of Italy. It now looks as if the program is back on track, though the aircraft will be of greatly reduced cost and capabilities.

The surface fleet, based at five principal installations around Britain, will level off at about forty frigates and destroyers. The *Duke*-class Type 23 antisubmarine warfare frigate is being phased in, with five in the fleet and eight on order. Britain and France are at work on a replacement for the venerable Type 42 destroyer to serve as an air-defense platform.

The Royal Navy's most important role, however, remains the deployment of Britain's nuclear deterrent. Today's fleet of four Polaris submarines carries sixty-four Polaris submarine-launched ballistic missiles designed to strike city targets in what used to be the Soviet Union. Each target would be hit by three 200-kiloton Chevaline warheads.

The force is being replaced with four Trident submarines, which would give Britain "the flexibility and capability to ensure our deterrent needs at minimum level well into the next century," according to the Defence Ministry. Each Trident sub will carry six-

teen highly accurate D5 missiles armed with a maximum total of 128 independently targetable 150-kiloton warheads.

At present, the Royal Navy keeps one missile-firing boat at sea, augmented as tensions warrant and maintenance cycles permit. Britain coordinates the sub's location with the US naval force to assure maximum coverage and minimum vulnerability.

Britain first tested an atomic weapon

Britain's reliance on the four-decade-old nuclear deterrent continues, at least in part, to ensure the former world power a seat at the Big Power table.

in 1952 and today deploys the world's fifth largest nuclear arsenal, though it is a pygmy force by the standards of the US deterrent or the combined forces of the successor states of the old Soviet empire. London's reliance on the four-decade-old nuclear deterrent continues, at least in part, to ensure that the former world power can have a seat at the Big Power table. Nuclear forces "underpin" British security, says the Defence Ministry.

Britain remains adamant that its "minimum deterrent" will not be put up for negotiation despite cuts in US and former Soviet nuclear arsenals. Britain's security is "not determined by the scale of the offensive capabilities of the superpowers," the new defense white paper argues. It insists that Britain did "not seek to match" the superpower buildups during the last three decades, and so the latest reductions in arsenals, "though very welcome in themselves, are not a determinant in sizing our own deterrent."

In its dealings with the Continent, Britain guards its security as it has

for centuries—taking a strong leadership role to make certain that potentially hostile powers do not coalesce against it and that no one Continental power gains the upper hand. British land and air forces remain in Germany. Warships retain a leading role in NATO's "standing naval forces" for the Atlantic and the Mediterranean. RAF Harriers, Tornados, and Jaguars bolster NATO's rapid reaction air force.

Britain continues to nourish the so-called "special relationship" with the US that twice brought American forces to Britain's aid in this century. The nature of the relationship may be changed somewhat over the coming months by the dealings between President Bill Clinton and British Prime Minister John Major. However, they start with a strong foundation.

In practical effect, Britain served as a gigantic aircraft carrier for the US throughout the cold war. Today 25,400 US Air Force personnel and 250 combat aircraft of 3d Air Force are stationed on British soil. With access to British bases, the US Navy maintained its North Atlantic submarine fleet on station near Soviet territory with fewer trips.

While it has restructured, Britain has kept a wary eye on events overseas, where regional crises threaten to explode into wider conflict. Uncertainty envelops the four nuclear-armed offspring of the old Soviet Union—Russia, Ukraine, Kazakhstan, and Belarus. "Should, against our hopes and expectations, the reform process not succeed, we cannot be sure who will control these [weapons]," Mr. Rifkind warns.

Britain faces tough choices as Her Majesty's government struggles to meet worldwide obligations with fewer forces and limited resources. Britain seems intent on retaining a variety of military capabilities to meet with a full range of threats. "It is extremely difficult to predict which might be required in some future crisis either inside or outside Europe," observes Mr. Sabin. "This provides strong incentives to maintain a little of everything just in case." ■

Stewart M. Powell, White House correspondent for Hearst Newspapers, has covered security affairs for more than a decade in Washington and London. His most recent article for AIR FORCE Magazine, "Scud War, Round Three," appeared in the October 1992 issue.

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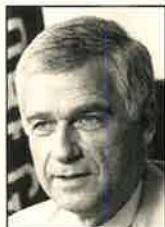
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Soon after airmen began shooting at each other, they saw the advantage of flying formation in combat.

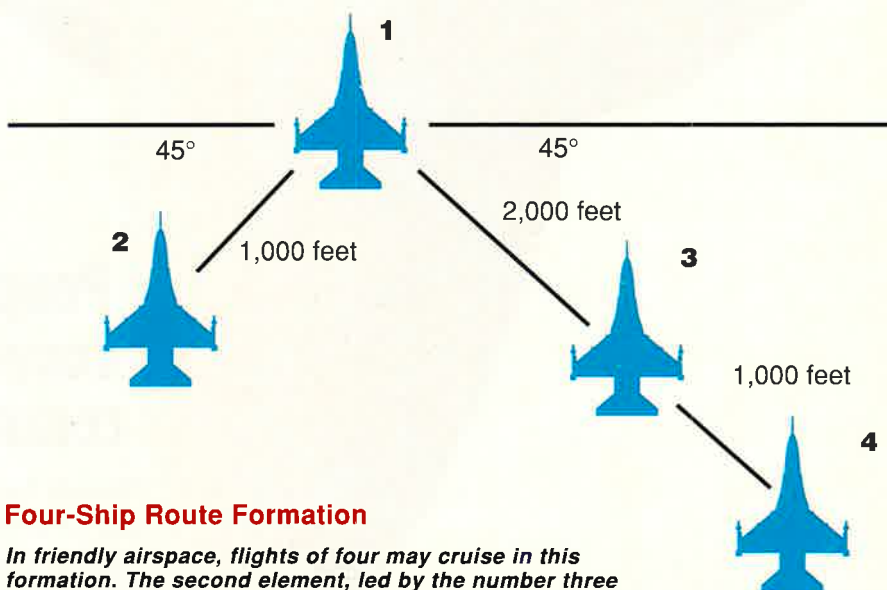
Fighting in Fours

By James P. Coyne

ON OCTOBER 27, 1918, Maj. William Barker, a Canadian in the Royal Flying Corps, was piloting his Sopwith Snipe on a single-ship flight on the Western front. He was en route to England, where he was to assume command of the RFC's Air Combat Tactics School. Along the way, however, he spotted a German two-seat observation plane and went after what he hoped would be his forty-seventh kill.

Major Barker had flown many "lone wolf" sorties during the Great War. Because he was attacking only one plane, he didn't worry about lacking squadron mates to support him. Mutual support didn't seem important. His view was about to change. No sooner had Barker downed the two-seater than he discovered he had flown into a German fighter sweep of some fifty Fokker D-VIIs.

What followed was one of history's most famous air battles. Major Barker, wounded three times and losing consciousness twice, fought alone against the whole German gaggle, plunging from high altitude down to the deck, boldly attacking and maneuvering while Allied troops in the trenches below cheered him on. He shot down



Four-Ship Route Formation

In friendly airspace, flights of four may cruise in this formation. The second element, led by the number three aircraft, can vary position from forty-five degrees back, as shown, up to a position abreast of the leader.



USAF photo by Sgt. David S. Nolan

four Germans. Finally, the Snipe dove out of the huge German swarm and crash-landed on Allied soil. Barker, bloody and near death, had survived. His Snipe sported 300 bullet holes.

Major Barker's triumph, though dramatic, was unlikely ever to be reproduced. His tactics were unorthodox and already becoming obsolete among combat pilots. If the Canadian had been leading a fighter formation, one of his mates surely would have spotted the Fokkers before he began his attack, and he could have avoided the fight and his crippling wounds. At the least, he could have gotten some help in the fight.

Major Barker was one of a vanishing breed. By the closing days of World War I, most fighter pilots had decided that it was preferable to fly in formations, so that their aircraft could support each other. The advantage of attacking in numbers was recognized by both sides. As early as 1916, Allied and German squadrons were flying in formations of three to six aircraft. By the end of the war, formations had as many as nine aircraft.

These fighting formations might be part of a larger force, as was the case with the fifty Fokker D-VIIs. How-

ever, experience dictated employment in smaller numbers—like the groups of five or so German aircraft that individually fought Major Barker during his famous battle. Fighter aircraft were deployed in a “vee” (or “vic”) formation. Some squadrons also flew line abreast. These flights usually had three, five, or six aircraft.

The Four-Ship Emerges

In the late 1930s, the world's air forces began to turn to the so-called “flight of four” or “four-shipper”—four aircraft flying in two elements of two aircraft each. The four-ship vic was developed and perfected by the German Luftwaffe during the Spanish Civil War of 1936–39. Some variations were called “fluid fours.” The flight of four remains the basic flight formation in most air forces today. In the US Air Force, a three-ship vic is called a wedge.

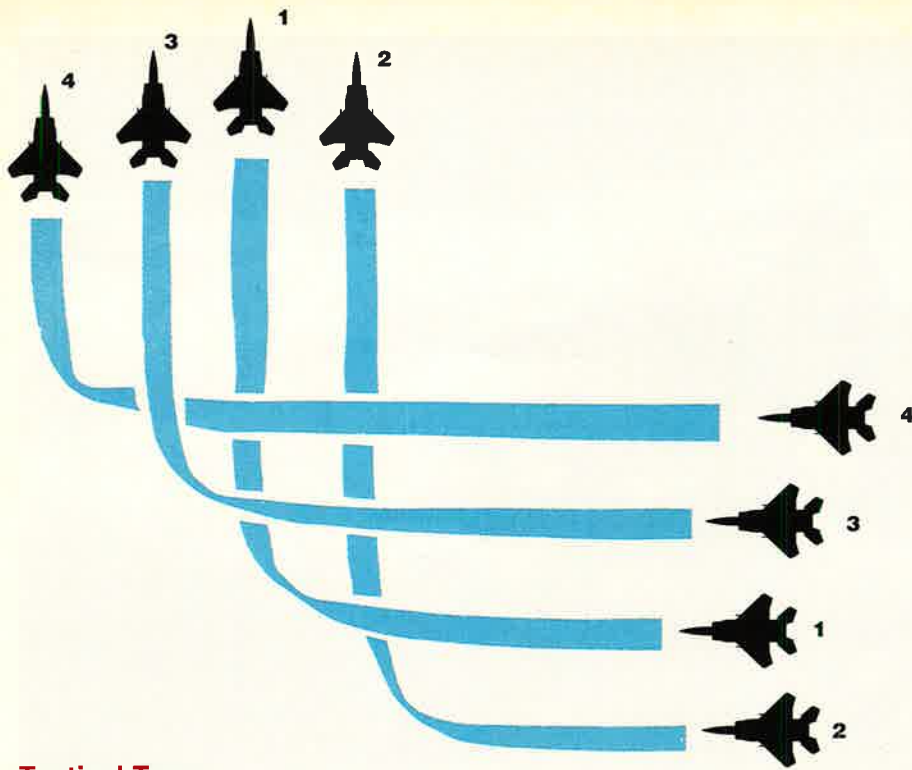
The four-shipper was used with spectacular success by the American Volunteer Group—the Flying Tigers—fighting for China against the Japanese before the entry of the United States into World War II. Their leader, Claire Chennault, later commanded Fourteenth Air Force in China. His

flights of four flew in two pairs, but in echelon—that is, with three subordinate aircraft staggered on one side of the leader.

The British adopted a version of the four-ship formation just before the outbreak of the Battle of Britain in summer 1940. The British four-ship formation comprised four aircraft in two elements of fighters, but with all four in trail. Later in the war, the Royal Air Force adopted the four-ship vic and nicknamed it the “finger four.” Even later, British and American fighter forces often used a variation of the finger four, with all four aircraft line abreast and about 400 yards apart.

In today's four-ship formations, there is a leader and a wingman, supported in turn by a second element leader with his wingman. Usually the second element flies to one side and almost abreast of the leading element. Since the advent of air-to-air missiles, it has become more common for the four aircraft to fly line abreast. If one aircraft in an element is shot down, the surviving aircraft becomes part of the remaining element, forming a three-plane vic for mutual support.

The high speeds attainable by jet



Tactical Turn

In carefully timed and coordinated turns, the four aircraft in tactical or route formation can change direction without losing flight cohesion or changing power settings.

fighters meant that they could fly farther apart and still provide mutual support. This led to a modern adaptation of the fluid four formation invented by the Luftwaffe in the 1930s. In the jet-age fluid four, a supporting element could fly several thousand feet above or below a lead element and move from one side of a formation to the other. This made the formation harder to detect. It enabled the flight to scan a much larger area without sacrificing mutual support.

Originally, an attack would always be made by a flight or element leader, whether the planes were in finger four or fluid four; the wingman always flew in a supporting role, a concept sometimes called "welded wing." In today's four-ship formation, however, the attack is to be made by the flight member who is in the best position to attack the enemy aircraft. In this system, a flight leader may find himself temporarily flying wing on his wingman, who has taken over the lead and is making the attack.

Eyes on the Leader

In combat, fighters are not flown in the tight formations used to teach and practice precision flying. In tight for-

mations, all wingmen must keep their eyes constantly on the leader because of the danger of a midair collision.

Pilots entering the combat zone use the tactical, or spread, formation. Flight members spread out enough for wingmen to be able to take their eyes off the leader to look around and search for the enemy. In tactical formation, each pilot scans the sky in all directions and the vital "six o'clock" blind spot behind and below the tail of each aircraft. They are far enough apart to rule out any chance that one surprise missile attack could damage more than one fighter.

The four-ship has limitations. One is that it can be maneuvered only with great difficulty, even if the maneuver is a simple, level turn. Because of the great distances between the aircraft, maneuvering a tactical flight of four is not as easy as maneuvering a tight formation in which aircraft stay in the same position relatively close to each other.

While maneuvering in the tactical formation, wingmen flying the shorter distance on the inside of a leader's turn would have to maintain dangerously low speeds. This severely restricts their maneuverability and makes

them vulnerable to attack while flying on the edge of a stall. On the other hand, wingmen on the outside of a turn would have to use very high engine power settings to maintain position while flying the longer distance around the arc. This wastes fuel. Alternatively, the outside wingmen could "cut the corner," sliding below and behind the leader; this makes the formation more vulnerable to attack.

Faced with the need to maintain good maneuvering speed, fighter pilots developed the "tactical turn." The tactical turn actually was developed in World War I but was not used again until the Germans began to employ it in air combat in the Spanish Civil War.

Here's how it is done:

The flight leader, with his wingman on his left and the second, two-ship element on his right, starts a turn to the right using, say, forty-five degrees of bank. At the same time, his wingman starts the turn to the right, using a slightly steeper degree of bank but without changing his power setting. His flight path will take him behind and below the leader.

The leader of the subordinate two-ship element flies straight ahead, descending or climbing through the flight leader's flight path. As he passes through the flight leader's new flight path (inscribed at a ninety-degree angle to the original), the subordinate element leader starts his turn to the right. Shortly thereafter, the element leader's wingman initiates his turn to the right, at a lesser degree of bank.

Trading Places

At the completion of ninety degrees of turn, the flight leader and the element leader have swapped sides of the formation. So have their wingmen. The formation has turned, the position of the flight members has been reversed, and nobody has had to change his power setting appreciably.

Four-ship formations use this turn when patrolling back and forth through an area or to defend against attackers coming from the side, with the flight lead calling the break, left or right.

In visual flying, fighters remained in "eyeball" contact, meaning no more than one mile apart and perhaps as little as 500 feet apart. The pilots gauged their proper distance by observing features on each other's aircraft. A pilot knows that, when an F-15's tail numbers are just recogniz-



In today's air-to-air engagements, the right mix of weapons is as important as tactics. Heat-seekers like these AIM-9 Sidewinders can make the crucial difference in a maneuver like the bracket (see p. 64).

Bogies and Bandits

The AIM-9 is a fire-and-forget, short-range missile, useful out to three miles. Both radar-guided missiles are for medium-range use, out to ten miles, but an aircraft launching a Sparrow must continue to illuminate the target with its radar until the Sparrow makes impact. The AMRAAM merely has to be pointed at the designated target; shortly after launch, it takes over tracking duties. This means the launching aircraft can almost immediately disengage from the battle. The E-3 AWACS flies on the edge of an air battle area, scanning the sky at all altitudes for unidentified planes—"bogies"—or enemy aircraft—"bandits."

Most of the tactics associated with the four vs. four engagement concern the premerge phase of the action. (Once the two sides begin launching missiles, the fight breaks down into two-ship element against two-ship element.) Say, for example, that four F-15s, flying line abreast, make radar contact with four bogies. AWACS identifies them as bandits, or, in the absence of AWACS, the F-15s use on-board equipment and procedures to make the identification. Both sides

able, you are 500 feet away; when you can just discern the big identification letters on the tail, you are 1,500 feet away; when you can only distinguish one rudder from the other, you are 3,000 feet out.

Pilots of modern F-15 and F-16 jets use the air-to-air setting on their tactical air navigation (TACAN) radios to determine separation distances with great precision. TACAN gives the pilot an exact readout, in tenths of a mile, of distance from his wingman. Aircraft within a formation can spread out over, say, three miles and still maintain a precise separation. If the flight is flying elements in trail, they can use their radars to maintain exact front-to-rear separation while searching for the enemy in front of them.

Generally, fast-moving jet fighters keep a separation of at least 6,000 feet. If surprised by an attack from the rear, the wingmen will have enough room to turn and reverse direction within the airspace between aircraft in the flight and begin to defend against that attack.

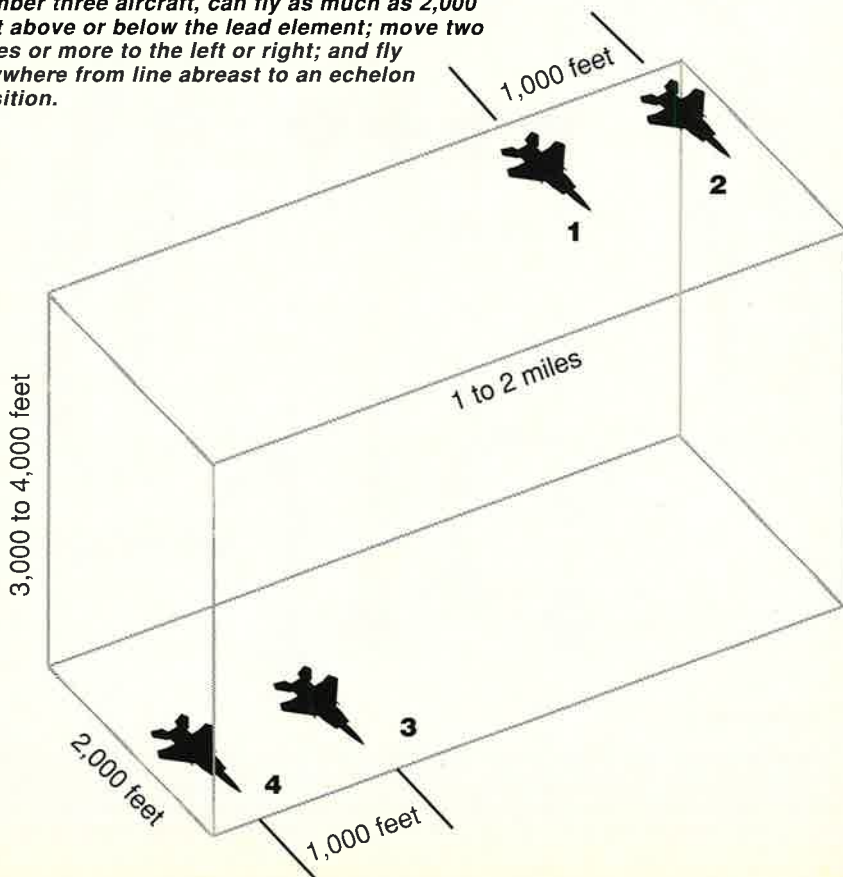
The introduction of jam-resistant communications, such as frequency-jumping Have Quick radios, enables fighters in the same flight to separate and still provide mutual support. The fighters no longer have to depend on visual signals.

Fighter pilots still practice visually the "four vs. four" combat tactics used in the past, including employment of the gun. However, they have a new

bag of tricks offered by air-to-air missiles like the heat-seeking AIM-9 Sidewinder, radar-guided AIM-7 Sparrow, and AIM-120 radar-guided AMRAAM, and by the E-3 Airborne Warning and Control System aircraft.

Fluid Four

In this formation, the second element, led by the number three aircraft, can fly as much as 2,000 feet above or below the lead element; move two miles or more to the left or right; and fly anywhere from line abreast to an echelon position.

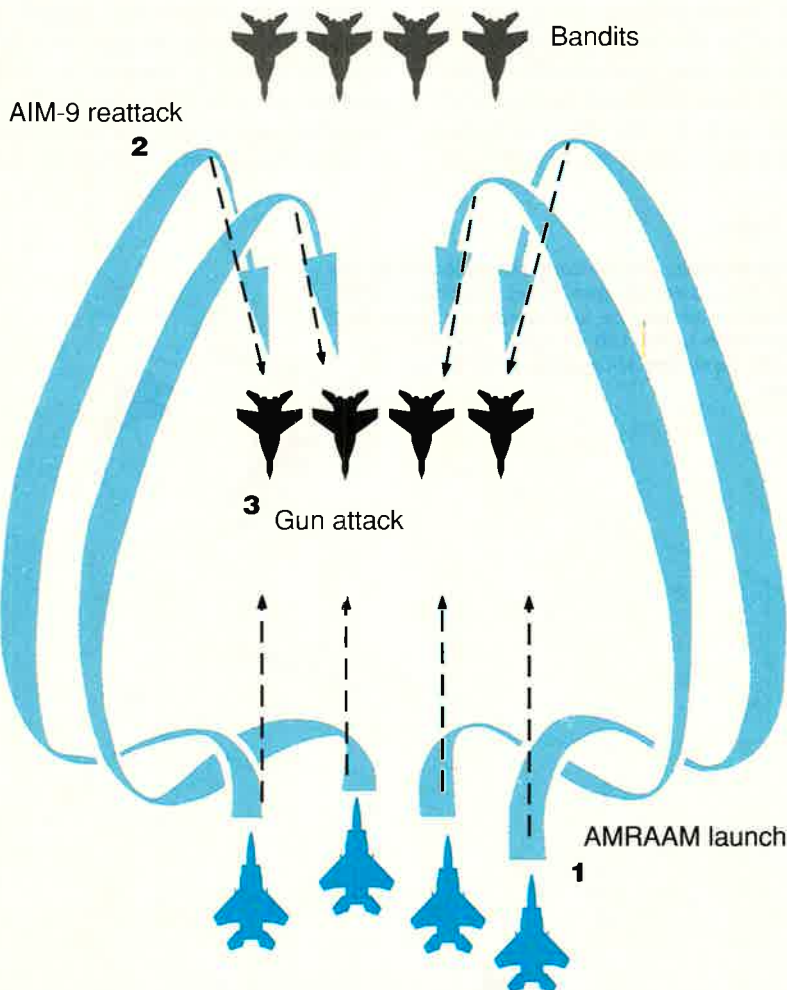


will fire air-to-air missiles at each other while each is still beyond visual range. Before takeoff, therefore, the USAF flight leader will have briefed how the enemy formation will be "sorted," to be sure that two F-15s don't target the same bandit and waste a precious missile. If the bandits are flying line abreast, each F-15 pilot will target the bandit opposite him. If the bandit leader and wingman are at one altitude and the other two enemy aircraft are at another altitude, the flight leader might say, "One and two will take the high element, three and four the low." If the bandits are in a formation that was not anticipated during the preflight briefing, the flight leader will assign targets by radio.

In an engagement, when the bandits are in AMRAAM range (somewhere between ten and twenty miles), the four F-15s launch their AMRAAMs.



F-15s (like these, over the Persian Gulf) are USAF's primary air-superiority weapon. Their capabilities far exceed those of their predecessors in the world wars, but their formations would not be unfamiliar to pilots of those conflicts.



The Bracket

On the offensive, the flight of four launches AMRAAMs (1) and the two elements immediately split left and right to set up a reattack. After hooking into position behind the bandits, they launch shorter-range heat-seeking Sidewinders (2) and then, if the bandits are still flying, close to 2,000 feet and employ their guns.

Then one element turns hard right and the other hard left to reposition for a reattack with their heat-seeking missiles. This maneuver puts the F-15s in position to bracket the enemy flight.

At an appropriate distance, the leader, pulling seven or more Gs, turns back toward the aircraft he has targeted, following through on the bracket, to give his heat-seeking Sidewinder a "rear quarter" shot. If the AMRAAM hits the target squarely, there will be no need to fire the Sidewinder, but the enemy aircraft may somehow cause the AMRAAM to miss. At any rate, the reattack, to be effective, must be initiated immediately, while the radar-guided missiles are still in flight.

The most modern Sidewinder is effective even when fired toward the target's front quarter, but it has a shorter range than radar missiles. If the fighter is carrying both, the radar missile is usually fired first.

At a distance of five miles, and while the F-15s are still turning, the bandits become "eyeball visible," though they are still just dots in the sky. When the target is in the Sidewinder seeker head's field of view, each pilot will hear a growl in his radio headset, telling him the missile "sees" and is locked on to the designated target. Symbology in the windscreen head-up display tells him the missile is aiming at the right target. The F-15 is now forty degrees or so off the target's tail and closer than three miles. The leader pickles off his missile.

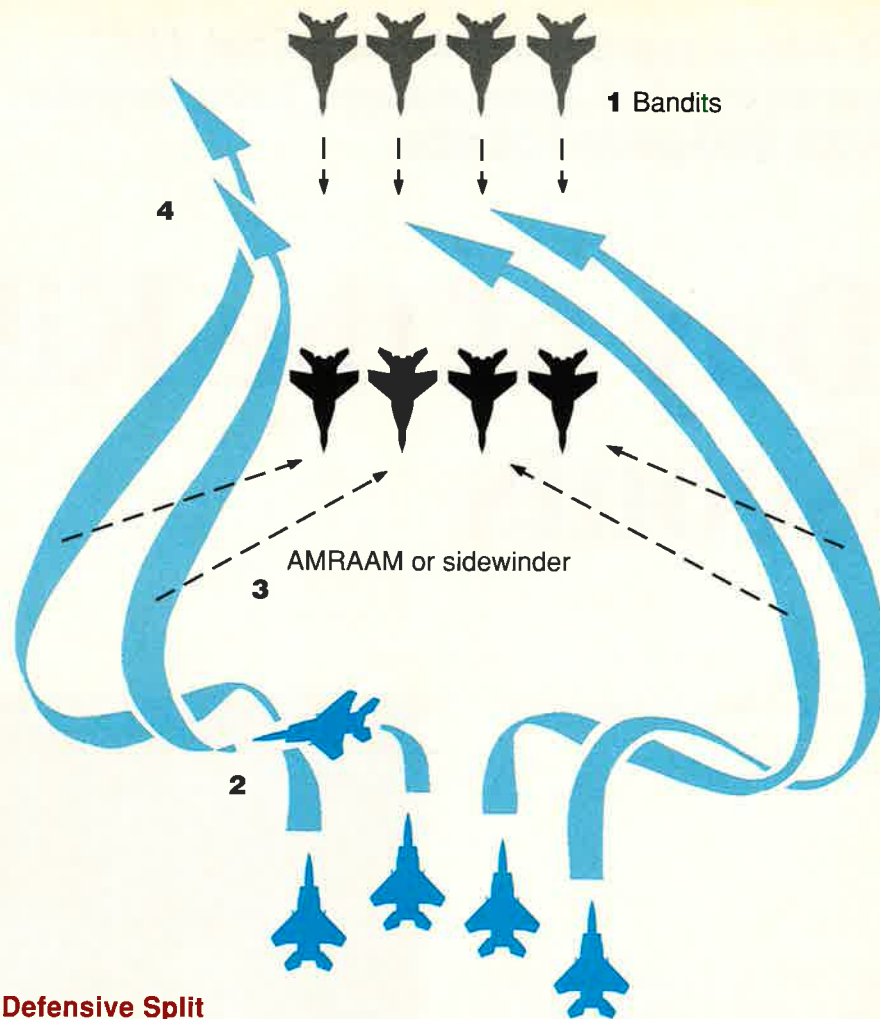
His wingman, who has been maintaining a prebriefed position on the leader, launches his Sidewinder after he is sure the leader is safely out of his missile's path. The other two flight members, meanwhile, have climbed above the targets' altitudes to be above the first element's line of fire. At the proper moment, the second element dives in and launches heat-seekers.

Both elements then press in from both sides of the enemy formation and close to the gun envelope, about a half mile astern of the bandits, preferably less. Closing to less than 2,000 feet, each F-15 pilot squeezes the trigger on the front of his control stick and squirts 20-mm rounds toward his target at the rate of 6,000 rounds per minute. Scratch four bandits.

On the Defensive

However, let's say the enemy formation is the first to launch radar missiles. The USAF formation would now be on the defensive. It immediately splits, one element breaking sharply left and one right, an action designed to place the oncoming missiles "on the beam" at a ninety-degree angle to the flight path of the F-15s. The practice of beaming, in combination with on-board electronic gear, disrupts and frequently defeats the tracking capability of oncoming missiles and causes them to miss. With the target flying at right angles to the launching aircraft rather than on a path continuing toward it, the enemy missile has a long distance to travel and may run out of fuel and energy, falling out of the sky before reaching its target.

The F-15s, having switched from a frontal attack to a pincer attack, press in from either side of the enemy formation. They break sharply back toward the bandits, who now will have split into two elements to counter the upcoming split attack. The F-15s cannot delay their launches too long because of the jets' high closure speeds, which may put them too close to launch their radar missiles. (They require time to accelerate, acquire the target, and arm.) The F-15s launch their radar- or heat-seeking missiles from the front side quarter and then



Defensive Split

The bandits fire missiles first (1). The two USAF elements split sharply away from each other to put the enemy missiles "on the beam" (2), then turn sharply back (3) to launch their own missiles. They then "blow through" the enemy formation (4) and rejoin.

"blow through" the enemy formation, leaving the fight.

They immediately streak out of the area, rejoin as prebriefed, and, if fuel levels permit, look for a new fight. Today, the old-fashioned "dogfight" is frowned upon. An aerial fight that progresses to the "furball" phase can attract a lot of attention from pilots in the area and from radar operators. In an air-to-air melee, the chances of midair collisions rise dramatically. Pilots absorbed in the fight will probably not see more bandits that might be coming from outside the churning dogfight area.

It is possible, in either of the two scenarios, that a surviving enemy fighter might pursue the F-15s as they

exit the engagement. At that point, the fight would break down to the classic two vs. one engagement. The two planes of the USAF element under attack might try to sandwich a trailing adversary. With the attacker in their rear, the two USAF fighters wait until he picks his target. If, say, he goes after the leader, the leader would begin to make a right turn, enabling the wingman briefly to fly straight ahead and make a tight, high-G turn to the right, tightening his turn to take a rear quarter missile shot at the bandit, followed by a gun attack.

The possible combinations of attacks and defenses are endless. Modern air combat should be thought of as a high-speed, three-dimensional chess game. Mutual support is the deciding factor. It's a lot more sophisticated than in the days of Maj. Bill Barker, though it's still true that the winners go home and the losers go down in flames. ■

James P. Coyne is a veteran fighter pilot who, after his retirement from the Air Force in 1984 as a colonel, served AIR FORCE Magazine as Senior Editor and Signal Magazine as Editor in Chief. His by-line last appeared in AIR FORCE Magazine with "Total Storm" in the June 1992 issue.

It was a reprise of the old “Fast FAC” concept—but they marked their targets with 500-pound bombs.

Day of the Killer Scouts

By Lt. Col. Mark A. Welsh, USAF

LATE in the afternoon of February 3, 1991, a group of tired and frustrated F-16 fighter pilots landed at the Saudi air base they had called home for five months. They were members of the 388th Fighter Wing from Hill AFB, Utah, and they were returning to base after carrying out attacks on units of Iraq's Republican Guard.

Though these pilots would later congratulate each other on weathering yet another combat sortie and tell the obligatory SAM or AAA story to those who weren't on the mission, each knew this had not been a good day. They had missed targets and felt certain they had mistakenly bombed some empty revetments.

It was not the first time the pilots had this feeling. It was, however, the last time.

At about the same moment, another group of fighter pilots gathered at Central Command Air Forces (CENTAF) Headquarters, in Riyadh, Saudi Arabia. This was Brig. Gen. Buster Glosson's special tactical planning cell, a group of instructors from the USAF Fighter Weapons School at Nellis AFB, Nev. Led by Col. Clyde “Joe Bob” Phillips, these experts were deeply involved in piecing together the air campaign.



On the nineteenth day of the Persian Gulf War, eight F-16s flew the first Killer Scout missions. Above, the F-16 flown by the author; opposite, four “Pointers” of the 4th Fighter Squadron line up for the first day's afternoon mission.

General Glosson was worried. The war was seventeen days old, and the focus of the Desert Storm air campaign had shifted to destruction of the Republican Guard. Intelligence reports showed that attrition of Republican Guard units was less than expected. Because the F-16 wings under his command were flying the bulk of the sorties against the Guard, General Glosson concluded he had to improve the force's overall effectiveness.



The F-16 pilots knew that, on each anti-Republican Guard mission, they had been plagued by a common set of problems. Thick cloud decks kept pilots from seeing the target area until they actually rolled down the chute. Primary targets looked exactly like numerous other armored formations surrounding them. The sheer volume of sorties sent to the area meant F-16 pilots could not loiter and positively identify their targets.

Compounding the problems was the impossibility of accurate bomb-damage assessment (BDA). By the time smoke from the bombing had cleared sufficiently to permit pilots to see the targets, they were back above the clouds or busy evading enemy surface defenses. Not only were they unsure they had found the “right” group of armored vehicles but they also did not know if they had hit their targets.

General Glosson understood that the simplest way to reduce or eliminate this problem would be to lift the minimum altitude restriction established before the war began. Such a move would permit the pilots to get closer to their targets, but it inevitably would produce higher losses. General Glosson was not prepared to pay this

price. Searching for an alternative, he turned the problem over to Colonel Phillips.

Looking to History

Colonel Phillips looked to recent history for solutions. He recalled that Pacific Air Forces units had run into similar problems during the Vietnam War and that in 1966 PACAF had begun to use high-performance aircraft in the forward air controller (FAC) role. These aircraft, called “Fast FACs,” provided aerial surveillance and controlled air strikes in areas of North Vietnam where significant surface-to-air defenses might be encountered.

The Fast FACs solved many of the same types of problems bedeviling the F-16s twenty-five years later in the Persian Gulf War. Colonel Phillips argued that the same general concept might work even better in the desert. He suggested to General Glosson that specific fighters be used to locate targets and control attacks on Republican Guard units in the Kuwait theater of operations (KTO). He noted that the fighters could also provide accurate BDA following attacks by the strike aircraft.

The group had to face an immediate question: Which fighter would assume the Fast FAC role? The need to operate deep in enemy airspace for long stretches led Colonel Phillips’s group to recommend testing the concept with the fast, maneuverable F-16. The F-16’s self-defense capability, navigation system, and multipurpose radar all weighed heavily in their recommendation.

General Glosson liked the idea. He asked Colonel Phillips and his Nellis group to develop a tactical concept of operations. The General then turned his attention to determining which F-16 unit in the Gulf region to select for the job.

Almost immediately, a series of fortuitous events helped shape the project and determine its success. Shortly after he met with Colonel Phillips, General Glosson received a message from the 388th Fighter Wing. That message was the end product of the mission debriefing after the frustrating F-16 raids of February 3. Officers of the 388th FW suggested that “an airborne platform be stationed in the second echelon area to validate Air Tasking Order [ATO] targets and find new targets if required.”

In other words, they wanted some Fast FACs.

General Glosson was well aware that the 388th's Block 40 F-16Cs carried Global Positioning System equipment, the most accurate navigational system found on any F-16s in-theater. He called the wing to see if it had any seasoned pilots with prior experience in the close air support mission.

The selection came through a process of elimination. Two of the wing's three fighter squadrons—the 421st FS and the 69th FS—expected to be heavily tasked for night operations and were not available. The question was referred to the 4th FS. The squadron, it turned out, had sixteen pilots with FAC experience, A-10 close air support experience, or both.

Identical Concepts

General Glosson asked the 388th FW's officers how the mission should be executed. The wing's proposal, developed independently, proved almost identical to the concept developed by Colonel Phillips's tacticians.

All that remained was to give the mission a name. General Glosson, eager to prevent confusion with the mission of the A-10 (and OA-10)

FACs, suggested the term "Scout." Colonel Phillips noted that the F-16s had no rockets and would have to mark targets with 500-pound bombs; thus, he observed, "killer scout" might be a more appropriate description. The name was not poetic, but it stuck, and the Killer Scouts were born.

Late on February 3, Lt. Gen. Charles A. Horner, the CENTAF commander, gave the project his go-ahead. General Glosson told the 388th FW and the 4th FS that their training would begin the next morning over southern Iraq.

The tactical concept was simple. The Killer Scouts would validate targets in the ATO that had been assigned to the F-16s and then find other lucrative targets in the area. They would provide indirect control, target area deconfliction, threat information, and updated target coordinates and descriptions to inbound fighters. If the ATO target was a good one, the Killer Scouts would clear the assigned fighters to attack under flight lead control. If it was not valid, the Killer Scouts would direct fighters to one of the backup targets.

Killer Scouts were responsible for target identification and for coordina-

tion with E-3 Airborne Warning and Control System (AWACS) and EC-130 Airborne Battlefield Command and Control Center aircraft. They had direct communication with and control of all fighters tasked into their assigned area.

Target areas were assigned according to the ATO and in harmony with the Central Command kill box grid. Each kill box had an area of 900 square nautical miles. These kill boxes were overlaid on a map of Kuwait and southern Iraq. The system greatly simplified fighter deconfliction and allowed planners to focus firepower where it was needed most.

In this regard, A-10 FACs handled all normal close air support operations behind the Army's fire support coordination line (FSCL). The F-16 Killer Scouts would control all F-16 strikes beyond the FSCL, an area whose targets usually are struck by planes flying on uncontrolled battlefield air interdiction missions. In the new concept, AWACS aircraft would provide threat advisories and direct inbound fighters to Killer Scout frequencies. They would also provide information on any tanker, Wild Weasel, or air-superiority aircraft that might be needed during the mission.

Call Sign "Pointer"

Wing officers selected eight F-16 pilots to fly first-day Killer Scout missions. They walked out the door with a boatload of maps, a list of all the fighters and targets assigned to them, and some significant doubts about orbiting over the Republican Guard for an hour at a time. Their new call sign—"Pointer"—reflected their primary task: pointing ground-attack fighters to the best targets.

The first two-ship Killer Scout formation arrived in the target area at sunrise on February 4. For the next eight hours, the four Killer Scout elements rotated between their kill boxes and a dedicated refueling track over the Persian Gulf.

The F-16 pilots were astounded to see how much Iraqi weaponry was burrowed into the desert. They discovered that some units targeted by that day's ATO had been moved, leaving only empty revetments like those the pilots were sure they had bombed the previous day. The Killer Scouts found new targets—assembly areas, ammunition storage bunkers, transshipment points, artillery, and com-

Colonel Welsh, shown here returning from his first mission, arrived at the target area at sunrise. He and the other Killer Scouts orbited for eight hours, "astounded" at the sight of buried Iraqi weapons.





munication sites—and logged them all.

When the fighters started checking in, things got busy in a hurry. In one two-hour period, 120 coalition fighters hit targets under Killer Scout control. During breaks in the fighter flow, the Killer Scouts returned to targets that had been hit to assess damage and determine whether more attacks were warranted. For the first time, accurate, large-scale BDA was possible. Mission reports from virtually every unit that worked with the Killer Scouts that day suggested expanding the operation.

The success on day one was repeated on days two and three. Updates from the 388th Fighter Wing helped General Glosson's staff make minor adjustments to the communications plan, kill box assignments, and fighter flow into the area.

F-16 Killer Scouts began to work four to six kill boxes at a time, covering an area of 5,400 square nautical miles. They used overlapping coverage of two-ship formations to man those target areas from sunrise to sunset. The original concept required only eight pilots to serve as Killer Scouts. The initial sorties were so successful, however, that CENTAF eventually tasked the 4th Fighter Squadron to cover three of these target areas simultaneously, a job that required thirty-two Killer Scout sorties per day.

All of the pilots of the 4th FS were checked out by flying a mission on the wing of a previously "qualified" flight lead. By the last three weeks of the war, ninety-nine percent of the



The Killer Scout operation created long days for ground crews. Scouts worked four to six kill boxes at a time. The flight lead usually carried six 500-pound bombs. Other F-16s carried 2,000-pounders (being loaded above).

squadron's sorties were dedicated to the Killer Scout mission.

Hours Over Target

The typical Killer Scout mission lasted five and a half hours. It included three one-hour time-on-target blocks and four in-flight refuelings, which consumed the other two and a half hours. After prestrike refueling, a Killer Scout flight proceeded to an assigned kill box and established communication with the Killer Scout flight already on the scene. After receiving target and threat updates, the oncoming Killer Scouts assumed control of the area, and the others departed. Out-

going Killer Scout flight leads passed an in-flight report and BDA data to airborne command-and-control aircraft and any follow-on Killer Scouts.

Tactics matured along with the mission. As Killer Scout flight leads searched for targets and controlled strike aircraft, wingmen flew a fluid tactical formation, searched for threats, and backed up the flight lead on the radio. Wingmen routinely directed defensive maneuvers against previously unseen threats, called out conflicting friendly traffic, and pointed out new targets the flight leads had overlooked. Most flight leads are quick to note instances in which a wingman was all that stood between them and death or capture.

Killer Scouts normally worked at

altitudes of 15,000 to 30,000 feet, descending only to investigate potential targets or pinpoint threat locations. They attacked targets in a shooter-cover formation: One aircraft rolled in from high altitude and dropped bombs from a dive-bomb pass of twenty to forty-five degrees, while the second aircraft stayed high and looked for threats during the attack and recovery. Generally, flight leads carried six 500-pound bombs and wingmen a cluster munition. This mix gave Killer Scout flights the ability to suppress threats, mark targets, or destroy targets.

The Killer Scouts learned quickly that they could not both do their job



This Killer Scout F-16, with cluster munitions visible, has just refueled. General Glosson has said that the presence of Killer Scouts increases the power of the F-16 force "three- or fourfold."

and avoid Iraqi surface-to-air defense envelopes. Their "avoid-the-threat" concept rapidly evolved into a "pound-the-threat" approach. Any surface-to-air threat system operating in a Killer Scout area automatically became the primary target.

Maj. (now Lt. Col.) J. D. Collins demonstrated a typical Killer Scout response one day after he observed an Iraqi SA-2 SAM launched unsuccessfully at B-52s flying over his area. Reaching the SAM site moments later, Major Collins saw a single launcher being pushed back into a large tin shed and a radar van parked nearby. He and his wingman bombed the site. The next three flights of fighters to check in got his instructions to hit the same target, just to drive home the point.

The tactic seemed to work. After the first three days of Killer Scout operations, Iraq's daytime SAM launches in the KTO virtually ceased. There was a marked decline in AAA fire. When enemy SAM radars were extremely active in a particular kill box, Killer Scouts would call AWACS and ask to make contact with an F-4G Wild Weasel flight. After briefing the responding F-4G flight, the Killer Scouts would move on.

Every Killer Scout pilot learned that the Iraqis were adept at disguising targets and using decoys. Sun angles made it difficult to tell what was parked inside a partially shaded revetment. As the air campaign moved into its

latter stages, the Republican Guard units buried themselves deeper and deeper into the desert sand. It was not always possible to identify and assess targets with the naked eye. At this point, the most critical piece of Killer Scout equipment became the binoculars carried on every sortie. Only by using them could the Scouts tell which revetments contained actual targets and which contained decoys.

Bombing By Radar

When bad weather forced the F-16 Killer Scouts to operate above a low cloud deck, they used the radar's ground moving target mode to locate groups of moving vehicles. Inbound fighters with similar radar capability could identify the targets at the coordinates provided by the Killer Scouts and deliver radar bombs from medium altitude. The same tactic was used in the ground war, when retreating Iraqi forces attempted to hide under dense smoke blowing in from Kuwait.

With the kickoff of the ground campaign, the Killer Scouts helped ensure deconfliction between Army and Air Force assets. The Army's speed of

movement during the ground assault meant that forward units could move up to twenty miles in a single hour. Fighters launched from their bases an hour earlier could be in danger of bombing friendly units now occupying their assigned target areas. The Killer Scouts, along with the A-10 FACs and AWACS, had to stay aware of the location of friendly maneuver units. If there was any doubt, fighters could not drop their bombs. Direct radio communications with ground units made the job much easier and allowed the Killer Scouts to mass aerial firepower where the ground commander needed it most. It also gave the ground commander a readily available source of real-time intelligence along his line of advance.

With the ground campaign came more bad weather. Because allied ground troops were now at risk, Killer Scouts were forced to operate below low- to medium-altitude clouds. For the first time, the threat of Iraqi low-altitude SAMs and AAA became unavoidable. SAM launches increased dramatically, and Killer Scout pilots paid more and more attention to suppressing AAA sites before they cleared fighters into the area.

The Killer Scout operation was a small piece of a very large and complex campaign. Perhaps the greatest Killer Scout contribution was that their operations made it impossible for Republican Guard units to move during daylight hours. When they tried to move at night, allied night fighters, bombers, and special operations aircraft detected them easily and attacked relentlessly.

General Glosson asserted that the Killer Scouts "increased the effectiveness of the F-16 force . . . three- or fourfold." Gen. John Michael Loh directed the staff of Tactical Air Command (now Air Combat Command) to formalize the mission and document the tactics that made it successful. Now all F-16 squadrons have six fully trained Killer Scout flight leads, and every squadron wingman sees the mission during initial mission-qualification training. ■

Lt. Col. Mark A. Welsh, an F-16 pilot, was one of the first Killer Scouts, flying twenty-seven missions in the Persian Gulf War. He is a student at the National Defense University in Washington, D. C. Portions of this article were adapted from a briefing paper prepared by the author and Capt. Philip A. Oppenheimer, who served as a flight commander in the 4th Fighter Squadron during Operation Desert Storm and was also one of the original Killer Scouts.



★ Thirty-fourth Annual Outstanding Squadron Dinner

Saturday, May 29 Outstanding Squadron Dinner

AFA's 34th Annual Outstanding Squadron Dinner will be held at The Broadmoor Hotel on Saturday, May 29. The dinner honors cadets of the United States Air Force Academy for the 1992-93 school year. Featured speaker is an Academy graduate from the Class of 1962, **Gen. Henry Viccellio, Jr.**, Commander, Air Training Command.

Thursday, May 27 Golf Tournament and Reception

The golf tournament will be held at noon on the Broadmoor West Course. The price is \$115 per person. This includes golf, greens fees, golf cart, and reception. The fee is \$35 for the reception only. For more information on both the dinner and the golf tournament, call Dottie Flanagan at (703) 247-5805.

The following have been invited:

Gen. Ronald W. Yates, Commander, Air Force Materiel Command
Lt. Gen. Howard W. Leaf, USAF (Ret.), Director, Air Force Test and Evaluation
Brig. Gen. George K. Muellner, Director of Requirements, Air Combat Command
The Assistant Secretary of the Air Force (Acquisition), (to be named)

The 1993 Air Force Acquisition Update will be held at Peterson AFB, Colo., and will require a Department of Defense Secret clearance. The local AFA chapter has made arrangements to certify the need-to-know requirements in accordance with DoD 5220.22-M. The cost for the symposium is \$225 for AFA individual or Industrial Associate members and \$50 for US military government employees. The registration fee includes coffee and doughnuts, lunch, and a reception in honor of the speakers following the symposium. Additional individual reception tickets are \$35 (spouses and individuals not registered for the Acquisition Update). For more information, contact Andrea Schmeyer at (719) 570-6200. Fax: (719) 570-6202.

Friday, May 28 Air Force Acquisition Symposium

The third annual Air Force Acquisition Update, sponsored by the Lance P. Sijan Chapter of AFA, will focus on "Air Force Acquisition: Cradle to Grave." The program is aimed at industry executives and government leaders.

The following speakers have already accepted:
Gen. Charles A. Horner, Commander in Chief, US Space Command
Maj. Gen. (selectee) Kenneth R. Israel, AFPEO for C³ Programs
Mr. Vladimir Kuz'min, General Director, MiG-29 Factory, Russia



Registration Form

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A Checklist of Air Force Test and Training Programs

Edited by Tamar A. Mehuron, Associate Editor

Work in progress at the Air Force Flight Test Center, Edwards AFB, Calif.; 4950th Test Wing, Wright-Patterson AFB, Ohio; and Range System Program Office, Aeronautical Systems Center, Eglin AFB, Fla.

Air Force Flight Test Center, Edwards AFB, Calif.

AC-130U Gunship

Development of the modification of the C-130H aircraft into the AC-130 gunship for US special operations forces (SOFs). Modification efforts include the addition of 25-mm, 40-mm, and 105-mm guns, infrared sensor, all-light-level television, dual-mode attack radar, armament, battle management center, and defensive system suite. **Contractor:** Rockwell International. **Status:** Qualification test and evaluation (QTE), qualification operational test and evaluation (QOT&E).

Advanced Cruise Missile Variant

Program to formulate development, test, and evaluation of the ACMV. This version of the Advanced Cruise Missile will be incorporated into the 1995 revision of the Single Integrated Operational Plan. **Contractors:** General Dynamics (GD), Convair, Boeing. **Status:** Engineering and manufacturing development (EMD).

Advanced Fighter Technology Integration/F-16

Test program for use in development and integration of advanced avionics and flight-control systems. The AFTI/F-16 is a highly modified, full-scale development aircraft designed to develop, integrate, flight test demonstrate, and implement promising new technologies applicable to present and future fighter aircraft. Currently evaluating technologies for the close air support mission. **Contractors:** In-house, NASA Ames Dryden Flight Test Facility, GD. **Status:** Ongoing.

B-2 Advanced Technology Bomber

Continuing operational test and evaluation (OT&E) flight test of the B-2 Advanced Technology Bomber over the full range of operational situations. **Contractor:** Northrop B-2 Division. **Status:** EMD.

C-17 Airlifter

Program to conduct full range of tests on the C-17, a four-engine turboprop aircraft designed to provide worldwide direct airlift of US combat forces, equipment, and supplies over intercontinental distances and within operating theaters. It is designed to deliver passengers and outsize/oversize/bulk cargo in both airdrop and conventional modes and to augment aeromedical evacuation and special operations. **Contractor:** McDonnell Douglas (MD). **Status:** Ongoing.

F-15/APG-63 Radar Annual Operational Flight Program (OFP)

Program to incorporate software changes recommended by ACC. These include air-to-air missile integration and development, test, and evaluation of APG-63 electronic counter-countermeasures (ECCM) features. Test programs are conducted in formal phases. The radar OFPs are released annually to ACC as part of two avionics suites—the Multistage Improvement Program APG-63 and pre-MSIP. **Contractors:** MD, Hughes. **Status:** Development, test, and evaluation (DT&E).

F-15/APG-70 Radar Air-to-Air Missile Integration

Flight test and evaluation of the F-15/APG-70 Radar OFP and avionics suite support for the AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM), AIM-7 Sparrow, and AIM-9 Sidewinder. Capability is assessed for each radar OFP following the completion of OFP development, test, and evaluation. **Contractors:** MDA, Hughes. **Status:** DT&E.

F-15/APG-70 Radar Operational Flight Program

Flight test and evaluation of F-15/APG-70 radar OFP updates, which incorporate changes and ECCM features requested by using commands. Test programs are conducted in formal phases. The radar OFPs are released to operational units every 18 months as part of two avionics suites—the MSIP APG-70 and the F-15E. **Contractors:** McDonnell Douglas Aircraft (MDA), Hughes. **Status:** DT&E.

F-15E Avionics Operational Flight Program

Flight test and evaluation of F-15E avionics OFP updates, incorporating changes requested by using commands. Test programs are conducted in formal phases. The avionics OFPs are released to operational units every 18 months. **Contractor:** MDA. **Status:** DT&E.

F-15E/LANTIRN DT&E

Flight test and evaluation of the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system OFPs as installed on the F-15E. Both the AAQ-13 Navigation Pod and the AAQ-14 Targeting Pod OFPs are tested. OFP updates incorporate changes requested by using commands. Test programs are conducted in formal phases. The LANTIRN OFPs are released to operational units every 18 months. **Contractors:** MDA, Martin Marietta Electronic Systems. **Status:** DT&E.

F-15/F100-PW-229 Component Improvement Program (CIP)

Flight test and evaluation of Pratt & Whitney F100-PW-229 engine performance and operability as installed in the F-15 with improved components, developed as required to improve engine reliability and maintainability. Test programs are conducted in formal phases. Improved components are released for incorporation into operational aircraft after the successful conclusion of CIP DT&E. **Contractors:** MDA, Pratt & Whitney (P&W). **Status:** DT&E.

F-16 Combined Test Force/Block 30 Close Air Support

An MSIP retrofit of avionics systems for the F-16C/D dedicated to the close air support mission. Implements new avionics architecture based on the Modular Mission Computer and several sensor and display modes to enhance close air support operations. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-16 Combined Test Force/Block 30 System Capability Upgrade

An MSIP production upgrade of avionics systems for Block 30 F-16C/Ds. Integrates several sensor and display modes to enhance versatility in both air-to-ground and air-to-air operations. **Contractors:** GD, Westinghouse. **Status:** Ongoing.

F-16 Combined Test Force/Block 40 Avionics Integration

Testing program to help upgrade the avionics systems as part of the MSIP for F-16C/D production. Includes avionics architecture based on a General Avionics Computer, LANTIRN compatibility, GPS, digital flight-control system, and wide-field-of-view holographic HUD. **Contractors:** GD, Westinghouse, Martin Marietta (MM). **Status:** Flight test, reporting.

F-16 Combined Test Force/Block 50 Avionics Integration

An MSIP production upgrade of avionics systems for F-16C/D. Integrates modes to enhance air-to-ground operations, including AGM-65G Maverick and AGM-88 HARM. **Contractors:** GD, Westinghouse. **Status:** Development, test planning, risk reduction, flight test.

F-16 Combined Test Force/F-16A/B Air Defense Fighter

MSIP retrofit of avionics systems for the F-16A/B aircraft dedicated to the air defense fighter mission. Integrates beyond-visual-range missile capabilities, advanced IFF, and several sensor and display modes to enhance air defense operations. **Contractors:** GD, Westinghouse. **Status:** Flight test, reporting.

F-16 Combined Test Force/F-16A/B Midlife Update

A retrofit of avionics systems to extend viability of Block 15 (USAF) and Block 10 (European Participating Air Forces) F-16A/Bs past 2000. Includes implementation of the Modular Mission Computer-based avionics architecture. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-16 Combined Test Force/F100-PW-229

Testing of the Increased Performance Engine (IPE) version of the existing F100 engine being developed for the Block 50 F-16C/D. **Contractors:** GD, P&W. **Status:** Flight test, reporting.

F-16 Combined Test Force/F110-GE-129

Testing of the IPE version of the existing F110 engine being developed for the Block 50 F-16C/D of the 1990s. Will compete with P&W IPE. **Contractors:** GD, General Electric. **Status:** Flight test, reporting.

F-16 Combined Test Force/LANTIRN

Program to conduct follow-on DT&E of system enhancements to the two-pod navigation and targeting system for nighttime, under-the-weather ground attack. **Contractors:** GD, MM. **Status:** Flight test, reporting.

F-22

Program in which combined test force conducts DT&E of the YF-22/F119 prototype aircraft and engine in preparation for the F-22 air-superiority fighter, which will replace the F-15. **Contractors:** Lockheed, Boeing, GD, P&W. **Status:** EMD.

MC-130H Combat Talon II

Program to evaluate the modification of C-130H aircraft into MC-130H configuration for US SOFs. Modifications include terrain-following/terrain-avoidance radar, integrated avionics systems, and a defensive avionics suite. **Contractor:** IBM. **Status:** QTE, QOT&E, development improvements testing.

Variable Stability In-Flight Simulator Test Aircraft/F-16

VISTA/F-16 is modified to function as a general-purpose fighter simulator to replace the NT-33. **Contractors:** GD, Calspan Corp. **Status:** Ongoing.

X-29 Vortex Flow Control

Program designed to investigate the ability to control asymmetric nose vortices at high angles of attack, using forebody blowing to enhance control and stability. **Contractor:** Grumman. **Status:** Continuing evaluation of data.

X-30 National Aerospace Plane

Program to investigate possible simulation, ground support system design, and instrumentation in support of the joint Air Force, NASA, and Navy NASP effort, whose goal is to develop and verify the technologies needed to build military and civilian single-stage-to-orbit and hypersonic cruise vehicles. **Contractors:** Rockwell, MD, GD, Rocketdyne, P&W. **Status:** Planning.

X-31 Enhanced Fighter Maneuverability

Testing of the EFM, a program to verify and validate the tactical utility of maneuvering at very high angles of attack. Includes use of two X-31A vehicles with post-stall techniques enabled by thrust vectoring and specialized control systems. Participants include the International Test Organization, composed of US government, German government, and industry participants. **Contractors:** Rockwell International, Messerschmitt-Bölkow-Blohm. **Status:** Flight test and documentation.

4950th Test Wing, Wright-Patterson AFB, Ohio

Advanced Range Instrumentation Aircraft (ARIA) Scoring Systems

Program to provide state-of-the-art, broad-ocean-area coverage of reentry vehicles for weapon system testing. Functions previously requiring both EC-135 and P-3 aircraft are combined in the EC-18 ARIA. The Sonobuoy Missile Impact Location System acquires and processes missile impact data. Impact times and locations of multiple reentry bodies are determined using deep-ocean transponders as geodetic references. Associated programs will collect optical data on reentry vehicles during the terminal phases of flight and sample meteorological parameters from the surface to 80,000 feet. **Contractors:** Applied Physics Laboratory (Johns Hopkins U.), E-Systems. **Status:** One aircraft operationally capable.

Cruise Missile Mission Control Aircraft

The CMMCA (designated EC-18D) will provide a stand-alone asset for OT&E (off-range) and a range support asset for DT&E (on-range) cruise missile testing. By combining the aspects of telemetry reception and real-

time display, remote command and control, and radar surveillance into one airframe, cruise missile testing will not require the large airborne support group currently used. IOC is planned for FY 1995. **Contractors:** Chrysler Technological Airborne Systems, Hughes. **Status:** Second aircraft in systems ground testing.

ECCM/Advanced Radar Test-Bed

The ECCM/ARTB is an airborne platform for DT&E of advanced radar systems and ECCM techniques, to include multisensor integration. This unique Air Force resource is designed to support development of current airborne radar systems and advanced technology programs into the next century. The NC-141A test-bed has been specifically designed to both instrument and physically accommodate five radars currently in use in the F-15, F-16, and B-1. **Contractor:** Lockheed-Georgia. **Status:** Upgrade to increase the bandwidth of the data collection system in support of Wright Laboratory Program.

Integrated Data Facility

The IDF will standardize, modernize, and enhance the capability for processing flight-test data. It will consist of a ground-based laboratories (GBL) module, a real-time test data monitoring module, and a module for improved data computation and analysis. The GBL module will provide for ground integration and checkout of test item hardware prior to aircraft installation. Local and wide area networks will provide for efficient sharing of data and computational resources. Full operational capability is scheduled for FY 1994. **Contractors:** Many. **Status:** Several components are operational.

Photo Safety Chase

The 4950th Test Wing has developed a full complement of photo safety chase aircraft especially suited for medium- and low-speed aircraft. **Contractors:** Many. **Status:** Ongoing.

Testing Off-the-Shelf Aircraft

Commercial aircraft purchased for military applications are evaluated against applicable military requirements both during source selection and after contract award. Areas of evaluation include ground handling, maintenance, flying quality, performance, human factors, and technical orders. Two programs are ongoing: T-1A and T-3A. **Contractor:** None. **Status:** Continuing.

Range System Program Office, Aeronautical Systems Center, Eglin AFB, Fla.

Air Combat Manuevering Instrumentation (ACMI)/Aircraft Instrumentation Subsystem Pods

Production of the airborne portion of the ACMI system. Pods can be carried on any AIM-9 missile rail; some can be carried on AIM-120 rails. Pods are interoperable on all eight- and 36-aircraft ACMI systems, as well as on all US Navy Tactical Aircrew Combat Training System (TACTS) ranges. Program includes fully automated/computerized pod test sets, which are deployed at each AIS pod maintenance facility. **Contractor:** Metric. **Status:** Production.

ACMI Interoperability

Series of projects to upgrade all existing/operational ACMIs. Level I involves all Air Force and Navy aircraft. The system is designed to allow fighters in simulated combat to identify eliminated players easily. **Contractor:** Cubic Corp. **Status:** Production.

ACMI Mini-DDS

Joint USAF-Navy project to provide a majority of the debriefing information currently available on the ACMI Display and Debriefing System (DDS) to widely scattered users at their home bases at greatly reduced cost. The program will use state-of-the-art mini- and microcomputer equipment to reduce the cost of ACMI debriefing facilities. **Contractor:** ADTI. **Status:** EMD.

AN/MST-T1V Mini-Multiple Threat Emitter System (Mini-MUTES)

Production of a variant of the AN/MST-T1A that allows dispersion of emitter signals to simulate an integrated air defense system. The remote emitters will be unmanned and will radiate multiple threat signals. **Contractors:** GD, Harris. **Status:** Production.

Bomber Airborne Instrumentation Subsystem (AIS)

Project to develop internally mounted subsystem to perform the functions of the P4AM AIS pod and allow bomber aircraft to play on ACMI and TACTS ranges. The program consists of internal modification and interface of B-52 and B-1 aircraft to allow rack mounting of the BAIS electronic components, the BAIS box itself, and an organizational level test set. **Contractor:** Kollsman Corp. **Status:** Preproduction.

Global Positioning System Production

Development of High-Dynamics Instrumentation Set, a full mil-spec GPS five-channel CA/P-code receiver for use in high-speed aircraft and in pods mounted on the aircraft. Data-link subsystem is used for data communication between the participants and the RR/P and host range. Ancillary equipment includes a control display unit to communicate with GPS

instrumentation sets and a data retrieval unit to download recorded data for transfer to a host range computer. **Contractor:** Interstate Electronics. **Status:** Low-rate initial production.

GPS/Strategic Training Route Complex

Program to integrate the GPS software and hardware and transitional devices into the STRC sites. **Contractor:** To be determined (TBD). **Status:** Program definition.

GPS Translator Range Applications

Program to develop and test translators for test and training ranges. Translator will be used for low-volume requirements and will receive L-band signals from all satellites in view, shift signals to another frequency (commonly S-band), and transmit this broadband information to the ground station for reduction. **Contractor:** Interstate Electronics. **Status:** Production, product improvement.

GPS Upgrade

Projects to upgrade the GPS data link to include the latest encryption technology and over-the-air rekeying. Prototype and low-rate production equipment will be retrofitted. **Contractor:** Interstate Electronics. **Status:** Product improvement.

Ground Jammer Follow-On (AN/MLQ-T4)

Production of I/J-band radar jammer that includes functional duplication of known threat jammers. Modular construction and software changes will permit low-cost updates. **Contractor:** American Electronic Lab, Inc. **Status:** Production.

Ground Transmitters GPS Range Applications

Program to develop and test ground transmitters. The GT provides equipment that will enable triservice test and training ranges to augment GPS coverage when less than four Navstar satellites are in view. The SDI mission uses this increase in coverage to track an interceptor missile and a reentry vehicle. **Contractor:** Stanford Telecom, Inc. **Status:** Sustainment.

Gulfport North Range ACMI

Program to expand existing Gulfport overwater ACMI to instrument airspace surrounding Camp Shelby, Miss. The north range consists of an additional Tracking Instrumentation Subsystem (TIS) master and 13 remotes (including one collocated with the master and one collocated with the microwave data-link relay). The south range will be used primarily for air-to-air training and the north range for air-to-ground training of Guard, Air Force, and Navy pilots. **Contractor:** Industrial Data Link. **Status:** Production.

Gulf Range Drone Control System Upgrade

Program to replace all computer hardware of the older GRDCUS with a more powerful computer system to control both full-scale and subscale drones. It will include a mobile control system. The mobile system is part of the test equipment being acquired for the QF-4 full-scale aerial target and is designed to land damaged drones. This upgrade will also include a capability to accept GPS data for time and space positioning information (TSPI). **Contractor:** TBD. **Status:** Program definition.

Joint Air Combat Training System

Program to provide next-generation ACMI. Features will include GPS-based TSPI; secure data link; and expanded capability in terms of participants, threat environment, and airspace. Threats will be computer-generated, requiring a two-way interface. USAF priority aircraft are F-15, F-16, and F-22. Navy priority aircraft are F/A-18, F-14, and A-6. Nellis AFB, Nev., will be the first user. **Contractor:** TBD. **Status:** Pre-EMD.

Low-Cost GPS C/A Receiver GPS Range Applications

Program to provide the US Army with up to 400 C/A receiver units. This will be a two-step competitive acquisition to procure approximately 700 units. **Contractor:** Navstar, Ltd. **Status:** Production.

Mid-Atlantic Tracking System (MATS) and Western Space and Missile Center (WSMC) Upgrade, Navstar GPS Range Applications

Program to develop and integrate selected GPS equipment into the MATS at the Naval Air Test Center, Patuxent River, Md., and the Western Test Range at the WSMC at Vandenberg AFB, Calif. **Contractor:** Interstate Electronics. **Status:** EMD.

Missile Endgame Scoring System

Program will provide development, test, and production options for QF-106 and BQM-34A aerial targets. **Contractor:** Motorola. **Status:** EMD.

National Training Center/Air Warrior Integration System

Program to place an ACMI range over the existing Army National Training Center Range at Fort Irwin, Calif. Data from the Army tracking system will be shared and integrated with the ACMI data stream so that weapon events can be conducted among both Army and Air Force players. Specially modified AIS pods will form part of the system to allow the Army system to designate airborne targets. **Contractor:** Cubic Corp. **Status:** Production.

Naval Weapons Center Range Development Program, GPS Range Applications

Program to provide Naval Weapons Center, China Lake, Calif., with a TSPI system to support Integrated Naval Air Defense Simulation testing requirements, evaluation of new airborne countermeasures equipment, and tactics development. **Contractor:** Interstate Electronics. **Status:** EMD.

Navstar GPS Range Applications

Development and demonstration of a GPS system to calculate a participant's TSPI and telemeter this information to a central location for display and processing. This will be demonstrated at seven DoD ranges and as part of the SDI ballistic missile program. The system will use GPS receivers, translators, and ground processors. **Contractor:** Interstate Electronics. **Status:** EMD.

On-Board Electronic Warfare Simulator

Program to provide F-16 and F-15E aircrews with realistic electronic combat threat indications. This ground-independent, computerized threat simulator will cause aircraft radar warning receivers to react visually and aurally as though threats existed. **Contractor:** Lockheed Sanders. **Status:** EMD, production.

PACAF Measurement and Debriefing System/USAFE MDS

Program to upgrade the PACAF and USAFE ACMIs with the next-generation MDS capability. This involves the replacement of the eight-aircraft system with more modern systems, such as the 36/45-high-activity-aircraft system, 70 ground threats, and GPS/computer-generated threat system capability. **Contractor:** TBD. **Status:** Program definition.

QF-4 Full-Scale Aerial Target

Conversion of retired F-4 aircraft to full-scale aerial targets for use in support of aircrew training, tactical air forces weapon systems evaluation, and development/test programs. **Contractor:** Tracor. **Status:** EMD, production.

QF-106 Full-Scale Aerial Target

Conversion of retired F-106 aircraft to full-scale aerial targets for use in support of aircrew training, tactical air forces weapon systems evaluation, and development/test programs. **Contractor:** Honeywell, Inc. **Status:** Production.

Range Control System

The RCS will support safety, overall management, and ground-control intercept training at the range control facility at Tyndall AFB, Fla. The RCS will receive and display sensor input and provide the capability to receive and display other future sensor system inputs. **Contractor:** DigiComp. **Status:** Production.

Strategic Training Route Complex (STRC)/Route Integration Instrumentation System

Program to provide RIIS for a bomber training complex in the northwest US. Encompasses communication, control, information processing, and debriefing display capability for the STRC. The RIIS aircrew-debriefing function will provide capability to review missions, analyze associated events, and evaluate aircrew performance. **Contractor:** GTE. **Status:** Production.

Translator Processing System GPS Range Applications

Program to develop and test the TPS for test and training ranges. TPS will receive telemetry signals from the translator and process the position of the translator to the ground controller. The TPS provides tracking for the Army's SDI interceptor missile and reentry vehicle. **Contractor:** Interstate Electronics. **Status:** EMD.

Tyndall ACMI Upgrade

Project to improve the training of Air Force and Navy fighter pilots, including Reserve and Guard, in tactics and techniques. System provides for real-time monitoring and control of aircraft during training. It records events for postmission debrief and analysis. This system directly supports deployed units at Tyndall and Eglin AFBs, Fla. **Contractor:** ADTI Corp. **Status:** Production.

Wisconsin ACMI

Measurement and debriefing system to be installed at Volk Field ANGB, Wis. The system includes a dual TIS with two master stations and 18 associated remotes. It provides instruments for military operating areas and other airspace surrounding the Combat Readiness Training Center at Volk Field, 90 miles northwest of Madison. **Contractor:** Kollsman Corp. **Status:** Production.

Yukon Mission Debriefing System

Project to improve the training of Air Force and Navy fighter pilots, including Reserve and Guard, in tactics and techniques. This system directly supports deployed units at Eielson AFB, Alaska. The tracking instrumentation subsystem to be installed on the Yukon range will consist of three master stations and approximately 17 remotes. The communication subsystem will also interface with the recently installed Cope Thunder Radar Microwave Link and range UHF and VHF radio systems. **Contractor:** TBD. **Status:** Source selection. ■

By John L. Frisbee, Contributing Editor

Flying Tiger

As a P-40 pilot with a “frontier” air force, Bruce Holloway launched a career that led to four stars.

In May 1940, the US was not at war. China was, fighting for survival against Japanese invaders. The US agreed to let Chiang Kai-shek have 100 older P-40Bs with crews to be recruited from the Army and Navy and trained by Claire L. Chennault. One disappointed would-be volunteer was Lt. Bruce Holloway, West Point 1937. Only Reservists were eligible.

Two years later, the US was at war. Bruce Holloway was sent to Chennault's American Volunteer Group (AVG), the Flying Tigers, as an observer. On July 4 of that year, the AVG was disbanded to become the nucleus of the AAF's 23d Fighter Group, later Fourteenth Air Force. During his eighteen months in China, Holloway rose from major to colonel; he commanded first a squadron, then the 23d Fighter Group, and finally Fourteenth Air Force Advance. He became one of the first AAF aces of World War II and returned to the States in November 1943 as the leading ace in the China-Burma-India theater, with thirteen confirmed victories.

When we talked with one of the AVG/23d pilots who flew with Bruce Holloway, he said Holloway was the smartest combat leader he flew with—a man who led all the tough missions. He continued, “You'll never get a story from Bruce about his own heroism. He would consider that bragging.” General Holloway's unpublished diary of his China days bears that out. There is plenty of combat narrative about other members of the 23d, but in his own case only the facts: “Shot down two today.” “Got behind a Zero and told my wingman to take it.”

What did Bruce Holloway find when he arrived in China? First, the most colorful collection of airmen ever assembled anywhere. Next, absolute austerity: no navigation or letdown aids in a region of chronic bad weather, maintenance done in the open, a

warning net of Chinese who reported sight or sounds of enemy planes by radio or phone, constant shortage of all but spirit. Everything used by the 23d Fighter Group (and later by some bomber squadrons) had to be flown over the Hump in the longest supply line of the war. It was comparable to a frontier cavalry post in the early days of the American West. There seldom were more than fifty fighters operational to cover an area as large as western Europe, but, despite all their problems, the 23d's pilots led by Holloway shot down enemy aircraft at a rate of ten to one.

An April 1943 mission typifies Bruce Holloway's leadership. When General Chennault was away, as he was at the time, Colonel Holloway and Col. “Casey” Vincent were responsible for operational decisions. There undoubtedly were lucrative targets on Formosa (now Taiwan), some 500 miles from the easternmost Fourteenth Air Force base. Holloway decided to find out.

It would be a solo reconnaissance because “I didn't want to risk losing more than one airplane in the event I got lost or the weather socked in completely.” Flying his P-40 across the 100-mile-wide Strait of Formosa from a crude Chinese Air Force base near the coast, he found many bombers at airfields near Taihoku and Sinchiku while ducking in and out of a 1,500-foot overcast to avoid enemy planes. On the way back to the mainland, he shot down an enemy bomber “with about fifteen rounds” to complete a daring mission that set Formosa up for future bomber strikes.

Holloway was shot down once—by ground fire—while strafing a column of trucks several miles west of the Salween River in Burma. His Allison engine ran for three minutes with no oil pressure, enough to get across the river into China. Once the Chinese peasants, who knew little about the war, were convinced he was on their side, they sent him on a triumphal five-day journey by pony, horse, and charcoal-burning truck to Yunnan-yi, whence he was flown to Kunming.

One of General Holloway's most



Colonel Holloway and friend in the cockpit of a 23d Fighter Group P-40, circa 1943, in Kunming, China.

unusual experiences could only have happened in China. The Yunnan government requested help for a remote town on the border of Tibet that was besieged by bandits. He took three P-40s to the walled city of Chungtien, located at 13,000 feet in a beautiful valley surrounded by 20,000-foot peaks—a Shangri-la setting. Six frag bombs dropped on the bandits outside the wall lifted the siege.

After the war, Bruce Holloway commanded USAF's first jet fighter group. He rose to General through key command and staff assignments, and, after serving as Vice Chief of Staff of the Air Force, was named commander in chief of Strategic Air Command. He continued to be an active pilot until his retirement in 1972 and is the only four-star general to check out in the SR-71.

Jimmy Stewart, one of the General's old friends, said: “Anyone who knows Bruce Holloway knows he has never forgotten the difference between machines and people. You keep machines going with wrenches and hammers, but people with human understanding.” That just about sums up this distinguished but unassuming man of great good sense, admired and respected by all who know him. ■

US military airmen flew their first humanitarian mission in 1919. Since then, there have been many more.

A History of Helping

By Bruce D. Callander

During the Berlin Airlift of 1948, C-47s full of food and other supplies became a common sight at Tempelhof Airport in that city. Over the course of a year, USAF planes delivered more than two million tons of goods for the relief effort.

THE AIR FORCE had just been through a major drawdown and restructuring, but, when hunger threatened millions, it turned out to lend a hand. The year was not 1993 but 1948. The crisis was not in Somalia but in Germany, which was still recovering from World War II and was divided by occupying powers.

Soviet troops had blockaded land routes into West Berlin. If Western nations intervened, there could be fighting. If they did not, however, thousands of Berliners would starve.

The US and its allies launched Operation Vittles, an ambitious effort to resupply the city by air. Later known as the Berlin Airlift, the resupply mission lasted for more than a year, moving food, fuel, and other necessities into the city around-the-clock. In one record twenty-four-hour period, there were 1,398 landings, spaced just minutes apart. When winter struck, C-54s from around the world converged on Berlin to deliver duffle bags of coal.

When the operation was over, there had been almost 278,000 flights. More than two million tons of goods had been delivered, mostly by US planes. As it would do forty-five years later in Somalia, the Air Force had demonstrated that airpower was more than dropping bombs and downing enemy fighters.

Critics still debate whether military resources should be used for humanitarian operations. They are costly and often risky. There is the danger that helping in one area may set a precedent for becoming involved in others. Some experts even suggest that using the military forces in such ways detracts from their combat training and could dull their fighting edge. These claims have been heard again in the wake of Operation Restore Hope, the relief effort in Somalia.

The use of ground forces in east Africa is in some ways

unique, but the Air Force's portion of it is hardly a new thing. Even at the time of the Berlin Airlift, USAF and its previous incarnations had had decades of experience helping civilians both at home and abroad. Those early missions were hazardous and, in some cases, politically dangerous. Far from weakening the service's combat capabilities, however, they often sharpened flying skills and, in the process, helped generate public support for airpower.

The First Mission

The first humanitarian airlift took place shortly after World War I. In 1919, less than ten years after the Army bought its first airplane, Curtiss NC-4s from Kelly Field and Corpus Christi, Tex., turned out to deliver air-dropped food and supplies to flood victims in Texas. Later, the Air Service flew similar flood relief missions in Ohio, Colorado, and other states.

It was in 1919 too that Army pilots began flying regular fire-watch missions for the US Forest Service. "Jennies" from Rockwell and Mather Fields patrolled areas of California. Few of the planes had radios, and some carried pigeons to report their observations. Some spotters even went aloft in captured balloons left over from the Great War.

Despite a lack of funds and the extensive gasoline shortages that developed as the private automobile began to grow in popularity, the Army continued to fly forest patrols until 1925. Then the Forest Service took over, using ten de Havillands supplied by the Air Service and Reserve pilots to fly them.

By the early 1920s, Army pilots were battling the forces of nature. Planes from Aberdeen Proving Ground, Md., practiced their bombing skills by breaking an ice jam on



the Delaware River. Soon afterward, Martin and de Havilland bombers from Western bases targeted a similar jam that threatened bridges on the Platte River in Nebraska.

Army planes helped other agencies in various ways. They flew mapping missions for the US Coast and Geodetic Survey. When that job began to tax the Air Service's meager budget, the War Department billed the Geodetic Survey \$51 per flying hour, but Army pilots continued to provide free service to other government agents and educators. They took to the air to explore everything from solar eclipses to suitable places in which to plant rubber in Panama.

The War Department also picked up the tab in 1920, when de Havilland DH-4Bs from Post Field, Okla., and Fort Leavenworth, Kan., airlifted rescue workers to a Colorado mine disaster. Two years later, planes from Crissy Field flew a similar mission when miners were trapped in California. Both efforts won friends for the Air Service.

That same year, an Army pilot won friends by helping Ohio farmers plagued by an infestation of caterpillars. Lt. John Macready and a civilian scientist used a JN-6 to spray arsenate of lead on the insects. Later, the Air Service sent planes to Louisiana to dust the cotton crop, to Oregon to spray apples, and to the Philippines to battle locusts attacking cane fields.

Commercial aviation firms soon moved into the lucrative crop-dusting business, but Army pilots continued to help agriculture and industry in other ways. They mapped the spread of wheat rust, surveyed storm damage in Oregon forests, counted elk herds in California, and dropped seeds to reforest parts of Hawaii.

The airplane gave scientists new ideas about harnessing nature, and the Army supplied the planes for the experi-

ments. Lt. Harold R. Rivers led a three-plane formation to photograph the lava flow from a volcano on Hawaii. At the time, flyers could only observe the destruction. A few years later, bombers attacked another flow and diverted it from destroying the waterworks at Hilo.

Medical Emergencies

The most publicized operation between the wars was the medical emergency mission. A stock movie plot of the period showed a child dying of mysterious causes while fearless pilots battled through snowstorms to deliver life-saving serum or the one world-famous physician who could operate on the child. Some real-life rescue missions were no less dramatic. Planes from France Field air-dropped tetanus serum to the wife of an American professor working in the wilds of Panama. When the woman was well enough to be moved to an airstrip, a bomber picked her up, and Capt. Andrew Smith, a flight surgeon who had studied under the professor, tended her on the flight to a hospital.

In another cliff-hanger, a boy lay dying on an isolated island in Lake Michigan, and no doctor could reach him through the winter storms. Brig. Gen. Billy Mitchell happened to be on an inspection visit to Selfridge Field, Mich., when word of the crisis came in. Lt. Russell Meredith of the 1st Pursuit Group borrowed the General's personal de Havilland, landed on the ice to pick up a doctor, and flew through a snowstorm to Beaver Island, where the doctor operated and saved the boy.

Even when it was going about its normal business, the Air Corps managed indirectly to lend a hand to civilians. By the 1930s, it was getting planes with enough range to roam most of the western hemisphere. It mounted flights to



When the Congo (now Zaire) gained independence from Belgium in 1960, a civil war erupted, and UN troops were sent in to restore peace to the area. Here Congolese workers unload a USAF C-124 bringing food and supplies to UN troops in Leopoldville.

Alaska and back and sent long-range bombers on goodwill missions through Latin America. The Army was flexing its muscles and, in the process, mapping routes later used by the civilian airlines.

Air Corps planes still turned out in humanitarian causes. When severe storms in Chesapeake Bay stranded residents on Tangier and Smith Islands, Capt. William Bently airdropped food and medical supplies to them. During the same month, Maj. Barney Giles was leading a composite group from Langley Field, Va., to maneuvers in New Hampshire when he got word that seven young Civilian Conservation Corps workers had been stranded on an ice floe. The Army planes joined the search. Major Giles spotted the youngsters, had supplies dropped, and alerted the Coast Guard to pick the workers up. Later that year, floods hit parts of Pennsylvania and planes from Langley again dropped food to stranded communities.

Another of the Air Corps's most spectacular rescue missions originated at Langley. This time the beneficiaries were on another continent. In the mid-1930s, Boeing

had developed a bomber larger than the B-17, with a range of 5,000 miles. The B-15 proved too slow for its intended purpose, and only one copy was built. In January 1939, however, nature provided the ideal mission for the giant. A major earthquake hit Chile (28,000 were killed), and Langley dispatched the B-15. Less than thirty hours later, Maj. Caleb Haynes and crew landed in Santiago with 3,250 pounds of medical supplies. Their unit, the 2d Bomb Group, received the Mackay Trophy for the mission.

An Airmail "Fiasco"

In 1934, Franklin D. Roosevelt had been President less than a year. He concluded that the government's commercial airmail contracts had been arranged through fraud and collusion. Outraged, he asked if the Air Corps could carry the mail while new contracts were negotiated. It was a chance to show what Army pilots could do, and Maj. Gen. Benjamin Foulois, Chief of the Air Corps, said they would give it their best. President Roosevelt promptly canceled the contracts and gave him the job.

At an airstrip in Puerto Montt, Chile, a young boy waits to be airlifted to Santiago by an Air Force C-124 after a series of earthquakes rocked Chile in late May 1960.



Volunteers in Somalia unload relief trucks filled with provisions to be distributed to feeding centers in the famine-stricken region. Sometimes US airlift missions involve not only delivering vital supplies but also seeing that food and medicines get to those who need them.



It was February of one of the harshest winters on record, and the Air Corps had few planes equipped with instruments and even fewer pilots trained to use them. Three flyers died in storms on familiarization flights even before the Army began carrying the mail. More were killed as the operation got under way for real, at least one of them because his instruments had been mounted too low in the cockpit and gave faulty readings.

General Foulois cut back on the routes and tightened safety procedures, but the casualties continued to mount. Pilots and aircrews worked and often slept in cold hangars. Until Congress authorized small per diem payments, many had to supply their own food. It was three months before commercial carriers took over again. In that time, the Air Corps had lost a dozen pilots and numerous aircraft. It had not carried as much mail as the commercial carriers, and its operating costs had been twice as high.

The press dumped on the service for what it called the "Air Mail Fiasco," but the experience had some positive results. Congress eventually raised the Air Corps's budget, and the Corps got serious about instrument training. The Corps's experience doubtless helped some pilots survive the war that broke out less than a decade later.

After Pearl Harbor, the services commandeered civilian planes, took over aircraft production, and scooped up most of the able-bodied pilots. The war, however, had its spin-off benefits for the civilian world. In the fall of 1944, a Douglas A-20 made the first successful penetration of a hurricane. Col. Floyd Wood, Maj. Harry Wexler, and Lt. Frank Record became the first "hurricane hunters." In later years, other pilots would brave these powerful storms to track their progress and alert coastal regions.

As the war wound down in Europe and then in the Pacific, transports that had been dropping paratroopers into the war zones dropped relief supplies, first to POW camps, then to civilian victims of the war. Planes that had brought destruction now delivered life-saving supplies.

The Air Force found ways to help on the domestic front as well. The winter of 1948-49 was abnormally severe, and storms left sheep and cattle stranded on western ranges. The Air Force launched Operation Haylift and, for more than a month, air-dropped feed to the snowbound animals.

By the 1960s, the Air Force had begun to modernize its troop carrier and cargo fleets. Their primary mission was to support the military's global forces, but they took on a wider humanitarian role as well. The 464th Troop Carrier Wing, successor to a World War II bomb group, received the 1964 Mackay Trophy for its evacuation flights in the Congo.

During that decade, Alaskan Air Command carried out a three-day rescue and support operation during flooding in Fairbanks. Military Airlift Command and USAFE provided a week-long airlift of food and supplies to earthquake victims in Sicily. Southern Command took tons of food to drought-stricken Ecuador, helped evacuate people from Costa Rica during a volcanic eruption, and joined the Public Health Service in fighting an encephalitis epidemic in Central America. Other Air Force crews flew relief to flood victims in Ethiopia, Nicaragua, and Tunisia.

Later, the Air Force airlifted supplies to New Orleans after Hurricane Camille and evacuated handicapped children from their Texas school after Hurricane Celia. Planes from Yokota AB, Japan, rescued seamen from a ship sinking in the North Pacific. USAFE sent units to Turkey to provide earthquake relief, and Southern Command turned out to help flood victims in Costa Rica and Panama.

Through the 1980s and into the 1990s, the Air Force continued to use its resources to speed relief to the victims of natural and man-made disasters. As in Somalia, the operations sometimes involved not only delivering food and vital medicines but also bringing in troops to see that they got to the people for whom they were intended. Such operations were expensive. As in the Berlin Airlift, there was often danger of resistance and even open warfare. The United States knew both the cost and the value. ■

Bruce D. Callander, a regular contributor to AIR FORCE Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, becoming editor in 1972. His most recent article for AIR FORCE Magazine, "Career Paths in the New Air Force," appeared in the February 1993 issue.

Books

By Frank Oliveri, Associate Editor

Battle for Panama: Inside Operation Just Cause, by Lt. Gen. Edward M. Flanagan, Jr., USA (Ret.). Drawing on interviews with key planners of the operation and official after-action reports, the author relates the story of the December 1989 action in Panama in detail. Brassey's (US), Inc., 8000 Westpark Dr., First Floor, McLean, VA 22102. 1992. Including notes and index, 251 pages. \$25.00.

Guerrillas: The Men and Women Fighting Today's Wars, by Jon Lee Anderson. The reader gets a firsthand look at how these warriors wage their struggles while trying to live with some semblance of normality. Anderson's account is based on twelve years of living among insurgents around the world. Times Books, 201 E. 50th St., New York, NY 10022. 1993. 271 pages. \$22.00.

The Heights of Courage: A Tank Leader's War on the Golan, by Avigdor Kahalani. Kahalani, who commanded an Israeli tank battalion on the Golan Heights during the October 1973 war, describes the fighting from his close perspective and traces the efforts of the Israel Armored Corps to overcome extreme odds in the early fighting against Syria. Praeger Publishers, One Madison Ave., New York, NY 10010. 1992. Including photos and index, 198 pages. \$12.95.

Incredible Victory: The Battle of Midway, by Walter Lord. Mr. Lord presents a detailed account of individual acts and a panoramic view of the grand drama that was a part of this pivotal World War II battle. HarperCollins Publishers, 10 E. 53d St., New York, NY 10022. 1993. Including photos and index, 331 pages. \$12.00.

In Search of Stability: Europe's Unfinished Revolution, edited by Gerald Frost and Andrew McHollam. A unique commentary on some of the most remarkable events of the twentieth century, this dense volume sketches Europe's fate up to and including the fall of the Soviet Union and European involvement in the 1991 Persian Gulf War. Greenwood Publishing Group Inc., 88 Post Rd. W., Box 5007, Westport, CT 06881. 1992. Including notes, 388 pages. \$65.00.

Inside Japan's Defense: Technology, Economics, and Strategy, by Michael W. Chinworth. The author relates the story of Japan's recent defense industrial development, identifies the Japanese strat-

egy for the year 2000, and demonstrates why and how the US has contributed to Japan's military growth. Brassey's (US), Inc. 1992. Including notes, bibliography, and index, 243 pages. \$26.00.

Israel Versus Jibril: The Thirty-Year War Against a Master Terrorist, by Samuel M. Katz. One of the foremost Western experts on Israeli military and security forces documents in detail Israel's struggle against one of the world's most effective terrorist organizations, the Popular Front for the Liberation of Palestine—General Command. Paragon House, 90 Fifth Ave., New York, NY 10011. 1993. Including notes and glossary, 250 pages. \$24.95.

The Line of Fire: From Washington to the Gulf, the Politics and Battles of the New Military, by Adm. William J. Crowe, Jr., with David Chanoff. Tracing his own career, the former Chairman of the Joint Chiefs of Staff describes the changes that have taken place in the US armed forces—politically, technologically, and socially. In addition, the author offers an insider's view of Presidents Ronald Reagan and George Bush. Simon & Schuster. 1993. Including index, 390 pages. \$25.00.

Pendulum: The Story of America's Three Aviation Pioneers, Wilbur Wright, Orville Wright, and Glenn Curtiss, the Henry Ford of Aviation, by Jack Carpenter. A fine, detailed portrait emerges of the early history of flying and the rise of three aviation greats. Arsdalen, Bosch & Co., 15 Lowell St., Box 823 (F), Carlisle, MA 01741. 1992. Including photos, appendix, and index, 409 pages. \$20.00.

Six Days in June: How Israel Won the 1967 Arab-Israeli War, by Eric Fammel. In a fine historical irony, Israel used modern military techniques devised by German officers of the Third Reich to swiftly defeat the combined forces of the Arab belligerents and rewrite the Middle East map for a generation. Charles Scribner's Sons, 866 Third Ave., New York, NY 10022. 1992. Including bibliography, 46 pages. \$30.00.

Thunderbolt. From the Battle of the Bulge to Vietnam and Beyond: General Creighton Abrams and the Army of His Times, by Lewis Sorley. Mr. Sorley explores the career of one of the US Army's greatest generals. Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. 1992. Including photos, notes, bibliography, and index, 429 pages. \$25.00.

Tomlin's Crew: A Bombardier's Story, by J. W. Smallwood. The author tells of his bomber crew from early training and formation through combat and eventual POW experience. Sunflower University Press, 1531 Yuma, P. O. Box 1009, Manhattan, KS 66502-4228. 1992. Including photos and index, 26C pages. \$21.95.

The Universal Man: Theodore von Kármán's Life in Aeronautics, by Michael H. Gorn. Here is a brief but useful look at the life of one of the fathers of supersonic flight, a man who pioneered the use of applied mathematics in aeronautics and astronautics. Smithsonian Institution Press, 470 L'Enfant Plaza, Suite 7100, Washington, DC 20560. 1992. Including photos, notes, and index, 202 pages. \$24.95.

We Are All the Target: A Handbook of Terrorism Avoidance and Hostage Survival, by Douglas S. Cerrer. Dr. Derrer, a psychologist who conducted terrorism-awareness and captivity training for the US Navy, introduces the reader to the psychology that motivates terrorism and offers a means to survive if such a threat should arise close at hand. Naval Institute Press, Annapolis, MD 21402. 1993. Including notes and index, 135 pages. \$14.95.

Other Titles of Note

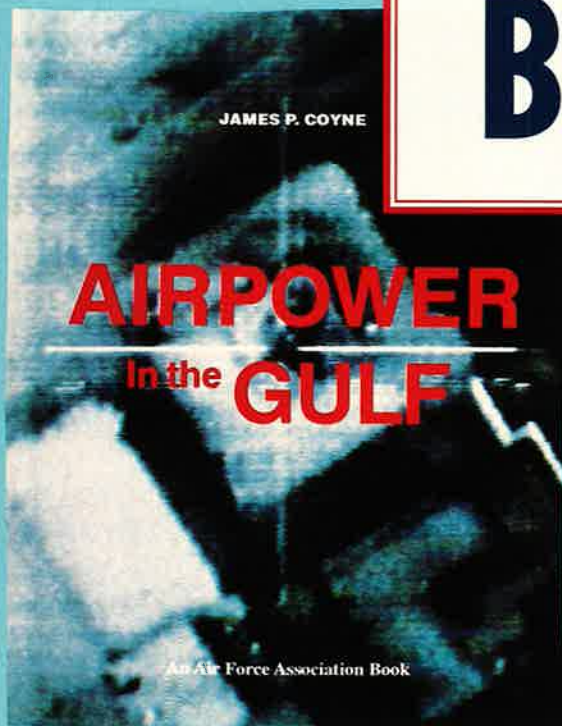
Angle of Attack: Harrison Storms and the Race to the Moon, by Mike Gray. The story of the Apollo Project, America's race to the moon. W. W. Norton & Co. Inc., 500 Fifth Ave., New York, NY 10110. 1992. Including bibliography and index, 304 pages. \$22.95.

The Codebreakers' War: The Ultra-Magic Deals and the Most Secret Special Relationships, 1940-46, by Bradley F. Smith. Intelligence-sharing between the US and Great Britain during World War II. Presidio Press, 505 B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1993. Including notes, bibliography, and index, 276 pages. \$24.95.

Flight to Black Hammer, by Ted Withington. The life of a World War II pilot told through his letters home. Biddle Publishing Co., P. O. Box 1305 #103, Brunswick, ME 04011. 1993. Including photos, 159 pages. \$12.50.

New Guinea Skies: A Fighter Pilot's View of World War II, by Wayne P. Rothgeb. A fighter pilot's account of life in the south Pacific. Iowa State University Press, Ames, IA 50010. 1992. Including photos, 261 pages. \$18.95. ■

A BOLT From The BLUE



Cloaked by darkness and stealth, more than 400 allied aircraft crossed the border into Saddam Hussein's Iraq in the early morning hours of January 17, 1991, and struck a blow from which the Iraqi armed forces never recovered. It was the beginning of the most impressive air campaign in history.

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By Daniel M. Sheehan, Assistant Managing Editor

Fogleman in Little Rock

The **David D. Terry, Jr. (Ark.), Chapter** welcomed Gen. Ronald R. Fogleman, commander of Air Mobility Command and commander in chief of US Transportation Command, to a general membership luncheon held at Little Rock AFB, Ark. General Fogleman had high praise for the men and women of Little Rock AFB's 314th Airlift Wing, who have been instrumental in bringing relief to Somalia. He said, "United States involvement in Somalia did not begin in December. It began when aircraft from Little Rock AFB deployed in August." The wing's C-130s were vital because larger airlifters cannot use the austere airstrips of Somalia's interior.

General Fogleman took note of the huge cuts in personnel in response to the end of the cold war but observed that increased reliance on forces based in the continental US "puts a premium" on AMC's mission of helping US forces respond to crises worldwide. He closed with this assessment: "Air Mobility Command, because of the roles it's going to play in our national military strategy, is going to play big in the future of the United States Air Force. Little Rock AFB is going to play big in the future of AMC."

Chapter President Marleen Eddlemon thanked General Fogleman and led the crowd in helping him celebrate his birthday. Later at the meeting, President Eddlemon welcomed three new Community Partners: Mark Magie of the Jacksonville (Ark.) *Patriot*, John Simms and John Payne of CAE/Link, and Art Brannen of Art's Hot Shot (a local business).

Veterans Day in Knoxville

Lt. Gen. Henry Viccellio, Jr., director of the Joint Staff (he has since been promoted to General and named to head Air Training Command and will command the new Air Education and Training Command) was the keynote speaker at Knoxville's Veterans Day Luncheon last November, at an event strongly supported by members and guests of the **General Bruce K. Holloway (Tenn.) Chapter**. In his assessment of the drawdown, General



The Central Florida Chapter, now in its ninth year of hosting the Air Force Gala, is still going strong. Here, AEF Chairman James Keck (left) and AEF President Gerald Hasler (second from right) accept the \$30,000 donation from Central Florida Chapter President Richard Ortega (right) and Gala Chairman Thomas Churan.

Viccellio struck many of the same chords as General Fogleman did in Arkansas. He also described the rising ratio of Guardsmen and Reservists in the Total Force mix, the redefinition of America's security needs and the role of the armed forces in filling those needs, and a shift from military effectiveness to military efficiency—"not just costing less because [the armed forces are] smaller but because the military must learn to be better businessmen and managers."

Also at the luncheon, Gen. Bruce K. Holloway, USAF (Ret.), was honored for his long and distinguished service to the nation [see "Valor: Flying Tiger," p. 75]. A World War II ace with the Flying Tigers, General Holloway rose to be commander in chief of Strategic Air Command, retiring in 1972. Chapter Vice President Billy Linebaugh presented an engraved pewter mug to the chapter's namesake, General Holloway also received an engraved plate from the Commanding General of the Air Force of the Republic of China presented by Maj. Gen. Fred Chiao, Republic of China

Air Force (Ret.), who flew with General Holloway in the Flying Tigers during World War II.

Chapter News

The **Lufbery-Campbell (Germany) Chapter**, led by President Lt. Col. James G. "Snake" Clark, has recognized some of the outstanding performers of the 86th Wing, Ramstein AB, Germany. The Base Information Transfer Center, Special Orders, and NATO Subregistry—all parts of the 86th Mission Support Squadron's Administrative Communications Management Section—received recognition certificates from President Clark for their performance in 1992. The certificates read, in part, "Thanks for consistently providing outstanding support to the Kaiserslautern Military Community." Maj. Renona Etter-Trotter, chief of Base Information Management, accepted the awards. Colonel Clark has since become Vice President (European Region). Col. James W. Prouty replaced him as chapter president.

When three vintage aircraft visited



Brig. Gen. Sebastian Coglitore (left), commander of 30th Space Wing, addressed a meeting of the General B. A. Schriever Los Angeles Chapter, discussing his trip to the former Soviet Union. He received a copy of AFA's Airpower in the Gulf from Chapter President Chris Harlambakis as a token of appreciation.

Florida's gulf coast, the **Southwest Florida Chapter** seized the opportunity to recruit new members and help disseminate AFA's message. Three fully restored World War II aircraft—a B-17G Flying Fortress, a B-24 Liberator, and a P-51 Mustang—landed at Page Field, Fort Myers, Fla., witnessed by an appreciative crowd. Chapter President Charles Butt and Shirley Olson, Chapter Vice President (Communications/Government Relations) Jack Olson's wife, spent the day handing out brochures, AIR FORCE Magazines, and membership applications. They report an enthusiastic response, including invitations for both Mr. Butt and Mr. Olson to speak before school groups and civic organizations about AFA's message.

The **Riverside County (Calif.) Chapter**, in conjunction with the Fifteenth Air Force Association and local branches of the Retired Officers Association, Air Force Sergeants Association, and the Bob Hope Council of the Noncommissioned Officers Association, is gearing up for the fiftieth anniversary of Fifteenth Air Force. The March Field Museum Foundation and the Silver Eagles, a March AFB civilian support group, are also making major contributions. A bust of the Fifteenth's first commander, Gen. Jimmy Doolittle, has been completed, and a new March Field Museum has opened. The official unveiling of the bust will take place November 1, 1993, the fiftieth anniversary of General Doolittle's assumption of command

and of the activation of Fifteenth Air Force in North Africa. The celebration will also mark the seventy-fifth anniversary of March AFB.

Michigan AFA's newsletter editor Jim Anderson delivered plaudits to the **Lloyd R. Leavitt, Jr., Chapter** in general and to its Vice President (Aerospace Education) Bob Fournier in particular. The chapter is sponsoring participation for nineteen local classrooms in the Aerospace Education Foun-

ation's "Visions of Exploration" program in conjunction with *USA Today*.

In a message to Michigan's chapters, State President George Copher has struck a new theme for 1993: "Honor the Past—Shape the Future." He points out the importance of AFA's mission in informing the public about the uses of airpower. "The Air Force is clearly out front, and it knows where it is going," he declares. He cites the thirteen-word USAF mission statement promulgated by Air Force Chief of Staff Gen. Merrill A. McPeak—"to defend the United States through control and exploitation of air and space"—and deems it "compelling, even inspiring." He stressed the historical benefit of such control: "It's been nearly forty years now since a US ground soldier was killed by enemy aircraft."

The **College Park Airport (Md.) Chapter** sponsored its second annual Fly-O-Rama for University of Maryland AFOTC cadets at College Park Airport. The cadets were treated to a cookout, guest speakers, and airplane rides around the Washington, D. C., metropolitan area. Army Capt. Gregory Woodward, a helicopter pilot, and George Parr, a World War II veteran, were this year's speakers. They discussed the changes in military aviation over the past fifty years. Chapter Vice President M. Scott Glasser called the event a success and looks forward to next year's Fly-O-Rama.

The **Columbia (S. C.) Chapter** has elected its first female president, Dola



The March Field Museum will honor the career of AFA's first National President, Gen. Jimmy Doolittle. This bust will be officially unveiled in conjunction with the fiftieth anniversary of Fifteenth Air Force. Here, airpower legend Chuck Yeager, sculptor Don Winton, and the General's grandson Peter pose with the sculpture.

Coming Events

May 7-9, **North Carolina State Convention**, Seymour Johnson AFB, N. C.; May 14-16, **South Carolina State Convention**, Clemson, S. C.; May 21-22, **Tennessee State Convention**, Nashville, Tenn.; June 4-5, **Alabama State Convention**, Montgomery, Ala.; June 11-13, **Louisiana State Convention**, New Orleans, La.; June 12, **Massachusetts State Convention**, Boston, Mass.; June 18-20, **New York State Convention**, Griffiss AFB, N. Y.; June 18-20, **Ohio State Convention**, Mansfield, Ohio; June 25-27, **Oklahoma State Convention**, Oklahoma City, Okla.; July 9-11, **Georgia State Convention**, Columbus, Ga.; July 9-11, **Missouri State Convention**, Whiteman AFB, Mo.; July 16-17, **Arkansas State Convention**, Jacksonville, Ark.; July 16-18, **Pennsylvania State Convention**, Trevese, Pa.; July 23-24, **Kansas State Convention**, Wichita, Kan.; July 30-August 1, **Florida State Convention**, Cypress Gardens, Fla.; August 5-7, **California State Convention**, Sacramento, Calif.; August 13-14, **Colorado State Convention**, Colorado Springs, Colo.; August 13-14, **Mississippi State Convention**, Jackson, Miss.; September 13-15, **AFA National Convention and aerospace exhibition**, Washington, D. C.

Cordoni. She succeeds her husband, Adrian Cordoni, in the office. Mrs. Cordoni previously served the chapter as treasurer, secretary, and vice president.

Westchester-Falcon (N. Y.) Chapter President Herbert S. Leopold has spearheaded his chapter's letter-writing campaign to keep the nation's elected leaders informed about the importance of a strong military. He wrote to both of New York's senators and several representatives, urging them

to "do all in your power to maintain a militarily invincible United States." Mr. Leopold further exhorted the representatives and senators to keep the nation's "sons and daughters superbly equipped at all times—equipped for safety, survival, and victory."

Have AFA/AEF News?

Contributions to "AFA/AEF Report" should be sent to Dave Noerr, AFA National Headquarters, 1501 Lee Highway, Arlington, VA 22209-1198. ■

New Membership Directory Under Way

The Air Force Association is pleased to announce the upcoming publication of an AFA directory of retired Air Force personnel who are AFA members.

This new, one-of-a-kind directory will include such valuable information as name and rank, years of military service, names of family members, residence address and phone number, and current employment information, if any.

The new directory will enable members to cross-reference membership by name and by geographic location.

The Bernard C. Harris Publishing Company, Inc., has been contracted to produce this unique directory at no cost to the Air Force Association. Letters are being sent to all known Air Force retirees throughout the month of April so that Harris can begin compiling the needed information. If you are retired from the Air Force but have not been contacted by May 1, please call AFA's customer service office (toll free, 800-727-3337) so that we can update our records. (If you prefer not to be listed, please contact AFA's Member Services office in writing as soon as possible.)

This new directory of retired AFA members will soon make it easy for you to network with colleagues and find fellow members—no matter where they are. Look for more details on this project in future issues of AIR FORCE Magazine.

Unit Reunions

Air Commando Ass'n

The Air Commandos of World War II (2d and 3d Groups) will hold a reunion October 7-10, 1993, in Hampton, Va. **Contact:** W. Robert Eason, 10031 Barnetts Ford Rd., Orange, VA 22960. Phone: (703) 672-4074.

Chambley AB

Military and civilian personnel who served at Chambley AB, France, will hold a reunion July 16-19, 1993, at the Hyatt Regency Dallas-Fort Worth Airport Hotel in Dallas, Tex. Veterans of the 7122d/122d and 21st Tactical Fighter Wings, 25th Tactical Reconnaissance Wing, and assigned units are invited. **Contact:** Charles R. Timms, P. O. Box 6892, Marietta, GA 30065. Phone: (404) 514-8382.

LeMay Foundation

The General and Mrs. Curtis E. LeMay Foundation will hold a dinner/dedication ceremony May 16-17, 1993, at the Bolling AFB Officers Club Ballroom in Washington, D. C., and the Smithsonian Institution's Paul E. Garber Facility in Silver Hill, Md. **Contact:** Bruce Jamieson, 17050 Arnold Dr., Riverside, CA 92518. Phone: (800) 554-5510.

Ohio Air National Guard

A-7 Squadrons of the Ohio Air National Guard will hold a reunion May 13-16, 1993. **Contact:** 1st

Lt. Barry James, Springfield-Beckley Municipal Airport, OH 45501-0178. Phone: (513) 327-2319.

Santa Ana AAB

Personnel who served at Santa Ana AAB, Calif., during World War II will hold a reunion May 1, 1993, at Orange Coast College in Costa Mesa, Calif. **Contact:** Alvin E. Anderson, P. O. Box 1764, Costa Mesa, CA 92628. Phone: (714) 631-5918.

USAF MSC Ass'n

The USAF Medical Service Corps Association will hold a reunion October 24-28, 1993, in Las Vegas, Nev. **Contact:** Col. Edward S. Nugent, USAF (Ret.), 670 Village Trace, Building 19, Marietta, GA 30067-4069. Phone: (800) 967-9772.

V Bomber Command

Veterans of V Bomber Command, 5th Air Force, who served in the southwest Pacific will hold a reunion June 23-27, 1993, in Indianapolis, Ind. **Contact:** L. J. Buddo, P. O. Box 270362, St. Louis, MO 63126-0362.

2d Air Division

Veterans of the 2d Air Division, 8th Air Force, will hold a reunion May 26-27, 1993, in Springfield, Ill. **Contact:** Russell Valleau, 1310 N. Neil, Champaign, IL 61820. Phone: (217) 359-6080.

3d Photorecon Squadron

Veterans of the 3d Photoreconnaissance Squadron will hold a reunion August 19-22, 1993, in Colorado Springs, Colo. **Contact:** Robert C. Davidson, P. O. Box 70, Higgins Lake, MI 48627. Phone: (517) 821-6645.

Readers wishing to submit reunion notices to "Unit Reunions" should mail their 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.

7th Airlift Squadron

Veterans of the 7th Airlift and Military Airlift Squadrons will hold a sixtieth-anniversary reunion October 1-3, 1993, at Travis AFB, Calif. **Contact:** Capt. Thomas E. Thompson, USAF, 999 Marshall

Rd., Apt. 62, Vacaville, CA 95687. Phone: (707) 447-8265.

25th Bomb Group (RCN) Ass'n

Veterans of the 25th Bomb Group (World War II) will hold a reunion October 6-9, 1993, in Seattle, Wash. **Contact:** Jack W. Sheen, 13003 N. 12th Ave., Phoenix, AZ 85029-1755. Phone: (602) 863-3142.

27th Fighter Wing

Veterans of the 27th Fighter Wing who served between 1947 and 1958 will hold a reunion November 4-7, 1993, in Fort Walton Beach, Fla. **Contact:** John McConnell, 106 Woodcrest, San Antonio, TX 78209. Phone: (210) 824-1329.

29th Air Service Group Ass'n

Veterans of the 29th Air Service Group, 13th Air Force, and attached units will hold a reunion July 11-17, 1993, at the Holiday Inn Airport Hotel in Pittsburgh, Pa. **Contact:** Frank Pace, 315 W. 15th St., Dover, OH 44622. Phone: (216) 343-7855.

37th/62d Troop Carrier Ass'n

Veterans of the 37th and 62d Troop Carrier Squadrons of the 316th/314th Troop Carrier Groups, 483d Troop Carrier Wing, and the 315th Air Division will hold a reunion October 7-10, 1993, in Albuquerque, N. M. **Contact:** Byfield D. Gordon, 1117 Santa Ana Ave., S. E., Albuquerque, NM 87123-4234. Phone: (505) 299-1071.

39th Troop Carrier Ass'n

Veterans of the 39th Troop Carrier Squadron, 39th Military Airlift Squadron, and 39th Airlift Squadron will hold a reunion September 16-19, 1993, at the Doubletree Hotel in Salt Lake City, Utah. **Contact:** Hal Schultz, 2080 Hollywood Ave., Salt Lake City, UT 84108. Phone: (801) 486-6471.

Class 43-A-1

Members of Class 43-A-1 (Mather Field, Calif.) will hold a fiftieth-anniversary reunion August 25-29, 1993, at the Marriott Riverwalk Hotel in San Antonio, Tex. **Contact:** Lt. Col. Wallace E. Linn, Jr., USAF (Ret.), 8715 Starcrest Dr., #21, San Antonio, TX 78217. Phone: (210) 590-7254.

Class 43-F

Members of Class 43-F (Southeastern Training Command) will hold a fiftieth-anniversary reunion June 18-21, 1993, at the Ramada South Ocean Golf and Beach Resort in Nassau, the Bahamas. **Contact:** James Frew, P. O. Box 21743, Fort Lauderdale, FL 33335, or P. O. Box 4354, Nassau, the Bahamas. Phone: (809) 362-4592.

Class 43-G

Members of Class 43-G (Blytheville AFB, Ark.) are planning to hold a reunion July 28, 1993, at Eaker AFB. **Contact:** Maj. Russell M. Olson, USAF (Ret.), 6429 Hickory Ave., Orangevale, CA 95662. Phone: (916) 988-0439.

Class 43-G

Members of Class 43-G (Brooks Field, Tex.) will hold a fiftieth-anniversary reunion October 1-3, 1993, in San Antonio, Tex. **Contact:** Lt. Col. Hector Santa Anna, USAF (Ret.), 313 Blue Cedar Ct., Millersville, MD 21108. Phone: (410) 923-3541.

49th Fighter Squadron

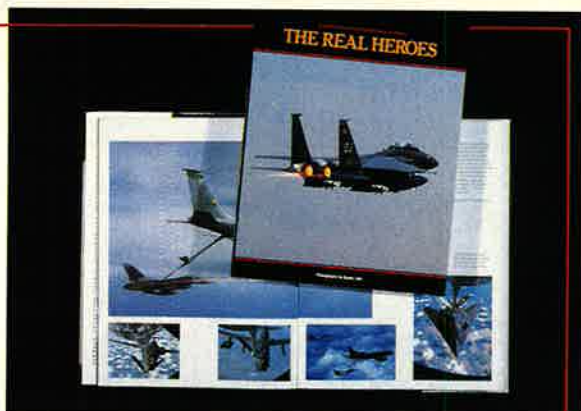
Veterans of the 49th Pursuit/Fighter/Fighter-Interceptor Squadron will hold a reunion October 5-7, 1993, in Reno, Nev. **Contact:** Sheril D. Huff, 3200 Chetwood Dr., Del City, OK 73115-1933. Phone: (405) 677-2683.

56th Fighter Group Ass'n

Veterans of the 56th Fighter Group/Fighter-Interceptor Group/Fighter-Interceptor Wing/Tactical Fighter Training Wing will hold a reunion June 18-20, 1993, in Memphis, Tenn. **Contact:** Leo Lester, 600 E. Prospect, Kewanee, IL 61443. Phone: (309) 856-6826.

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58th Bomb Wing Ass'n

Veterans of the 58th Bomb Wing, which included the 40th, 462d, 444th, and 468th Bomb Groups and the 25th, 78th, 86th, and 87th Air Service Groups, will hold a reunion June 14-20, 1993, at the Adams Mark Hotel in Tulsa, Okla. **Contact:** Edgar C. Shaw, Rte. 1, Box 236, Barnsdall, OK 74002. Phone: (918) 847-2920.

65th Troop Carrier Squadron

Veterans of the 65th Troop Carrier Squadron, 433d Troop Carrier Group, 54th Troop Carrier Wing, 5th Air Force, will hold a reunion August 4-8, 1993, in Fort Wayne, Ind. **Contact:** Bud Hawkey, 106 Union Dr., New Madison, OH 45346. Phone: (513) 996-3851.

Class 66-E

Members of Class 66-E (Williams AFB, Ariz.) will hold a reunion May 14-16, 1993, in Chandler, Ariz. All former students and instructor pilots are invited. **Contact:** Cal Tax, 5084 Odins Way, Marietta, GA 30068. Phone: (404) 992-7197.

69th Fighter Squadron

Veterans of the 69th Fighter Squadron will hold a reunion June 10-14, 1993, in Minneapolis, Minn. **Contact:** George E. Mayer, 7445 Thomas Ave., S., Richfield, MN 55423. Phone: (612) 866-6073.

78th Fighter Squadron

Veterans of the 78th Fighter Squadron (World War II) will hold a reunion July 28-August 1, 1993, in Milwaukee, Wis. **Contact:** Col. Kenneth J. Sweet, USAF (Ret.), 4045 S. 54th St., Milwaukee, WI 53220. Phone: (414) 541-4015.

79th Airdrome Squadron

Veterans of the 79th Airdrome Squadron, 5th Air Force, will hold a reunion June 10-13, 1993, at

the Marriott/Green Tree Hotel in Pittsburgh, Pa. **Contact:** Fred Hitchcock, 29 Blueberry Hill Ln., Sudbury, MA 01776. Phone: (508) 443-6679.

80th Fighter Group

Veterans of the 80th Fighter Group (World War II), which included the 88th, 89th, 90th, and 459th Fighter Squadrons, will hold a reunion September 1-4, 1993, in Spokane, Wash. **Contact:** Dodd Shepard, 13123 E. 24th, Spokane, WA 99216. Phone: (509) 926-0365.

96th Air Refueling Squadron

Pilots and navigators of the 96th Air Refueling Squadron (Altus AFB, Okla.) will hold a reunion September 24-26, 1993, in Altus, Okla. **Contact:** Col. Richard F. Lyon, USAF (Ret.), 1037 Woodlore Cir., Gulf Breeze, FL 32561. Phone: (904) 932-0124.

97th Bomb Group Ass'n

Veterans of the 97th Bomb Group will hold a reunion October 6-9, 1993, in Colorado Springs, Colo. **Contact:** Harry Alsaker, 1308 Jackson, Missoula, MT 59802. Phone: (406) 543-5388.

100th Bomb Group

Veterans of the 100th Bomb Group (World War II) will hold a reunion October 21-24, 1993, in Little Rock, Ark. **Contact:** Bill Woods, 32 Baeza Way, Hot Springs Village, AR 71909. Phone: (501) 922-0436.

315th Fighter Squadron

Veterans of the 315th Fighter Squadron and the 324th Fighter Group (World War II) will hold a reunion May 13-16, 1993, at the Holiday Inn Hotel in Fairborn, Ohio. **Contact:** Eugene J. Orlandi, 311 North St., East Northport, NY 11731. Phone: (516) 368-9193.

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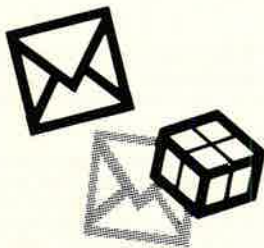
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Unit Reunions

351st Bomb Group Ass'n

The 351st Bomb Group will hold a reunion June 24-27, 1993, in San Antonio, Tex. **Contact:** George L. Steinbach, 135 Park Dr., San Antonio, TX 78212-2506. Phone: (210) 826-1467.

352d Fighter Group Ass'n

Veterans of the 352d Fighter Group and the 1st Service Group will hold a reunion August 26-29, 1993, in Hartford, Conn. **Contact:** Richard J. DeBruin, 234 N. 74th St., Milwaukee, WI 53213. Phone: (414) 771-0744.

364th Fighter Group Ass'n

The 364th Fighter Group (World War II), 8th Air Force, will hold a reunion September 14-18, 1993, at the Marriott Hotel in Salt Lake City, Utah. **Contact:** Dan Leftwich, 6630 Caldero Ct., Dayton, OH 45415. Phone: (513) 890-3641.

405th Fighter-Bomber Group

Veterans of the 405th Fighter-Bomber Group, which included the 509th, 510th, and 511th Fighter-Bomber Squadrons, who served at Langley AFB, Va., between 1953 and 1958 will hold a reunion October 1993 in Hampton, Va. **Contact:** Roger Warren, 7550 Palmer Rd., Reynoldsburg, OH 43068. Phone: (614) 866-7756.

417th Bomb Group

The 417th Bomb Group will hold a fiftieth-anniversary reunion June 15-17, 1993, in Oklahoma City, Okla. **Contact:** Charles Troutman, 4325 N. W. 26th St., Oklahoma City, OK 73107-1014. Phone: (405) 942-1256.

454th Bomb Group

The 454th Bomb Group (World War II) will hold a reunion October 22-25, 1993, in Norfolk, Va. **Contact:** Ralph Branstetter, P. O. Box 678, Wheat Ridge, CO 80034-0678.

753d AC&W Squadron

The 753d Aircraft Control and Warning Squadron will hold a reunion July 9-10, 1993, at the VFW hall in Sault Sainte Marie, Mich. **Contact:** Jim Doyle, 15009 Rosehill Rd., Olathe, KS 66062. Phone: (913) 897-2069.

1266th Air Transport Squadron

Veterans of the 1266th Air Transport Squadron who served at Travis AFB, Calif., and Hickam AFB, Hawaii, between 1947 and 1953 will hold a reunion September 16-19, 1993, at Travis AFB. **Contact:** Col. A. S. Gainey, USAF (Ret.), 8518 Montgomery Ln., San Jose, CA 95135-1427. Phone: (408) 238-6790.

3910th Bomb Group

Veterans of the 3910th Bomb Group, 7th Air Division, who served between 1950 and 1953 at RAFs Wyton, Upper Heyford, Mildenhall, and Lakenheath, UK, and all satellite stations will hold a reunion July 23-28, 1993, in Reno, Nev. **Contact:** Bill G. Parkhurst, P. O. Box 2881, Tulsa, OK 74101. Phone: (918) 446-6400.

Moselle Control Personnel

The Royal Canadian Air Force Association is organizing a reunion for personnel who served with the 1283d AACs, 2183d AFCS, Royal Canadian Air Force, French Air Force, and Siemens Corp. assigned to Moselle Control in Metz, France. Planned dates for the reunion are September 19-20, 1993. **Contact:** M. J. Wilds, 1151 Gregory Rd., Kelowna, British Columbia V1Z 2W4, Canada. Phone: (604) 769-4431.

SAC Emergency Actions/Force Status Controllers

For a reunion in summer or fall 1993, we are seeking former Emergency Actions and Force Status Controllers (officers and enlisted personnel) assigned to Hq. SAC Underground and Airborne Command Posts. **Contacts:** CMSgt. Pat Madrid, USAF (Ret.), 12908 La Cueva Ln., N. E., Albuquerque, NM 87123. SMSgt. Len Buch, USAF (Ret.), 1116 Wilshire Dr., Trophy Club, TX 76262.

WAAC/WAC

Seeking contact with former members of the Women's Army Auxiliary Corps and Women's Army Corps who served in 1943 or later at Luke AFB, Ariz. **Contact:** Mrs. Edward R. Cahall, 1713 E. Sierra Vista Dr., Phoenix, AZ 85016.

85th Bomb Squadron

In order to plan a reunion, I am seeking contact with members of the 85th Bomb Squadron, 47th Bomb Wing, who served at RAF Sculthorpe, UK, between 1955 and 1958. **Contact:** Ed Byrne, 120 High St., Winnsboro, SC 29180.

728th Bomb Squadron

Seeking contact with members of the 728th Bomb/Troop Carrier/Airlift Squadron (AFRES) for a fiftieth-anniversary reunion in June 1993. Also looking for memorabilia, photos, and information on unit activities. **Contact:** Lt. Col. John W. Barton, AFRES, Commander, 728th Airlift Squadron, McChord AFB, WA 98438-1326. Phone: (206) 984-3111 (Maj. Gary Hudson).

Bulletin Board

Seeking contact with members of the **28th Troop Carrier Squadron** who served in North Africa, Sicily, Italy, and Greece during World War II. The squadron flew Douglas C-47 aircraft. **Contact:** Col. Victor Lisee, USAF (Ret.), 3520 Nantucket Dr., Fairfield, CA 94533.

Seeking contact with **Warrant Officer Gerald Parker**. He was a member of the RAF and served in Flight Lt. Bill Siddle's crew in No. 9 and No. 83 Squadrons in England. He later transferred to the US 8th Air Force in June 1944. **Contact:** Clayton Moore, 4 Edgehill Way, Billingham, Cleveland TS23 3LE, England.

Seeking information about the **F-4 Phantom** from aircrews, crew chiefs, and maintenance person-

nel for a book on the aircraft. Especially interested in aircrews with combat experience and those that downed enemy aircraft. **Contact:** Joe Cupido, P. O. Box 20121, Riverside, CA 92516.

Seeking information on and contact with **Stephanie Jones Bower** and her husband. Their address in the Philippines was S. E. 4, Box 17476, APO SF 96408-0006. **Contact:** Dr. Mario G. Fiorilli, 220 Smith Church Rd., P. O. Box 1838, Roanoke Rapids, NC 27870.

Seeking information on **Edward A. Federer** and his connection to Norway during World War II or the first postwar years. He was probably a navigator in AAF or USAF. Also would like information on his service career in Europe, units he

belonged to, and the nature of his operations over Norway if any. **Contact:** Oyvind Aadnevik, 330 Banak, N-9700 Lakselv, Norway.

Seeking information on **James T. Patrick**. He flew in the CBI theater from May to November 1945 with the 325th Bombardment Squadron, 92d Bombardment Group. He was squadron commander of the 19th TASS, Bien Hoa AB, Vietnam, from January 1968 to December 1968. He also served at the following stations: Lindsey AS, Germany, March AFB, Calif., Shaw AFB, S. C., and Quarry Heights, Panama. **Contact:** Bruce Patrick, 9307 Silvercreek Ct., Fairfax Station, VA 22039.

Seeking contact from veterans who are **stamp collectors** interested in used postage stamps. **Contact:** VA Medical Center, Veteran's Stamp and Coin Club, 678/135, Tucson, AZ 85723.

Seeking information on and photos of **James Connally AFB**, Tex. It was formerly Waco AAF, then Waco AFB. The base was the home of the 3565th Navigator Training Wing until its closure in 1966. It was also the headquarters of the 12th Air Force (TAC) until it transferred to Bergstrom AFB, Tex. **Contact:** Pete Hjelmstad, Jr., 237 Shirley St., Waco, TX 76705.

Seeking information and photographs from former residents of **Randolph AFB**, Tex., before 1950 for a book on the history of the base. **Contact:** Col. Charles G. Tucker, USAF (Ret.), 3538 Oakhorne St., San Antonio, TX 78247.

Collector seeks contact with personnel from the **428th Fighter Squadron/428th AMU** "Buccaneers" who can provide a flight scarf, color or subdued patch, sticker, airframe decal, unit history, squadron ball cap, and a color photo of an F-111G from their unit. Also seeking a 27th Fighter Wing Standardization/Evaluation patch and a 27th FW gaggle patch. **Contact:** Curtis J. Lenz, 32 June St., Nashua, NH 03060-5345.

Detachment 695, AFROTC, University of Portland, is seeking contact with alumni and past personnel to receive newsletters; also interested in receiving newsletter items. **Contact:** Cadet Maj. Deborah Driver, 5000 N. Willamette Blvd., Portland, OR 97203.

Seeking contact with **Alan E. Bragg, Donald T. Dube, Jerry L. Cooper**, 85th Bomb Squadron, 47th Bomb Wing. They were stationed at RAF Sculthorpe, England, from 1955 to 1958. **Contact:** Edward J. Byrne, 120 High St., Winnsboro, SC 29180.

Historian seeking information on any **US citizen (military/civilian) who died in southeast Asia** during the Vietnam War. **Contact:** David W. Schill, 132 Harding Ave., Moorestown, NJ 08057.

Seeking contact with members of the **409th Bomb Group** (A-20s, A-26s). **Contact:** Lt. Col. Thomas R. Sammons, 216 S. Jones Blvd., Las Vegas, NV 89107.

Seeking information from those who flew and supported B-52 missions from Andersen AFB, Guam, to North Vietnam for a book on **Operation Linebacker II**. Also interested in people who lived in the Tent and Tin Cities at Andersen. **Contact:** Brig. Gen. James R. McCarthy, USAF (Ret.), 127 Morning Dove Ct., Daytona Beach, FL 32119.

Seeking information on scoutmaster **Maj. Ed Seibert**. His last known address, as of 1990, was PSC Box 1698, APO NY. **Contact:** Eagle Scout (selectee) Creighton Cox, 4709 Western Hills Dr., West Des Moines, IA 50265-2942.

Seeking information on and photos of **Maj. George A. Davis**, 4th Fighter-Interceptor Wing. He was stationed in Korea from 1951 to 1952. The material will be used in a biography of Major Davis. **Con-**

tact: Larry Davis, Squadron/Signal Publications, 4713 Cleveland Ave. NW, Canton, OH 44709.

Seeking intact copies of the **Air Force Register, 1969-78**, to help historian identify officers who served in the Thor missile program. **Contact:** Eric G. Lemmon, c/o the Thor Association, P. O. Box 5566, Vandenberg AFB, CA 93437.

Seeking information on **2d Lt. Wallace Lane**, 447th Bomb Group. A former POW at Stalag Luft III, his last place of residence was in Yonkers, N. Y. **Contact:** Maj. Michael Gannon, USAF (Ret.), 7925 E. Luke Ln., Scottsdale, AZ 85250.

Seeking contact with **Norbert E. Gastonguay** and **Bernard J. Geeland**, who served with the 85th Bomb Squadron at RAF Sculthorpe, England, in the mid-1950s. **Contact:** Richard L. McCormick, 307 S. Meridian St., Greenwood, IN 46143.

Seeking information and photos from any member of the crew or support personnel for a book on the **16th Special Operations Squadron**. It operated AC-130 Spectre gunships and other aircraft that hit North Vietnamese truck routes and flew other missions out of Ubon RTAFB, Thailand, during the Vietnam War. All contributed material will be acknowledged in the book. **Contact:** Gregory T. Davis, P. O. Box 42, Peru, ME 04290.

Seeking all **Air Rescue Service** unit patches, pins, or other artifacts from World War II to present for personal collection. Also seeking any photographs of B-17G *Sleepy Time Gal* that flew with the 532d Bomb Squadron, 381st Bomb Group, from Ridgewell, England, during World War II. Also seeking an original 532d patch. **Contact:** Arthur C. Napolitano, 4 Lorimer Rd., Belmont, MA 02178-1002.

If you need information on an individual, unit, or aircraft, or if you want to collect, donate, or trade USAF-related items, write to "Bulletin Board," Air Force Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be brief and typewritten; we reserve the right to condense them as necessary. We cannot acknowledge receipt of letters. Unsigned letters, items or services for sale or otherwise intended to bring in money, and photographs will not be used or returned.—THE EDITORS

Seeking photos of the Republic **F-105 Thunderchief** for a comprehensive book covering its history. An attempt will be made to show at least one photo or image of each of the 833 F-105s built. All photos returned on request. **Contact:** John M. Campbell, 5405 Bodine, Oklahoma City, OK 73135.

Seeking contact with **Robert J. Hoke**, formerly of Norwich, N. Y. As a navigator in a B-17 Flying Fortress, he was shot down over Belgium in 1943. He spent a few months in Brussels, Belgium, with William Alan Poulton and Vincent Horn, both of the RAF. He was transferred to another safe house, arrested by Gestapo, then placed in a POW camp. He last visited the Thyrn family in 1945-46. **Contact:** Claire Keen-Thyrn, Pen-Y-Borfa Fawr, Cearsws, Powys SY17 5JA, UK.

Collector of **World War II aviation memorabilia** seeks contact with people who served in the air forces of that era, saved their flying equipment, and would like to sell or donate items to a collection in Switzerland. **Contact:** Reto Renfer, Solothurnstr. 53, 2543 Lengnau, Switzerland. ■

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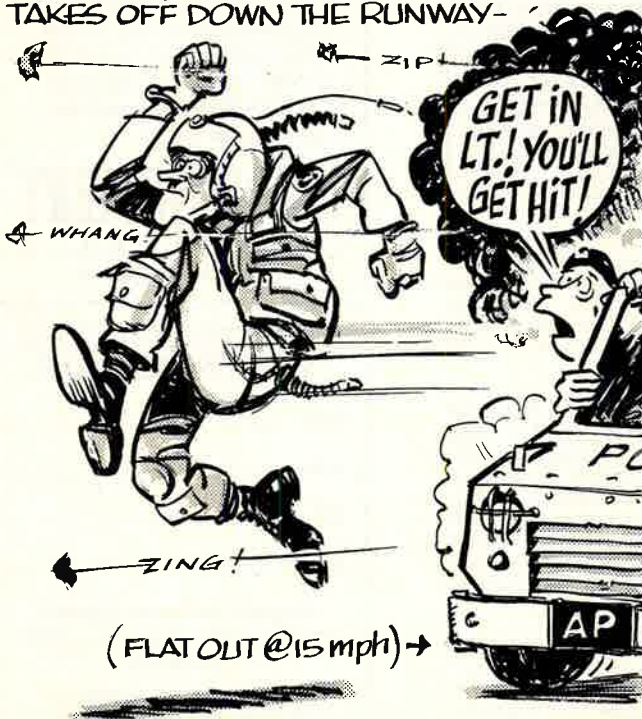
SCENE: TAKHLI, THAILAND - A FULLY LOADED F-111A IS LAUNCHING IN LINEBACKER II;

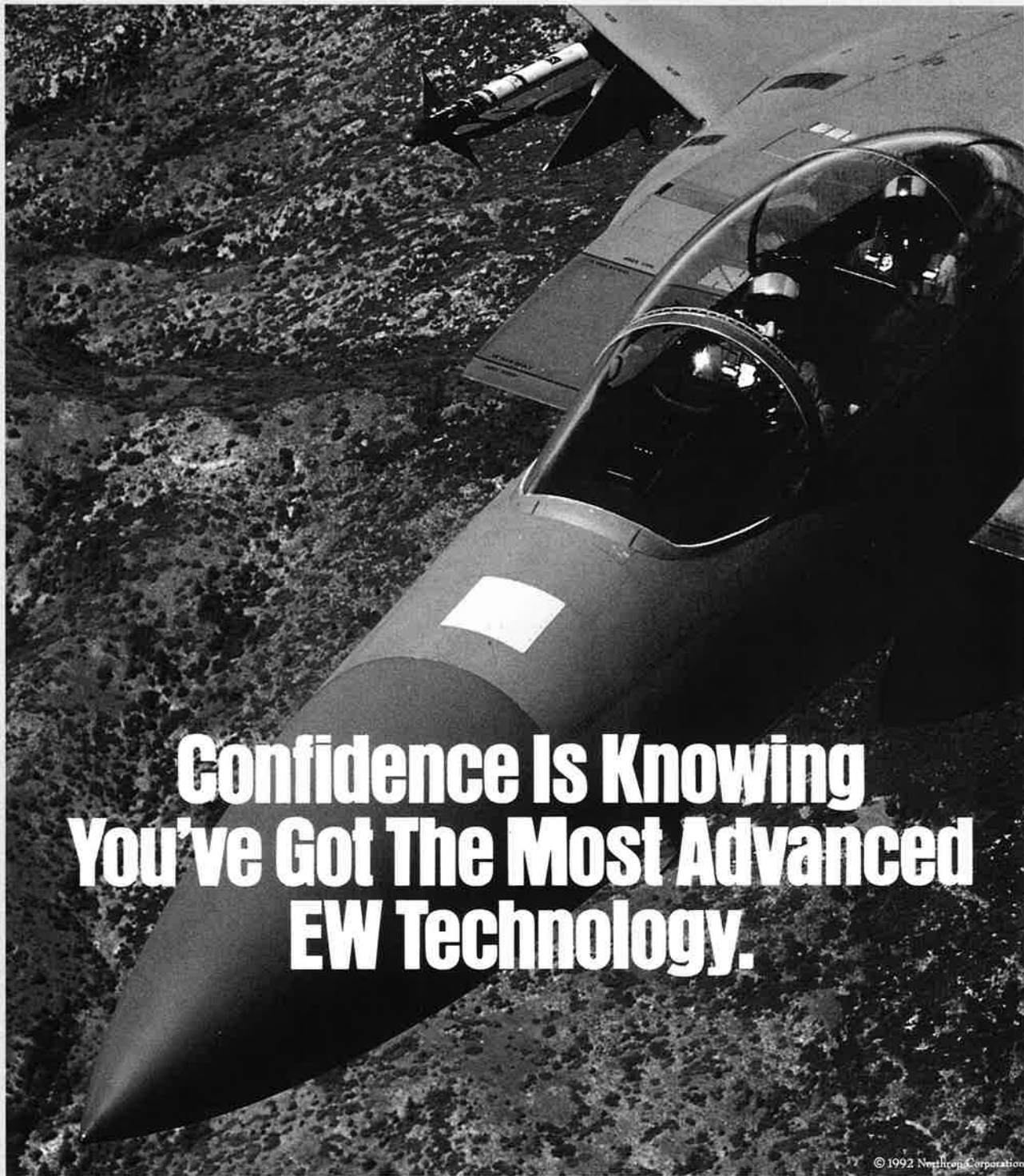


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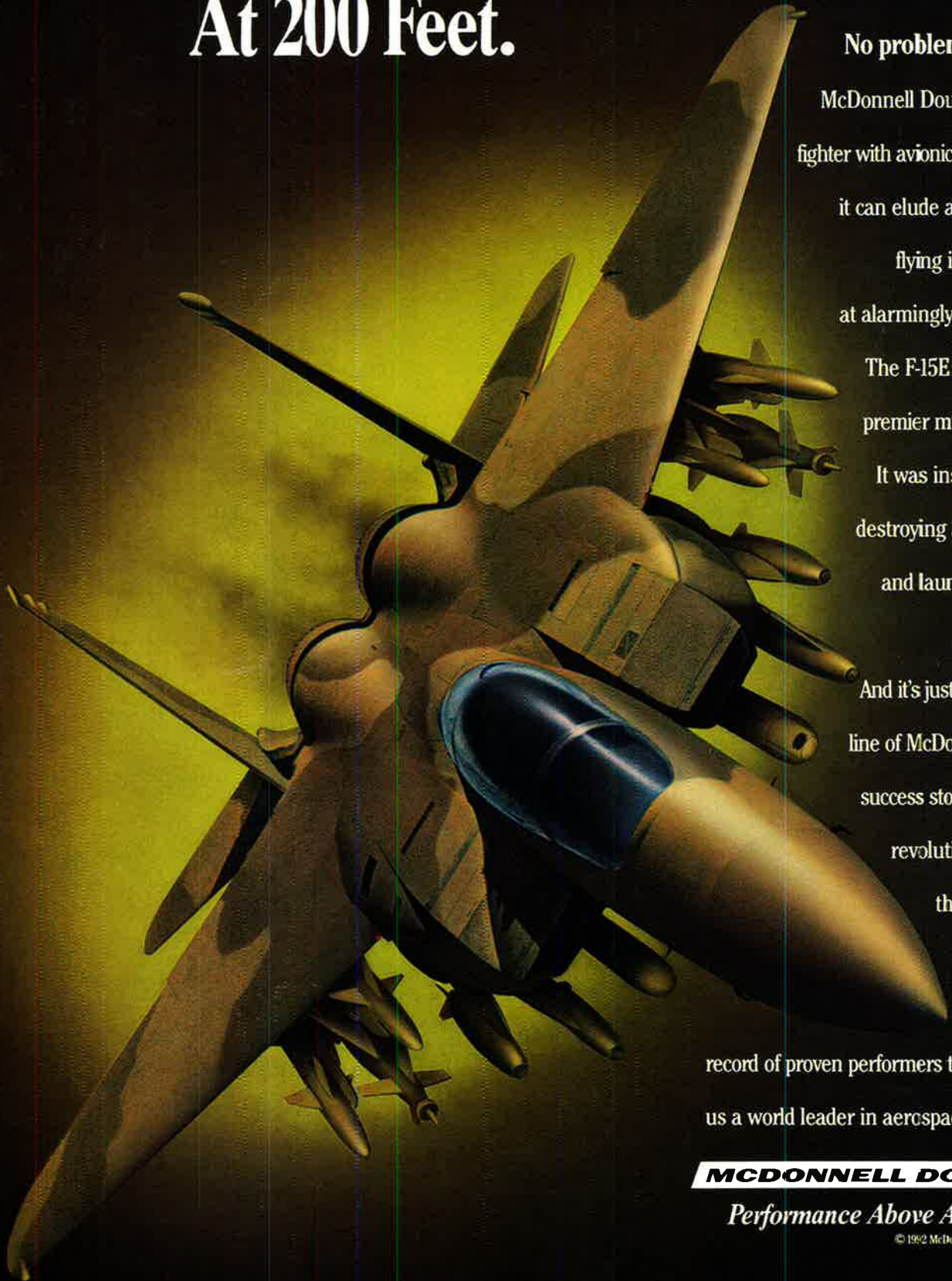
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