APRIL 1997/$3

AIR FORCE

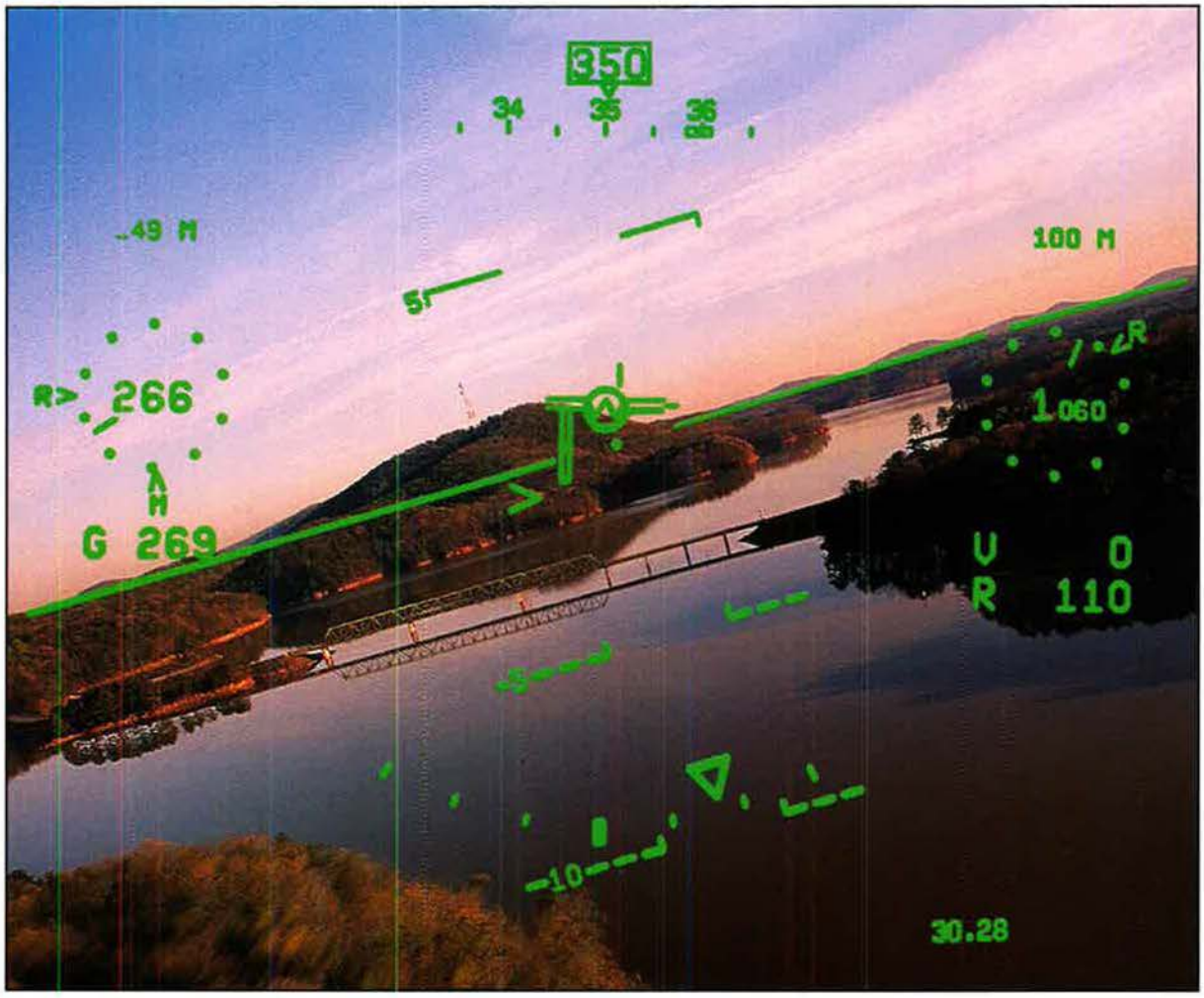
PUBLISHED BY THE AIR FORCE ASSOCIATION MAGAZINE

Shifting Patterns of Air Warfare

The Congressional Defense Establishment

The Forty Years' War
Images From the Cold War

Pilots aboard the new C-130J can utilize a special low-altitude technique. We call it "looking out the window."



If you're wondering why we put a Head Up Display on the new C-130J, ask the pilots who must routinely pull out of approaches just 10 feet off the ground in order to drop their cargo. They'll tell you that the aircraft's twin HUDs are a great safety feature, particularly during those critical low-altitude drops and when executing instrument approaches at minimums. They also help maximize terrain masking enroute.

Of course, this is just one of the "J's" many technological improvements. We've also replaced 600 pounds of hard wiring with MIL-STD 1553 databus architecture, redesigned the props, and installed fuel-efficient twin-spool engines. In addition, mission plans are now put on a 2-by-3 inch card and inserted into the aircraft's mission computer.

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April, 1997, Volume 80, No. 4

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

About the cover: The Cold War often brought the US "eyeball to eyeball" with the Soviet Union. In this shot of a Tu-95 "Bear," the tailgunner warily regards an F-102 interceptor. See "The Forty Years' War," p. 28. Cover photo courtesy Chuck Mordan via Warren Thompson.

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Editorial

By John T. Correll, Editor in Chief

The Clash of Visions

THE Commission on Roles and Missions of the Armed Forces in 1995 called for a "joint warfighting vision" to stand above the doctrinal concepts of the individual services, which were presumed to be narrow and parochial. Responding to that call, the Joint Chiefs of Staff last summer put out "Joint Vision 2010." It was a remarkable piece of work. It broke with tradition and said that information technology and precision strike have brought about a basic change in the ways that wars are fought.

"Instead of relying on massed forces and sequential operations, we will achieve massed effects in other ways," it said. "With precision targeting and longer-range systems, commanders can achieve the necessary destruction or suppression of enemy forces with fewer systems, thereby reducing the need for time-consuming and risky massing of people and equipment."

Joint Vision 2010 did not resolve the service differences. In fact, those differences have intensified in recent months as Joint Vision led into the Quadrennial Defense Review and a new round of financial pressures on the defense program.

At stake are force structure, personnel strength, system modernization, budget shares, and more. Among the potential losses rumored, for example, are two active Army divisions, at least one Navy carrier air wing, and two or three Air Force fighter wings. Much depends on the relative credibility of the service visions and how they are seen to square with the joint vision.

The Air Force made a strong case in its "Global Engagement" vision statement, published in November. Its air and space assets provide much of the information superiority on which Joint Vision 2010 was based. Long-range Air Force systems can rapidly find, fix, track, and target anything of consequence on the face of the Earth.

Thomas Ricks, writing for the *Wall Street Journal*, called it a "Federal Express approach to national strategy—when it absolutely, positively has to be destroyed overnight." In many instances, the Air Force believes, an air campaign will be able to bring a regional invasion to a decisive halt in which the enemy no longer has the capability to advance and wherein his strategic options are exhausted.

Joint Vision 2010 also favors the Navy somewhat, but carrier air wings have neither the aircraft nor the striking weight to match what the Air Force can bring to bear in wartime.

The Army argues that it's "boots on the ground," not aircraft and precision strike, that matter most.

In fact, the Navy has scrapped an aggressive "2020 Vision" concept and has gone back to its 1994 doctrine, "Forward . . . From the Sea," and its emphasis on the forward presence mission.

The main challenge comes from the Army, supported by the Marine Corps, arguing that it is "boots on the ground," not aircraft and precision guided weapons, that matter most. The Army bills itself as "the force of decision" and says in "Army Vision 2010" that land power makes permanent "the otherwise transitory advantages achieved by air and naval forces."

Furthermore, where Joint Vision 2010 prescribed "full spectrum dominance" in combat, current sentiment in the Department of Defense is slipping toward "SSCs" (small-scale contingencies) and Military Operations Other Than War. A senior Pentagon official is quoted as saying the military is "going to end up 40 to 60 percent committed to war and 40 percent committed to some type of peacekeeping missions."

That theme resonates with Army leaders who contend that "increased demand for operations on the lower end of the spectrum of crisis" suggests "a redefinition of general missions for the military." According to Army Vision 2010, both major and lesser regional conflicts will be the domain for "increased reliance on joint operations" while the "dominant roles for land forces" fall lower on the scale. These will include disaster relief, refugee protection, "reassurance," Military Operations Other Than War, "conflict containment," and "punitive intrusion" in counterdrug, counterterrorism, and counterproliferation missions.

It is too soon to say how this clash of visions will be decided or what the consequences will be for strategy and force structure, but several conclusions are difficult to escape.

- The primary purpose of the armed forces is to fight and win wars. Lesser and collateral missions are important, but we must remember always that they are lesser and collateral.
- Joint Vision 2010 got it right. The objective is full spectrum dominance, not marginal advantage or just enough capability to get by.
- Former Secretary of Defense William J. Perry also got it right when he reminded us, during his last days in the Pentagon, that a strategy of force dominance—in which the United States can expect to win quickly, decisively, and with few casualties—is made possible largely by the combination of stealth, reconnaissance and intelligence systems, and precision strike.
- Thanks to that combination of technologies, airpower can strike directly and with great accuracy at critical parts of the enemy's infrastructure and order of battle. Military effectiveness is no longer measured by battle lines on the ground.
- The nation needs a full range of military capabilities. That includes boots on the ground and ships at sea. However, and with all due respect, it seems reasonably obvious that the dominant elements of warfare in the future will be airpower and systems in space. ■

THERE IS ANOTHER 50TH ANNIVERSARY...

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Letters

Upward and Onward

Had George "Dad" Rarey lived to see "The Art of a Fighter Pilot" *[February 1997, p. 34],* he would have been pleased by it. This unassuming, talented, bold fighter pilot of the 379th Fighter Squadron, 362d Fighter Group, would flash that sly grin, fire up his pipe, and set about producing yet another of his whimsical cartoons of life in a fighter squadron during the perilous days of World War II. The world lost a remarkable talent when he was killed in action in Normandy, and thousands were denied sharing in this talent. . . .

Those of us who knew him in the 379th Fighter Squadron will never forget this man. The same applies to all men of the 362d Fighter Group, which, incidentally, was the first P-47 group assigned to Ninth Air Force. This group forged in blood a most distinguished record during the war.

James M. "Andy" Anderson, Jr.
Dallas, Tex.

Having served for 32 years as a pilot—from F-84s to the initial cadre of flight examiners in the C-5—I look forward to receiving your excellent magazine. Each month I say, "This is the best issue yet." The February 1997 issue was truly a standard for others to follow. I commend you for "The Art of a Fighter Pilot." I was moved to tears as I read the Western Union telegram. I salute your staff and wish you 50 more years as we celebrate the fiftieth anniversary of USAF.

Col. William G. Holman,
USAF (Ret.)
Redlands, Calif.

Mahurin's Valor

I had the privilege of serving with Col. Walker "Bud" Mahurin while I was a crew chief on a P-51 with the 3d Fighter Squadron, 3d Air Commando Group *["Honest John," February 1997 "Valor," p. 33].*

My respect and admiration for him are as strong today as they were back at Lakeland AAF, Fla., when the 3d Air Commando Group was formed. From time to time, he flew my ship. Watching him handle a P-51 was a sight to behold.

Some time after the Korean War was over, the book *Honest John* appeared. I read it and was thrilled to find that the author was Colonel Mahurin. I wrote to him and still have the letter he wrote in return.

I wish to thank John Frisbee for this long-overdue honor to a great pilot, a great man, and a great American.

Irving Distenfeld
Baltimore, Md.

I enjoyed John Frisbee's "Honest John." I know of another incident in Bud Mahurin's adventurous career that he may think of as minor but that someone of lesser valor would find traumatic.

Near the end of World War II, Bud and his wingman flew from the Philippines to Formosa (now Taiwan), looking for any enemy aircraft they could find. They did some strafing on the way home. Bud's P-51 took a hit in the radiator, and he lost his coolant. He bailed out about 100 miles north of Luzon, and his wingman raced back to Laoag, where a rescue PBY Catalina was on strip alert. He climbed into the "Cat," and it took off for Bud's last known position. The Cat notified the high-speed rescue boats (stripped PT boats) stationed on the northern tip of Luzon, and they also headed out at full speed, in case the rough seas made an open-sea landing iffy.

The Cat arrived at the designated area and soon spotted a large patch of sea-dye marker. Nearby was a slightly smaller patch, followed by another. At the end of this several-mile trail of marker was Bud Mahurin sitting in his life raft. The Cat buzzed Bud at about 10 feet, and he appeared to be in good shape.

Rather than chance a tough sea landing and perhaps add to the problem, the Cat marked Bud's position and went back to lead a rescue boat to him. This procedure was repeated three times, and in less than an hour the boat had Bud. You can imagine Bud's exasperation every time the Cat returned, then immediately flew away.

How do I know about this? I was that Catalina pilot. Bud and I have laughed about it over the years.

Victor R. Kregel
Colorado Springs, Colo.

Arguments for the B-2

Gen. Charles A. Horner has finally summed up the crucial arguments for more B-2s *["What We Should Have Learned in Desert Storm, But Didn't," December 1996, p. 52].* One important consideration is missing.

The US lacks the commitment to fund adequate long-range airpower. The proposed bomber force of slightly more than 180 may be adequate, but I doubt it. During World War II, the US produced 12,000 B-17s and thousands more B-24s, B-25s, and other bombers. Even though the combination of stealthy, high-technology B-2s and precision guided munitions produces a massive wallop, our planners and Administration leaders say we cannot afford more of them. . . . It seems only the will is missing in order to provide the most powerful method of projecting force in our national interests.

In 1997, Northrop Grumman will deliver *Spirit of New York*—one of the few remaining funded B-2s—to our bomber force. (It will be christened in New York, and AFA's Falcon Chapter, which meets at West Point, will kick off the delivery process by hosting a thorough Northrop Grumman debriefing.) . . .

We have precious little time in which to save manufacturing capability for

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the B-2. Let us keep the lessons of the Persian Gulf War uppermost in our planning. It's the least we can do.

Karl Miller
Yonkers, N. Y.

The Jet Engine's Growing Pains

I thought "The Jet Age in Review" *[February 1997, p. 72]* was great. I appreciate Peter Grier's giving Wright Air Development Center some credit for its part in the early stages of research and testing of the jet engine.

Things were hot and heavy in the Power Plant Lab in 1952, when I arrived there. I was assigned to Air Research and Development Command's Wright Air Development Center, commanded by Maj. Gen. Albert Boyd. All test cells (torque stands) had some sort of engine testing being conducted. To name two, there was acceptance testing on a J65 engine called the Fire Ball, built by the Buick Division of General Motors, and on the J35 engine built by Westinghouse for F-84 aircraft. . . .

Out back, next to the flight line, a J47 engine was mated with an afterburner and mounted on a flatbed truck. Two D8 bulldozers, one on each side of the flatbed, used their blades to keep the whole assembly from leaving the ground. This was one of the many exhibits built for the annual open house. West Point senior class cadets took turns firing up the afterburner and setting fire to about 100 yards of field.

At an out-of-the-way area called the rabbit patch, a test was performed to find out what a half-inch stainless-steel bolt would do to a J47 engine when allowed to enter the compressor. The engine selected for the test was not fit for use on aircraft, due to hailstone damage. It blew up, as expected. The resulting film was very graphic, proving that small objects, when ingested by a jet engine, are very dangerous. . . .

I don't think many people knew or realized what transpired behind the well-guarded gates of Wright-Patterson AFB, Ohio.

Richard L. Walkup
Narvon, Pa.

Not Routine

Bruce Callander's "When Is a Major Not (Exactly) a Major?" *[November 1996, p. 54]* is somewhat flawed in reference to the Navy's policy concerning honorary promotions.

It is not true that the Navy "*routinely* advanced officers one grade on retirement" (emphasis mine). The so-called "tombstone promotions" were limited to those officers holding a combat decoration. The awards ranged from the Medal of Honor through the Distinguished Flying Cross.

These honorary promotions required Chief of Naval Operations approval, usually automatic. The authority expired in 1959. Correctly, the promotions had no effect on pay or benefits.

William A. Riley
Los Angeles, Calif.

Missing From the Hall

The list of 150 aviation greats in the January 1997 *Air Force* Magazine does not include Edwin E. "Buzz" Aldrin, Jr. His name belongs along with Neil A. Armstrong and Michael Collins, who are listed.

Lt. Col. Ralph M. Speck,
USAF (Ret.)
Sioux City, Iowa

In reviewing the list of individuals inducted into the National Aviation Hall of Fame, I was astonished and saddened that one of America's greatest pioneers in modern aviation, Capt. James A. Lovell, Jr., USN (Ret.), was not a member of this select group. I would urge the Air Force Association and all of its members to take whatever action is necessary to correct this terrible oversight.

Alfred K. Kenyon
North Barrington, Ill.

The list of aviation greats in the National Aviation Hall of Fame, in Dayton, Ohio, and reprinted in your January issue falls one name short—although this gentleman's name was evident on every page.

Milton Caniff, whose illustrations you used, will always, in my mind, be connected to aviation. During his production of the comic strips "Terry and the Pirates" and "Steve Canyon," he brought wonderfully drawn depictions of aircraft and crews to millions of the folks at home.

During World War II, he also illustrated manuals for the armed forces. His many friends in the AAF, and later, USAF, would agree that although he never designed a plane or flew in harm's way, he belongs.

David Swift
Lombard, Ill.

Two Views of Levin

If, as Brian Green reports in the February issue *["Senator Levin Steps Up," "Capitol Hill," p. 7],* Sen. Carl Levin (D-Mich.) thinks nuclear weapons are "useless," how does the Senator propose to deal with Chinese nuclear intimidation of Taiwan and—beyond Taiwan—Japan?

For all the double-talk in govern

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Letters

ment and the press about "one China," the fact remains that the US is committed to "peaceful" resolution of the question of whether the 21 million people of Taiwan will choose to join Communist China or establish themselves as an independent nation.

We reaffirmed that commitment ast year by deploying two carrier battle groups near Taiwan when China was splashing potentially nuclear-tipped missiles north and south of the island. China needs only real-time reconnaissance to dispose of the carriers with the same nuclear-capable missiles. Just to make sure we got the message, a Chinese official noted that Los Angeles, also, is within reach of Chinese nuclear missiles.

All of Asia is watching to see how this is played out.

The silence of the US government in the face of the open threat against Los Angeles could lead to a much more dangerous bit of brinksmanship when the Communists are finished digesting the formerly free population of Hong Kong and turn once again to Taiwan—and Japan, the true objective of the intimidation.

China will back down only when it understands that it is courting a massive US nuclear response. In the meantime, let's make China aware that it will not have a free shot at Los Angeles, by deploying the ballistic missile defense system Senator Levin has helped to delay.

Col. William V. Kennedy,
USA (Ret.)
Wiscasset, Me.

I read with interest, and growing annoyance, Brian Green's discussion of Senator Levin's replacing Senator Nunn as the ranking Democrat on the Senate Armed Services Committee. Of particular interest were his comments regarding Senator Nunn's "independent streak [causing] him to clash on occasion with the Defense Department" and Senator Levin's "voting record [demonstrating] greater opposition, in general, to Pentagon programs and priorities and a stronger emphasis on arms-control issues and acquisition and management problems."

Mr. Green needs to go back to his high school civics text and reeducate himself on just who determines "Pentagon programs and priorities." Making those determinations is precisely why the citizens of Georgia elected Senator Nunn and why the citizens of Michigan elected Senator Levin.

Just who is Senator Nunn "independent" from? Apparently, Mr. Green thinks that the lawmakers on the Senate Armed Services Committee should be taking their cues from the Pentagon. Senators don't answer to generals and high-ranking DoD civilians across the Potomac. DoD answers to the people of the US, and Congress represents the people. It's our job in DoD to determine and then manage appropriate programs in a manner responsive to Congress's duty to enumerate national priorities.

Independence from, and disagreement with, the Pentagon is an absolute necessity for our lawmakers. As a citizen, I expect Congress to keep the Pentagon "in check" as necessary. As an officer, I look to all our elected representatives to set national priorities and then make sure that I and others like me do our best to carry out those priorities and thereby provide for a "common defense."

With such attitudes as Mr. Green's, it's little wonder that the opponents of a strong national defense see the "military-industrial complex" as out of sync with national priorities.

Capt. Allen R. Naugle,
USAF
Antelope, Calif.

Obsolete Nomenclature

In a letter to *Air Force* Magazine *["Other Air Forces," November 1996 "Letters," p. 8],* Lt. Cmdr. R. N. McDowell, USN (Ret.), says that naval aircraft operate from attack carriers (CVAs) and that the role of these ships is to project airpower.

Shades of the 1950s! Before it abandoned a misguided effort (in about 1955) to station strategic bombers on carrier decks, the Navy published a map "proving" that carrier-based bombers could reach targets deep in the Soviet Union. The Navy's map became a public embarrassment when people noticed that it depicted US carriers operating in the Black Sea and the Caspian Sea—unlikely locations for US vessels but the only way CVAs could get within range. Then, as now, carrier-based aviation was never more than an adjunct to landbased strategic bombardment.

While his use of incorrect terminology may not detract from the point Commander McDowell wants to make, the US Navy has not operated attack carriers, or CVAs, for many years. Beginning in the early 1970s when it changed the composition of carrier air wings, the Navy dropped the attack carrier designation and now calls these ships simply carriers, or CVs.

Robert F. Dorr
Oakton, Va.

The Chart Page

By Tamar A. Mehuron, Associate Editor

The Defense Budget at a Glance

In February, President Clinton presented his proposed defense budget for Fiscal Year 1998. The document requests $250.7 billion in budget authority and $247.5 in outlays for the direct program (DoD activities only). The budget request for the total national defense program (DoD activities and defense activites in the Department of Energy and other federal agencies) is $265.3 billion in budget authority and $259.4 billion in outlays.

Funding levels can be expressed in several ways. Totals are most frequently stated in **budget authority,** which is the value of new obligations that the government is authorized to incur. These include some obligations to be met in later years. Figures can also be expressed in **outlays** (actual expenditures, some of which are covered by amounts that were authorized in previous years).

Another difference concerns the value of money. When funding is in **current** 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. When funding is expressed in **constant dollars,** or **real dollars,** the effect of inflation has been factored out to make direct comparisons between budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars.

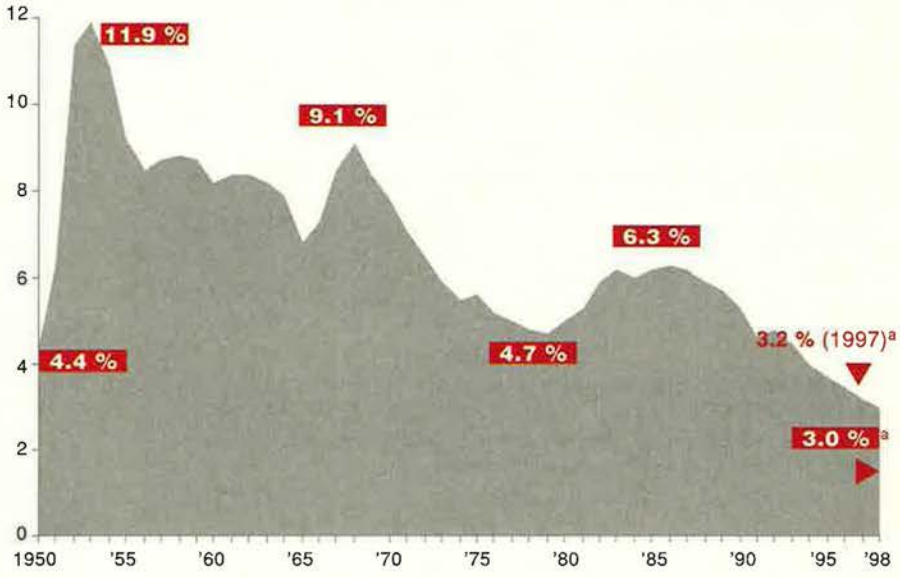
The following charts address only the Defense Department program. In some instances, numbers on the charts in this section may not sum to totals shown because of rounding. Years indicated are Fiscal Years. Civilian manpower figures are now measured in terms of full-time equivalents (FTEs).

Budget Top Line

($ billions)

	1997	1998	1999	2000	2001	2002
Budget authority (current $)	250.0	250.7	256.3	262.8	269.6	277.5
Budget authority (constant FY 1998 $)	256.5	250.7	250.8	251.3	251.9	253.2
Outlays (current $)	254.3	247.5	249.3	255.2	256.2	261.4
Outlays (constant FY 1998 $)	260.9	247.5	243.9	244.1	239.5	238.8

Defense Outlays as a Share of Gross Domestic Product



aestimates

Source: US Department of Defense.

Cutting the Pie: Who Gets What

(Budget authority in current $ billions)

	1996	1997	1998	Change 1997–98
Military personnel	69.8	69.9	69.5	–0.4
Operations & maintenance	93.7	92.9	93.7	+0.8
Procurement	42.4	44.1	42.6	–1.5
Research, development, test, & evaluation (RDT&E)	35.0	36.6	35.9	–0.7
Military construction	6.9	5.9	4.7	–1.2
Family housing	4.3	4.1	3.7	–0.4
Other	2.5	1.3	0.7	–0.6
Recission	—	–4.8	—	—
Total	**254.4**	**250.0**	**250.7**	**+0.7**

Manpower

(End strength in thousands)

	Change 1989–95	1996	1997	1998	1999/ Goal	Change '96–99/ Goal
Total active duty	–612	1,472	1,452	1,431	1,445	–27
Air Force	–171	389	381	371	382	–7
Army	–261	491	495	495	495	+4
Marine Corps	–22	175	174	174	174	–1
Navy	–158	417	402	391	394	–23
Selected reserves	–225	920	902	892	893	–27
Civilians (FTEs)	–233	819	799	772	728	–91

Force Structure Changes

	Cold War Base 1990	Base Force	1998	Bottom-Up Review Plan
Air Force				
Active fighter wings	24	15.3	13	13
ANG/AFRES fighter wings	12	11.3	7	7
Army				
Active divisions	18	12	10	10
Army National Guard/ Army Reserve brigades	57	34	42[a]	42[a]
Navy				
Battle force ships (including carriers)	546	430	346	346
Aircraft carriers				
Active	15	13	11	11
Reserve	1	—	1	1
Carrier air wings				
Active	13	11	10	10
Reserve	2	2	1	1
Marine Corps				
Active Marine Expeditionary Forces	3	3	3	3
Reserve MEF	1	1	1	1

[a]Includes 15 enhanced brigades (equivalent to 5+ divisions). Also includes eight National Guard divisions (24 brigades).

Operational Training Rates

	1985	1996	1997	1998
Air Force				
Flying hours per crew per month, fighter/attack aircraft	19.1	20.0	19.3	18.7
Army				
Flying hours per tactical crew per month	13.1	13.9	14.5	14.0
Annual tank miles	850	618	800	800
Navy				
Flying hours per tactical crew per month	25.0	22.8	23.8	23.7
Ship steaming days per quarter				
Deployed fleet	53.6	50.5	50.5	50.5
Nondeployed fleet	27.4	29.6	28.0	28.0

Service Shares

(Budget authority)

	1997	1998
Current $ billions		
Air Force	72.4	75.0
Army	62.4	60.1
Navy	78.9	79.1
Defense agencies, DoD-wide	36.4	36.4
Total	250.0	250.7
Percentages		
Air Force	29.0	30.0
Army	25.0	24.0
Navy	31.6	31.6
Defense agencies, DoD-wide	14.6	14.5

Fiscal 1998 figures are those contained in the Clinton Administration's budget request.

Total Funding of Major Programs

(Current $ millions, RDT&E and procurement funding)

	1998
Air Force	
C-17 transport	2,413.6
F-15E fighter	307.5
F-22 fighter	2,152.1
B-2 bomber	624.8
E-8 Joint STARS aircraft	508.9
Milstar satellite	676.7
Joint Primary Aircraft Training System	131.7
Joint Strike Fighter (RDT&E only)	458.1
Army	
AH-64D helicopter	525.2
RAH-66 helicopter (RDT&E only)	282.0
Navy	
DDG-51 destroyer	2,972.9
New attack submarine	2,996.3
F/A-18E/F fighter	2,528.9
Trident II ballistic missile	368.0
E-2C early warning aircraft	327.1
Joint Strike Fighter (RDT&E only)	448.9

Procurement of Major Air Force Systems

(Current $ millions)

	1998	1999
Aircraft Procurement		
B-1 bomber	125	127
B-2 bomber	188	252
C-17 transport	2,202	2,961
C-130J transport	51	0
E-8 Joint STARS aircraft	371	766
F-22 fighter	81	908
Joint Primary Aircraft Training System	65	93
Missile Procurement		
Advanced Medium-Range Air-to-Air Missile	118	125
Sensor-Fuzed Weapon	154	143
Other Procurement		
Airborne Warning and Control System	135	115
Space Boosters (Titan)	555	585
Global Positioning System	167	179
Defense Support Program	114	138
Medium Launch Vehicle	219	214
RDT&E		
Attack Laser	157	297
Milstar	718	615
Titan	82	138
Evolved Expendable Launch Vehicle	91	294
Spacebased Infrared satellite system	560	707
F-22 fighter	2,071	1,465
Joint Strike Fighter	458	466
B-1 bomber	217	200
B-2 bomber	356	45
JASSM	203	136

Washington Watch

By Robert S. Dudney, Executive Editor

The F-22 and Other Priorities

The Air Force says there is room in the budget for the F-22. Without it, the whole aircraft modernization plan falls apart.

GEN. Ronald R. Fogleman, Chief of Staff of the Air Force, had a blunt response to suggestions that the cost of USAF's F-22 air-superiority fighter might be threatening the health of the Pentagon's overall tactical aircraft plan. His message: Without the F-22, there *is* no plan.

The program's other elements—the Navy F/A-18E/F and the multiservice Joint Strike Fighter—hinge on the F-22, the General told the Senate Armed Services Committee on February 25. "Without air superiority," he explained, "you are not going to function." He said that the F-22, by dominating the airspace over the battle area, will provide "the environment in which you will be able to operate F/A-18s . . . and Joint Strike Fighters."

One possible upshot of killing the F-22, therefore, would be the need to redesign the JSF and possibly the F/A-18, at great cost, to give them more air-to-air punch, said Fogleman. "If you take the F-22 out of the equation, you are going to have to seriously rethink the Joint Strike Fighter and F/A-18," he concluded, adding, "It's pay-me-now or pay-me-later. You cannot operate without air superiority."

The General's message was clear—the F-22 comes first, or should, in a balanced tactical aircraft program. With these remarks, he put the Air Force on the offensive in what shapes up as a contentious budget year for the fighter. The battle over the F-22, USAF's top modernization priority, is sure to continue throughout Congress's review of the Fiscal 1998 Pentagon budget and the Quadrennial Defense Review, set to end next month.

The budget contained something of a surprise: USAF will undergo yet another troop cut. When it happens, noted an Air Force budget document, "Our military end strength will be at its lowest level since before the 1948 Berlin Airlift."

In the budget that Secretary of Defense William S. Cohen unveiled on February 6, the Clinton Administration sought $250.7 billion for Fiscal 1998, which starts October 1, 1997. It represents a one-year real drop of $5.8 billion and marks the thirteenth year in a row that defense spending has declined. Plans call for real defense spending (with inflation factored out) to be flat again in 1999 but to turn up slightly thereafter.

These funds would pay only for Defense Department activities. On top of that would come $14.6 billion to fund the defense projects of the Energy Department and other agencies.

Four-Percent Solution

The problems of the F-22, successor to the venerable F-15 fighter, stem almost totally from powerful downward pressures on the federal budget in general and the DoD budget in particular. The Pentagon's overall fighter program, it is said, will consume too big a share of the defense budget and should be cut back. The F-22 enjoys strong support within the Pentagon and on Capitol Hill, but it is now coming under sharper scrutiny.

In response to questions, Secretary of the Air Force Sheila E. Widnall noted that the amount committed to upcoming fighter modernization, as a percentage of Air Force spending, will be lower than it was during the last modernization, which played out from the mid-1970s to the early 1990s. It was in that period that the Air Force procured the F-15, F-16, and A-10.

Procurement of those three aircraft consumed roughly six percent of the Air Force budget, said Widnall, whereas the next round of modernization, comprising the F-22 and JSF, will take up only four percent of the USAF budget.

"We do believe that these programs—the F-22 and the Joint Strike Fighter—will fit within the Air Force budget," she said.

The F-22 promises to be the most controversial single hardware item in the 1998 DoD budget, which is part of a six-year blueprint projecting total defense spending of $1.57 trillion. That figure is $11 billion higher than was projected last year. The Air Force's share comes to $75 billion, which, in real terms, marks a small increase—not quite one percent—from this year's $74.3 billion.

USAF's overall spending plan breaks out into these major categories: $14.5 billion to research and development, $15.3 billion to hardware procurement, $23.9 billion to operations and maintenance, $19.3 billion to military personnel, and $2.3 billion to construction and family housing, with $249 million in offsetting receipts.

Air Force funding for modernization (combined procurement and R&D) comes in at $29.8 billion, sufficient to cover highest-priority investment programs and systems.

Fighters. The Pentagon budgeted $2.2 billion for the F-22 program in Fiscal 1998. Plans call for the Pentagon to fund the F-22 at $2.4 billion in 1999, enough to continue with a full development effort and to pay for the first two production aircraft.

"The F-22 is . . . one of our highest modernization priorities," said a top DoD official. "It is not on the bubble, because we're going to need an F-22 in the future."

One reason is the aging of the fighter fleet. By 2004, the year the F-22 enters into service, the F-15—the world's top air-to-air fighter—will have been in use for 30 years.

In addition to funding the F-22, the Air Force plans to commit $458 million of a Pentagon-wide total of about $1 billion to continue development of the JSF, a program that is expected to produce new fighters for the Air Force, the Navy, the Marine Corps, and the British Royal Navy.

Aviation procurement also includes funding for a handful of older USAF fighters. The Air Force plans to buy three F-15Es for $170 million in 1998 and another three of the multimission fighters for $165 million in 1999.

The Air Force also has begun budgeting for yet another type of combat aircraft—the Attack Laser. The YAL-1A, a 747 jumbo jet equipped with a high-energy laser, could turn out to be a key component in Pentagon plans to shoot down threatening ballistic missiles in the boost phase and perhaps even to shoot down aircraft. The Air Force expects to spend $454 million over the next two years to develop the YAL-1A technologies and hardware.

Bombers. The budget contains $624.8 million to continue work associated with the B-2 bomber and its systems, though none of that money is to be used to procure additional aircraft. The Administration provided no funds for new procurement of bombers beyond the 21 previously authorized.

Sen. Strom Thurmond (R–S. C.), chairman of the Senate Armed Services Committee, asked Fogleman whether he had given "any thought" to buying more B-2s.

"Sir, we think about them all the time," said the Air Force Chief of Staff. "The problem is, in order to afford a balanced Air Force within the procurement accounts that we have, we have not been able to find a way to put them in."

The new budget contains some $342 million to continue to equip B-1 bombers with precision guided munitions. Another $484 million is earmarked in Fiscal 1998 for procurement of four types of precision weapons—the Joint Air-to-Surface Standoff Missile, the Joint Standoff Weapon, the Joint Direct Attack Munition, and the Sensor-Fuzed Weapon.

Widnall said that these aircraft constitute, for theater commanders, "the tools to join the fight while other forces are still deploying."

Mobility. The 1998 budget allots $2.4 billion to procure nine new C-17s plus spare parts, research, and military construction. In the following year, 1999, the Air Force will spend $3.4 billion to procure another 13 new lifters.

DoD has published an official requirement for 120 C-17s. Air Force budget documents maintain that getting large numbers of the new lifter into the force is USAF's number one near-term need.

USAF also will spend $54.7 million to buy one new C-130J theater transport.

Aerial refuelers also get attention. The budget provides enough money to modify 180 aging KC-135 aircraft, part of a plan to modify 602 active-duty, Reserve, and Guard KC-135s with three new types of aircraft avionics.

Battlefield Awareness. The Pentagon's planned battlefield awareness investments include many major Air Force programs designed to provide detailed, timely information on air and surface battles. Among them:

- $1.36 billion for three more E-8C Joint Surveillance and Target Attack Radar System aircraft in 1998, and two in 1999.
- $134.7 million to upgrade the fleet of E-3 Airborne Warning and Control System aircraft with Block 30/35 electronic support measures, Central Computer Memory Upgrade, Joint Tactical Information Distribution System, GPS, and Radar System Improvement Program.
- $116.5 million for 15 units of the Predator unmanned aerial vehicle, a lightweight, high-performance air surveillance system, and several ground stations.
- $560 million for continued development of the Spacebased Infrared satellite system, successor to the Defense Support Program warning satellite.
- $718 million for the Milstar satellite follow-on system.
- $311 million for the Global Positioning System, about half of which will buy three additional satellites and the other half will fund more research.

USAF's active-duty strength at the end of 1996—the latest complete fiscal year—stood at 389,001 troops. Plans call for the service to cut another some 8,000 this year, dropping the total to 381,100. After that, end-strength cuts were to cease.

However, USAF's most recently published figures set yet another, lower target of 370,821 troops, meaning USAF will shed another 10,000 active-duty members next year.

When the Air Force achieves the lower projected level, it will be 39 percent smaller than it was at its Reagan-era peak.

One Pentagon official said the new force cut stemmed from "an explicit decision" made by the Air Force to cut end strength and free up money for other uses. Fogleman confirmed to Congress that the push came from "the force," not DoD. However, Thurmond warned that such a reduction requires Congressional approval.

The latest Air Force budget supports a combined military force of 180,786 in the Air National Guard and in Air Force Reserve Command—107,355 Guardsmen and 73,431 Reservists.

ANG will operate 1,157 aircraft and rack up more than 361,000 flying hours in the interceptor, tactical airlift, air refueling, general-purpose fighter, and reconnaissance missions.

AFRC, with 64 flying units and 395 aircraft, will provide 100 percent of the Air Force's weather reconnaissance, more than half of its strategic airlift, and 30 percent of the air rescue and medical airlift capability.

The Air Force's Fiscal 1998 operations and maintenance funding levels support the operation of 20 fighter wing equivalents, 87 major installations, 5,140 primary aircraft authorized, 1.87 million flying hours, 550 ICBMs, and 24 GPS satellites.

Readiness Over All

Flying time for active Air Force fighter and attack aircrews has been set at 18.7 hours per month, down from 19.3 this year and 20.0 the year before. Bomber and transport crews continue flying at their current rates.

"These are slight reductions," said a Pentagon executive. "We're absolutely confident, in talking with the services as they propose them, that this reflects no change in readiness."

Indeed, the Fiscal 1998 defense budget still is dominated by former Defense Secretary William J. Perry's penchant to protect force readiness above all else.

One high-ranking DoD executive described the latest budget drill this way: "Secretary Perry gave precise instructions: 'Your first priority is readiness. Your second priority will be quality of life. Third priority is, well, complete the downsizing without breaking anything. And then finally, if you've got any money left over, put as much as you can into modernization.' "

DoD funded many programs to acquire or hold on to high-quality personnel. In military pay accounts, the Administration proposed the full legal pay hike of 2.8 percent in 1998 and three percent for each of the ensuing four years.

The DoD proposal protects commissary benefits. The budget also continues to give attention to quality-of-life initiatives. For example, the budget supports construction, replacement, or refurbishment of about

5,900 family housing units; construction or modernization of 11,000 barracks living spaces; and strong child-care and family support programs.

In contrast, procurement continues to stagnate, as it has for more than a decade, despite many promises to the contrary.

At this time last year, DoD said the procurement "holiday" was over. Specifically, officials said 1997 procurement spending of $38.9 billion would mark the low point and that it would turn up in 1998 to $45.5 billion. It would then rise every year and exceed $60 billion in 2001.

Yet, when the actual 1998 budget was presented, procurement again had fallen short.

"Last year, we proposed to be at $45.5, and . . . we're at $42.6," said a senior DoD executive. "So, obviously, we fell short by $2.9 billion. . . . Was I lying to you last year? . . . Scout's honor, I was not lying to you, but my guess is my credibility . . . is lower than a snake's belly in a wagon rut."

DoD now says the much-promised procurement "ramp-up" will start in 1999 and reach $68.3 billion in 2002. Few, however, are sanguine about the prospects.

Steep Ascent

"It's going to be a very hard climb," Defense Secretary Cohen told the House National Security Committee on February 12. The climb, he went on, resembled "the ascent level of an F-15."

The 1998 budget request is, in real terms, 40 percent below the inflation-adjusted sum of $418 billion voted in Fiscal 1985, the peak year of post-Vietnam defense spending.

As a share of the nation's GDP, defense spending goes down to 3.0 percent in 1998 and will fall to 2.6 percent in 2002, compared to 6.3 percent of GDP in the mid-1980s.

Most Pentagon spending will go to everyday activities—training, maintenance, exercises, repairs, payroll, health care, and the like. The operations and maintenance account is projected to hit $93.7 billion, consuming 37.4 percent of the budget. Military personnel accounts take another $69.5 billion, or 27.7 percent. The family housing and "other" account will take up $4.4 billion. Taken together, these fast-spending categories account for two-thirds of the new Pentagon budget.

The remaining one-third of the total will go to long-term investment in military power. Procurement accounts for only 17 percent of Pentagon spending, a huge decline from the Reagan-era peak. Research and development comes in at $35.9 billion, or 14.3 percent of the budget. The rest—$4.7 billion—goes to construction.

Service shares have remained relatively constant. In 1998, $214.2 billion, or 85 percent of Pentagon spending, will be allocated to the three military departments. Of the services' total, the Air Force's $75.0 billion reflects a 35.0 percent share; the Navy Department (Navy and Marine Corps) gets $79.1 billion, or 36.9 percent; and the Army gets $60.1 billion, or 28.1 percent.

If any of the current force structure is removed, General Fogleman says, the "risk of executing two-MRC strategies is going to go up tremendously."

Department of Defense agencies and defense-wide activities get the other $36.4 billion—15 percent of the total defense budget of $250.7 billion.

Since the big drawdown began in the late 1980s, the White House and Congress have approved a net reduction of 722,200 active-duty troops. The large US force of 2,174,200 deployed in 1987 (the post-Vietnam peak year) will have shrunk to 1,452,000 by September 30, 1997, declining by more than 33 percent.

Plans call for the uniformed military in Fiscal 1998 to lose another 21,000 active-duty troops, with the force to level off at 1,431,000. This is 14,000 below the goal set by the 1993 Bottom-Up Review. The force left at that time will be 34 percent smaller than the Cold War force at its 1987 size.

The budget allocates approximately $19 billion to service reserve components. Selected Reserves are to total 892,000 at the end of 1998, down 24 percent from their peak of 1,171,000 in 1989.

DoD officials said that civilian end strengths are being similarly reduced. By the end of Fiscal 1998, the Pentagon will have shed some 363,000 civilian defense employees since 1987 and will lop off another 54,000 by the end of the six-year plan, leaving a total of 718,000.

The 1998 budget contains no new force-structure changes for the Air Force, Army, or Marine Corps. The Pentagon kept hands off of force structure, one official said, because "we did not in any way try to anticipate what the QDR was going to do."

In the February 25 Senate hearing, Thurmond asked the Air Force Chief of Staff whether the United States could reduce its force structure and still be able to fight and win two nearly simultaneous major regional conflicts, as current strategy requires.

The General replied that the US faces "moderate to high risk" even with its current level of forces, "and so, if you take any of the force structure that we have today away from us, and if it is not replaced by high-leverage kinds of capabilities, then I think clearly that the risk of executing two MRC strategies is going to go up tremendously."

For another year, anyway, the budget will provide funds for USAF to stick with 20 active and reserve fighter wing equivalents and about 100 deployable bombers. According to the budget documents, the Army will hold steady at 10 active and five reserve divisions, and the Marines will have three active and one Reserve Marine Expeditionary Forces.

The Navy's 1997 "battle force" fleet of 354 warships will shrink over the next two years to 335 warships, mostly because of retirements of nuclear-powered attack submarines. The Navy's fleet of aircraft carriers remains unchanged, with 11 of the big decks available.

In the procurement accounts, the Pentagon continued to emphasize aviation. DoD in 1998 would commit $2.5 billion for the development and procurement of 20 more Navy F/A-18E/F Super Hornet fighters. In addition, DoD would provide $1 billion for JSF development work and $1.1 billion to procure five Marine Corps V-22 aircraft and to continue research and development work.

The Ballistic Missile Defense program seeks $3.5 billion in the next fiscal year, down from $4 billion appropriated in 1997. DoD said it planned to spend $21.4 billion during the six-year period 1998–2003. Of that $3.5 billion, roughly $2.7 billion will go for the Theater Missile Defense system and the balance to the National Missile Defense system. ■

Aerospace World

By Suzann Chapman, Associate Editor

Late Start for Defense Panel

Defense Secretary William S. Cohen on February 6 announced selection of nine members of a National Defense Panel whose tasks are to take an independent look at DoD's Quadrennial Defense Review and to make an assessment of potential force structures through 2010.

By the time it held its first meeting last month, the NDP already was two months behind schedule. It has nine members:

Philip A. Odeen (chairman), president and chief executive officer of BDM International; Richard L. Armitage, former assistant secretary of defense for International Security Affairs; Gen. Richard D. Hearney, USMC (Ret.), former assistant commandant of the Marine Corps; Adm. David E. Jeremiah, USN (Ret.), former vice chairman of the Joint Chiefs of Staff; Brig. Gen. Robert M. Kimmitt, USAR, managing director of the investment banking firm Lehman Brothers; Andrew F. Krepinevich, director of the Center for Strategic and Budgetary Assessments; Gen. James P. McCarthy, USAF (Ret.), former deputy commander in chief, US European Command; Janne E. Nolan, senior fellow at the Brookings Institution; and Gen. Robert W. RisCassi, USA (Ret.), former commander of US forces in Korea.

Congress mandated creation of the panel in the Fiscal 1997 defense authorization bill and expected members to be named this past December so they could consult during the QDR process. Despite the delay, Pentagon spokesman Kenneth H. Bacon emphasized that their defense backgrounds would enable them to "acclimate themselves very quickly to the questions that are being considered."

The panel was to present an interim assessment in early spring and its final report on the QDR by May 15. The independent analysis of alternative force structures is due to Congress by December 15, 1997.

From Hospitals to Clinics

The Pentagon announced February 6 that it proposes to downsize 17 military hospitals—eliminating their inpatient-care capability—by Fiscal 2000. The move was made as part of the DoD Fiscal 1998 budget request and, if approved, would free an estimated $42 million for other health-affairs uses.

Under the proposal, the Air Force would convert 11 of its 48 remaining hospitals to clinic or superclinic status. A superclinic would be capable of providing same-day surgery.

The Air Force list includes hospitals that have 20 or fewer inpatient beds and serve an average of six patients or fewer per day. The hospitals are located at the following bases: Beale and McClellan AFBs, Calif.; Columbus AFB, Miss.; Davis-Monthan AFB, Ariz.; Dover AFB, Del.; Fairchild AFB, Wash.; Little Rock AFB, Ark.; Maxwell AFB, Ala.; Patrick AFB, Fla.; Robins AFB, Ga.; and Seymour Johnson AFB, N. C.

As part of the overall defense drawdown, Pentagon health-affairs officials continue to evaluate what should constitute the "right size" for the active-duty medical service.

With the hospital downsizing, the Air Force announced that the service could reduce its active-duty medical force by another 13.6 percent between Fiscal 1998 and 2008. The new cuts would bring the USAF medical force reduction to an overall 17.9 percent since Fiscal 1989.

Teledyne Ryan Aeronautical hosted more than 1,000 military and civilian guests and employees at the February 20 rollout of its Global Hawk unmanned aerial vehicle. Sporting USAF insignia, the Tier II Plus UAV will help US and allied forces gain information dominance.

Global Hawk Unveiled

Teledyne Ryan Aeronautical unveiled the Defense Department's newest unmanned aerial vehicle, Global Hawk, on February 20 at its San Diego facility.

As the companion vehicle to the low-observable, high-threat-environment DarkStar UAV, Global Hawk will cover low- to moderate-threat, long-endurance reconnaissance missions.

The Global Hawk, which flies at altitudes up to 65,000 feet, has a 116-foot wingspan, is 44 feet long, and weighs 25,600 pounds. It carries both synthetic aperture radar and electro-optical and infrared sensors.

The UAV will be able to survey, in one day, a 40,000-square-mile area,

equivalent in size to the state of Kentucky, while providing imagery with a three-foot resolution. It can also provide more detailed (one-foot-resolution) images if needed.

Pentagon officials said that, for a typical mission, the Global Hawk will fly 3,000 nautical miles to a target, conduct a continuous airborne data-collection patrol for 24 hours, and then return to base.

The Defense Advanced Research Projects Agency manages the High-Altitude Endurance UAV program for the Defense Airborne Reconnaissance Office with Air Force, Navy, and Army participation.

DARPA plans to begin Global Hawk flight tests at Edwards AFB, Calif., in late summer or early fall. Once completed in Fiscal 1998, Global Hawk and DarkStar will start operational user demonstrations with US Atlantic Command.

USAF photo by SrA. Erick Saks

TSgt. Luke Brohaugh, USAF, of the 86th Security Police Squadron, Ramstein AB, Germany, greets Capt. Eba Krou of the local security forces, on Brohaugh's arrival in Liberia as part of Operation Assured Lift. Crews from Ramstein's 37th Airlift Squadron transported nearly 1,200 African peacekeepers to Liberia.

Khobar Report Delays Promotion

The Air Force announced January 29 that it had placed on hold the promotion of Brig. Gen. Terryl A. Schwalier to major general, which would have been effective February 1, "pending the resolution of an inquiry into the circumstances surrounding the June 25, 1996, terrorist bombing of Khobar Towers in Saudi Arabia."

News reports of a not-yet-released USAF inquiry into the bombing surfaced late last year, citing its absolution of the former senior Air Force commander in Dhahran. *[See "USAF Wraps Up Khobar Probe," February 1997 "Aerospace World," p. 11.]*

According to a DoD spokesman, both the Secretary of the Air Force and the deputy secretary of Defense reviewed the Air Force report as a "work in progress" and "agreed that more work needs to be done."

An Air Force statement attributed to senior Air Force leadership maintained that the delay in the Schwalier promotion "does not in any way reflect a decision on Schwalier's promotion to major general. It is simply a prudent step, given that these matters are still under review."

USAF photo by SrA. Bryan Purtell

As part of continuing exchanges, Maj. Gen. Kazimierz Dziok, commander in chief of Polish Air Forces and Air Defense Forces, visited Ramstein AB, Germany. Here, Maj. John Morawiec, an Oregon Air National Guardsman fluent in Polish, helps the General get strapped into an F-16 for an orientation flight.

Incidents Change Flight Rules

Several February incidents involving active-duty and Air National Guard aircraft and civilian airliners prompted the Air Force to temporarily suspend flying training, first off the East Coast and then over the southern US.

Pentagon officials emphasized that the incidents were not actual "near-misses;" however, they have already led to new flight rules.

The Air Force has changed its procedures on how close its pilots may fly to civilian airliners to avoid setting off the traffic alert and collision avoidance system, standard on all commercial airliners. Apparently, the TCAS is more sensitive and triggered at greater distance than previously understood, according to a Pentagon spokesman.

In one of two separate incidents off the East Coast, an ANG F-16 of a two-ship formation, on entering a military warning area, broke off to investigate traffic nearby, passing about 1,000 feet from the civilian airliner and setting off its TCAS. In a second incident, three ANG F-16s flew approximately 2,000 feet above a civilian airliner and one about 2,500 feet below it.

In the first incident over the southern US, an active-duty F-16 was 3.5 horizontal miles away from a civilian airliner flying over Clovis, N. M. In the second incident, an ANG F-16 came within 4.6 horizontal miles of a civilian airliner.

ANG Director Maj. Gen. Donald W. Shepperd told reporters at the Pentagon on February 7 that the pilots

were always well aware of the location of the civilian airliners and that there was no indication that anyone "was engaging in a maneuver that was improper at this point."

He added that the military flies thousands of flights off the East Coast, one of the nation's busiest airspaces, each day, with "relatively few incidents."

USAF officials instructed all USAF, ANG, and Air Force Reserve pilots to review operating procedures with Federal Aviation Administration and military air traffic controllers before returning to flying in the two areas. At press time, the National Transportation Safety Board, the FAA, and the Air Force were still investigating the incidents.

The first two Block 50 F-16s destined for Greece—an F-16C (foreground) and a two-seat F-16D—rolled out of the Lockheed Martin Tactical Aircraft Systems facility in Fort Worth, Tex., ahead of schedule. They will be delivered to the Hellenic Air Force in May.

Lockheed Martin Wins WCMD

USAF announced January 27 that Lockheed Martin had won the $21 million contract to complete development and begin production of the Wind-Corrected Munition Dispenser (WCMD) inertial guidance tail-kit assembly system. Follow-on production contracts for 40,000 kits could increase the contract value to nearly $500 million.

Initially, Lockheed Martin will deliver 40 WCMD tail kits, which enhance the precision of tactical munitions, for testing on F-16 and B-52 aircraft beginning next month.

The "smart" guidance kit designed by Lockheed Martin corrects the munition dispenser's free-fall trajectory, compensating for weather and allowing accurate delivery at any altitude. The dispenser is an aerodynamic weapon container that is dropped from an aircraft, then flies to a designated position where it releases a cluster of submunitions over ground targets, such as armored columns.

The WCMD program allows the Air Force to convert older, unguided "dumb" bombs into modern "smart" weapons. WCMD can be delivered by a variety of bombers and fighters including the F-15E, F-16, F-117, B-1, and B-52.

Lockheed Martin is teamed with Simmonds Precision Motion Controls, Cedar Knolls, N. J.; Honeywell Military Avionics, Minneapolis, Minn.; Litton Guidance and Control Systems, Woodland Hills, Calif.; and PRB Associates, Hollywood, Md. The company expects foreign military sales to boost the program to more than $1 billion.

USAF photo by SrA. Ken Bergmann

Air Force units continued their support for Operation Joint Endeavor as NATO's Implementation Force became its Stabilization Force. Here, a C-17 from Charleston AFB, S. C., delivers a US Army M2A2 Bradley Fighting Vehicle to Tuzla, Bosnia-Hercegovina.

Food Stamps in Perspective

Concern about the continued need of some military families for food stamps flared at one of Defense Secretary Cohen's first news conferences. According to a 1995 DoD study, approximately 11,900 active-duty members and their families receive food stamps.

Both the new Secretary and Gen. John M. Shalikashvili, Chairman of the Joint Chiefs of Staff, declared that even that relatively small number is not acceptable.

However, Secretary Cohen explained that the number would be even smaller if housing allowances were considered. He also noted that the need for food stamps is generated by the number of members in a family.

According to the Pentagon, 59 percent of the service members receiving food stamps were living on base; food-stamp procedures ignore the value of "in-kind" quarters when computing need. Only 0.3 percent of all active-duty members receive stamps

and live off base. They are primarily junior enlisted members with larger-than-average families.

Although the Air Force does not track the number of its personnel who use food stamps, officials estimated the number who are eligible at approximately 1,200.

General Shalikashvili pointed out that, although the Pentagon would like to eliminate the conditions that necessitate the use of food stamps, he did not want to "paint that in such a way that it is something demeaning" thus making a young military member reluctant to use food stamps. "It's very important that those who are in need do, in fact, avail themselves of food stamps, so we need to keep that perspective open."

New Nighthawk Debuts

An improved F-117A stealth fighter, complete with a new navigation sys-

Congressional News

New Budget Debate

Republicans quickly set the stage for upcoming deliberations on President Clinton's Fiscal 1998 defense budget request, citing shortfalls they perceive will lead to continued problems in readiness, quality of life, and, particularly, modernization.

Statements and analyses in early February left little doubt that Republicans believe defense is again underfunded.

The chairman of the House National Security Committee (HNSC), Rep. Floyd D. Spence (R–S. C.), warned that the Fiscal 1998 defense budget request "represents the thirteenth consecutive year of real spending decline and reflects the lowest percentage of the US Gross Domestic Product that any administration has committed to defense since before World War II."

He added that the Administration's "promises of more savings and higher spending to address identified shortfalls remain out in the future, while, in the short term, the decline continues."

Rep. Curt Weldon (R-Pa.), chairman of the HNSC's Military Research and Development Subcommittee, specifically criticized the President's defense budget for failing to meet the military's $60 billion annual procurement goal.

"The Clinton Administration continues to pay lip service to the need for force modernization, but its budget is years too late and billions of dollars short," he said. "Once again, the department is kicking the can down the road, and at this point, promises of future funding increasingly strain credibility."

Rep. Joel Hefley (R-Colo.), chairman of the HNSC's Subcommittee on Military Installations and Facilities, expressed concern about a $1.6 billion cut—16 percent below current spending levels—in military construction and military family housing. He said that the $8.4 billion requested by the Administration "continues a pattern of underinvestment" and that facilities built in the 1940s and 1950s are ill equipped to handle the systems of the 1990s and beyond.

He found "troubling" such budget decisions as cutting the Air Force military construction account by roughly one-third and Navy family housing construction by 44 percent.

Procurement Shortfall

In separate analyses of the new budget, the House and Senate Budget Committees on February 6 projected continued erosion of the Pentagon's weapon modernization plans.

In its report, the House Budget Committee noted that the Administration had requested a $2.8 billion increase in budget authority for Fiscal 1998, compared with last year's projections, but pointed out that the figure is $2.9 billion less than projected in last year's Congressional Budget Resolution.

The House analysis said that most of the funding increase will go to administration, overhead, support, and other areas not directly related to combat forces and weapons. In fact, the House committee noted a four-year trend in which the Administration had devoted less to weapon purchases than it had projected the year before. The Fiscal 1998 $42.6 billion procurement request represents a decline of $1.5 billion from the Fiscal 1997 appropriation.

The Senate Budget Committee analysis also highlighted the potential procurement shortfall. It noted that the 1998 defense budget authority request, adjusted for inflation, is 30 percent below the 1985 level, while procurement spending over the same time period had dropped 70 percent—$134.3 billion in constant dollars.

The Senate committee stated that it had asked for independent analyses to test whether DoD had realistically budgeted funds to support procurement plans while also maintaining readiness and existing force structure. Both the Congressional Budget Office and the General Accounting Office found that the 1997–2001 Future Years Defense Program is "underfunded" by as much as $50 billion in its first four to five years.

As an example, the Senate report noted that despite a $400 million reduction in the military personnel account from last year, the Administration's 1998 FYDP projects nominal increases from $69.5 billion to $75.3 billion in 2002. Additionally, the GAO found that the per capita cost of military personnel is increasing. The Senate committee concluded that if the Administration expects to save money in this account, it will require "significant reductions in personnel and/or benefits."

The Senate analysis emphasized that these problems are not new, but "the mismatch between available funds and planned programs is very likely to worsen as real declines in core defense spending accounts continue to occur."

"Tightrope"

HNSC Chairman Spence warned that the White House and Congress had failed to alert the American public to the fact that "its military is confronting some of the most critical challenges and fundamental decisions since the end of World War II."

Opening the latest round of budget hearings on February 12, the chairman compared Clinton's new defense budget to a "tightrope without a safety net," rather than a bridge to the twenty-first century for America's military forces.

Spence also forecast that the services would face the "untenable choice" during the Quadrennial Defense Review of choosing between further reductions in force structure and end strength to fund modernization. The context of the QDR, he said, is largely set since it essentially assumes fixed budgets. However, he added that his deepest fear was that those reductions "will not come close to funding the kind of recapitalization needed to take even the smaller military of the mid-1990s into the twenty-first century with unquestioned technological superiority."

"It is a stunning commentary on the depth to which the defense budget is being cut when Congress can add $8 [billion] to $10 billion a year to a President's budget, and the nation still ends up with a budget that fails to even keep pace with inflation." ■

tem to reduce drift experienced by pilots, arrived at Holloman AFB, N. M., on January 22. The upgraded fighter was the first delivered under a program called the Ring-Laser Gyro/ Global Positioning System Navigation Improvement Program.

Under the program, Lockheed Martin is replacing the current navigation suite with the ring-laser gyro inertial navigation system developed for the F-16, coupled with GPS to provide both enhanced navigation and targeting capability. USAF expects to have the entire fleet retrofitted by October 1999.

Program officials at Aeronautical Systems Center, Wright-Patterson AFB, Ohio, said the new system is three times more reliable and requires 100 times less maintenance than the current system. Additionally, the time needed to calibrate the equipment before takeoff dropped from 43 to 15 minutes. Pilots also have the option to take off within 90 seconds and complete the navigation alignment in about five minutes while airborne using GPS.

LANTIRN Extends Reach

Lockheed Martin announced plans to develop a program called LANTIRN 2000 that will improve Low-Altitude Navigation and Targeting Infrared for Night system capabilities—not only taking it out of the low-altitude category but broadening its capabilities to include air-to-air tracking, Theater Missile Defense, and bomb-damage assessment.

From a system designed for low-altitude ground attacks at night, it will extend its targeting pod's operational range from 25,000 feet to 40,000 feet.

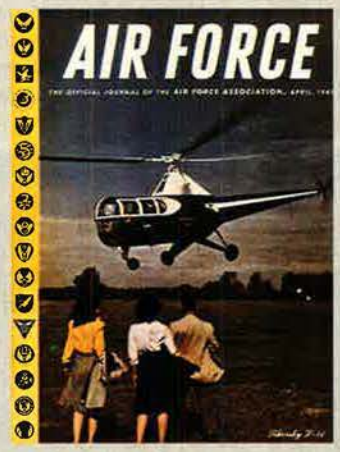
With a limit of only 25,000 feet, the use of LANTIRN during the Persian Gulf War was limited because allied pilots had to fly at medium or high altitude to avoid small-arms fire and shoulder-launched surface-to-air missiles.

Company officials expected to have the upgrades flying for demonstration early this year. They have told USAF commanders that LANTIRN 2000 could be ready for "full implementation before the turn of the century."

USAF and ANG use LANTIRN on F-16 and F-15E aircraft and the Navy on F-14s. Eight foreign countries also have LANTIRN-equipped aircraft.

AFRES Becomes a Major Command

On February 17, the Air Force Re-



50 Years Ago in *Air Force* Magazine

April 1947

On the cover: The Sikorsky S-51 helicopter was the largest rotary wing aircraft then in production. The AAF used it extensively in the Operation Frigid exercise in Alaska.

■ *Air Force* Magazine visits Gen. H. H. Arnold, wartime commander of the AAF, now retired and "turned farmer" on a 40-acre ranch near Sonoma, Calif. The ranch is "a paying proposition," producing crops and milk for sale. General Arnold continues to travel and speak but enjoys the solitude of the ranch and threatens to 'shoot the first plane that flies overhead."

■ AFA President James H. Doolittle struck hard at proposals to cut the defense budget to about half the minimum amount deemed necessary by service leaders. He said since the first priority for funding had to be the occupation forces in Germany and Japan, the reductions would fall in a "fundamentally unsound" manner on other forces and that airpower, "our strongest agency of defense," would be weakened most.

■ The railroads and bus lines announce that the special furlough rates for service personnel in wartime terminated on March 1, 1947.

■ With senior Air Force personnel and other dignitaries on hand, Norden bombsight Number 4120, used to drop the atomic bomb on Hiroshima, is presented to the Smithsonian Institution.

AFA news: In his report to the membership, President James H. Doolittle says that during its first year of existance, AFA had pursued two "missions of first importance": vigorous support of autonomy for the Air Force and a vigorous program to increase AFA membership and field organizations.

USAF Celebrates 50

■ The American Legion Parade on July 4 in Anchorage, Alaska, will honor USAF's fiftieth anniversary.

■ The International Plastic Modeler Society's annual convention will gather in Columbus, Ohio, July 11–12 to discuss 50 years of the Air Force with guest speaker Brig. Gen. Robin Olds, USAF (Ret.), on July 12 at the US Air Force Museum at Wright-Patterson AFB, Ohio.

■ Air Force Materiel Command is an official sponsor of the Dayton US Air and Trade Show July 14–20 at the Dayton IAP, Ohio. The National Aerospace and Electronics Conference and AFA Technological symposium takes place in Dayton July 14–18.

■ The Royal International Air Tattoo 1997, July 16–20 at RAF Fairford, UK, will feature the United Kingdom's salute to USAF's fiftieth.

■ Special USAF programs, exhibits, and aircraft will highlight the 1997 Experimental Aircraft Association Fly-In Convention July 30 to August 5 at Wittman Regional Airport in Oshkosh, Wis.

■ The Tuskegee Airmen Convention in Indianapolis, Ind., August 13–17 will salute USAF's fiftieth anniversary.

■ Air Force Services will release some limited-edition memorabilia throughout the year, including five commemorative prepaid phone cards in February, March, May, July, and September. Each card, showing a collage of aircraft, includes 25 minutes of long-distance phone time and sells for $5 each at exchanges and airshows.

US Navy photo by Vernon Pugh

The heaviest Hornet: F/A-18E/F Super Hornet E1 took off carrying three 480-gallon fuel tanks, two Mk. 84 bombs, two AGM-88 High-Speed Antiradiation Missiles, and two AIM-9 Sidewinder missiles externally and flew without incident during tests at NAS Patuxent River, Md., in February.

serve became the Air Force Reserve Command (AFRC), the Air Force's ninth and newest major command. Maj. Gen. Robert A. McIntosh, the former AFRES commander, now serves as the first AFRC commander.

Congress authorized the new status as part of the Fiscal 1997 National Defense Authorization Act. It based the change on lessons learned from reserve component mobilization for Operations Desert Shield and Desert Storm. It is expected to enhance day-to-day support and recognizes the realities of the reserve component partnership in the Total Force, according to a USAF statement.

AFRC headquarters remains at Robins AFB, Ga. Previously, the Air Force Reserve was a field operating agency.

AFOATS for Commissions

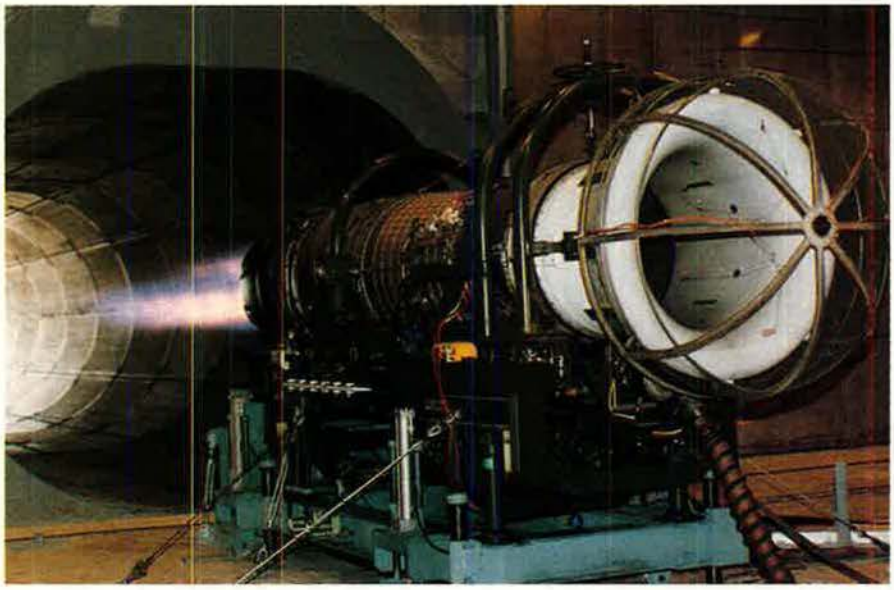
On February 14, the Air Force combined the Air Force Reserve Officers Training Corps and Officer Training School into one organization—the Air Force Officer Accession and Training Schools (AFOATS).

Both programs have resided at Maxwell AFB, Ala., as part of Air University (AU), since 1993, when the Air Force moved OTS from Lackland AFB, Tex., to Maxwell to consolidate all its officer education and training programs.

The new AFOATS commander, Brig. Gen. Brian A. Arnold, former AFROTC commander, said the consolidation will not alter the day-to-day operation of either school. It will reduce duplication and streamline administrative and reporting procedures within AU.

Together, both schools produce 75 percent of USAF's officers. This year,

USAF photo by A1C Monie Volk



Aviano AB, Italy, built this $3.1 million aircraft engine test "hush house" to enable the base to run checks on F-16 engines 24 hours a day without disturbing the neighbors. The facility's sound-suppression system cuts the outside noise level by 50 percent.

AFROTC will produce about 2,000 officers through programs at 144 college campuses nationwice. OTS will commission about 500 new line officers this year and provide military orientation and training for another 2,000 new, already-commissioned judge advocates, chaplains, and health-profession officers.

Southwest Asia Tours Lengthened

US Central Command officials announced that tour lengths for Air Force members individually selected to support contingencies in southwest Asia will increase from 90 to 120 days beginning June 1. They said the change, affecting about 2,700 support positions, was made to improve force protection.

By lengthening the tours, officials said they would reduce the number of people who spend time in the theater by 25 percent each year.

Col. Bob Baskett, chief of the Air Force Contingency and Joint Matters Division at the Pentagon, said that about 10,000 support personnel rotated through the theater each year. Under the new 120-day policy, the rotation demand drops to about 7,500 per year.

The Downing Report on the June 1996 bombing of the Khobar Towers recommended increased tour lengths as one means to improve force protection. Prior to the bombing, the Air Force had already extended 10 leadership positions to one-year tours and planned to convert additional positions.

Flight crews and their maintenance personnel deploy as "operational packages" and will continue to serve 90-day tours.

First Deployment "Outstanding"

The commander of the 93d Air Control Wing—the Air Force's newest—declared its first operational deployment to have exceeded initial expectations "by a wide margin." Col. Ben Robinson praised his crews and aircraft as they celebrated the new wing's first birthday on January 29 at Robins AFB, Ga.

Crews from the 93d ACW and two E-8C Joint Surveillance and Target Attack Radar System aircraft returned on January 4 from Europe, where they had supported Operation Joint Endeavor in Bosnia-Hercegovina.

Colonel Robinson said that during the operation, the wing exposed 40 percent of its personnel to deployed operations, trained more than 40 aircrew members, and reduced its deployed number of personnel by 12 percent. "There wasn't an area that we weren't successful in," he said.

Additionally, the crews covered more than 90 percent of their assigned target areas and participated in eight exercises with six nations. They also developed an innovative approach, flying a banana-shaped orbit to use their radar over mountainous terrain.

"I can't overemphasize the success of this deployment," stated the Colonel. "For the first [operational] deployment with a brand-new airplane, for the first deployment with the newest wing in the Air Force, meeting every one of our objectives, plus more—that is just outstanding."

News Notes

■ Maj. Peter Woodbury, an Air National Guard pilot with the 148th Fighter Wing at Duluth IAP, Minn., was killed January 7 when his F-16 crashed in a heavily wooded area about 50 miles northeast of Duluth.

Senior Staff Changes

RETIREMENTS: Gen. Billy J. **Boles,** B/G Robert G. **Jenkins,** B/G David L. **Young.**

PROMOTIONS: To be **Lieutenant General:** Joseph E. **Hurd.**
To be **Major General:** Steven R. **Polk.**

CHANGES: L/G Lawrence P. Farrell, Jr., from Vice Cmdr., Hq. AFMC, Wright-Patterson AFB, Ohio, to DCS/P&P, Hq. USAF, Washington, D. C. . . . **M/G (L/G selectee) Joseph E. Hurd,** from Dir., Ops., J-3, Hq. USCENTCOM, MacDill AFB, Fla., to Dep. CINC, UN Command Korea; Dep. Cmdr., US Forces Korea; Cmdr., ROK/US Air Comp. Cmd., CFC; and Cmdr., 7th AF, PACAF, Osan AB, Korea, replacing retiring L/G Ronald W. Iverson . . . **Col. (B/G selectee) Edward L. LaFountaine,** from Cmdr., 374th Airlift Wing, PACAF, Yokota AB, Japan, to Vice Cmdr., 5th AF, PACAF, Yokota AB, Japan, replacing retiring Col. Ernest M. Skinner.

Col. (B/G selectee) Michael C. McMahan, from Dep. Dir. for Ops., J-31, USACOM, Norfolk, Va., to Cmdr., 7th Wing, ACC, Dyess AFB, Tex., replacing B/G Larry W. Northington . . . **B/G Larry W. Northington,** from Cmdr., 7th Wing, ACC, Dyess AFB, Tex., to Dir., Manpower, Organization, and Quality, DCS/P&P, Hq. USAF, Washington, D. C. . . . **Col. (B/G selectee) Michael W. Wooley,** from Cmdr., 375th Airlift Wing, Hq. AMC, Scott AFB, Ill., to Vice Cmdr., Hq. AFSOC, Hurlburt Field, Fla., replacing retiring B/G Howard J. Ingersoll. ■

He had served with the Guard for six years and previously on active duty for nine years. He had 1,199 hours in the F-16. The accident investigation is ongoing.

■ Two Air Force Reservists ejected safely before their F-16D crashed February 4 in an unpopulated area about 10 miles northeast of Wendover, Utah. Maj. Edward G. Goggins, pilot, and Capt. Mark C. Snyder, flight surgeon, both with the 419th Fighter Wing, Hill AFB, Utah, were rescued the same day and listed in fair condition.

■ Lt. Col. John Kennedy, a master weapons controller, became the first nonrated officer selected to command an operational flying squadron when he became commander of the 963d Airborne Air Control Squadron at Tinker AFB, Okla., on January 16. USAF recently changed its policy regarding command of flying organizations to permit air-battle managers to command specific units.

■ Major commands selected 216 officers from 296 on the candidates list to fill this year's projected wing and group command vacancies. A first was the selection by the ANG of an active-duty officer to command a nonmobilized ANG unit—another means to integrate into a Total Force environment, according to ANG officials.

■ USAF aircrews flying from Aviano AB, Italy, continue to fly more than 20 sorties daily over Bosnia to support Operation Deliberate Guard. Last year, they flew some 13,000 sorties. Aviano's 555th Fighter Squadron set an operational milestone January 28 when Capt. Matthew Dana flew the unit's 2,000th sortie over Bosnia.

■ The Air Force will end operations at Pirinclik AS, Turkey, and return the installation to Turkey by September. The move will affect about 117 USAF personnel assigned to the base.

■ The 20th Fighter Squadron, Holloman AFB, N. M., the only USAF unit still flying F-4 Phantom II aircraft, received nine F-4Fs from Germany on January 16 to replace its older E models. They will get a total of 24 F-4Fs, used to train German aircrews under a $48 million foreign military sales program.

■ In early February, another air expeditionary force, with about 30 fighter aircraft, deployed to Qatar to support Operation Southern Watch in southwest Asia. The AEF included F-15Es from the 4th Wing, Seymour Johnson AFB, N. C.; and F-16s from the 169th Fighter Wing, McEntire ANGB, S. C., 27th FW, Cannon AFB, N. M., and 20th FW, Shaw AFB, S. C.

■ Maj. Steve Moulton and Capt. Jeff Long emerged February 1 after completing the longest B-2 simulator flight—44.4 hours—in Air Force history, according to USAF's Armstrong Laboratory officials, who used the

Working the Web

The Air Force selected the World Wide Web home page for Altus AFB, Okla., in February as the first winner of its Five Star Web Site award. A panel of judges named the sites for the US Air Force Museum, Dayton, Ohio, and Brooks AFB, Tex., for second and third place honors.

The award recognizes sites for their usefulness, currency, visual appeal and navigability, interactivity, linking, download time, appearance using various web browsers, incorporation of multimedia, feedback mechanisms, and administrative information.

Altus AFB, Okla
http://www.lts.aetc.af.mil/

US Air Force Museum
http://www.wpafb.af.mil/museum/

Brooks AFB, Tex.
http://www.brooks.af.mil/

flight to help determine the impact of fatigue on a pilot's ability to perform a mission and return safely. They said the tests help pilots learn to recognize and adapt to fatigue.

■ USAF declared two SR-71 "Blackbird" reconnaissance aircraft and their aircrews "mission ready" on January 1 for the first time since the aircraft entered retirement seven years ago. The 32-year-old SR-71 is the world's fastest, highest-flying production aircraft. It can survey more than 100,000 square miles of the Earth's surface in one hour.

■ A McDonnell Douglas Delta II booster exploded about 12 seconds into powered flight on January 17 as it lifted off from Cape Canaveral AS, Fla. It was the first Delta near-pad destruction since 1977. It was carrying the first of a new generation of Global Positioning System satellites.

■ 710th Airlift Squadron Reservists from Travis AFB, Calif., flew nearly 20,000 pounds of blankets and clothing to Ellsworth AFB, S. D., on January 19 for residents of the Cheyenne River Sioux Indian Reservation, which was hit by frigid winter storms.

■ Construction of the Women in Military Service to America Memorial at Arlington National Cemetery, Va., passed the halfway point in January, right on schedule for completion this summer and opening ceremonies, now set for October 18.

■ Winners of the 1996 Civil Engineer Outstanding Unit Award are the 10th Civil Engineering Group, US Air Force Academy, Colorado Springs, Colo., and the 31st Civil Engineering Squadron, Aviano AB, Italy.

■ Maj. Michael Leahy, Jr., Air Force Materiel Command, Wright-Patterson AFB, Ohio, is the Air Force military engineer of the year for the National Society of Professional Engineers. James LaFrenz, Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., is the Air Force civilian engineer of the year.

■ Luke AFB, Ariz., Radar Approach Control received the Air Traffic Communication Facility of the Year award from the Aviation Safety Advisory Group of Arizona, Inc., for its assistance to general-aviation pilots.

■ US Air Forces in Europe celebrated its fifty-fifth birthday on January 23. It traces its heritage to the activation of Eighth Air Force in 1942.

■ January 24 marked the end of 55 years of pilot training at Reese AFB, Tex. Personnel over that time at the base, once known as Lubbock Army Airfield, trained 436 classes of student pilots, graduating 25,349 men and women, including 614 from 40 allied nations.

■ Gen. John G. Lorber, commander of Pacific Air Forces, became the first PACAF commander to receive the Grand Cordon of the Order of the Rising Sun, one of Japan's highest honors, on January 20. Instituted in 1875, the award is seldom bestowed, and rarely presented to foreigners, according to a USAF release.

■ Twenty-eight cadets from the Air Force Academy traveled to Greensboro, Ala., in January to help restore the Rising Star Missionary Baptist Church, one of the churches burned in last year's string of arsons.

■ In January, the Air Force commissioned as a second lieutenant its first Muslim chaplain candidate, Abdullah Hamza Al-Mubarak. On completion of his course work, designation as an imam, and endorsement from his faith group, he will be eligible for selection as an active-duty chaplain. Within USAF's ranks, there are about 700 Muslims. The Army and the Navy also each have one Muslim chaplain candidate.

■ DoD officials dedicated a Hall of African-American Military Heroes and Contributors Corridor in February as part of Black History Month. The initial corridor exhibit will focus on African-American Medal of Honor heroes, now numbering 86, from the Civil War through the Vietnam War. ■

A classic part of the Air Force uniform found its way to the US Air Force Museum at Wright-Patterson AFB, Ohio, courtesy of the family of Col. Edward Gleed, who flew with the Tuskegee Airmen during World War II. Here, his daughter, Carol Weaver, stands next to the A-2 jacket, donated by his widow, Lucille Gleed.

Index to Advertisers

Tourane

Photos from David Botto via Warren Thompson

This exchange of aircraft took place at a time when most Americans would have been hard-pressed to find French Indochina on a globe. In late 1953, 3d Bomb Wing B-26s, rendered surplus by the Korean War armistice, were stripped of their USAF markings and flown to a small airfield at Tourane (seen in aerial view at top), in the Annam region of French Indochina. The French military accepted the aircraft at this austere airstrip. A very different base at this site would become familiar to hundreds of thousands of US servicemen as Da Nang AB, South Vietnam, during the long conflict that followed.

Air Force leaders put change in perspective at AFA's Air Warfare symposium.

Shifting Patterns of Air Warfare

By **John A. Tirpak,** Senior Editor

ACC: General Hawley

Operations tempo is so high in some parts of Air Combat Command that overworked people may start leaving the service in droves, ACC Commander Gen. Richard E. Hawley told attendees at AFA's Air Warfare symposium, held January 30–31 in Orlando, Fla. The problem will be greatly aggravated, he said, if the Quadrennial Defense Review (QDR) calls for new force cuts.

"Our people are working hard, and they know it," the General said. "They want to know if there is any light at the end of the tunnel." While his ACC personnel are "dedicated men and women" who have "not been found wanting . . . in their commitment to 'service above self,' . . . there are limits on how much we can ask these wonderful people to give. It is my sense that we are close to that limit. Once we cross that fine line, the exodus will be devastating and difficult to reverse. We must find a way to keep our force structure and our commitments in balance. I believe we can do that."

The QDR potentially could "lead to further reductions in our already heavily committed force structure," said General Hawley. "As a primary provider of air combat forces to our joint warfighters, I advise caution as we contemplate this course."

The General noted that alleviating the high operations tempo has been his top priority, and there are some successes to show for the effort. The number of ACC personnel deployed beyond the USAF-wide goal of 120 days away from home station "was cut in half" in 1996, compared with 1995 levels, despite a shrinking force and no letup in commitments.

To further manage the work load, the General explained, ACC hosts a worldwide contingency- and exercise-scheduling conference to build some breathing room into the pace of deployments and to "spread the work more evenly across the force than we have done in the past."

Scheduling criteria "help us avoid scheduling any one part of the force for too many events in too short a period of time or violating the sanctuary periods the units need to prepare for—and recover from—major tasks," according to the General. Some units that were overtaxed were found to be undermanned. Where possible, the empty billets have been filled to relieve the stress.

In addition, General Hawley said, ACC is working with the other services and USAF components to find comparable, substitute capabilities that can fill in to provide a breather. Regional commanders in chief are also being asked to occasionally "do without." He added that if a capability is simply too much in demand and too short in supply, "we will advocate . . . investment in additional force structure," as ACC has done in the case of RC-135 Rivet Joint aircraft and combat rescue forces.

In spite of the pace, 1996 was "our safest year ever, . . . both on the ground and in the air."

Reflecting on last year's other achievements, the General noted that in 1996, ACC also "demonstrated and refined the concept of the air expeditionary force" with deployments to Bahrain, Jordan, and Qatar. In conjunction with Air Mobility Command, response time and logistics footprint have been reduced on each deployment, with aircraft in place and ready to begin combat sorties within 72 hours of the "go" order. A second Qatar-bound AEF, the 4th Air Expeditionary Wing, was scheduled to deploy in February.

Bombers stole the spotlight in 1996, as all three serving types demonstrated new or more powerful capabilities, General Hawley said. The B-2's new Global Positioning System–Aided Munition was a huge success as three aircraft shacked 16 different targets from 31,680 feet, "destroying or damaging each one." In Operation Desert Strike against Iraq last September, B-52Hs deployed to Guam flew a 34-hour round-trip mission to launch Conventional Air-Launched Cruise Missiles, scoring "13 hits on critical air defense targets." Moreover, the B-1B gained the ability to carry and drop cluster munitions, allowing it to threaten "a much wider range of targets."

"Once again, our global airpower provided the means for us to answer aggression and to demonstrate US resolve without a massive and costly deployment," General Hawley asserted.

This year, the Air Force will get its first Joint Direct Attack Munitions, and the first Block 30 B-2s will be delivered, further enhancing precision attack capabilities.

Preserving programs that will ensure future air dominance will be the chief challenge of 1997, General Hawley said, as tactical air modernization comes under further scrutiny.

"This nation has invested billions [of dollars] to achieve technological dominance in aerospace," he said, but "when we propose to spend less than two percent of a much-reduced national security budget to provide guaranteed air dominance through the first third of the next century, we are questioned at every step of the way and held to a standard that no other development program has ever been asked to attain."

General Hawley asserted that the debate over the F-22 and other tactical aviation programs "has gotten too emotional." The Air Force, he noted, has carefully sequenced buying the planes it needs over the next 15 years, and at no time will the investment exceed two percent of the defense budget.

"There are limits on how much we can ask" of the men and women of ACC. It is my sense that we are close to that limit. —General Hawley

"There are limits on how much we can ask" of the men and women of ACC. "It is my sense that we are close to that limit." —General Hawley

"We are not buying all of these things at the same time," he said. "It is a myth that we can't afford these. The question is, do we want to?"

AETC: General Boles

The streamlining and rationalization of military education that was intended with the formation of Air Education and Training Command is taking place, according to its then-commander, Gen. Billy J. Boles.

The merger of Air Training Command, Air University, and combat crew training has created "the sixth largest air force in the world," he said, and the effort is yielding both savings and better-trained people.

One big way to save is by training jointly with other services. General Boles said that "one of every three" students in AETC "is in a joint school" and, within three years, that number could top 50 percent. He noted that jointness is expanding so much that it is possible for a pilot candidate to go from commissioning through pilot training "and never see an Air Force base until after he or she is awarded . . . wings."

Another push is to get Air Force people trained faster, at less cost. The "mission-ready training" program provides system-specific education right out of basic training, rather than months of generic system education before "graduate" courses at the assigned base.

Airmen now reach their bases "fully trained . . . and ready to go" at four months rather than five. At 600 maintenance technicians a year, "we just saved [50] man-years right there," General Boles observed.

More is being done with computers and the Internet to improve and accelerate training, General Boles noted. Some correspondence courses can be taken by CD-ROM or interactively over the Internet, with participants thousands of miles apart.

New simulation equipment, with highly realistic threats and visual systems, can allow an F-15 pilot to electronically "dogfight" an adversary at another base, as well as tie him into Airborne Warning and Control System simulators and other "composite force" participants. Eventually, all this will enable AETC to achieve its goal of never permitting a pilot "to experience an event for the first time in an airplane."

General Boles paused to say that simulation is not a complete substitute for experience, and he is not "advocating cutting flying time [in favor of] simulators." However, he believes the strides being made in simulation can "make the crews much more efficient." Nevertheless, in its 1998 budget request, the Air Force proposed cutting its monthly crew flying time by 30 minutes.

Still in the planning stages is the "Air and Space Basic Course," which will be given to all incoming officers, and eventually to all senior and midgrade noncommissioned officers, as well as some civilian employees. The "basic course" is expected to take about six weeks and will give an individual "the big picture" of the Air Force mission and its contribution to national security, General Boles said.

Privatization and outsourcing in AETC will continue, he said. The process is not "much different from what is taking place in the business world today. Businesses are shedding a lot of functions that are not part of their core competencies, so they can focus on their core competencies." For example, he said, there's no reason a blue-suiter has to teach basic electronic principles. The savings from outsourcing can reach 35 percent, the General added.

Recruiters are meeting their goals without lowering standards, but recruiting will remain a challenge as the percentage of high school graduates going on to college continues to increase. The Air Force needs about 35,000 enlistees—including 5,000 in the Guard and Reserve—and about 5,000 new officers annually to keep its personnel strength up to par, General Boles said.

The current fighter pilot shortage is part of a cyclical problem that has defied permanent solution, he said.

European Command: General Jamerson

Ongoing operations in Bosnia-Hercegovina, Africa, and the Middle East underline that a strictly CONUS-based force is not in the best interest of the US, asserted Gen. James L. Jamerson, deputy commander in chief, US European Command.

The various contingency operations in which US forces are involved entail work "that cannot be done from the continental US. That is not because . . . anybody is incompetent; you just can't do it from here. You've got to have some forces over there to have this engagement," he said.

By having regular, military-to-military contacts with allies and potential allies—and in many cases, among forward-deployed forces from all the services—operations can be rehearsed and connections maintained that permit contingencies to be dealt with far more effectively and swiftly, General Jamerson maintained.

" 'Multinational' is . . . much, much easier to say than to do," he observed. "We are forward-presence, forward-based, forward-stationed, and we think it is important to stay that way," he said.

He echoed remarks from the other speakers regarding the high operations tempo of US forces overseas and, noting that US Air Forces in Europe is down to 2.33 wings, said, "I've always contended that when you start measuring fighter wings with decimal points, things are getting a little bit tense."

General Jamerson also cautioned against further reductions in force structure unless comparable reductions are made in commitments. He pointed out that some taxing operations, once started, can go on far longer than expected. Operations Northern and Southern Watch in Iraq are both more than five years old, and the US has been running an air bridge to Lebanon for 14 years.

"These things do not go away fast," he said. "It is easy to get in, hard to get out."

The General asked industry attendees to put their efforts into technologies that will multiply the strength of US forces—particularly information-sharing technologies—but to also put a great deal of thought into the concept of operations of these new systems.

"Help us with the trade-offs," he said. "That is important. We have got to trade something out if we are going to bring something in."

He also stressed that new technologies and systems, regardless of how valuable, must be cost-effective.

"We've got to have . . . clear information on . . . the cost of bringing it on board," the General said. "This is eating us alive. . . . We get handed something that is really good. Everybody turns around and goes home, and nobody spends much time thinking about the cost over the next 20 years" nor the personnel required to run it.

PACAF: General Lorber

Pacific nations are watching the Quadrennial Defense Review with great interest to see if the US will remain engaged there with the same level of commitment it has maintained throughout the twentieth century, according to Pacific Air Forces Commander Gen. John G. Lorber.

"Crisis is inevitable" in the Asia-Pacific theater, General Lorber reported. The explosive growth of economies in the region "creates divisive forces. The need for raw ma-

Vice Chief of Staff: General Moorman

Gen. Thomas S. Moorman, Jr., in his remarks to the Orlando symposium, focused on USAF's long-range planning effort, which is moving from the conceptual to the action phase.

"This plan will drive the [major commands'] mission-area plans," he said. "From that, the Air Staff will produce the annual planning guidance, which will in turn drive the [program objective memorandum]," the Pentagon's five-year budgeting process.

"For the first time in my memory, we will have a traceable and auditable planning and programming system," the General observed. He added that none of it would work if it lacked the "corporate buy-in" of the whole Air Force, and for that reason he has been leading a consensus-building effort involving all the major command vice commanders and functional commanders.

In addition, "the Air Staff and Secretariat have been deeply involved in developing this plan over the past several months," to ensure a true USAF consensus.

Addressing himself to the industry attendees, General Moorman said it has yet to be worked out "how exactly you . . . become exposed to the details of the plan. But we realize that must be done. . . . Ultimately, what is important to you is [that] it will allow you to have a clear and understandable statement of our priorities, so you can make your investments and [direct] the thrusts of your technologies accordingly."

terials and access to markets breeds competition. And, unfortunately, competition often breeds conflict."

Nations in the Asia-Pacific region "look to the United States for help in . . . dealing with these challenges. But the question they all raise . . . is whether we will be there when needed."

If there were reductions in the size of US forces dedicated to Pacific operations, it "would, in my opinion, cause an arms proliferation," General Lorber asserted.

He noted that nations in the region now have the money not only to buy but to develop the technology necessary to deal with each other—and the US—on even terms. All look to China and its "shift . . . from a large standing army" to qualitatively better overall forces—including sharply improved air forces—as reason to be nervous and build up forces, the General said. To avoid provoking China, however, the Asia-Pacific nations are reluctant to formally cooperate in mutual security coalitions, he said, further increasing the need for US engagement in the region to offset the threat and to be an impartial broker during conflicts.

A reduction from the current level of 100,000 US troops in the Pacific theater "would, in my opinion, produce a signal to [those] . . . nations that what they feared was beginning to occur—US withdrawal from the region," General Lorber said.

The Air Force is particularly critical to security in the region because of its ability to act quickly, over long ranges, and with very little in-country support or prepositioning, the General said. Long-range assets, and particularly precision weapons, will be vital to stopping a conflict before it becomes too large to control.

"We must have air and space superiority. In many cases, our ground forces will be outnumbered," he said. "We just won't have the luxury of large stockpiles and immediate resupply. . . . Every bomb, every bullet, must count."

With the introduction of advanced Russian and European aircraft to the region, the US no longer "corners the market" in air dominance, he added.

In response to questions, General Lorber said he believes the two Koreas will eventually be reunited,

"We just won't have the luxury of large stockpiles and immediate resupply. . . . Every bomb, every bullet, must count."
—General Lorber

"We just won't have the luxury of large stockpiles and immediate resupply. Every bomb, every bullet, must count."
—General Lorber

but he can't predict whether it will be through conflict or peaceful means. In any case, the reunification "will occur only after a rough and very turbulent journey. It will not follow the ease of the structured German model."

Should a war break out in Korea, USAF's biggest problems would not be the North Korean Air Force but deconflicting US and South Korean air forces "operating in a space one-fifth the size" of the area of Operation Desert Storm. Better friend-or-foe systems need to be in place "that allow us to use [beyond-visual-range] missiles."

Airpower would have to move "very fast" against advancing North Korean ground forces to "stop the destruction level" that would otherwise occur in a ground war there, the General said. The ramifications of a ravaged peninsula would be "felt by all" the nations of the region, "including the US."

Regardless of the path to unification, the other nations of the Asia-Pacific region are already wondering what role a unified Korea would play economically and militarily in the region, the General said.

"There is tension on the Korean peninsula, growing economies that are breeding competition for limited resources, military modernization, and nuclear weapons, yet the Asia-Pacific [area] is more stable, more peaceful, now than at any time this century. So our strategy is working," General Lorber said, arguing for a continuation of the capabilities that make the strategy possible.

AFMC: General Viccellio

"For the very first time in our Air Force's 50-year history," combat support and logistics have been designated as core competencies of the Air Force, observed Commander of Air Force Materiel Command Gen. Henry Viccellio, Jr., who retires May 1.

The "agile combat support" competency underlines the critical nature of a supply train "tailored" and delivered directly to front-line troops without expensive and time-consuming intermediate steps, the General told the Orlando conference.

"The days when we could prepare for war through forward-basing or by pushing massive inventories of supplies and equipment out to our deployed forces are long gone," he said. "Tomorrow's forces will require supplies and sustainment . . . delivered in a matter of hours, not days or weeks or months."

The laboriously crafted Cold War logistics system "is incapable of meeting today's constantly changing requirements," which must be more akin to an overnight package service, General Viccellio said. "We can no longer stockpile massive inventories 'just in case.' We've got to respond to our warfighters' needs 'just in time.' "

The Air Force has copied commercial operations like Federal Express with its Air Mobility Express and Worldwide Express programs, but the effort to achieve "lean logistics" goes further, the General said.

Lean logistics will allow operators to see inventories on a computer screen and call parts or goods forward without endless paperwork. It will mean increasingly reliable, low-life-cycle-cost weapon systems that either rarely fail or degrade gracefully, with plenty of warning.

Reliability and maintainability will rise to achieve importance equal to performance in considering new systems, General Viccellio asserted, if those systems are going to last the projected 40 to 90 years they may be in service. He argued that the last big investment in reliability and maintainability technology was more than a decade ago and that another infusion of money into the field would yield big dividends.

AFMC is also cutting costs by not overspecifying work to be done by contractors and by entertaining all-new methods to reduce inventories and overhead and is "beginning to get some credibility with Congress" in the process.

In an effort to discipline the Air Force, Congress sharply reduced parts funding, forcing USAF to live off inventory, which was difficult because much of the parts stockpile was inappropriate to the modern Block 40 F-16s and F-15Es that needed support.

"We set out a very aggressive program, . . . trying to define what we really need to hang on to for this post–Cold War Air Force," General Viccellio reported, adding that the liquidation effort "has produced income for us and it has offset the need for procurement, which was Congress's goal." The effort is "not over yet, but we have reduced the value of our inventory by billions."

The Air Force is still bound by the 60-40 rule, which mandates that no more than 40 percent of depot work can be contracted out.

"We were unsuccessful in getting relief" from Congress on that rule last year, the General noted, but the outsourcing and privatization initiatives at Kelly AFB, Tex., and McClellan AFB, Calif., may hold the key to further depot reductions.

At Kelly and McClellan, "I've told lots of industry folks . . . it's up to them to make it a success. If it is a success, then we can go back to Congress with a very powerful track record and perhaps get the relief we are looking for" from the 60-40 rule.

Acquisition: General Muellner

Acquisition reforms have allowed the Air Force to save or avoid $17 billion in costs over the last few years, which can be used to help pay for needed modernization or pay the bills for unfunded operations, according to Lt. Gen. George K. Muellner, principal deputy to the assistant secretary of the Air Force for Acquisition.

He said the services only have about $40 billion of the $60 billion that needed modernization will cost and the other monies must come from acquisition streamlining, lower system costs, outsourcing, and privatization.

Part of the issue is getting stability in programs, because "when we take a dollar out in the short term, we end up putting three or four dollars back in the long term to fix that problem."

Efforts are being made across the board to divest USAF of capabilities it doesn't need, General Muellner said. "We are up to 75 or 80 percent" in outsourcing science and technology, and the goal is to go higher while still retaining enough expertise "to remain smart buyers."

Another potentially huge savings would be in what is called "autonomic logistics, . . . [which means] it doesn't take conscious action to make it happen," the General said. Right now, the newest commercial airplanes can, to some degree, monitor themselves and automatically request needed parts "without a lot of human intervention. That is exactly what we would like to provide to our warfighters," the General asserted.

Efforts to reduce cycle times, staffs, and red tape, "are really working well. . . . We are seeing much lower costs," the General continued. "We are seeing contractors accepting more responsibility for their performance. We are using that money, plowing it back into modernization," he said.

The Air Force is pioneering the use of "past performance" as a determinant of contract winners and will continue to put emphasis on it in future awards, he said.

The challenge in outsourcing and privatization, General Muellner noted, "is not only to do it, which is what we are facing right now, but actually to save money as a result of doing it." With regard to depots, "the jury is still out as to when we will start recognizing those savings."

NSA: General Minihan

The diffusion of power with the end of the Cold War has created a world with more danger and conflict, seeing increased threat from weapons of mass destruction and from information used as both a weapon and a battlefield, observed Lt. Gen. Kenneth A. Minihan, director of the National Security Agency.

In an age of threat mainly from "failed" and "rogue" states, the danger to the US is not mainly from conventional weapons but "asymmetrical" challenges, General Minihan said.

"The threat is becoming 'demassified,' " the General asserted. Hostile forces "are likely to pursue deniable covert action, such as terrorism, subversion, and insurgency, while acquiring missiles, chemicals, and biological weapons of mass destruction to deter retaliation. They will have limited staying power in a confrontation, but when they fight, they will have the potential to inflict a great deal of harm. We will need to rethink our own 'small-war' strategies, with particular attention to deterring weapons of mass destruction."

Information is both the greatest advantage and, given American dependency on information, the greatest weakness of the US, General Minihan said.

Coupled with weapons of mass destruction, information warfare creates an "environment [that] will be messy, not Clausewitzian, and highly ambiguous. . . . It will be increasingly difficult to answer the questions, 'Are we under attack?' and 'If so, by whom?' "

General Minihan called for cooperation between industry and government in protecting information against attack, urging the acceptance of government cryptographic "keys" that can enter any system as a defense against lost or corrupted information, for law enforcement, and for improving collaboration with allies.

The General also argued that the US must have "information dominance" because without it, all other weapons and systems can be defeated. However, he urged that systems not be "gold-plated" with prohibitively expensive or unwieldy defenses but, rather, be "layered" so that intrusions can be detected and defended against as they happen.

The problem is one of "balancing trade-offs among the finite resources, the cost of losing information or systems, and the probability of attack," he said.

General Minihan noted that he has persuaded Defense Department leaders to eliminate the classification "NOFORN," or "No Foreign," on information dispersal, because it impeded the flow of information through multinational channels to the allied warfighters who needed it. He also asked industry to help devise more flexible, powerful, and transportable information systems "to get us to be lighter and more agile." ■

Industrial Associates

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society and the maintenance of adequate aerospace power as a requisite of national security and international amity.

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The struggle against Communism lasted longer than all of America's other wars put together.

The Forty Years' War

Photos courtesy Chuck Mordan via Warren Thompson

Escorting a Tu-95 "Bear" bomber down the Atlantic Coast was a fairly common Cold War mission and illustrates how close the Soviet Union and the US often came to a direct confrontation.

Some say the Cold War began even before the end of World War II, but Soviet leader Joseph Stalin officially initiated it when he attacked his wartime Allies in a speech in February 1946. The next month at Westminster College, Fulton, Mo., Winston S. Churchill, former British Prime Minister, made his "Iron Curtain" speech, noting that all the eastern European capitals were now in Soviet hands. The US Army Air Forces had demobilized much of its World War II strength even as Moscow provoked Communist Party take-overs in Poland, Hungary, and Czechoslovakia in 1947 and 1948. Emboldened, the USSR began a blockade of the Western-controlled sectors of Berlin in spring 1948, intending to drive out the Allies. The newly independent US Air Force countered with a massive airlift of food and supplies into Berlin. C-54 Skymasters like the one at left earned their fame handling this mission.

The Soviet Union conceded failure in May 1949, and a C-54 crew made the Berlin Airlift's last flight on September 30, 1949. In the following decades, conflicts flared between the USSR and satellite countries. In this 1968 photo, Czechs carry a comrade wounded in Prague during the Soviet invasion to crush Alexander Dubcek's attempt at reform. Earlier, the Hungarians had risen up against the Communist regime and were also brutally crushed. The Czechoslovakian movement became known as the "Prague Spring," and Dubcek's program to free his country from Soviet control ended when forces of the USSR and four other Warsaw Pact nations overthrew Dubcek and installed a hard-line, pro-Moscow puppet government.

Charles E. Yeager via Robert F. Dorr

Just before the Berlin Airlift ended in 1949, the Soviet Union detonated its first nuclear bomb—much sooner than the Western world had anticipated. At the same time, attention turned to the Far East, as Mao Zedong proclaimed the People's Republic of China in September 1949. Just nine months later, North Korean Communists invaded South Korea. The Air Force entered the age of jet-to-jet combat during the Korean War, where the F-86 Sabre became its best-known fighter. USAF's hottest aircraft also served in Europe: At left in a photo taken in about 1955 is an F-86H from the 50th Fighter-Bomber Wing, Hahn AB, Germany, flown by Lt. Col. Fred J. Ascani, wing commander.

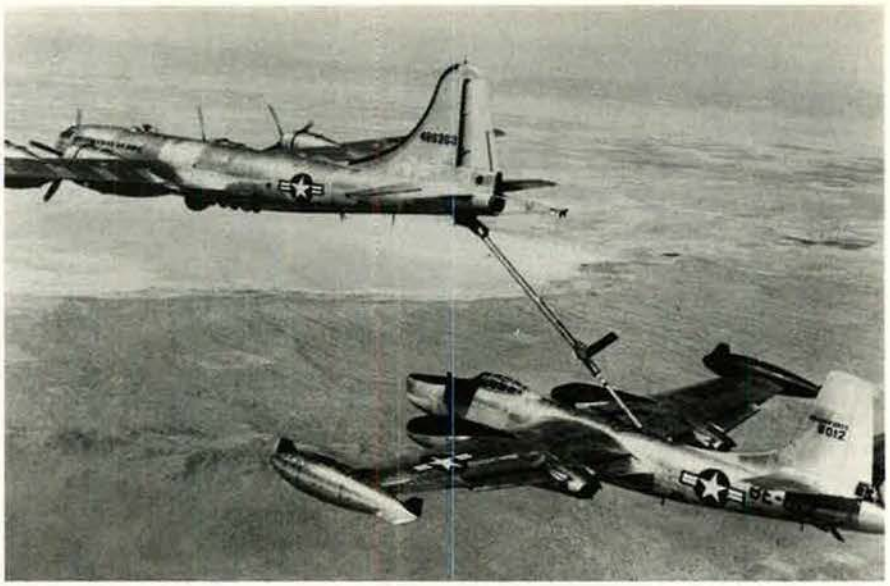
E. J. Magill via Robert F. Dorr

Knowing that the USSR now had nuclear capabilities, Gen. Curtis E. LeMay embarked on a major campaign to strengthen Strategic Air Command. SAC had been established in 1946, along with Tactical Air Command and Air Defense Command, in the post–World War II USAAF reorganization. Above and at right, the Boeing B-47 Stratojet, the world's first sweptwing bomber, symbolized the swift response and capability that characterized SAC. As an RB-47, the aircraft served in the vanguard of reconnaissance efforts in the Cold War, sometimes flying sensitive missions requiring a dash into Soviet airspace.

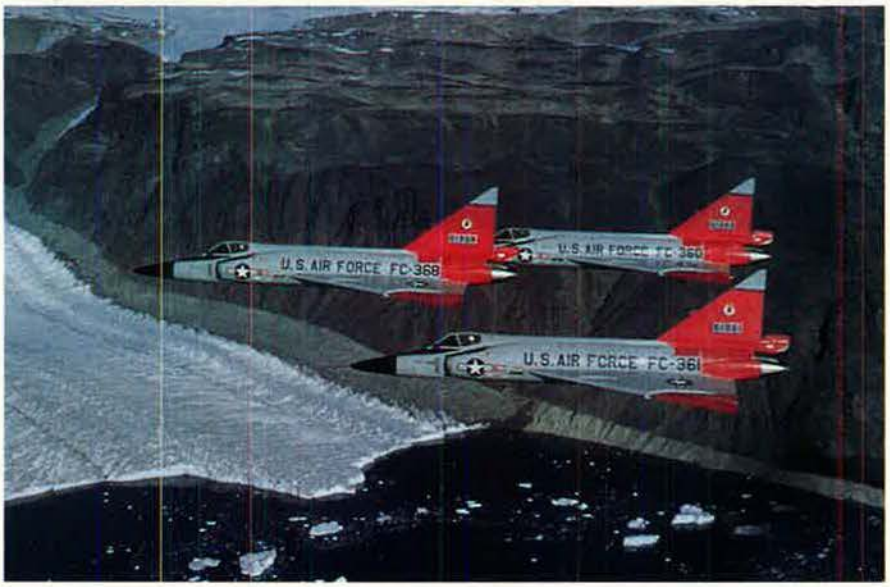
The arms race between the Soviet Union and the US escalated through the 1950s. Both sides produced an abundance of new weapons and aircraft types. In the US, the list included the "Century Series": the North American F-100, the McDonnell F-101, the Lockheed F-104, the Republic F-105, and the Convair F-102 and F-106. The Soviets produced the MiG series: MiG-15, MiG-17, MiG-19, and MiG-21.

via Warren Thompson

Global operations required range and—to maintain it—fuel. At right, in June 1951, a North American RB-45 Tornado became the first jet bomber to be refueled in flight by a KB-29. The KB-29s were converted B-29 Superfortresses. Boeing eventually outfitted more than 100 of the old bombers for the increasingly important air refueling mission.



Budd Butcher via Warren Thompson

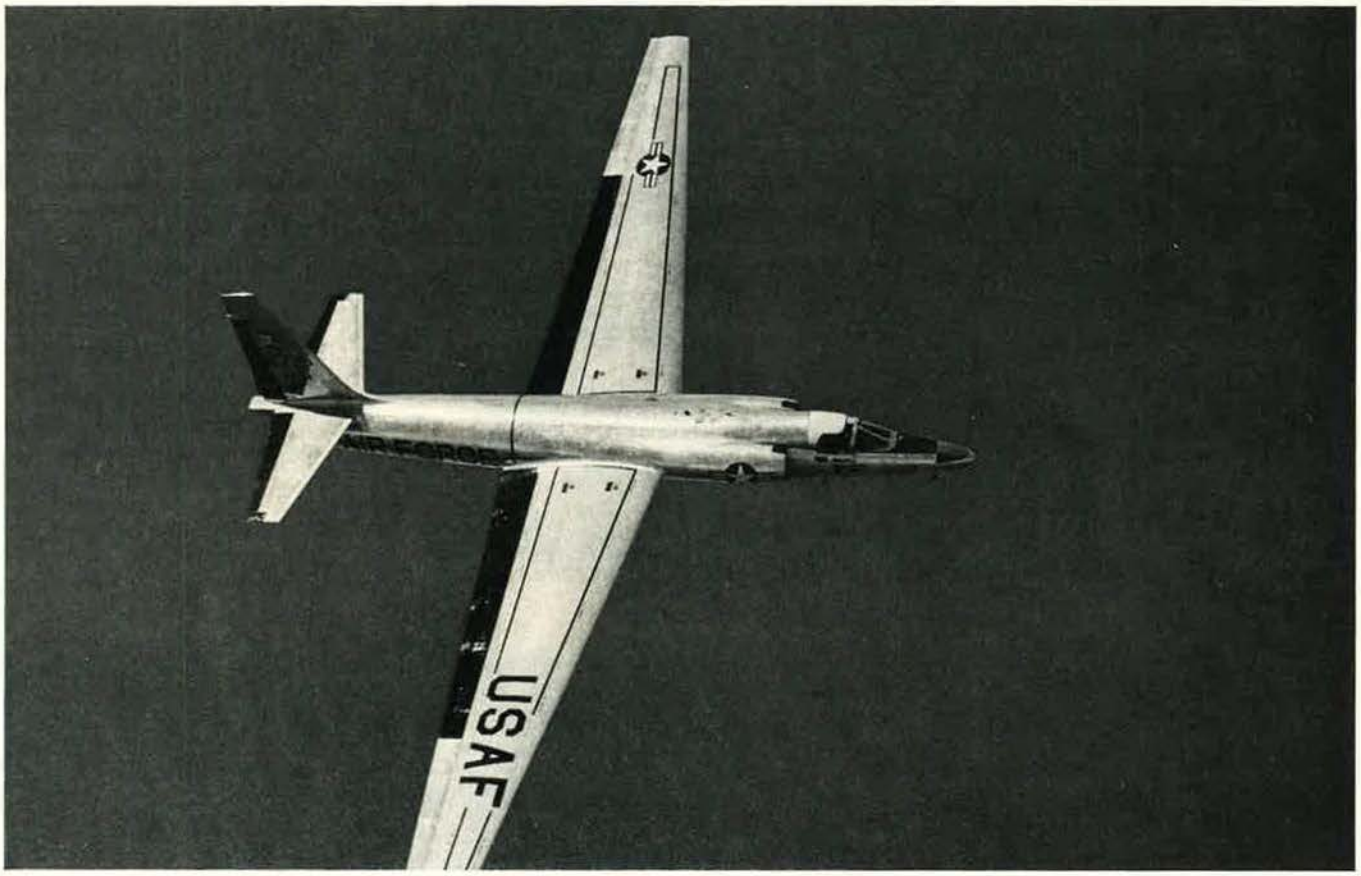


Cold War interception in the cold: North American Aerospace Defense Command was activated in 1957 to integrate command of US and Canadian air defense forces. In its early years, it had custody of fighters, interceptors, surface-to-air missiles, control centers, and other facilities to guard against attack.

F-102 Delta Daggers (like those over Greenland at left) spearheaded Alaskan Air Command, where they were to join SAC bombers in responding to attack from the north. F-102s were the first supersonic, all-weather jet interceptors. The Distant Early Warning Line, a high-frequency electronic "fence" established in 1957, also stood guard up north. Stretching thousands of miles across Canada and Alaska, the DEW Line equipment, monitored by USAF and RCAF personnel, was said to be so sensitive that geese could set off its alarms.

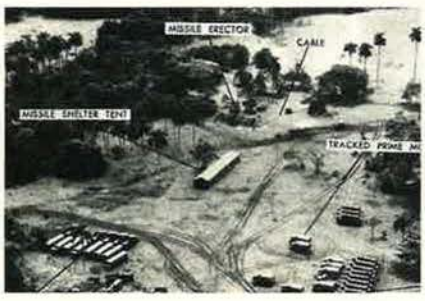
This Douglas C-124C Globemaster II—predecessor to today's C-17 Globemaster III—prepares for a relief mission in 1963 into central Africa—then seen as an arena for East-West conflict. A move for independence from Belgium precipitated a civil war in the Congo, prompting a United Nations airlift of supplies, troops, and materiel and an evacuation of refugees. By the time the airlift ended in January 1964, Military Air Transport Service had flown 2,128 missions, transporting more than 63,000 passengers and more than 18,000 tons of cargo. This C-124C, from the 39th Air Transport Squadron, Dover AFB, Del., flew supplies into Leopoldville (today Kinshasa, Zaire).

Col. Albert A. Vrilakas via Robert F. Dorr



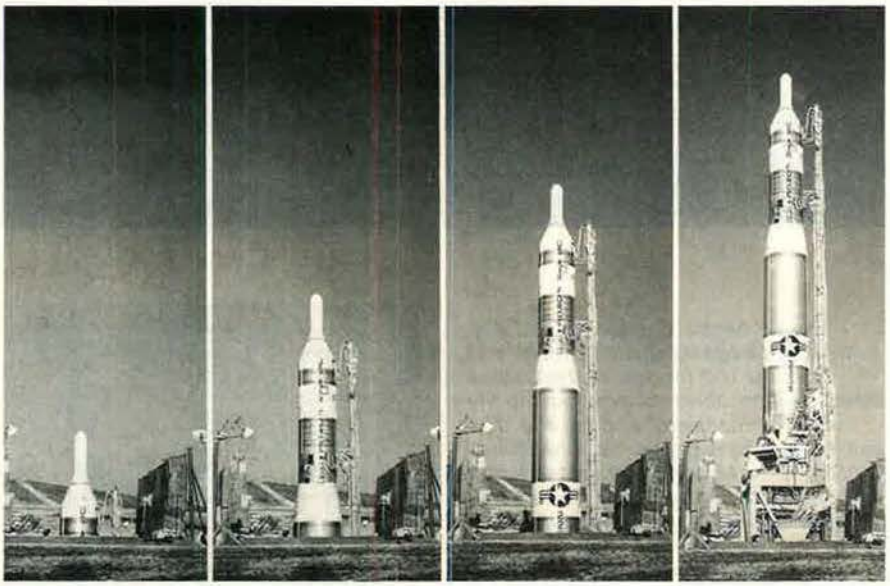
The US began a series of Cold War intelligence operations that would lead from the U-2 (above) to the Corona satellite reconnaissance programs to the SR-71 "Blackbird" and beyond. The gathering of intelligence made headlines in 1960 when Moscow announced that a U-2 piloted by Francis Gary Powers had been shot down over Soviet territory. A four-power summit in Paris on the tense Berlin situation was under way, but the U-2 incident caused the collapse of talks. This, combined with the West's continuing refusal to leave West Berlin, led Soviet Premier Nikita S. Khrushchev to order the building of the Berlin Wall in August 1961.

The U-2 also figured in the Cold War's most dangerous confrontation—the 1962 Cuban Missile Crisis. U-2 pilot Maj. Rudolf Anderson, Jr., was shot down by an SA-2 missile over Cuba while on a reconnaissance flight to document (as in the photo below, right) the suspected buildup of Soviet offensive ballistic missiles on the island, which had triggered the crisis. After an "eyeball-to-eyeball" confrontation with President John F. Kennedy, Premier Khrushchev agreed to withdraw the missiles. When this threat of war had abated, President Kennedy met with USAF Chief of Staff General LeMay and members of Major Anderson's reconnaissance team (l–r) Col. Ralph D. Streakley, Lt. Col. Joe M. O'Brady, and Maj. Richard S. Heyser.



Donal Whicker via Warren Thompson

In the 1960s, the US became more deeply involved in Vietnam, also viewed as a cockpit of superpower rivalry. This T-28 Trojan, with markings of the South Vietnamese Air Force, was flown in the early 1960s, probably by a USAF pilot. A detachment of the 4400th Combat Crew Training Squadron, code-named Farm Gate, used armed T-28s, RB-26s, and SC-47s to train South Vietnamese in commando operations. These aircraft were also modified into fighter-bombers for use in counterinsurgency warfare.



A 97-foot, 110-ton intercontinental ballistic missile practices for liftoff from the original Titan I Operations Systems Test Facility at Vandenberg AFB, Calif. This early Titan was housed in a concrete and steel underground silo hardened against nuclear attack and was raised to the surface by elevator for launch. Although the 1960s ushered in the era of nuclear ICBMs, the systems were never launched against an enemy. The first ICBM, Atlas, gained fame launching Marine Lt. Col. John H. Glenn, Jr., on the first US orbital space mission in 1962. Titans, after retiring from ICBM duty in 1987, now serve as expendable space-launch vehicles. The Minuteman ICBM, deployed more than 30 years ago, is still in service.

In February 1960, Gen. Thomas S. Power (left), commander in chief of SAC, described Soviet missile capabilities to the Senate's Space and Preparedness Committees. Joining him was Lt. Gen. Bernard A. Schriever (right), commander of Air Research and Development Command. Even as SAC's bomber and tanker fleet reached its peak, General Schriever was leading a military-industrial team that would field an intermediate-range ballistic missile (Thor) and three ICBM systems (Atlas, Titan, and Minuteman) in less than 10 years' time.

It was called the nuclear triad—US strategic deterrent forces, made up of ICBMs, SAC bombers like this B-52G, refueling from a KC-135 tanker (above), and Navy ballistic missile submarines. SAC received its first Stratofortress in 1955, where it became its primary strategic bomber. Other elements of USAF always on alert during the Cold War are symbolized by the EC-135 airborne command post crew at right, sprinting to their aircraft. EC-135s (later joined by E-4Bs) were on continuous alert from 1961 until 1990 in the Looking Glass system, which was to serve as an alternative means of command in case SAC headquarters at Offutt AFB, Neb., were destroyed.

By the 1970s, domestic and international political considerations led the US and USSR to conclude a strategic arms agreement in May 1972, putting a ceiling on the size of missile forces for the next five years, and a second treaty banning large nationwide antiballistic missile systems.

USAF photo by SSgt. Jerry Baker

Photo by Randy Jolly

Faced with the need to maintain dominant airpower, USAF developed weapons and created training systems that reflected the rigors of combat against first-class Soviet systems. USAF took delivery of its first McDonnell Douglas F-15 in 1974 and its first General Dynamics (now Lockheed Martin) F-16 in 1978, along with a host of improved missiles and precision guided munitions. Above is the first F-15 during testing. It opened an era of large yet maneuverable air-superiority fighters. At Nellis AFB, Nev., the first Red Flag exercise got under way in November 1975, marking the beginning of highly realistic training for combat aircrews against "Aggressor" squadrons who used Soviet tactics. Though they never faced off with Warsaw Pact forces, F-15s and F-16s proved superior in combat against Soviet equipment in the Persian Gulf War.

Photo by William A. Ford

In December 1979, Soviet forces invaded Afghanistan and became embroiled in their own futile, eight-year Asian land war. Inside the USSR, changes were taking place. Soviet President Mikhail S. Gorbachev and President Ronald Reagan signed a treaty in 1987 to eliminate intermediate-range missiles in Europe. After an attempted coup in 1991, Gorbachev resigned as leader and several republics declared their independence—including those with nuclear weapons, Russia, Ukraine, Belarus, and Kazakhstan. The Soviet Union broke up on December 26, 1991.

For the first time, Russian aircraft could fly near (and even over) US territory without USAF fighters scrambling on alert: At right, on a goodwill visit, a Russian Il-76 transport heads a formation of two Su-27 Flankers and two F-15s, on the way to Langley AFB, Va., from McChord AFB, Wash.

USAF photo by TSgt. Steve Turner

Photo © Werek / Unipholo

Taking down the barbed wire: Before the Cold War could come to an end, a revolution took place where it had begun—in eastern Europe. By 1981, 9.5 million workers had joined Solidarity, the trade union in Poland working to establish a non-Communist government, and in June 1989 its candidates swept the parliamentary elections. In October 1989, the Communist Party in Hungary was formally dissolved (the last Soviet troops left the country in June 1991). The next month, the Communist Party leader—Todor Zhivkov—who had headed Bulgaria for 35 years, resigned. Also in November, tens of thousands of Czechs protested in the streets of Prague, demanding free elections and forcing the resignation of the country's Communist Party leadership.

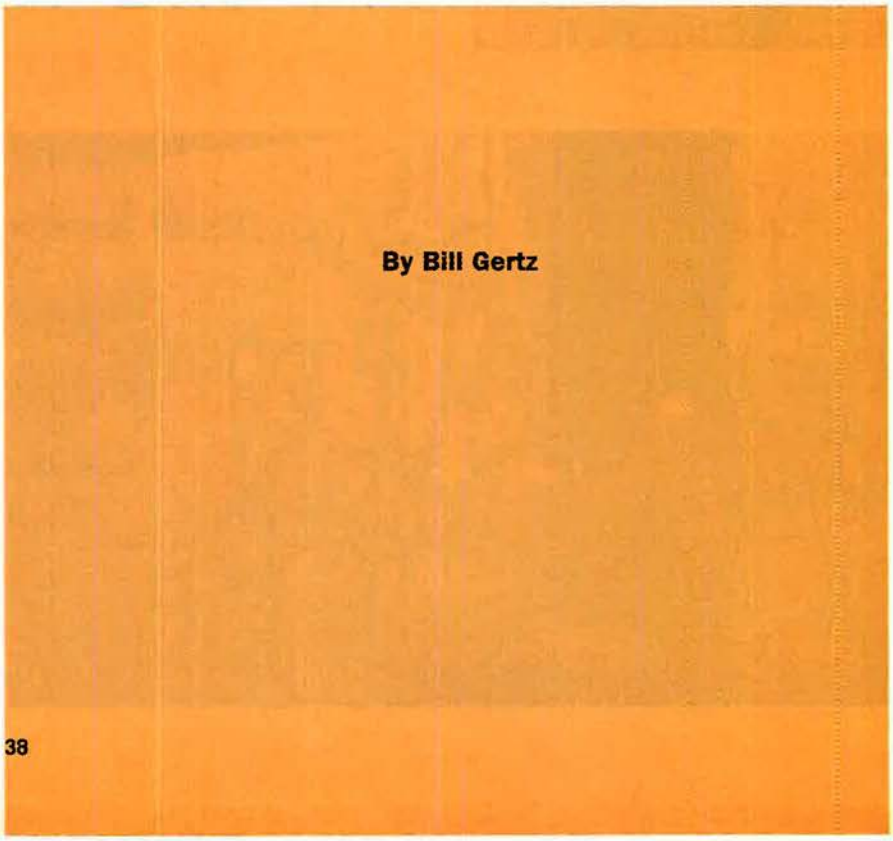
In East Germany, nationwide demonstrations demanding reform forced the country's Communist leader, Erich Honecker, from office. The Berlin Wall came tumbling down. It was November 11, 1989. Perhaps because it happened in a city they had saved through a famous USAF mission, it was a special triumph for the Air Force. ■

Photo © Werek / Unipholo

Once, the superpowers had a lock on satellite imagery. No more.

Crowding In on the High Ground

By Bill Gertz



For decades, satellite photography of Earth was the product of multibillion-dollar intelligence systems conceived, built, and operated by the superpowers. Beginning with the Corona program in the 1960s, the US closely followed Russian strategic forces, particularly ICBM deployments. Russia's intelligence "birds" did much the same thing in the relentless, silent war that ended with the collapse of the Soviet Union in 1991.

With the end of the Cold War has come a new development: commercialization of spy-satellite technology. Today, satellite imagery is no longer the exclusive domain of two superpowers. France, Canada, Japan, India, and the European Union also operate civil or commercial remote-sensing systems capable of taking low- or medium-resolution photographs and making them available on the international market.

Within the next several years, even more capable nonmilitary satellites will go online, and the nations and companies that operate them will open up shop to market space pictures.

The Department of Commerce estimates that by 2000, the growing remote-sensing industry—satellite producers, ground stations, imagery sellers, and other components—will be a market worth more than $2.65 billion. Other analysts think the value of the market in 2000 could be as high as $5 billion.

Many of the new satellites will be capable of producing images having a resolution of one meter or less, meaning ground objects of about three feet in diameter will be recognizable in the photographic take. New commercial imagery also will be available in a matter of days, not the

Figure 1: Today's Civil/Commercial Sensors

Country	System	Sensor	Status	Resolution (meters)
US	Landsat 4	EO, MS	OP	30
US	Landsat 5	EO, MS	OP	30
France	SPOT 1, 2, 3	EO, PC	OP	10
France	SPOT 1, 2, 3	EO, MS	OP	20
Russia	IMSAT	EO, PC	OP	1
Russia	IMSAT	EO, MS	OP	10
Russia	Photogeo-2	film	A/IN	2
Russia	ALMAZ	SAR	A/IN	15
Russia	Resurs F1	EO, MS	A/IN	170
Russia	Resurs F2	EO, MS	A/IN	170
Canada	Radarsat	SAR	OP	8
Japan	ADEOS	EO, PC	OP	8
Japan	ADEOS	EO, MS	OP	16
Japan	JERS-1	EO, MS	OP	18
Japan	JERS-1	SAR	OP	18
India	IRS-1A, -1B, -1C	EO, PC	OP	6
India	IRS-P2, -P3	EO, MS	OP	36
EU	ERS-1, -2	SAR	OP	30

A/IN=archived or inoperative
EO=electro-optical
IR=infrared
MS=multispectral
OP=operational, in orbit
PC=panchromatic
SAR=synthetic aperture radar

weeks or months that it takes to fill customer orders today.

Thirty More

US intelligence officials say that, by 2000, the new purveyors of high-quality, high-resolution satellite capabilities available for domestic use or for sale to others will include Israel, Pakistan, China, Brazil, Italy, Spain, Germany, Ukraine, South Korea, and the United Arab Emirates. In all, the US expects that as many as 30 nations will have indigenous remote-sensing industries, according to a report last year by the consulting group KPMG Peat Marwick, "The Satellite Remote Sensing Industry: A Global Review."

The proliferation of high-resolution imagery around the world is under way and has many positive commercial applications, from assisting in natural disaster relief to helping farmers plant crops, but access to close-up pictures is a dual-use technology with extremely valuable military applications. Wider distribution of this technology brings with it potential threats that trouble the Pentagon.

Robert V. Davis, deputy under secretary of defense for Space, watches the trend very closely. "Iridium, Globalstar, ICO, Spaceway, Teledesic—the list is becoming endless," he said. "In 10 years, in the commercial market, you'll be able to buy direct broadcast, worldwide point-to-point handheld communications, private [Very Small Aperture Terminal] networks, spaceborne wide-area computer nets, and process switched bandwidth capacity at nearly [extremely high] frequencies—all from the privacy of your own home or from the local terrorist training camp."

Mr. Davis went on, "Imagine a scenario of any individual in a remote corner of the world being able to order and download a GPS [Global Positioning System] benchmark image of any target in near–real time from any computer hooked into the global information infrastructure via direct satellite connections. What if that individual also has access to a GPS-guided weapon, say a Cessna with GPS-loaded autopilot with conventional weapons? What could he do, and what should we be doing to counter that? I guarantee in the near future this threat will emerge."

Mr. Davis also noted that Pentagon support for the US commercial space launch program is "a real success story."

"Through time, the Department of Defense, particularly the Air Force, has acted as an excellent steward, maintaining America's ability to access space—not just for national security missions but for civil and commercial activities as well," Mr. Davis told the House Science Committee's Space and Aeronautics Subcommittee in June.

The value of satellite imagery is obvious: It is essential for providing accurate targeting for missiles, whether ballistic or cruise. It also provides bomber pilots with advance views of routes and details of individual targets. Bomb and missile damage could also be assessed with satellite pictures.

A rogue state like Libya, or even a state-backed terrorist group like Islamic Jihad, might be able to acquire detailed satellite photographs of US Central Command's bases in Saudi Arabia or Bahrain and use the data, along with information from GPS satellites, to program the bases' exact coordinates into the guidance system of a cruise missile obtained from Iran or China.

A Certainty

"That's going to happen," predicts one government contractor involved in remote sensing. "Anything that is fixed can be targeted."

Terrorist groups could acquire high-resolution imagery to gain information for planning attacks on routes used by assassination targets or to learn vulnerable points to plant explosives for maximum damage or casualties. Additionally, weather-related imagery could assist terrorists in planning deadly biological weapons or poison-gas attacks.

Imagery could also provide foreign governments or corporations with a valuable tool for economic espionage operations. Corporate competitors might find high-resolution photographs of a foreign competitor's manufacturing facilities useful.

The Pentagon is looking at how the emergence of space-capable adversaries will affect warfighting doctrine.

"While we are developing an ef-

fective spacepower strategy, the capabilities and the systems that support our strategy are coming into the hands of not just our global peers but the rest of the world as well," Mr. Davis said. "How do we truly integrate space into our warfighting doctrine and terrestrial operations, and how do we prepare for the time in the not-too-distant future when we face adversaries that use space nearly as well as we do?"

DoD officials said that one of the several US companies entering the commercial remote-sensing industry already has been contacted by several foreign governments seeking to purchase future satellite imagery.

Mr. Davis is careful to note that he does not see "the sky falling" because of commercial remote sensing but added that DoD officials must look at worst-case scenarios for the misuse of commercial satellite imagery. "We get paid on a day-to-day basis to think through worst-case scenarios so we can develop countermeasures," he noted.

A major worry is that satellite imagery will be combined with GPS capability to develop precision guided munitions.

"If you take remote sensing, where you have specific information on specific places that is becoming more and more readily available, the potential for that information to be not just in picture format but in digitized, three-dimensional data, and you tie that to GPS, we need to pay particular attention to the threat down the road to what may be the poor man's cruise missile," Mr. Davis said.

The widespread proliferation of high-resolution satellite imagery could be used by nations, criminal and terrorist groups, or even foreign economic spies who can exploit the technology for nefarious aims.

"Clearly to the extent that any party, whether it's a sovereign nation or a terrorist or a commercial firm, can see pictures of something they otherwise would not see, that information can be put to good purposes or bad purposes," Mr. Davis said.

Figure 2: Planned Civil/Commercial Sensors

Country	System	Sensor	Resolution (meters)
US	Space Imaging	PC	1
US	Space Imaging	MS	24
US	EarthWatch EarlyBird	PC	3
US	EarthWatch EarlyBird	MS	15
US	EarthWatch QuickBird	PC	.82
US	EarthWatch QuickBird	MS	3.28
US	Orbimage OrbView-3	PC	1 and 2
US	Orbimage OrbView-3	MS	4
US	Orbimage SeaStar	MS	1,100
US	Boeing Global Monitoring System	MS	10
US	GDE Systems	PC	.85
US	AVSat	MS	1,000
US	Landsat 7	PC	15
France	SPOT 4	PC	10
France	SPOT 4	MS	20
France	SPOT 5	PC	5
France	SPOT 5	MS	10
Israel	EROS	PC	1
Israel	EROS	MS	—
India	IRS-1D	PC	<6
India	IRS-1D	MS	20
India	IRS-2	PC	<5
India	IRS-2	SAR	—
Japan	ALOS	MS	2.5
Japan	ALOS	SAR	—
Japan	Mitsubishi-Lockheed	PC	1
Japan	Mitsubishi-Lockheed	MS	4
China/Brazil	CBERS	MS	19

Two Types

Earth-imaging satellites today fall into two general categories. The first type produces its images with electro-optical cameras—machines similar to television cameras that transmit digital images to Earth. These systems produce images from visible light or "multispectral" images—those derived from unseen light, such as infrared or ultraviolet, that are useful commercially for scientific research or environmental monitoring.

The second type of satellite uses synthetic aperture radar, a system that sends beams to Earth and then creates high-resolution images from the reflections. These satellites have the advantage of being able to see through clouds, but their images are not as sharp.

By 1994, France, Russia, Israel, Brazil, China, India, and Japan had begun developing high-resolution remote-sensing satellites with commercial applications. The competition prompted the Clinton Administration to loosen its policy on the commercial use of satellite imagery. In a directive, the President allowed private companies to sell images of up to one-meter resolution.

To protect US forces and military operations in wartime or other national emergencies, government licenses require companies that market the images to permit the government to maintain "shutter control" and would cut off the flow of space imagery in national emergencies.

The White House announced that the new policy would "promote and not preclude private-sector commercial opportunities in Landsat-type remote sensing." Landsat pictures were used to produce the computer-generated graphic simulations used by Air Force pilots to plan missions into Haiti in 1994.

The easing of restrictions on commercial remote sensing also was prompted by the military's growing

Figure 3: Foreign Government/Military Systems With Commercial Potential

Country/Grouping	System	Sensor	Resolution (meters)
France, Italy, Spain	Helos-1A	EO, PC	.5–.8
France, Italy, Spain	Helos-1B	EO, PC	<.5
France, Germany, Italy, Spain	Helos-2	EO, PC	<.5
Israel	Ofek-3	EO, PC	.7
Israel	Ofek-4	EO, PC	.7
France, Germany	Horus	SAR	3–5
Russia	Mir	EO, PC	2
Russia	Hires-2	film, PR	.5
Russia	Cosmos-2031	film, PC	.7
Russia	Medres	film, PC	1–2
China	FSW1, 2, 3	film, PC	1
China	Jianbing-1B	EO, PC	13
Ukraine	Sich-1	radar	—
South Korea	Komsat	PC	10
Germany, UAE	Germany-EO	EO, PC	1
Japan	Hinomaru	EO	.3
Pakistan	Pakistan-EO	EO, PC	2–5

Some systems in this table are already in orbit. Most, however, are being developed or are awaiting launch.

use of commercial imagery for its tactical operations. The Air Force, according to Defense Department officials, is the biggest customer for France's five-meter-resolution SPOT satellite imagery. SPOT imagery was used by the military during Operation Desert Storm to lay out air and missile raids on downtown Baghdad.

Today, the Air Force's Eagle Vision program uses small portable ground stations to convert SPOT imagery into tactical intelligence for field units. The program grew out of problems encountered in getting highly classified satellite photographs to military commanders during Desert Storm.

"Nobody has a purely commercial satellite in orbit yet," says Larry W. Janski, chief of Peat Marwick's Space and High Technology office. "People selling commercial imagery are using data coming off of spinoffs from government systems."

Landsat 4 and 5 are two current civilian US satellites in orbit. Landsats have provided 30-meter-resolution images since 1972. A Landsat 6 satellite failed to reach orbit in October 1993, and the 15-meter-resolution Landsat 7 is not scheduled for launch until next year.

By contrast, France's SPOT 1, 2, and 3 satellites now in orbit can provide 10-meter-resolution images in two to three weeks' time. Russia currently operates a single, one-meter-resolution imagery satellite known as IMSAT that, while primarily a military system, sells pictures degraded to two-meter resolution on the commercial market.

Other countries also have commercial or civil remote-sensing satellites in orbit:

- Canada's Radarsat, a synthetic aperture radar system that can provide eight-meter-resolution pictures to customers in five to 10 days.
- Japan's ADEOS satellite (eight-meter resolution) and JERS-1 satellite (18-meter resolution), both of which can make images available in two to three weeks.
- India's IRS-1A, -1B, and -1C satellites, which can provide 5.8-meter-resolution images in two to three weeks, and the IRS-P2 satellite, which can provide 36-meter-resolution images in three weeks.
- The European Union's ERS-1 and -2 satellites, synthetic aperture radar systems, which can supply 30-meter-resolution images in two to three weeks.

US Commercial Remote-Sensing Firms

The United States is expected to emerge as the world leader in the commercial field within the next several years, according to US officials. Currently, several US companies or consortiums are working on high-resolution commercial remote-sensing systems. Three are considered serious players in the emerging commercial remote-sensing industry.

One venture is Space Imaging EOSAT, a company formed by Lockheed Martin together with other contractors, including E-Systems, Inc., with years of experience in building and operating satellites for the National Reconnaissance Office. The first Space Imaging satellite will have the highest resolution of any new US commercial remote-sensing satellite, according to US officials. The system also will have imagery available within one day of order and is scheduled for launch from Vandenburg AFB, Calif., in December 1997 (aboard a Lockheed Martin booster).

Space Imaging is already emerging as an industry powerhouse. It acquired the EOSAT Co. in November. EOSAT operates Landsat 4 and 5. The company also has the only license to sell images from India's satellites.

The first commercial, remote-imaging satellite expected to reach orbit is EarlyBird-1, the product of EarthWatch, Inc., a consortium of WorldView Imaging Corp., Ball Aerospace and Communications Group, and other partners, including the Japanese company Hitachi, Ltd. WorldView was formed by a group of engineers who were part of the Reagan Administration's Strategic Defense Initiative (SDI) research program and is taking the lead in the EarlyBird-1 program.

According to US officials, the EarlyBird-1 will produce three-meter-resolution photographs in two to three days of order and multispectral images with a 15-meter resolution. EarlyBird-1 will produce pictures equal in quality to those of the first Corona reconnaissance satellites.

Launch schedules for 1996 slipped, and current plans call for EarlyBird-1 to be launched this spring aboard a

Moscow's Creeping Blindness

Russia's eyes in space are going blind. In January, the Russian government announced that its military satellites, which monitor the world for nuclear missile launches, would soon be obsolete. Six of every 10 Russian spy satellites no longer operate fully—a side effect of Moscow's severe economic problems that have decimated what was once a superpower military force.

In the US, by contrast, newer generations of secret high-resolution reconnaissance satellites are providing sharper images of more areas at lower cost. A top-of-the-line US spy satellite still costs about $1 billion to build and launch, but such satellites are designed to be smaller, operate longer, maneuver better, and combine both imagery—derived from photographs and radar—and signals intelligence systems that provide secret information to policymakers.

National security missions still include monitoring the 30,000 nuclear arms of the former Soviet Union and the nuclear weapons modernization under way in China, as well as nuclear tests planned in India.

Recent US successes captured on high-resolution images include the discovery of a surge in production at a Russian surface-to-air-missile plant, indicating Moscow's intention to begin exporting high-performance SA-12 systems around the world. A spy satellite also spotted the presence in central China of a B-6 bomber modified into a refueling tanker, confirming Beijing's plans to extend the range of its jet fighter-bombers throughout the region. Another photograph from space revealed how North Korea, despite severe economic problems, is upgrading long-range artillery units close to the demilitarized zone with South Korea. The photographs were sharp enough to show trucks mounted with rocket launchers parked at a base.

Reconnaissance satellites are being used to locate terrorist training camps, monitor drug trafficking production and flow, and help identify nations engaged in development programs for weapons of mass destruction and missile delivery systems.

converted Russian ICBM known as Start-1. A second EarthWatch satellite, QuickBird, is also planned. QuickBird, adapted from SDI's small satellite design, will produce sharper than one-meter-resolution images in two to three days, and it could be launched sometime this year. EarthWatch plans a constellation of four satellites, and its strategy is to provide low-cost satellites and images.

Orbimage, a subsidiary of the Orbital Sciences Corp., is developing OrbView-2, also known as SeaStar. A multispectral imager, SeaStar will provide 1.1-kilometer-resolution pictures for maritime uses, such as environmental monitoring, ocean fishing, and cloud imaging. Fishing fleets could follow plankton masses from space. Landbased applications include use in agriculture and forestry management. US officials said both OrbView and SeaStar could be in orbit this year, but industry analysts say it will take longer. Orbimage is also developing a small satellite it calls OrbView-3, to provide one- and two-meter-resolution images on the commercial market within two or three days of customers' orders.

Other US commercial satellite systems in development include Boeing's 10-meter-resolution multispectral imaging satellite known as the Global Monitoring System, which could be available in 1999, GDE Systems satellite, which will produce images with a less-than-one-meter resolution by 1998, and AstroVision's AVSat, which will produce multispectral one-kilometer-resolution images for geophysical and meteorological purposes by 1998.

Foreign nations also are developing commercial remote-sensing satellites. France plans to launch SPOT 4, which is completed, in October 1997. SPOT 5 is being developed for launch in 2001. SPOT 4 will have a 10-meter resolution, and SPOT 5's highest resolution will be five meters, according to US officials.

India is working on two new satellites known as IRS-1D and IRS-2. The IRS-1D will provide less than six-meter resolution and could be in operation this year. The IRS-2 will carry both an electro-optical camera capable of producing images with a resolution of less than five meters and synthetic aperture radar. The system could be in operation by 2000.

China and Brazil also are expected to field a multispectral commercial imaging satellite known as CBERS that could be launched by October. The system will produce 19-meter-resolution images.

Japan is developing a satellite known as ALOS that will produce multispectral and synthetic aperture radar images. The multispectral images are expected to have an image resolution of 2.5 meters and will be available by 2000. Another Japanese commercial remote-sensing system under development is a joint Mitsubishi–Lockheed Martin satellite that will produce one-meter-resolution images. That system could be launched this year.

Israel Aircraft Industries and Core Software Technologies, of California, are collaborating in a joint venture to produce the EROS satellite that could be launched this year. The EROS will have a one-meter resolution and will provide images to customers within two to three days.

Public use of high-resolution imagery is expected to have a profound impact on international politics, as governments no longer will be able to control spy photography obtained from space.

Proponents of the open-skies use of space photographs say rumors of massacres in Bosnia-Hercegovina, which were eventually confirmed by military imagery from both aircraft and satellites, could have been investigated sooner by news organizations if they had had access to the photographs. Instead, the massacres were confirmed when pictures showed a stadium in Bosnia filled with prisoners one day and an empty arena a few days later with what appeared to be newly covered mass graves nearby.

In addition to news gathering, commercial satellite imagery will have a number of other applications. In agriculture, for example, imagery can help monitor crop yield and soil and the impact of pests and disease during growing seasons.

There is even the potential for use in law enforcement. High-resolution images could help identify evidence for use in a trial. As one official remarked, referring to the O. J. Simpson murder trial, "You'd be able to see if there was a white Bronco, but you couldn't see someone throwing a bloody glove." ■

Bill Gertz covers national security affairs and defense for the Washington Times. *His most recent article for* Air Force *Magazine, "Terrorism and the Force," appeared in the February 1997 issue.*

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Valor

By John L. Frisbee, Contributing Editor

Alone in the Arctic

Could a young lieutenant survive his winter bailout in a remote area of Alaska?

BY LATE 1943, any likelihood that the Japanese would invade mainland Canada had disappeared. Another threat to Army Air Forces aircrews in Alaska remained, however—that of flying over a vast, largely uninhabited land, bigger than Texas, California, and Montana combined, where for much of the year the temperature holds at well below zero.

On December 25, 1943, a B-24 took off from Ladd Army Airfield at Fairbanks, Alaska, on a test flight. About 120 miles east of Fairbanks, at 20,000 feet, the plane went into a spin from which the pilot could not recover. Three of the five-man crew, including copilot Lt. Leon Crane, bailed out. Later, the bodies of the two men who had stayed with the aircraft were discovered in the B-24 wreckage. The other two were never found. The story of Leon Crane's 80 days in the wilderness is a classic in the annals of Air Force survival.

Like other members of the crew, Crane was dressed for subzero weather, –40° to –50° on the ground. He landed in hip-deep snow, confident that rescuers would arrive within hours. They did not. The crash site was known to the Air Force in only a general way. Until help arrived, Leon Crane was on his own. A city boy, he had no experience with the solitude of a harsh and unforgiving land and had received no hands-on training in Arctic survival during the two months he had been in Alaska. His survival assets were minimal: a few matches, a scout knife, and his parachute, which would give him some protection from the cold. Worst of all, he had lost his mittens when bailing out, a potentially fatal mishap unless he could keep his hands from freezing by keeping them in his jacket pockets or wrapped in parachute cloth.

Lieutenant Crane knew that below his present location in rugged hills was a stream, which he later learned was the Charley River, a tributary of the Yukon. If there were habitation in the area, it probably would be there. In the remaining minutes of daylight, he trudged through snow to the river, there to wait for his rescuers. Until they arrived, he needed a fire to survive. With numb and soon bleeding hands, he gathered spruce boughs and, after several failed attempts, lit a match to start them burning. Wrapping himself in his parachute, he slept fitfully, rousing frequently to gather more boughs.

After more than a week of waiting, Crane concluded that help was not coming. Carrying his parachute, he began a laborious hike downriver through deep snow. One slip, a sprained ankle or broken leg, and it would be curtains. His only sustenance was vegetation that he chewed but did not swallow. As the miles dragged by, he grew rapidly weaker. After about a week of slow progress, he came upon a tiny cabin. It was the custom in remote Alaska to leave a cabin unlocked and stocked for any traveler in need. In the 10-foot by 12-foot den, he found food, a stove, wood, a rifle and ammunition, and in the adjoining cache a variety of tools, but most welcome of all, mittens and warm clothing. Since all this had been left unattended, Crane assumed he must be near civilization. Actually, he was 60 miles from the nearest human and 100 miles from a settlement.

In the morning, Crane started down the river again, expecting to see a settlement around the next bend. As the light faded, he was on the verge of complete exhaustion. He knew that he had to fight his way back to the cabin or die. In a daze, he struggled through the snow to the cabin, where he collapsed and slept for many hours.

Knowing now that he could travel but a few miles, Crane settled into a routine, eating sparingly twice a day and sleeping much of the time. Six weeks passed, and the food supply was running low. It was time to start

down the river again. A few days later, he saw open water on a small branch of the river, and started to cross on stones, but slipped and fell into the icy water. As his clothes began to freeze, he built a fire and spent the day drying out, one item at a time.

For two more weeks, Crane continued down the Charley. He came across another cabin, also open and stocked with food. He stayed there for about a week, using the time to repair his frayed clothing with parachute cloth and pieces of shroud line. Another eight days of slogging down the river brought him to a recently used toboggan trail, which the next day led him to a cabin occupied by a trapper and his wife and children. It had been 80 days since Crane had left the B-24, more than half of them spent exposed to the elements. The trapper harnessed his dogs, and with a recovering Crane on the sled, mushed to a settlement on the Yukon River. A light plane that landed there flew Leon Crane out and on his way to Ladd AAF.

The benevolence of three Alaskan trappers had made it possible for an inexperienced and inadequately equipped lieutenant to survive for a prolonged period, unprotected in the harshest imaginable conditions. Leon Crane's courage and determination to live demonstrated valor that has few equals in Air Force history. ■

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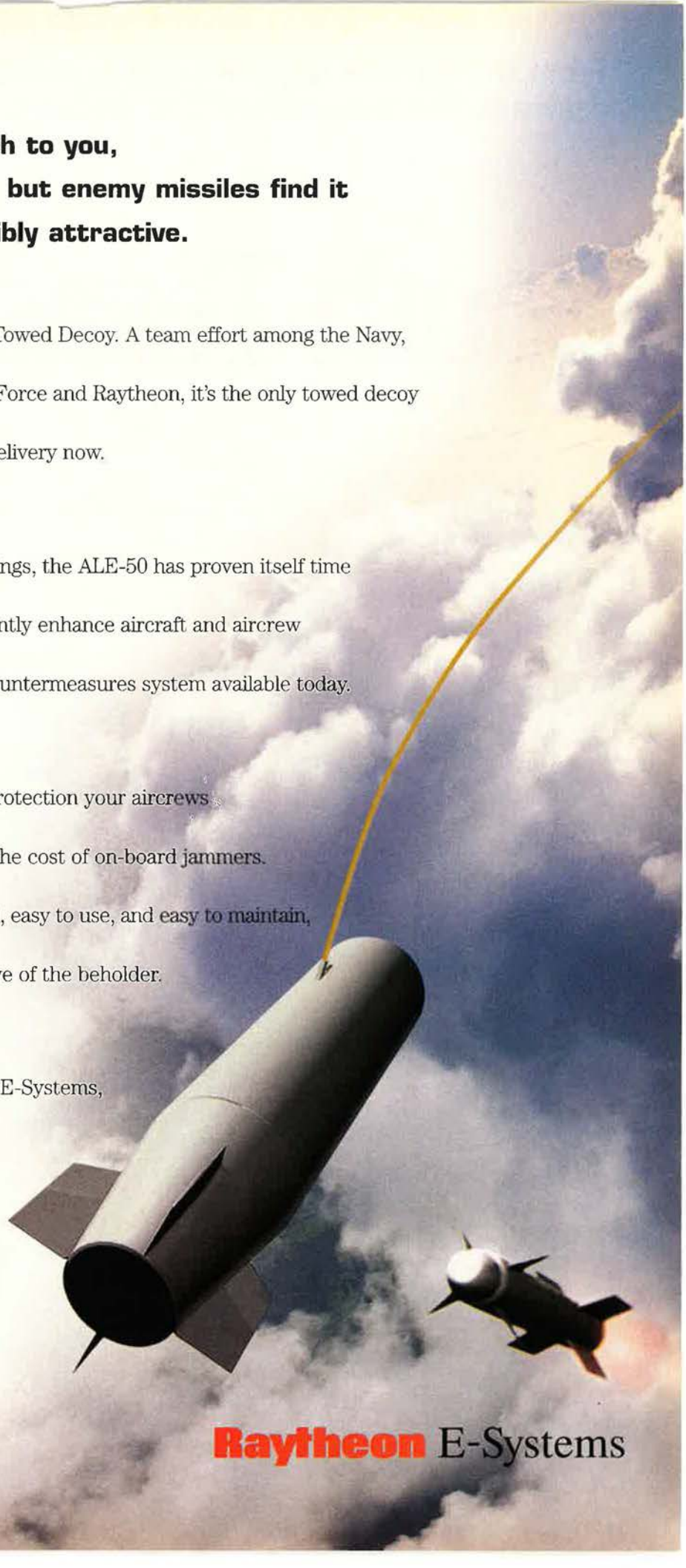
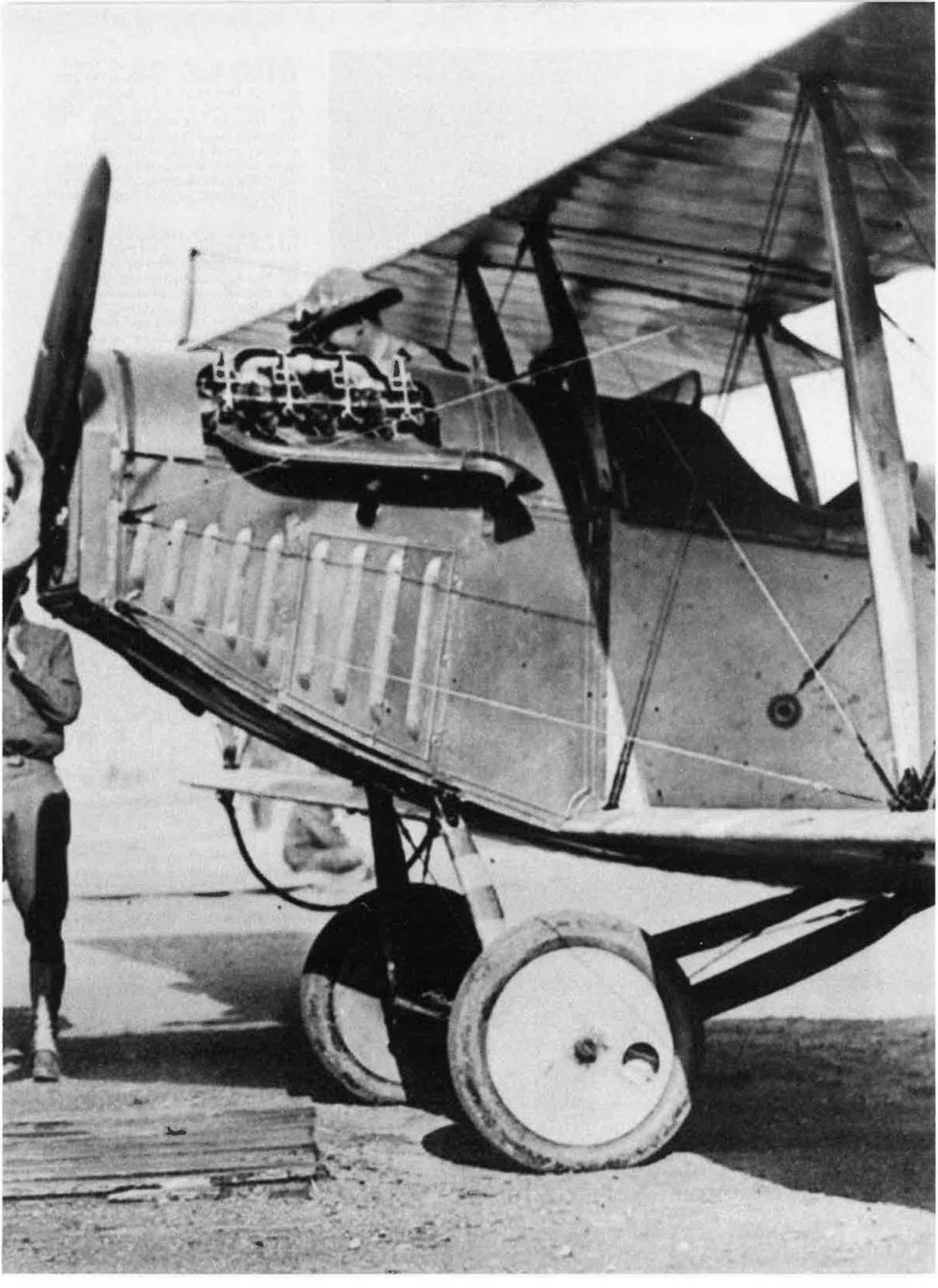


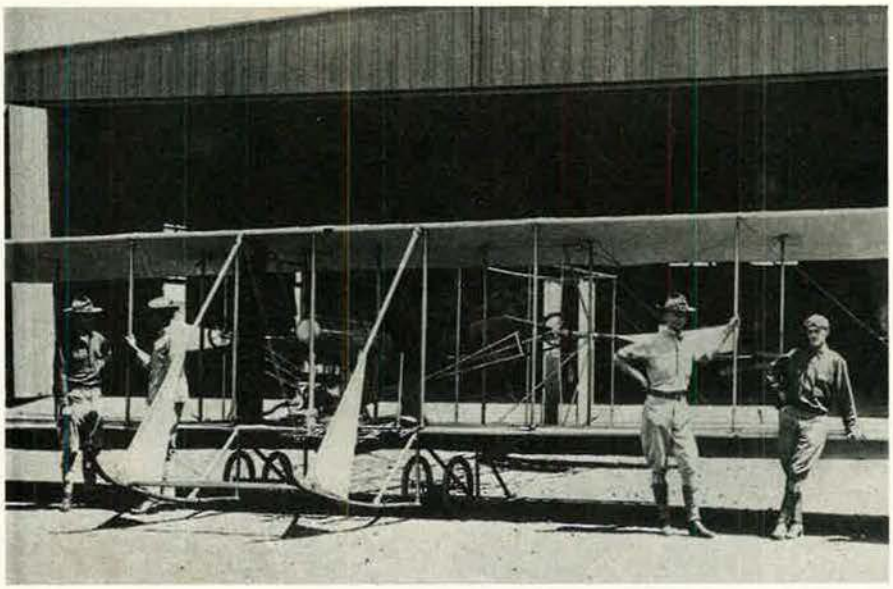
Raytheon E-Systems

From the earliest days of military aviation, flyers have been drawn to the area around San Antonio.

South Texas Roots

A group of students—as indicated by the white hatbands—receive flight instruction during the early days of Kelly Field.





Military aviation and south Texas came together in February 1910, when Lt. Benjamin D. Foulois (at far right in the photo at left) arrived at Fort Sam Houston, just outside of San Antonio, in search of good flying weather. With a group of enlisted men, spare parts, and long-distance coaching through correspondence with the Wright brothers, he then taught himself to fly.

A few years later, the experience of the 1st Aero Squadron in the Punitive Expedition against Mexican revolutionary Pancho Villa highlighted the need for improvements in US airpower. In 1916, Major Foulois received orders to find a location for training facilities for American flyers. He turned again to the San Antonio area. In March 1917, construction began on the concrete and steel hangars that became Kelly Field.

The next month, the first Curtiss JN-4 "Jennys" arrived at the field, piloted by Capts. George Reinburg, Bert Atkinson, and Carl Spaatz, together with Eddie Stinson, a civilian flying instructor who later founded the Stinson Aircraft Corp. in Detroit. The next day, April 6, 1917, the US entered World War I. Soon, 4,400 recruits poured into tents at the field, with the 4th and 5th Aero Squadrons joining the 3d Aero Squadron, along with a Provisional Aero Squadron that acted as a receiving agency for the newcomers.

At right, a group prepares for some aerial class time, circa 1918, while other cadets wait their turns in a small shelter.

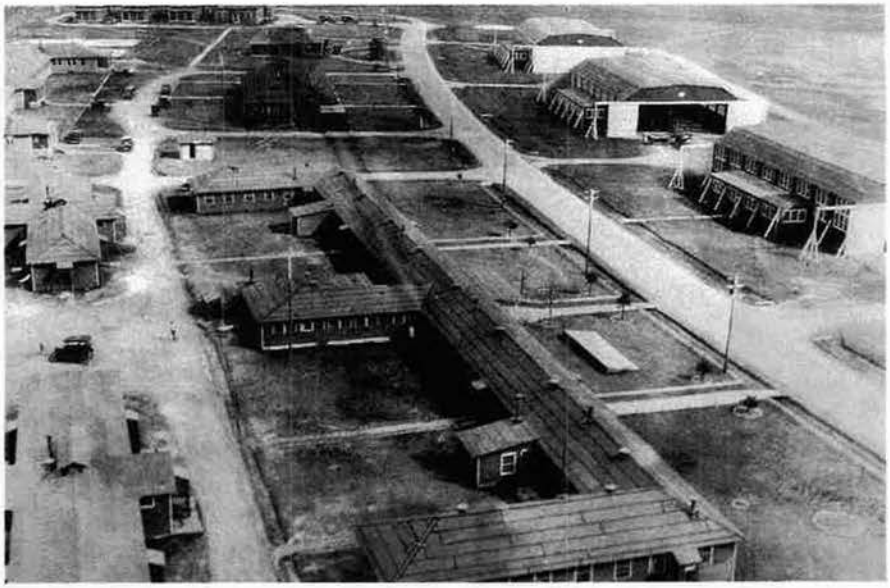
When Col. Charles E. Tayman arrived in June 1917 to take control of operations, he found only 25 officers to supervise about 5,700 men. Among his first steps was to name his new command Camp Kelly (changed to Kelly Field six weeks later) in honor of Lt. George E. M. Kelly, the first American pilot to die flying a military aircraft. At left, a class of cadets takes an exam. In 1917, pilot candidates began their military flying careers as flying cadets, taking eight weeks of ground instruction at schools set up at six civilian universities. After ground school came six to eight weeks of flight school. Cadets were then commissioned and went on to advanced school for a month of specialized training in pursuit, bombardment, or observation.

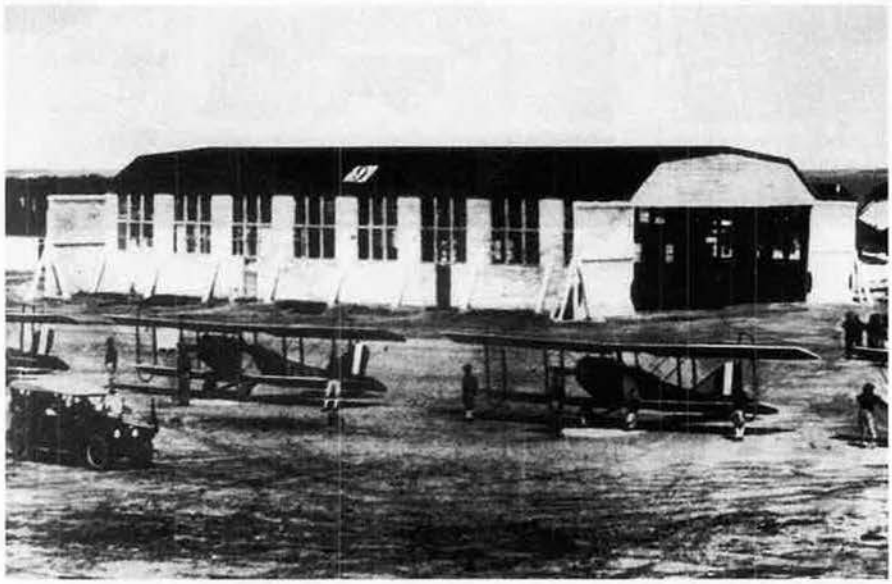
Only four months after construction began on Kelly Field, it became obvious that more space was needed. Eventually, plans were made for six Kelly Fields, most of them auxiliaries. Above is the flight line at Kelly Field Number Two. It became the center for flight training, able to accommodate 500 students, 75 instructors, and more than 200 airplanes. Kelly Field Number One remained the center for repair, maintenance, supply, reception, and training. Today, the F-16s of the 149th Fighter Wing (ANG) operate from a location near this mile-and-a-half-long collection of buildings.

Flight-training activities increased rapidly, despite the problems of beginning a training program from scratch. In February 1918, the students accumulated 9,500 flying hours. On March 18 alone, with more than 100 aircraft available to them, the cadets logged 1,033 hours. By August, however, the number of cadets dropped to less than 300. Nevertheless, by the Armistice on November 11, 1918, 1,459 pilots had graduated from flight training at Kelly Field, and 298 instructors had completed the advanced course.

Among the early trainees in south Texas was Charles Lindbergh (third from the left in this photo at Brooks Field), who graduated in March 1925. To his left is one of his instructors, Lt. Claire L. Chennault.

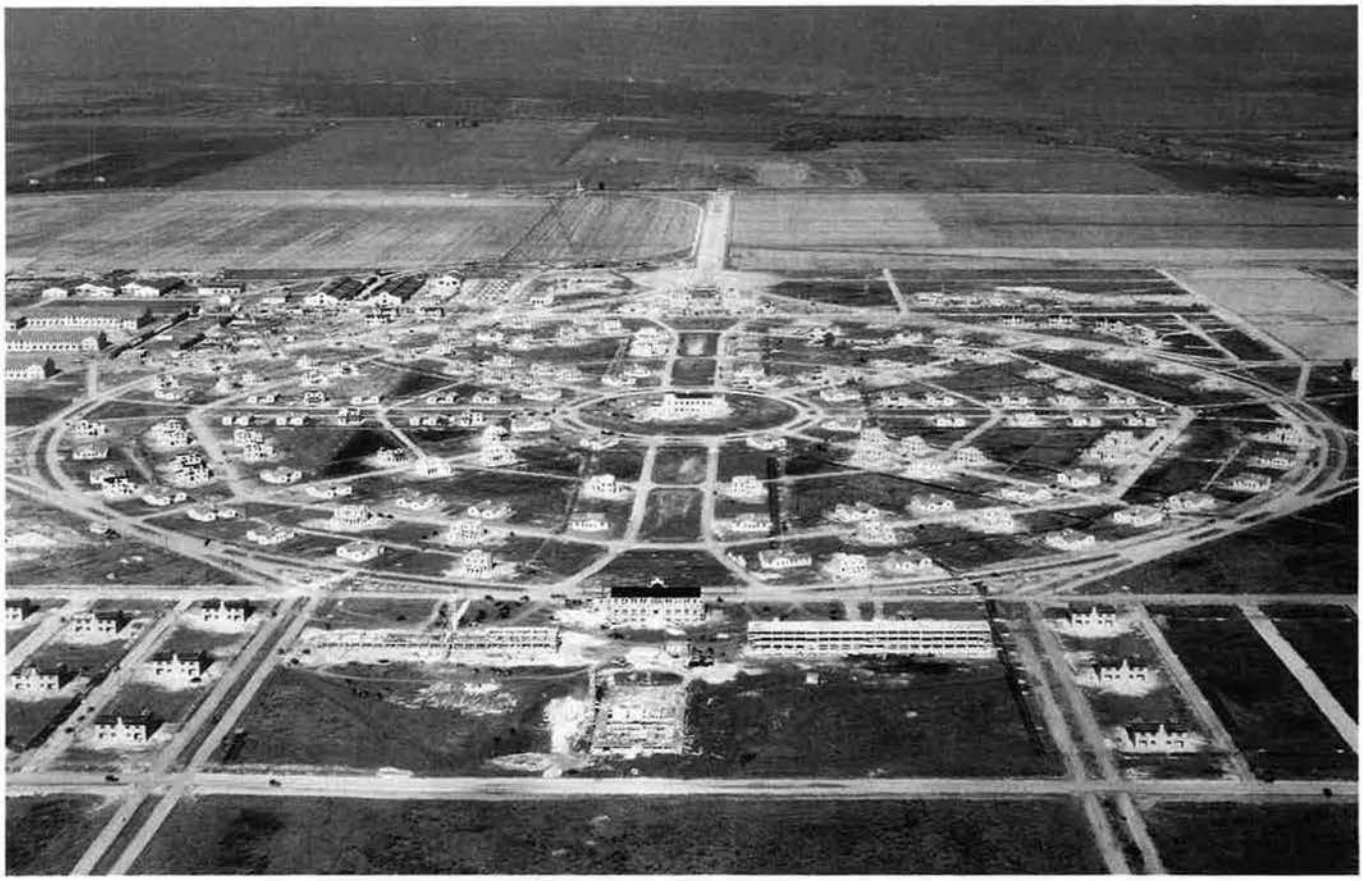
Kelly Field Number Five became Brooks Field in February 1918, named after Cadet Sidney J. Brooks, a San Antonio native who was in the first class of eleven cadets to arrive at Kelly. He was the first training fatality at Kelly. At right is a view of part of the Brooks Field cadet complex, used for training World War I pilots. After the war, pilot training was phased out, and the advanced flying school closed its doors in May 1919. Brooks then became a balloon and airship school until a series of accidents led to the transfer of airship training to Scott Field, Ill., in June 1922. Primary flying training opened again during that same month.



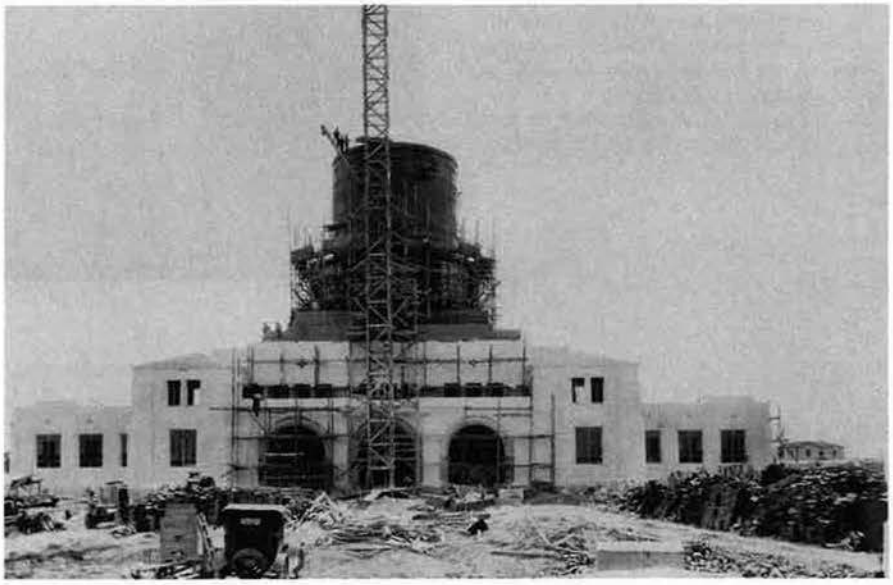


Some of the aviators who got their start at Brooks were Nathan F. Twining and Thomas D. White. The latter succeeded the former as USAF Chief of Staff. Primary flying training remained at Brooks until October 1931, when Randolph Field took over the responsibility. Early in World War II, Brooks Field became the AAF Advanced Flying School (Observation) and, in 1943, the AAF Pilot School (Advanced Two-Engine). The School of Aviation Medicine first relocated here in 1926, moving into a huge hanger that formerly housed dirigibles. The much smaller Hangar 9, shown at left, circa 1920, today is home to the Museum of Flight Medicine.

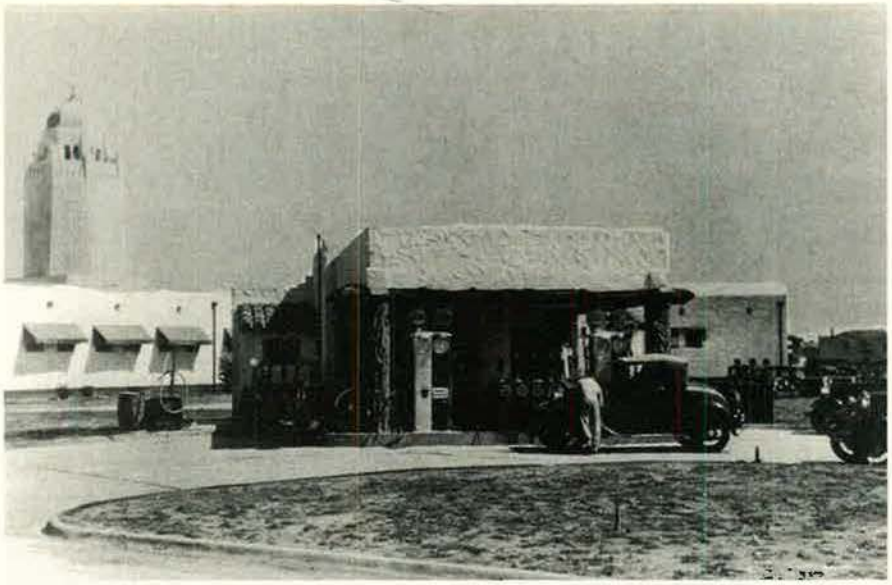
In 1926, the Air Corps established a single command for all flying training, the Air Corps Training Center, with Brig. Gen. Frank P. Lahm as its first commander. He soon realized that the Air Corps needed additional training facilities in the San Antonio area, and this led to the acquisition in 1928 of 2,350 acres of land northeast of San Antonio. The site became Randolph Field, whose original main gate is in the photo at right. The field, which has since doubled in size, was named after Capt. William M. Randolph, of Austin, Tex., who had completed pilot training at Kelly Field and had been the adjutant of its advanced flying school. He had been on the naming committee for the new field when he was killed in a takeoff from Gorman Field, Tex., in February 1928.



Randolph Field was designed even before its site had been selected. For his own amusement, 1st Lt. Harold L. Clark, who had received some training as an architect before enlisting for military service, had sketched the consolidated training center's layout on scraps of paper. "Air City" revolved around a central hub, with concentric streets surrounding it, and ramps and runways located on three sides of the circle. This circle within a square perimeter was divided into four quadrants—three for the primary, basic, and advanced flying schools and the fourth for the shop and service functions. Lieutenant Clark had also designed the facility to avoid the disadvantages of Kelly Field, where prevailing winds forced landings to be made over the hangars. General Lahm liked the plan, and, after some controversy over the revolutionary design, construction began in 1928.



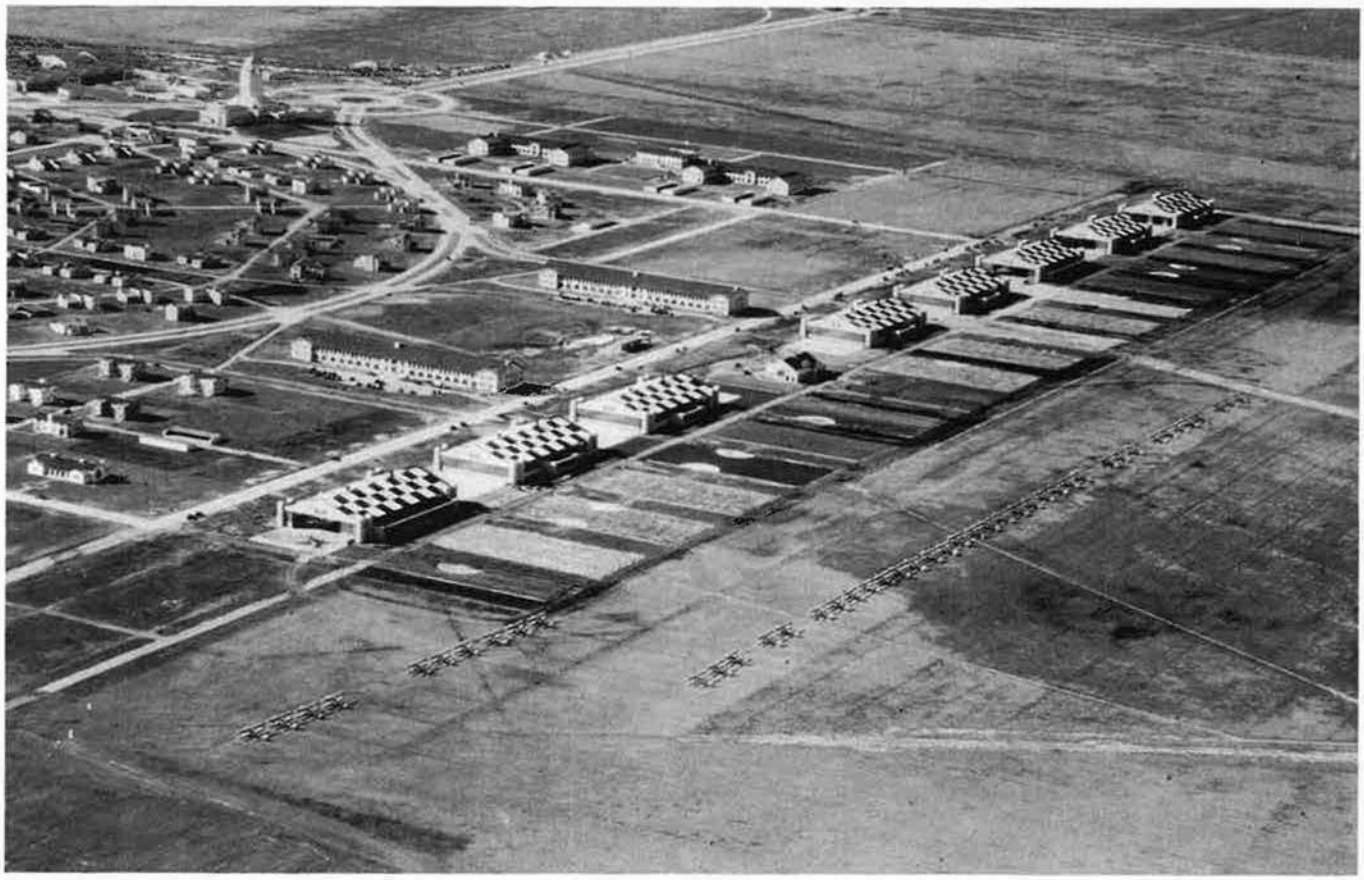
At top is an aerial view of Randolph Field under construction. Also under construction, above, is an Air Force icon that Lieutenant Clark originally designed to enclose a water tower, with administration buildings at its base. Nicknamed the "Taj Mahal," it is listed in the National Register of Historic Places.



On the far left stands the completed Taj, its Spanish Colonial Revival style contrasting with the rustic structure in the foreground, the first filling station on base. In 1931, gas at these pumps cost about 18 cents per gallon.

Some consider the buildings at Randolph to be the most beautiful of any Air Force base. Many were designed in the Spanish Mission style, with the red tile roofs, stucco, and hollow clay tile typical of the area. At right is the base chapel, patterned after two historic San Antonio missions. Spanish colonial law exempted incomplete buildings from taxation, so in keeping with what became a custom, the chapel was left unfinished, lacking the cupola on its right tower.

In October 1931, Randolph became headquarters for the Air Corps Training Center, and its first pilot training class of 210 cadets and 99 student officers began training the next month at the "West Point of the Air." Along with intensive military training, cadets at Randolph in the 1930s received instruction on flight theory, navigation, meteorology, maintenance, gunnery, radio code, and the internal combustion engine. Primary training back then amounted to 61 flying hours—31 hours of dual instruction and 30 solo hours. Cadets went on to four months of basic training at Randolph before proceeding to advanced training at Kelly Field.



Above is a view as familiar to pilots today as it was during the 1930s and 1940s—Randolph Field's Taj Mahal, circular street pattern, and flight line. The BT-9s at right were a common sight at the field from the mid-1930s, when the Army Air Corps adopted the BT-9 as a standard basic trainer, using it throughout World War II.

As the US mobilized after Pearl Harbor, aviation cadets began to arrive in Texas in large numbers. In June 1942, the War Department formally separated part of Kelly Field into an installation called San Antonio Aviation Cadet Center, where a preflight school, classification center, and medical training hospital were located. About 90,000 candidates for flying training passed through this preflight school before it was closed in April 1944. When this training ended, the center shifted focus to personnel reassignment and separation and, at its large regional hospital, rehabilitation. In 1947, the base received a new name, Lackland Air Base, after Brig. Gen. Frank D. Lackland, who originated the idea of an aviation cadet reception and training center for Kelly Field.

After 1946, Lackland earned its nickname "The Gateway to the Air Force." Except during such periods as the Berlin Airlift, the Korean War, and the Vietnam War, it has been responsible for the military indoctrination of all Air Force basic trainees.

With rich histories dating to military aviation's first days and their ties to legendary Air Force figures, this quartet of bases in south Texas had a key role in laying the groundwork for USAF's past 50 years as an independent Service.

Air Force *Magazine wishes to thank the authors of* A History of Military Aviation in San Antonio, *especially Bruce Ashcroft of the Air Education and Training Command History Office, whose assistance made this article possible.* ■

Soviet agents, working from master shopping lists, got amazing cooperation from their victims in the West.

How the Secrets Moved East

© Adri Berger, tony stone images

***Excerpted from* War by Other Means: Economic Espionage in America, *by John J. Fialka. © 1997 by John J. Fialka. Reprinted with permission of the publisher, W. W. Norton & Co., Inc. Mr. Fialka, a reporter in the Washington bureau of the* Wall Street Journal, *has covered defense, intelligence, and national security topics for many years. This is his first article for* Air Force Magazine.

THE Moscow avenue called Rublovsky Chosse is a street that knows how to keep its secrets. It meanders through the most exclusive suburb of the Russian capital, past the tall green fences shrouding the sprawling, forested estates where, in years past, powerful Soviet officials lived in regal splendor.

The street also has private little wooded pockets. In the early 1980s, Vladimir Vetrov, a paunchy, well-dressed man in his late 40s, used to park there with his mistress, Ludmilla. Vetrov had a huge secret, and, in November 1982, it almost came out. Behind the car's steamed-up windows, an argument began raging. The voice of Ludmilla sounded accusatory, then terror-stricken. Vetrov had pulled a knife and was trying to kill her.

A man walking nearby heard Ludmilla's screams. He rapped on the car window. Vetrov leaped out and plunged the knife into him. As the dying passerby slumped to the ground, Vetrov fled. Later, he returned, to the astonishment of police, who promptly arrested him. They were shocked to learn that the killer was a KGB colonel with a sensitive job in the First Chief Directorate, which handles foreign intelligence.

In truth, Vetrov's work was far more sensitive than even the KGB

By John J. Fialka

link suggested (though his mistress had guessed the truth). For 18 months or more, he had been a mole within the KGB, a double agent secretly working for French intelligence. Vetrov had in fact given the West its first detailed look at the most lucrative spy scheme in the long history of the Cold War.

Using teams of specially trained scientists and engineers, the USSR had mounted a systematic economic espionage campaign of epic proportions. It was spending $1.4 billion per year on salaries and bribes to obtain secrets of thousands of NATO weapons systems and related civilian technology. The systems had cost taxpayers hundreds of billions and taken years to develop. About 60 percent of this technology had been stolen from the US.

Vetrov's papers also provided the West with the names of hundreds of Soviet agents and the spies that they were running in dozens of countries. For the first time, NATO strategists were able to obtain an accurate picture of what the Soviets didn't have.

Phenomenal Success

Western leaders had known for years that some thievery was going on, but the scale and phenomenal success of the effort—as seen from documents supplied by Vetrov—went far beyond anything they had imagined. "The West is financing two military budgets: their own and that of their adversary," wrote one French official after studying Vetrov's papers. Even "more absurd," he noted, was that Soviet spies were getting the information largely from open sources. The West, especially the US, was wide open to people who knew what they were looking for. Weapon secrets were being stolen and copied before they were officially deemed secrets.

French intelligence gave the Vetrov case the code name "Farewell" and quickly revealed its secret to the intelligence officials of the Reagan Administration, who instantly recognized its value. The conservative new Administration was grappling with a bureaucracy in Washington that had for years dismissed Soviet economic espionage as inconsequential, and here was evidence that they were wrong.

Reagan officials argued that they now knew how the Soviet economy, with all of its glaring faults, managed to match US technology so quickly: The KGB had been systematically stealing information from US research and development programs. "The assimilation of Western technology is so broad that the US and other Western nations are thus subsidizing the Soviet military buildup," concluded one government report.

All of this happened a decade ago. Vladimir Vetrov is dead, and the secrets he delivered are locked in the CIA's vaults, but that does not mean that the story is over. The multiple pathways to steal US technology that the Soviets pioneered and that Vetrov exposed are still in use. For hostile intelligence agencies, the case of Farewell is an appealing roadmap. Some former Pentagon officials are convinced that Iraq's acquisition of US weapons-related technology in the late 1980s was based on the same training and even the same espionage "shopping lists" used early in the decade.

Other US officials believe that the next enemy who uses these techniques may not necessarily be a major power. One who agrees is Kenneth DeGraffenreid, a former Defense Intelligence Agency analyst who had pored over the Vetrov files as director of Intelligence Programs for the National Security Council. In earlier eras, DeGraffenreid notes, nations needed industrial bases and a sizable body of engineers and scientists to develop high-tech weapons. Now, it may be that a country that merely has money can do it, "if they went to school on the US," said DeGraffenreid.

He added, "It's not like the information is locked in a safe. It isn't. It's a more difficult problem as time goes on. How do you know when to lock things up?"

The Soviet collection effort began right at the top with a unit called VPK, or the Military Industrial Commission, which was placed just under the Politburo. It drew up vast "shopping lists" of needed Western items and used at least six different entities to get them. They included the KGB, the GRU (the Main Intelligence Directorate of the Soviet General Staff), and spy agencies of various satellite countries, such as Bulgaria, Romania, Czechoslovakia, and East Germany.

Many Are Called

There were many willing hands to do the work. It has been estimated that at any given time during the 1980s at least 1,000 of the 2,800 registered Eastern bloc diplomats were intelligence agents. The bulk of this enormous group was engaged in science and technology espionage.

Members of Russia's prestigious Academy of Sciences were also assigned to steal. Alexei Brudno, a mathematician and computer software specialist, remembers that the system was effective. Usually, only scientists who agreed to participate in KGB thievery schemes received permission to travel abroad. Western scientists, eager for the contact, often shared papers with Russian peers that they wouldn't give to their NATO colleagues, especially those who worked for competitor nations or companies. Upon returning, a Soviet scientist was carefully debriefed by a panel of KGB experts. Often they didn't bother to introduce themselves. They were only interested in the haul.

The most inventive and powerful element of this collection effort was Vetrov's own section, the KGB's "Line X."

Line X took shape in the 1930s after successful KGB thefts of German technology. It had a product: other people's research papers, blueprints, devices, and machinery. Stealing them, the KGB discovered, was one crime that paid. KGB defectors say Line X officials repeatedly boasted that Line X not only covered its own costs; the value of what it brought in sometimes exceeded the annual budget of the entire KGB.

The KGB in general tried to recruit agents from the best universities, but Line X itself fed on the cream of graduating scientists and engineers—men like Vetrov, who had initially set out on a career designing automobiles.

Once he was recruited, Vetrov turned out to be an enthusiastic counterspy, handing over vast amounts of information to France. As a result, the French, in the months that followed his defection-in-place, were able to send to Washington a large roomful of documents showing how the KGB's technology thieves operated in the US. Their techniques included bribery of sources in US corporations; piecing together weapon

secrets from open files in government agencies, such as NASA; and development of contacts in major US universities—the most heavily used being Massachusetts Institute of Technology—to fill in the gaps on the VPK's wish lists.

The Farewell material, acquired by Washington in the summer of 1981, had to be closely held because Vetrov was still producing. It was kept in the CIA library under the code name "Kudo." Only a handful of officials were allowed to read the blue-bordered documents, which signified a compartmented level of classification well above "top secret."

The Bank Shot

The documents told a tale of intelligence collection on a gargantuan scale. When it couldn't get the right hardware or weapon blueprints in the US, Line X often found that the same items could be acquired from US allies in Europe or Japan, where small bribes worked wonders. "You pay some engineer maybe $100,000 for something that costs $5 million. It's even more profitable than gambling," recalled Stanislav Levchenko, a KGB officer in Tokyo during the late 1970s.

When Levchenko was serving in Tokyo, Japan was already reaping the benefit of its own campaign to collect technology from the US. The Soviets went to great lengths to cultivate Japanese collectors of US technology and found they cared little about what happened to it once it arrived in Tokyo. "Japan, Inc.," functioned as an enormous intelligence machine, but it had almost nothing in the way of counterintelligence, allowing Line X to flourish in Tokyo. Levchenko recalls that, every two weeks, the 25 Line X operators in Japan would produce and send to Moscow a ton of samples and documents.

The result was that years of American sweat, money, blind alleys, and other frustrations were deftly avoided once US plans reached the Soviet laboratory. Soviet scientists often joked that much of what they did amounted to "translations from the American."

The list of items "translated from the American" was vast. Russian documents stolen or photocopied by Vetrov estimated that 5,000 Soviet military systems benefitted from stolen Western research each year. The CIA later toted up a list that ran from the space shuttle and cruise missile guidance systems to advanced components from all of the later US fighters, nuclear submarines, laser-guided artillery, and high-speed computers. Soviet engineers didn't even bother to research such mundane but useful things as cold-rolled steel armor for their ships; they had the US formulas.

Equipment from General Electric, Boeing, Lockheed, Rockwell International, and McDonnell Douglas topped Line X's shopping list, while MIT, Harvard, the University of Michigan, California Institute of Technology, and Princeton were the Soviet scientists' favorite hunting grounds for ideas.

One official, Maynard C. Anderson, then director of Security Plans in the Office of the Secretary of Defense, found the Vetrov files amazing. Through the magic of economic espionage, as he later put it, parts of US industry had become "a Soviet national asset."

Moving Targets

While the US expected its heavy investments in high-technology weaponry to give it many years' worth of military advantages over the Russians, Anderson found Line X's thefts were cutting that lead in half. "What you had as a result of our slowness [to develop] and the loss of this technology was that American industry was building weapons against a threat that was really no longer valid. By the time we had produced a system, they had already developed countermeasures."

Then came that night in November 1982 when contact with Farewell suddenly went dead. What had happened? No one in the West had a clue. Soviet authorities had hastily investigated the case and prosecuted Vetrov as a common criminal. Ludmilla survived her wounds and testified against him (though she did not mention her suspicions about his intelligence work). Vetrov got 15 years for murder and was sent to a prison labor camp in remote Irkutsk.

It took Soviet authorities some months to figure out that the man they had locked up for a crime of passion was the Soviet equivalent of Aldrich H. Ames, the CIA mole in the employ of Moscow, who singlehandedly rolled up dozens of American espionage operations in the late 1980s. In fall 1983, when the KGB finally put the pieces together (with help from Ludmilla), it sent for Vetrov.

The mole was brought back from Irkutsk and placed in an isolation cell in the KGB's Lefortovo Prison in Moscow. Following an interrogation, he signed a confession to having spied for the French. Former KGB officers say that he was executed, most likely in late 1983.

By then, many of the nation's technological horses had been stolen, but former Reagan officials said that getting government, academic, and industrial leaders to close the barn door proved maddeningly difficult.

Within the government, the prevailing view was that Soviet industry was so inferior and Soviet bureaucracy so cumbersome that US innovation would always leave them at least a generation behind in the arms race. This was patently untrue. Vetrov's documents showed that some of Russia's copycat weapons, such as the Soviet Navy's *Kirov*-class cruiser, were being launched sooner than the US systems from which they were copied.

The FBI, DeGraffenreid recalls, concluded that the losses were being overstated. The CIA worried that if Soviet students, scientists, and diplomats were expelled from the US, American agents would get reduced access in Moscow, although at that point much of the Soviet Union was off limits to them anyway.

Even within the Department of Defense, technology experts argued that putting further curbs on openness would slow the flow of technological advances and thus hinder new weapon systems. "It was a very hard case to make at the Pentagon," said Steve Bryen, then in charge of Technology Security Policy for DoD.

Bryen recalls one fight with officials at Nellis AFB, Nev., where he found several Soviet "students" were conducting research projects on a supercomputer, a machine useful for designing nuclear weapons and plotting missile trajectories. "We finally got them to stop it," said Bryen, "but can you imagine such craziness?"

The US academic community was skeptical, to say the least, of efforts to clamp down on Soviet access. Bryen recalls having many wrangles with officials at the National Acad-

emy of Sciences. "Nobody on the Russian side ever traveled over here without being tasked [to collect something]," he said, "but their argument was that good ties with Russian scientists will lead to a more peaceful role." US industry argued against placing rules on working with individual foreigners.

New Management

The Soviet Union is gone, but there are strong signs that intelligence operations continue under new management. Victor Yasminn, a former Soviet political dissident who has conducted a 12-year study of the KGB, believes the spies of the old regime split up roughly into three fragments: One-third remained in their old jobs in the new, slimmed-down state spy agencies; one-third went into the private security business; and one-third went into business for themselves as entrepreneurs, bankers, and wheeler-dealers.

Some of the new KGB-derived companies began rich and well connected. The spy agency had thousands of "file companies" or well-capitalized fronts overseas that had been used to buy or steal foreign technology.

However, the distinctions between businessman, spy, and crook are not nearly as tidy as they may sound because, in Moscow, the new lines can be rubbery, sometimes even nonexistent. Some of the new businessmen still function as spies—moonlighting as members of reserve units of Russia's new External Intelligence Service, the Sluzhba Vneshnei Razvedki, or SVR.

Adm. William O. Studeman, USN (Ret.), former deputy head of the CIA, said the situation is strange. "We see companies that are, on the one hand, legitimate and, on the other, intelligence fronts," he said. "And, on the third hand, they are elements of organized crime—all simultaneously."

Deadly games continue. Some good examples surfaced in what the KGB once referred to as its "sister services"—the Eastern bloc spy agencies that often did Moscow's dirtiest work.

In late 1990, the job of digging through the layers of Bulgaria's spy agencies fell to Dimitar Loudjev, a stocky, perpetually tired-looking history professor who had helped form the first democratic political party in Sofia. As the newly installed minister of State Security, Loudjev found and fired thousands of spies, but more could always be found when he overturned the next rock.

Going Into Business

In late 1991, when he was appointed Defense Minister, Loudjev discovered a large network of Bulgarian companies operating overseas. They were set up at the request of the KGB in the late 1980s to steal technology from the West. He followed convoluted trails of government money that led to banks in Liechtenstein, Switzerland, and Austria. There were more than 200 of these companies. Packed with experts and offshore funds, many of them went directly into private business, later reappearing in Sofia as Bulgarian representatives for large Western companies.

The privatization of the former Soviet bloc's espionage apparatus has created a grand specter that will haunt East-West business and political dealings for years, perhaps decades, to come. There was nothing quite like the KGB, whose sprawling apparatus conducted foreign espionage, provided internal security, performed military and police counterintelligence functions, operated the world's largest eavesdropping agency, protected Communist Party leaders and their hoard of gold, ran scientific laboratories and psychiatric torture clinics, and safeguarded nuclear weapons.

Eastern bloc nations produced enormous quantities of files on informants and agents, all of which have passed into the hands of new authorities in the wake of the Communist collapse of the 1990s. However, the KGB's huge network of helpers remains hidden and, probably, continues to be of use to Russian authorities.

The KGB's ranks always included the best and the brightest—men and women who had been allowed to travel abroad and who had the language skills and the manners that would appeal to a Western company. To survive in the new Moscow, Western businesses desperately needed to trust somebody. They needed muscle to ward off extortion attempts, investigators who could spot fraud and criminals, and reliable technicians who knew how to sweep offices for bugs. Thus, a huge new market beckoned, and the ex-KGB members responded in droves. By the mid-1990s, about 8,000 private guard and security services were registered in Russia, with some 30,000 employees.

The emergence of this strange situation raises interesting questions for Western companies hoping to tap the new markets in Russia. J. Michael Waller, a Washington analyst who has written a book on the evolution of the KGB, warns US companies to be wary and hints that the old game will go on.

"American businesses have to understand," he said, "that, while it's necessary to hire ex-KGB for the short term, it's possible that the same people who are advising you are the ones who are stealing proprietary information to sell to the negotiators on the other side or people who plant agents within your company for the long term." ■

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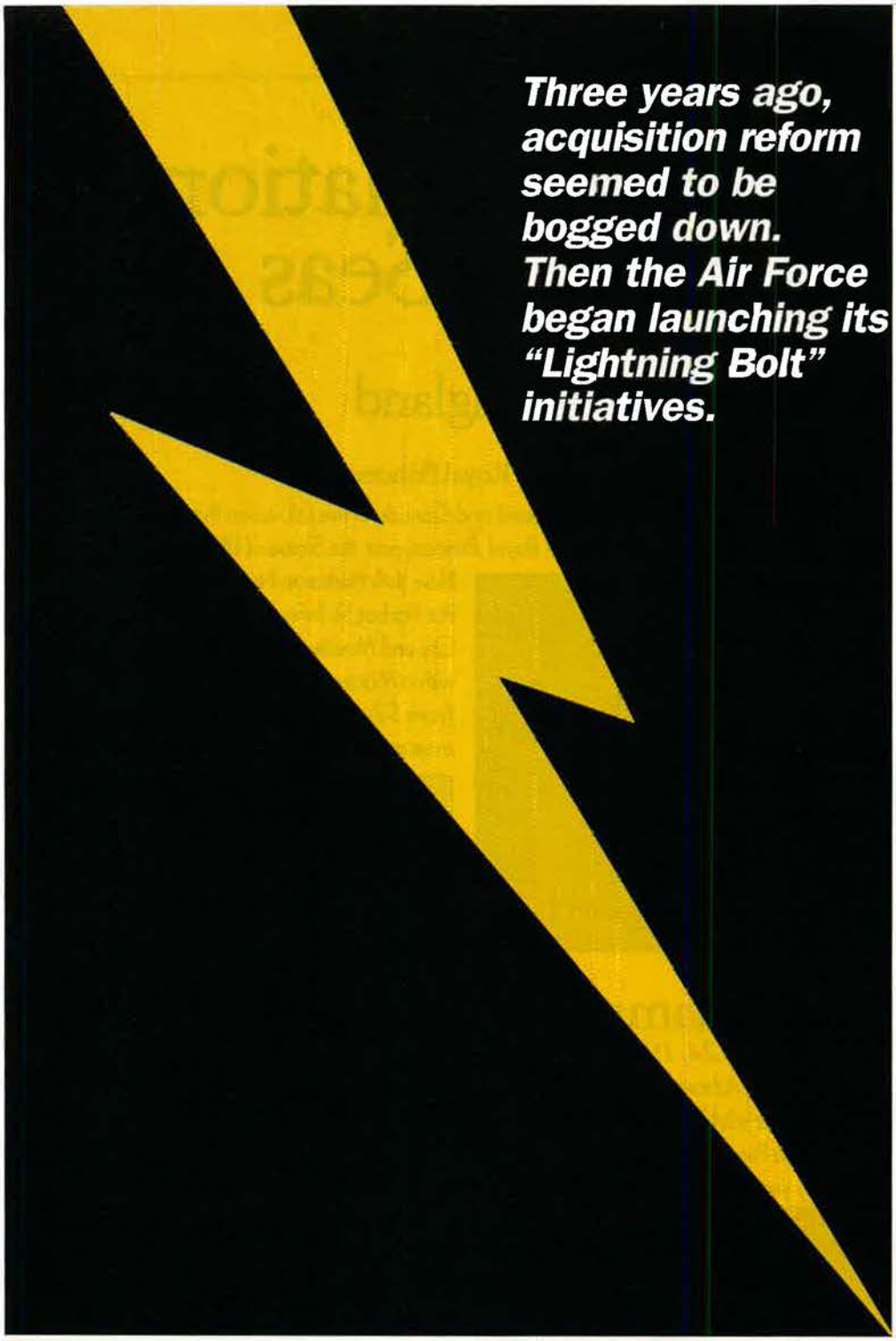

Three years ago, acquisition reform seemed to be bogged down. Then the Air Force began launching its "Lightning Bolt" initiatives.

Lightning Bolts

By James Kitfield

Not long after she became USAF's principal deputy assistant secretary for Acquisition and Management, Darleen A. Druyun received a call from R. Noel Longuemare, her counterpart in the Office of the Secretary of Defense. He wanted her to come review the Air Force's request for proposal concerning a major GPS satellite upgrade.

And there, atop his desk, she found it—a mountain of paper, 1,200 pages high. It symbolized everything about acquisition that she wanted to change.

"I took that RFP home with me for the weekend, and when I got in to work on Monday I was not happy," Ms. Druyun said. "Every milspec and milstandard imaginable was crammed into it."

Within hours, she had set to work with managers in the GPS System Program Office. Together, they pared 1,000 pages from the RFP, virtually eliminating military specifications and standards. She cut the contract data requirements lists from 100 to 10.

In the end, Ms. Druyun said, that streamlining process cut program costs by nearly $500 million. Those unspent funds became available for other modernization programs sought by US Space Command, which at the time was headed by Gen. Joseph W. Ashy.

"I can tell you that the CINC of Space Command became a believer that day," Secretary Druyun said. "He realized there was something to this acquisition reform after all."

The experience convinced Ms. Druyun, and many others, of the wisdom of the Air Force acquisition office's so-called "Lightning Bolt" initiatives, launched in 1994 at a

time when reform seemed to have bogged down. *[See box, p. 62.]* It's not just the GPS program that has benefited, said Ms. Druyun. She pointed to some 30 programs in which the Lightning Bolts have allowed the Air Force to recapture savings from budgeted funds and reinvest them in modernization.

At the outset of the Clinton Administration, William J. Perry, then deputy secretary of Defense, introduced a number of acquisition reforms. Despite early enthusiasm, the campaign soon hit a bureaucratic wall. To refocus the effort and overcome entrenched institutional resistance, Secretary Druyun administered some jolts with the bolts.

Seeking Focus

"I personally felt that we [in the Air Force] lacked a certain focus," she noted. "Early on, there was reticence on the part of Air Force people, in terms of walking away from the way we had traditionally done things. Some folks were kind of groping around for where to start the reforms."

She added, "I think the Lightning Bolts really helped our focus, and our acquisition people went out and actually changed the Air Force's acquisition culture."

The Lightning Bolt initiatives draw heavily from former Secretary Perry's emphasis on commercial practices. From his first days as deputy secretary, he argued that rapid advances in computer and communications technologies meant that future technological breakthroughs were as likely to come from the commercial sector as from the defense sector.

Moreover, he said, with relatively few new weapon programs on the drawing board, it was difficult to justify arcane military specifications and practices.

To adjust to those changes, Secretary Perry, Under Secretary of Defense for Acquisition and Technology Paul G. Kaminski, and their team instituted a host of acquisition reforms that generally forced program managers to abandon military-specific requirements and focus on commercial products and practices. Partnerships between government and industry were encouraged.

Mr. Perry, who became Secretary of Defense in early 1994 and served three years in the post before stepping down in January, said he had seen amazing changes in a short period. "When you go out and visit program offices today to see how programs are unfolding, in many cases you see the kind of project action teams that are typical of the commercial sector, with contractors, government program managers, and users all working together," he remarked in a farewell interview with defense reporters. "That reform of the acquisition system is fundamentally changing the relationship between the Pentagon and its suppliers."

Air Force and industry officials said acquisition reforms are bringing to an end the largely adversarial relationship that existed between service program managers and industry executives throughout the 1980s and early 1990s. At that time, the relationship was characterized by armies of government regulators and plant inspectors, reams of detailed military specifications, extremely high-risk, fixed-price development contracts that often left even contract winners badly bruised, and fractious multibillion-dollar lawsuits.

"We're continuing to move in the direction that Dr. Perry pushed from his first day in office," remarked Ms. Druyun, "and I don't see the direction changing" under new Secretary of Defense William S. Cohen. That direction, she said, "is basically toward creating a partnership with our contractors. They are not our enemy. If we erect a wall between us, then chances are we're both going to walk away with a failure."

We've Met the Enemy

Industry leaders say the new approach emphasizes the view that declining budgets and program turbulence constitute the true "enemies" in the acquisition business.

"Both sides now realize that, to ensure we get the most bang for our buck during this great competition for dollars in the federal budget, we have to act as a team," said Harry C. Stonecipher, president and chief executive officer of McDonnell Douglas. "You have to give Perry and Kaminski a great deal of credit for establishing a foundation of mutual trust and respect between the Pentagon and its suppliers. If you have an idea to speed up the process and save money, they'll let you lay it on the table and give it fair consideration."

Kent Kresa, chairman, president, and CEO of Northrop Grumman Corp., agrees with that assessment. "There's absolutely been dramatic progress in terms of acquisition reform, and you see it across the board," he said. "There's the relaxation of milspecs and requests for proposals that tell you what the military wants, rather than how to design it."

Mr. Kresa continued, "All of that is in the spirit of the commercial marketplace, and I expect we'll see even more of it in the future."

One of the original Lightning Bolts reflected former Defense Secretary Perry's emphasis on integrated process action teams. By "reinventing the [Air Force acquisition] process through Integrated Process Teams," Air Force officials say, they have not only transformed the way they develop weapons but also how contract competitions are conducted.

"With our Integrated Process Teams, we've tried a radically different approach to recent competitions," said Ms. Druyun.

One case in point, she said, is the Joint Direct Attack Munition program. The Air Force detailed five government employees to the two contractors competing for the JDAM program. For 24 months, they worked with the contractors to help them put together their programs in ways that would help them win the competition. The Air Force also dispatched a neutral team that oversaw the competition and became deeply involved in the source selection.

The approach, said Ms. Druyun, produced "outstanding results." The Air Force was able to cut JDAM production delivery time by 60 months and development costs by $167.7 million even as it increased the JDAM warranty from five years to 20 years. In the process, the size of the program office staff was cut in half (from 80 to 40), the statement of work was reduced from 137 pages to two, and the number of military standards and specifications used was slashed absolutely, from 87 to zero.

The net result: an estimated $2.7 billion in savings over the life of the JDAM program.

Air Force officials have also used the team approach to fundamentally change their interaction with acquisition officials in the Office of the Secretary of Defense.

Lightning Bolts, by the Numbers

One: Establish a centralized request for proposal support team to scrub all RFPs, contract options, and contract modifications worth more than $10 million.

Two: Create a standing Acquisition Strategy Panel composed of senior-level acquisition personnel from the Office of the Assistant Secretary of the Air Force (Acquisition), Air Force Materiel Command, and the user.

Three: Develop a new System Program Office manpower model that uses tenets established in the management of classified and special-access programs.

Four: Cancel all Air Force Materiel Command center–level acquisition policies by December 1, 1995.

Five: Reinvent the Air Force System Acquisition Review Council process through Integrated Process Teams.

Six: Enhance the role of past performance in source selections.

Seven: Replace acquisition documents with the Single Acquisition Management Plan.

Eight: Revise the Program Executive Officer's and Designated Acquisition Commander's Portfolio Review to add a section that deals specifically with acquisition reform.

Nine: Enhance the acquisition work force with a comprehensive education and training program that integrates acquisition reform initiatives.

Ten: Reduce by 50 percent the amount of time taken to award contracts that meet customers' needs.

Eleven: Enhance the capabilities of laboratories by adopting improved business processes learned from weapon system reform efforts.

Today, Air Force and OSD acquisition personnel meet each month as a team and review the progress of various programs. Said Ms. Druyun, "Too often in the past, the two sides used to sit across the table from one another and point fingers. It was time to stop fighting with each other and start working together to try and figure out how to solve the tough acquisition issues."

The Hated Milspec

Another Lightning Bolt stated simply that the Air Force should "establish a centralized RFP support team to scrub all RFPs . . . [worth more than] $10 million." This initiative directly targets the much-reviled military specifications. The result of the initiative, Air Force officials said, is a dramatic reduction in the number of military specifications, as shown in these examples:

- Airborne Warning and Control System upgrade. Before: 120 milspecs. After: zero.
- F-22 fighter. Before: 204 milspecs. After: 31.
- Common Missile Warning System. Before: 60 milspecs. After: zero.
- C-17 transport. Before: 82 milspecs. After: six.

In this, Ms. Druyun said, the Air Force is only responding to the desires of the private sector.

"Contractors have been pleading with the Air Force for years not to depend so heavily on milspecs and milstandards, because we used to just stuff them in all our statements of work," she said. "My goal is to get milspecs down to zero and, instead of writing statements of work, just lay out a broad statement of objectives, where we tell contractors what is absolutely essential in terms of key performance parameters and let them come back to us with a solution."

Secretary Druyun promulgated two other Lightning Bolts to clear potential bureaucratic roadblocks and develop a more streamlined approach. These called on the Air Force to "cancel all Air Force Materiel Command center–level acquisition policies" and to "replace acquisition documents with a Single Acquisition Management Plan." According to service officials, those initiatives led to a 40 percent reduction in acquisition policies and greater flexibility in developing innovative acquisition strategies.

Air Force officials concede, however, that weaning acquisition personnel away from military-specific requirements and familiar contracting policies has required patience and significant retraining.

Thus, Lightning Bolt Number Nine: "Enhance the acquisition work force with a comprehensive education and training program that integrates acquisition reform initiatives."

By necessity, that retraining effort has also involved contractor personnel. "There's been a lot of training involved in this effort, not only with our own acquisition personnel, but also with contractors who need to understand how to write a good proposal from our broad statement of requirements," Ms. Druyun said.

To assist field offices in implementing the reforms and dealing with unfamiliar problems, she said, Lightning Bolt Number Two created a standing Acquisition Strategy Panel of senior acquisition experts to offer advice and guidance.

Lobotomies for All

The whole idea behind the Lightning Bolts, said Ms. Druyun, was "to change the paradigm and, in a sense, give us all frontal lobotomies, so we

can change the ways of the past and approach this business in a very, very different manner."

That new paradigm for Air Force acquisition is reflected in the size and attitude of the System Program Offices. Throughout the 1980s, SPOs were swelled by government inspectors, lawyers, and overseers. All too often, program disputes were settled in court rather than in face-to-face talks.

USAF officials believe that this extremely aggressive government supervision and oversight was out of step with reforms emphasizing teamwork and streamlining.

Lightning Bolt Number Three calls on USAF to "develop a new SPO manpower model that uses tenets established in the management of classified and special-access programs."

According to DoD officials, that initiative is in keeping with a belief that streamlined "special-access" programs, such as the F-117 stealth fighter, stayed on course more often than was the case with traditional programs. "Many of the acquisition reforms we've instituted were lessons learned from the F-117 program," said Secretary Kaminski.

Ms. Druyun directed the SPOs to cut staff levels by 50 percent by 2000. The objective is to create new SPOs of about 140 workers for complex development programs and of about 50 for large but not complex production programs. The staff of the assistant secretary of the Air Force for Acquisition will be similarly reduced over the next five years.

The upshot, said Ms. Druyun, is to have "small program offices, not standing armies."

She went on, "I pay a contractor to develop and manage a program, and I don't need to be looking over his shoulder at every single thing he does. The new philosophy is that the contractor should have approved systems in place, with metrics that track how a program is going and that give the Air Force adequate insight into the program. Then if the contractor runs into problems, we can go from an insight to an oversight role."

Industry leaders say relaxation of burdensome oversight requirements has generated major rewards. One of these, said Mr. Stonecipher, concerns the C-17 advanced transport program.

"We now have a common-cost model, so that anyone at Wright-Patterson [AFB, Ohio, location of the C-17 SPO] or the Pentagon can call up a common database and look at the same numbers my accountants look at," noted the McDonnell Douglas chief. "We're all working from the same cost model. That kind of system, however, requires mutual trust. It couldn't happen prior to the real acquisition reforms we've seen."

Performance Counts

Along with that greater emphasis on mutual trust, however, goes added responsibilities. Thus Lightning Bolt Number Six: "Enhance the role of past performance in source selections." The idea, say Air Force officials, is to hold contractors responsible for meeting schedule, cost, and performance goals.

"That renewed emphasis on past performance has had a very positive effect in terms of contractors delivering on their promises," contended Ms. Druyun. "They know that if they do a crummy job, then they're going to have a very, very difficult time winning a future contract. They use similar criteria in picking their own subcontractors, so why would I do it any differently? I also want to reinforce the message that if you keep giving me excellent performance, business will keep coming in your direction."

Again, the C-17 program best illuminates the positive impact of the Air Force acquisition reforms.

For years after the Air Force and McDonnell Douglas signed the contract in 1985, the program suffered under cumbersome military specifications; a firm, fixed-price development contract that shifted many of the consequences of a high-risk program onto the contractor and disputes into the hands of lawyers; and cost overruns and schedule slippages.

By 1993, the C-17 was more than $1 billion over budget and a year behind schedule—in danger of being canceled. Acrimony and legal wrangling had poisoned the relationship between the Air Force and McDonnell Douglas. Pentagon leaders gave the service and contractor a two-year probationary period to get the program back on track while other alternatives were explored.

In the meantime, however, many of the acquisition reforms embodied in the Lightning Bolt initiatives were aimed at the C-17 program. Under the new strategy, use of milspecs declined dramatically. After approving commercially based manufacturing standards, the Air Force cut its inspection staff by 60 percent. Defects decreased by 76 percent. Integrated Process Teams were formed to bring customer, user, and contractor together to work out problems early and in unison.

"What had happened at the low point was that lawyers had taken over all negotiations," said Stuart Thompson, vice president of Business Development at McDonnell Douglas's Military Transport Division. "A McDonnell Douglas executive wouldn't even talk to a government representative without a lawyer by his side. To get away from that adversarial approach, both sides had to agree to trust each other again."

A little more than two years after the acquisition reforms were adopted, the C-17 program is on schedule, the costs are dropping, and the aircraft is flying to favorable reviews. Last year, the Air Force signed a $14.2 billion multiyear contract to build the next 80 C-17s, the largest multiyear defense contract ever awarded. The C-17 team received the prestigious Collier Trophy from the National Aeronautic Association, symbolizing the top aeronautical achievement of 1994.

Air Force officials said that, as a result of the Lightning Bolt reforms, the service has avoided $5.4 billion in C-17 costs. Such bottom-line results, they say, will ensure that the acquisition reforms firmly take root in the Air Force culture.

As Ms. Druyun put it, "When you look at the requirements the users have in terms of the future modernization of the Air Force, you realize that they are depending on us. That's why I remind my people that we're acquisition warriors. Our battle cry is 'Better, faster, cheaper.' " ■

James Kitfield is a defense correspondent for the National Journal *in Washington, D. C. His most recent article for* Air Force *Magazine, "Tuzla Is Tough Duty," appeared in the December 1996 issue.*

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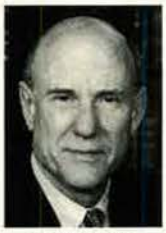

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In the words of the Secretary of the Air Force, "Without ranges, we can't train, and if we can't train, we can't fight."

Fighting for Airspace

By Suzann Chapman, Associate Editor

In 1995, Gen. Joseph W. Ralston, commander of Air Combat Command, warned that the Air Force needed to start paying closer attention to the availability of its airspace and ranges. He voiced concern that the force might not always have room to train as it should and announced that he had created a special ACC office to get on—and stay on—the case.

"This issue is more important than the F-22 or B-2," he said. "If we lose our airspace, . . . then we're going to be out of business as an Air Force."

General Ralston, now vice chairman of the Joint Chiefs of Staff, thought the Air Force needed to make a more vigorous case for its training needs because it was sure to be asked to withdraw from airspace and range areas in the post–Cold War retrenchment. Moreover, the General said, the Air Force in some areas "ought to be working on getting more."

Now, the problem foreseen by General Ralston has arrived, caused by two primary factors. First, there is fierce competition for access to military training areas. Col. Chuck Gagnon, the chief of ACC's Airspace and Ranges Management Division, reported that USAF is up against claims from land developers, ranchers, American Indian organizations, mining corporations, recreation clubs, other federal agencies, and more.

Compounding the problem is a second factor—growing USAF requirements. Though the Air Force has suffered force cuts and base closures and now has fewer aircraft and aircrews in fewer places, its overall space requirements haven't diminished. Far from it. Changing tactics, techniques, and weapon systems are certain to expand the Air Force's needs, officers said.

Staff photo by Guy Aceto

Though the Air Force operates 34 ranges encompassing nine million acres (about 14,000 square miles), new tactics and longer-range weapons have expanded USAF's airspace needs, even as the force gets smaller.

Three Problems

USAF operates 34 ranges encompassing some nine million acres. More than 60 percent of that land (5.4 million acres) is available for dual use by the military and the public. This includes managed forests, farming and grazing areas, and protected wetlands. In this huge area, the Air Force presently faces numerous operational airspace and range issues, but perhaps the three most significant problems can be found in Nevada, Arizona, and Idaho.

Photo by Lans Stout

As the nation's airspace gets more crowded and the FAA moves toward Free Flight, military air traffic controllers could see even greater responsibility as they help deconflict military flying training and civilian or commercial flights.

The Air Force's concerns in Nevada and Arizona are linked and grow out of the onrushing need for a renewal of the Military Land Withdrawal Act of 1986.

The Nevada case: By far the most important issue confronting the Air Force is the need to shore up its access to the airspace over and territory of the Nellis Range complex in southern and central Nevada, which the Air Force uses for operational combat flying training.

Air Combat Command manages the Nellis Range, which encompasses about 3.1 million acres. Colonel Gagnon said flatly, "Our number one priority is renewal of the Nellis Range complex in the year 2001."

The Arizona case: Air Education and Training Command manages the 2.7-million-acre Barry M. Goldwater Range in southern Arizona. The Air Force uses it primarily for initial training of F-16 pilots.

Together these two ranges constitute about 60 percent of the Air Force's total range space. Both have been used by the military since before World War II, but they do not belong to the Air Force outright. Congress has over the years "withdrawn" the lands from the national pool and set them aside for the exclusive use of the armed forces.

The latest withdrawal, passed in 1986, gave the ranges to DoD for only 15 years, and it must be renewed by 2001 or it expires. As part of the renewal process, the service must submit a draft environmental impact statement (EIS) to Congress in 1998, and then Congress will have until 2001 to consider the request.

This is not the first time around for the Nellis and Goldwater ranges. The last renewal requirement came up in the mid-1970s, according to Lt. Col. Tom Lillie of USAF's Range and Airspace Division at the Pentagon. It took Congress 10 years to work it out. During the intervening 10 years, the military was given permission to continue using the land.

However, the 1986 Withdrawal Act included the requirement for an EIS. Previously, the Air Force had done a less extensive environmental analysis. Producing an EIS for this 2001 renewal will cost the Air Force approximately $15 million.

The most serious Air Force concern, however, is not cost but the study's potential as a magnet for critics and opposition. This problem already has begun to materialize as environmentalists, business groups, and others line up to demand greater access to the areas or to further restrict military access to them.

Colonel Gagnon said his team has stressed to unit commanders that Air Force training needs must be explained to the American people. They've found that in many cases the public has identified better locations to meet those needs.

Colonel Gagnon noted the increasing sophistication of the public and some of the interest group claimants. "They are better educated, better organized, and well funded," he said. "The planes and people, you get through the annual budgeting process, but . . . you get [the places to train] by going out to the American public."

More Acres Needed

In the Idaho case, the Air Force faces a different kind of range problem. The Air Force is not merely trying to maintain current levels of access but is seeking a significant expansion of an existing site.

Photo by Lans Stout

USAF often employs drones, such as this QF-106 (here, with a pilot), over international waters in the Gulf of Mexico, where freedom-of-navigation laws do not provide for prohibition of flight, complicating safety concerns.

Military Flying Training Areas

Aeronautical charts used by civil, commercial, and military pilots include information about three types of alert areas that may be used by the military services for flying training:

***Military Operating Area*—airspace designated for nonhazardous military activity, such as aerobatics, air combat tactics, and formation training. The designation informs and segregates nonparticipating instrument-flight-rules aircraft from the activity. Visual-flight-rules aircraft are not prevented from operating in MOAs.**

***Restricted Area*—airspace designated for hazardous military activities, including live firing of weapons. Restrictions are placed on all nonparticipating air traffic.**

***Warning Area*—international airspace designated for military activities. Although activities may be hazardous, international agreements do not provide for prohibition of flight in international airspace.**

Since 1991, the Air Force has returned to the National Airspace System at least 13 MOAs around the country, as well as numerous instrument and visual military training routes. It has also closed 12 electronic scoring sites.

The difficulty stems from a move that the Air Force calls the Enhanced Training Initiative. ETI calls for creation of an additional military range in Idaho—specifically, a range for use by the 366th Wing, USAF's air-interdiction composite unit located at Mountain Home AFB. The base already has a 100,000-acre range. Though large, it is now not sufficient for the new tactics and techniques carried out by the wing's long-legged bombers and fighters.

Wing officials realized they needed to modify their airspace and range arrangement to provide "the best training today and into the future," stated Col. Gerald F. Pease, chief of USAF's Range and Airspace Division at the Pentagon.

The current USAF proposal for the Idaho initiative includes withdrawing from public use another 12,000 acres, within which the Air Force would construct a 300-acre bomb-drop site. However, ranchers could continue to use the area outside the 300-acre drop site to graze livestock.

Additionally, the proposal calls for 30 electronic emitter sites of up to an acre in size as well as four five-acre and one 640-acre sites that would simulate industrial areas. The simulated industrial areas would be classed as no-drop areas and only used for electronic scoring.

This current ETI proposal is not the first that the Air Force has produced. Two earlier proposals called for withdrawing much more acreage and were abandoned under political pressure. The current plan has evolved through negotiations and discussions with various interest groups.

Colonel Lillie said that, as a result of public review of this latest proposal, USAF has included a third proposed location for the 12,000-acre drop site.

The Colonel said that a draft EIS for the plan would be made available for public scrutiny for the required 90-day comment period, then the final EIS should be issued in August 1997. The proposal would then wind its way through the federal government, making stops at the Department of the Interior and Congress.

Prognosis: Uncertain

Air Force officials from Mountain Home, ACC, and the Air Staff have contributed to the effort to try to mitigate local concerns. Still, no one in the Air Force believes that the proposal is a shoo-in. Asked for a prognosis, Colonel Pease would say only that the current proposal seems to be "more favorably received than others in the past."

ACC officials emphasized that the Idaho initiative is based on very specific training requirements. However, Col. Ronald G. Ohlendt, deputy chief of ACC's Airspace and Ranges Management Division, pointed out that the application of airpower is constantly evolving and that weapon systems change and tactics with current systems change. Thus, he said, it's impossible to guarantee that the Air Force will never change its practices over the next 80 or so years. "I may be back in 10 years and say we found that the B-1 is better used flying this way than that way," he said.

Colonel Ohlendt said that today's airspace and range structure has been in place for decades and no longer fits the needs of the modern Air Force. Fifty years ago, he explained, aircrews could get effective training in a limited column of airspace about five miles in diameter. Those days are long gone, and the space requirement is increasing for three basic reasons.

One reason is the advent of sophisticated new munitions.

"In the last 10 years, we have brought on a vast array of very highly technical, sophisticated precision munitions," stated Colonel Ohlendt. "Air tactics have changed. We are employing those precision guided munitions differently. We have learned through Desert Storm and other things that we have to expand the envelope that we fly in, not only to preserve our resources but also to ensure our effectiveness and proper employment of these PGMs."

All those new capabilities expand the need for airspace and ranges. It is not possible to train with extended-range weapons on "back yard ranges built for gravity bombs," noted Colonel Pease.

The second factor complicating the situation is the fact that advanced technologies make it possible to conduct round-the-clock and all-weather combat operations.

Until recently, combat aircraft couldn't operate effectively in bad-weather or at night, so the Air Force had no need to structure its airspace to provide that kind of training, Air Force Secretary Sheila E. Widnall explained in a recent speech. Training operations took place during the day and in fair weather. Now, she added, the Air Force looks toward fielding systems with all-weather and day and night capability, and training must keep up.

The third factor is the advance of aircraft technologies that permit greater performance.

In his 1995 statement, General Ralston called particular attention to the planned arrival of USAF's F-22 air-superiority fighter, with its ability to fly at supersonic speeds without resorting to fuel-gulping afterburners. This means that, in actual combat, the aircraft will be able to travel much further and patrol a much larger area.

This single characteristic of the aircraft, he said, requires the service to make its case for a larger training airspace.

The upshot is that no wholesale return of airspace and ranges to the federal government is possible without serious damage to Air Force training. In the words of Secretary Widnall, "Without ranges, we can't train, and if we can't train, we can't fight."

Echo of the 1970s

No physical boundary surrounds military airspace, and relatively little of it is set aside solely for use by the armed forces. Today's military training airspace was devel-

ACC's Top 10

The membership of Air Combat Command's Airspace and Ranges Management Division started with seven then rapidly grew to 30 as it added experts on environmental issues, contracting, and public affairs as well as aircrew training and range and airspace management.

Among the team's dozens of projects, these are currently the top 10:

Nellis Land Use Renewal. *[See p. 71.]*

Chief of Staff Strategic Range Requirements Study. *[See p. 74.]*

Holloman II: Writing an environmenal impact statement to gain approval for the German Air Force to bring 30 additional Tornados to Holloman AFB, N. M., in 1999. Germany established a Tactical Training Center at Holloman in 1996.

Enhanced Training Initiative in Idaho. *[See pp. 72–73.]*

Nellis Range Study: Developing better business practices in managing the range, which hosts not just operational training, such as Red Flag, but also DoD research and development testing and Department of Energy projects.

Nellis Range Compatibility: Effort to exchange an Air Force land holding in another part of the US for a part of the Nellis Range that overlaps the Desert National Wildlife Refuge and is managed by the US Fish and Wildlife Service.

Utah Test and Training Range: Move by ACC to assume management on October 1 of the UTTR, near Hill AFB, Utah, from Air Force Materiel Command.

NAS Oceana Beddown: Response to Navy's movement of up to 400 fighters into the Oceana, Va., area, already heavily congested with USAF aircraft at Langley AFB, Va., Seymour Johnson AFB, N. C., and Shaw AFB, S. C.

Southwest Texas Electronic Scoring Site: Effort to provide Air Force bomber units with an additional electronic scoring training site in Texas.

Weapon Safety Footprints: Determination of the amount of space each USAF munition requires to land safely, so the Air Force can determine what constitutes a proper buffer zone.

Staff photo by Guy Aceto

Former ACC Commander Gen. Joseph Ralston called the airspace issue "more important than the F-22 or B-2," because if USAF cannot adequately train its flyers for combat, "we're going to be out of business as an Air Force."

oped in the 1970s, according to Colonel Pease. It was placed within civil-commercial aircraft routes, creating irregular-shaped patches *[see map, p. 72]*.

"People have a tendency to look at the map of airspace and say that you own the whole world—you own all the airspace," said Colonel Pease. Actually, he said, DoD conducts operational flying training in about 20 percent of the national airspace.

When individuals ask him how much airspace the Air Force has returned since the end of the Cold War, the Colonel said his quick reply is "about 30 percent."

However, he is not referring to the return of actual airspace but to a reduction in total flying hours. He said that, in 1988, USAF aircraft worldwide accounted for about 3.3 million flying hours. In 1995, the figure was about 2.3 million.

"If we're flying 30 percent less, that means we're using the airspace 30 percent less," explained Colonel Pease. "So in my mind, we have given back 30 percent.

"Airspace is four-dimensional. People forget that if no one is flying there, there's no wall there. So anyone who flies knows that if there's no flying activity, you can go right through the airspace using visual flight rules."

Commercial airliners cannot do so, yet. An initiative of the Federal Aviation Administration called Free Flight, begun in 1994, may provide the solution. Essentially, it will reduce the old groundbased air traffic control infrastructure to a system that will enable pilots, whenever practical, to choose their own route and file a flight plan that follows the most efficient and economical route. Key to the concept is the use of emerging technologies for communications, navigation (Global Positioning System satellites), and surveillance.

According to the FAA, it is employing elements of Free Flight incrementally. As part of the effort, DoD expects to provide next-day schedules to the FAA in 1998 via a new, automated, special-use airspace-scheduling system. It is also working on same-day information.

Until Free Flight fully takes hold—possibly not before 2010—US airspace will continue to get more crowded. The FAA estimates that the air traffic rate will grow by three to five percent per year for the next 15 years, a rate the current airspace architecture cannot efficiently handle.

To Decommission, or Not?

Meanwhile, some favor decommissioning military airspace to help solve the growing air traffic problem and to appease environmental concerns. Colonel Pease maintains that decommissioning is not a good answer. Compressing military flying training within fewer areas would simply create a much greater impact on the remaining locations.

"The answer is not necessarily to decommission some airspace used only 20 percent of the time and use another area 100 percent," he said.

Keeping open underused ranges and airspace actually provides a means to reduce the military training impact. Colonel Pease said that the Air Force could use those alternate ranges at various times without disturbing the environment. For instance, the Air Force is working with the National Park Service to see how it might deconflict its flying training with peak park visitation periods.

As a result of an April 1996 Chief of Staff directive, the Air Staff and major commands are now conducting a study of USAF airspace and range requirements, from entry-level flying training to sophisticated operational combat training at Nellis's Red Flag exercises. The idea is to produce a model that "delineates what we have and what we need by November 1998," stated Colonel Pease.

In addition to reviewing its requirements for operational training, ACC will develop a database of Total Force (active-duty, Air National Guard, and Air Force Reserve) airspace and ranges. It will also identify shortages and excesses, as well as map out long-range operational airspace and range requirements for the Total Force.

ACC's airspace and range team has taken a step that meshes well with the USAF-wide study. The team has been changing the way commanders view their requests for changes in locations used for combat flying training. They wanted to bring some rigor to the process.

"We have a lot of people who will tell you what they want, but we can no longer afford airspace and ranges based on what we want," stated Colonel Gagnon. "There are a lot of people with legitimate competing interests, so we ensure that our needs are requirement-based."

Colonel Ohlendt added that flying training must contribute to combat capabilities delineated in theater commander plans that will be used in combat. "We just can't afford the luxury of excess capacity in terms of airspace and ranges. There's a lot of internal hand-wringing and in-your-face type stuff with our unit commanders when they tell us they want more airspace. We say, 'What's the need?' " ■

Stealth, information technology, and precision strike make the "force dominance" concept work.

Perry on Precision Strike

The "Offset" Strategy

"It's hard from today's perspective to take our minds back 20 years to what kinds of problems we were worried about in [1977]. Then, we were worried about the fact that we were faced with the Soviet Union and the Warsaw Pact, and they had about three times as many tanks, artillery [pieces], and armored personnel carriers as we had, and we thought that they had a serious intent to use them, to send a blitzkrieg down through the Fulda Gap.

"It seems like a long time ago, but it was a very, very real problem to us then.

"We had no conceivable way of increasing the size of the US or the NATO forces to deal with that, and so the 'offset strategy' [devised by Defense Department officials] was no great leap of brilliance. It was simply a necessity. The only way we had of dealing with the three-to-one quantity advantage that Soviet forces had was to try to offset that with our superior technology. That was the key to our entire defense strategy in the late '70s and on into the early '80s.

"In retrospect, it seemed like a good strategy, and it even seemed like an obvious strategy, but . . . there was no shortage of critics in those days who questioned whether we could depend on technology. They argued that, when this modern technology was put into combat, the fog of war would make it ineffective. They also argued that this technology would be too sophisticated, too

William J. Perry *was Secretary of Defense for three years (1994–97). Throughout the Carter Administration (1977–81), he was DoD's top weapons development official and helped launch such programs as the B-2 and F-117 stealth aircraft and various types of cruise missiles. On January 15, 1997, shortly before he stepped down as Secretary, Mr. Perry addressed these remarks to a conference of the Precision Strike Association in Washington, D. C.*

complex for our military personnel to operate and to maintain.

"Well, they underestimated the technology, and they also underestimated the capability of our military personnel."

"Reconnaissance Strike Force"

"What we put together then for the offset strategy was a combination. It was not just precision strike. Precision strike was at the heart of it, but it also involved stealth aircraft to deliver these precision weapons, and it involved an intelligence and reconnaissance system that would target for them. Those were the three components of what we called a 'reconnaissance strike force,' and the reconnaissance strike force was the heart of the offset strategy.

"Thankfully, we never had our offset strategy tested; the Soviet Union dissolved, the Warsaw Pact dissolved.

"But a funny thing happened to this technology. . . . In Operation Desert Storm, this same technology, which had been developed to deal with superior numbers of Warsaw Pact forces, was used against essentially equal numbers of Iraqi forces. And in Desert Storm, we faced, by the way, pretty much the same equipment, the same weapon systems that we had designed our systems against, because nearly all of the Iraqi weapon systems came from the Soviets."

From "Offset" to "Dominance"

"Our equipment worked brilliantly well. I don't need to recall for this audience how well it worked. But what we found was that what we had done for the offset strategy—the application of the reconnaissance strike force, the application of precision strike—had achieved an alternative policy objective. When used in a major regional conflict like Desert Storm, when used against an opponent with equal numbers, our technology did not simply offset the other side. It gave us the ability to win quickly, decisively, and with remarkably few casualties.

"When we saw that result, when we studied that result, we looked at the kind of policy problems and military operational issues we were going to be facing in the years ahead, and we said the very same technology that was developed to deal with the superior numbers of Soviets would become the key to our new systems.

"Today, we don't call it the offset strategy, because we're dealing with a different problem. We call it 'force dominance.' . . . We're facing Iraq or Iran or North Korea with about equal numbers. We want to be able to dominate the battlefield. We did it in Desert Storm."

"When used in a major regional conflict like Desert Storm, . . . our technology did not simply offset the other side. It gave us the ability to win quickly, decisively, and with remarkably few casualties."

The Critics Still Yap

"Precision strike is, of course, at the heart of force dominance, just as it was at the heart of the offset strategy. And not surprisingly, there are still critics of force dominance, just like there were critics of the offset strategy.

"Most recently, we had a [General Accounting Office] report that really questioned whether precision strike was worth the effort—first, whether it was as good as we said, and second, even if it is as good as we said, why do we need it?

"The report made the profound observation that, in Desert Storm, dumb bombs were obviously much more important because we dropped a lot more of them, and they were less costly per bomb.

"This analysis, however, missed . . . the rather fundamental point: The cost-effectiveness measure is not how many bombs you drop but how many targets you destroy. By that measure, our precision weapons worked brilliantly.

"The GAO analysis missed a lot more, because these other points are just difficult to analyze. It missed how precision strike weapons dramatically reduce collateral damage, protecting property and the lives of noncombatants. It missed how PGMs significantly lower the risk to bombers and aircrews, because fewer sorties are required to do the same job. And it missed the synergy that comes from combining precision strike weapons with operations, battlespace awareness, and stealth technology—in short, the reconnaissance strike force."

Touchstone of the Future

"Adding all of these elements together gives you what I have called force dominance, and I can assure you that the decision-makers in the Pentagon today, next year, and for years to come are going to keep force dominance as the touchstone for their planning.

"Today, new generations of precision guided munitions continue to revolutionize how our military operates. The way we are going to obtain the next generation of PGMs is dramatically different [from the way we developed] the first cruise missile.

"Back then, the Defense Department generated the advanced technology we needed. Today, a lot of the technology we need is advancing in the commercial marketplace.

"So we face a new challenge, and that challenge is to tap the commercial marketplace for the technology and apply it to achieving force dominance." ■

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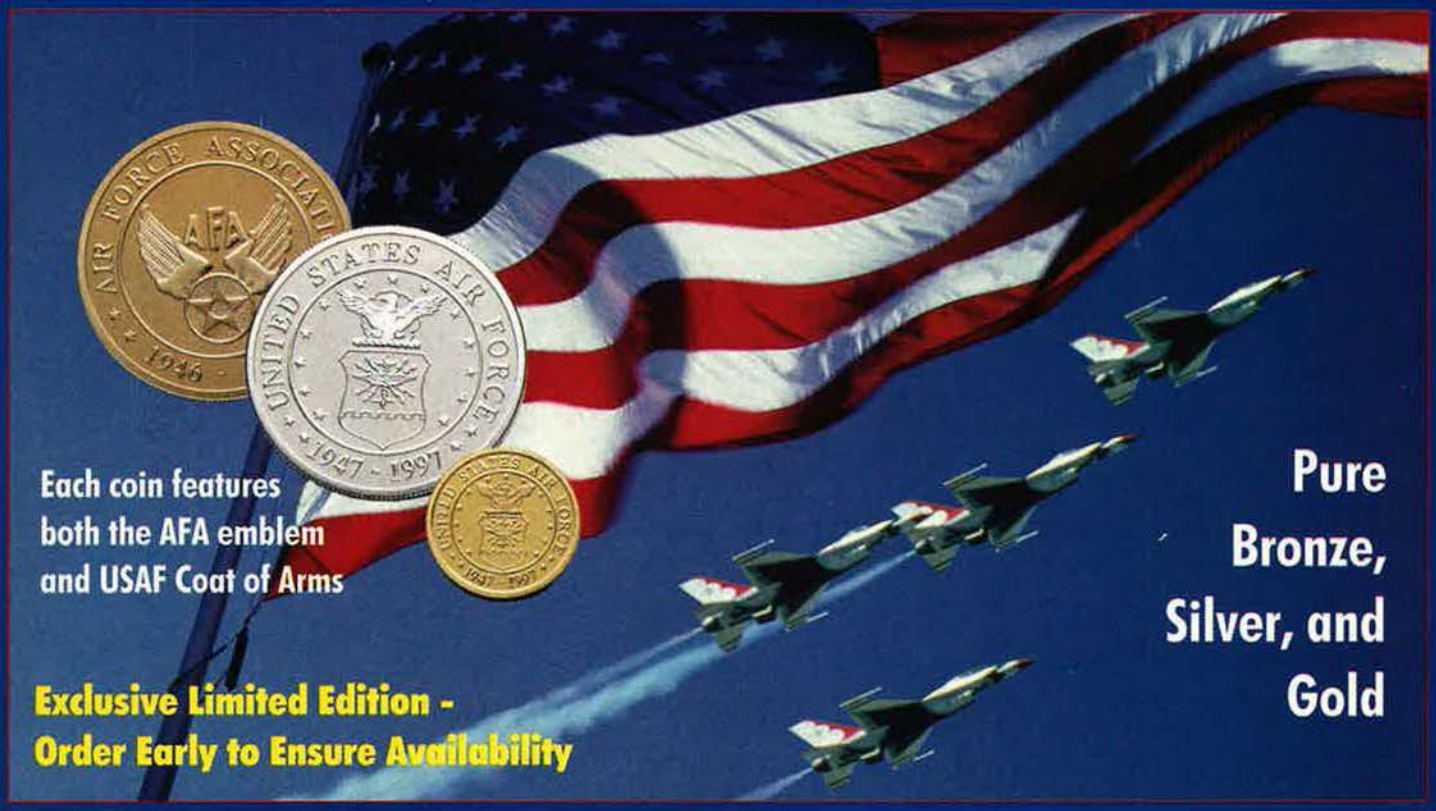

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AFA/AEF National Report

By Frances McKenney, Assistant Managing Editor

World Leaders Joining AFA at the Fiftieth

Former President George Bush heads a list of high-profile speakers participating in the International Airpower symposium. His keynote speech is just one highlight of Air Force Fifty, USAF's golden-anniversary celebration, April 22–26 in Las Vegas, Nev.

The Air Force Association has also arranged for other distinguished speakers to join him, including former British Prime Minister Margaret Thatcher (on video), Secretary of Defense William S. Cohen, Secretary of the Air Force Sheila E. Widnall, Air Force Chief of Staff Gen. Ronald R. Fogleman, Boeing President and CEO Philip M. Condit, and Alvin Toffler, author of *Future Shock* and *War and Antiwar.*

The symposium is among several once-in-a-lifetime events planned for Air Force Fifty. They include a first-of-its-kind Global Air Chiefs Conference, more than four acres of displays and exhibits at the aerospace exposition, and the "Golden Air Tatoo" airshow at Nellis AFB.

As of February, 277 exhibitors had signed up to participate in the aerospace exposition at the Las Vegas Convention Center, along with more than 150 reunion and affinity groups. *[See box on p. 84.]* The airpower symposium audience is expected to be 1,500, and the audience for activities in Las Vegas is projected at 12,000. At Nellis AFB, USAF plans for a crowd of more than 200,000 for each of its two days of open house.

Speaking to a recent meeting of the Board of Directors, AFA National President Doyle E. Larson said of Air Force Fifty, "This event has been six years in the planning, and it's one that those who attend are going to remember forever."

One of 30 successful "Visions of Exploration" programs in Utah takes place at East Layton Elementary School, in Layton, where Gary Hale, Utah state vice president, and Joyce Lehman, a* USA Today *representative from Denver, Colo., got down on the floor to work with a group of sixth graders.

Supporting Education

The numbers are in.

Looking back at its achievements in 1996, the Aerospace Education Foundation reported that it awarded 486 Eagle Grants to Community College of the Air Force graduates to continue their education. The scholarships totaled $121,500.

Twenty Air Force spouses received $1,000 college scholarships from AEF, and five Dr. Theodore von Kármán Graduate Scholarships, at $5,000 each, were awarded.

Educator grants, of $250 each, numbered 351 in 1996, adding up to $87,750 to help teachers cover the costs of aerospace, math, or science instruction.

Junior ROTC grants went to 90 recipients and totaled $22,500. Civil Air Patrol grants went to 66 units and totaled $16,500.

Twenty-six AFA chapters received matching grants that added up to $15,272, to help them in aerospace education efforts.

In spring 1996, 993 classrooms participated in the *USA Today*–AEF "Visions of Exploration" program that fosters in school children an interest in math and science. In the fall of last year, AFA chapters signed up 1,120 classrooms for "Visions." In all, the program reached 63,390 students.

As of February, the **General E. W. Rawlings (Minn.) Chapter** had the distinction of having the most classrooms signed up—121.

Pledges to the Memorial

The Air Force Memorial Foundation received $1.6 million from the estate of Ruth Apperson Eaker, who was the widow of Lt. Gen. Ira C. Eaker, commander of Eighth Air Force in World War II.

Ruth Eaker, a resident of Washington, D. C., died in December 1995. She was active in civic and charitable affairs.

AFA National Director Russell E. Dougherty said, "Mrs. Eaker was a very private individual and wouldn't want any recognition for her generosity, but airmen everywhere should know about and appreciate what she did to help make the Air Force Memorial a reality."

At the Air Warfare symposium in Orlando, Fla., in January, AFA's Board of Directors approved a $100,000 do-

nation to the memorial foundation. This fifth and final payment completes the Association's $500,000 pledge to help build the first USAF memorial in the national capital's monument area.

Also at the black-tie gala held in conjunction with the symposium, the **Central Florida Chapter** presented a $25,000 donation to Joseph Coors, Jr., the Air Force Memorial Foundation board chairman. It was the chapter's final payment on a total pledge of $100,000, funds raised primarily through the annual symposium gala that this year was attended by 1,000 guests, according to Chapter President Robert E. Ceruti.

Utah AFA/AEF showed its generosity at the Orlando affair, too, donating $2,500 to the foundation. Daniel C. Hendrickson, National Vice President (Rocky Mountain Region), said the group will give this amount every year until the memorial is built.

The Air Force Memorial will be paid for by $25 million in privately raised funds. It will be adjacent to Arlington National Cemetery in Virginia and is scheduled to open to the public around 2000. The foundation plans to hold a dedication ceremony on the Air Force's birthday, September 18, 1997.

Sign Up

AFA's Veterans/Retiree Council, headed by Thad A. Wolfe, is actively working with the 105th Congress, as several health-care issues important to USAF retirees come up for consideration in this session.

Among the issues are implementing the Medicare Subvention test and opening the Federal Employees Health Benefits Program to Medicare-eligible military retirees and their dependents. To pave the way for a transition to either program, the council encourages eligible AFA members to sign up for Medicare Part B at their earliest opportunity.

"It is more important than ever for Medicare-eligible military retirees to enroll in Medicare Part B as soon as they can," Wolfe said. "Both of these legislative initiatives take different approaches to addressing the health-care crisis that Medicare-eligible military retirees now face, but retirees will find it easier to use them if they are already enrolled in Medicare Part B."

If Medicare-eligibles do not enroll in Part B when they enroll in Part A, their Part B premiums increase by 10 percent for each 12-month period that they could have been enrolled but were not.

Medicare Part A, the Medicare Hospital Insurance program, primarily covers inpatient hospital stays and is financed through the Medicare Trust Fund. Those enrolled in Medicare automatically receive this coverage for no premium.

Part B, the Medicare Medical Insurance program, covers other medical needs, such as doctor services, hospital outpatient services, clinical laboratories, and durable medical equipment. Part B is 75 percent subsidized by the federal government.

AFA National Secretary Mary Anne Thompson addressed an Embry-Riddle Aeronautical University Aviation Magnet School National Conference in Daytona Beach, Fla., in January. She is flanked by Patricia Fleener-Ryan, conference chairman, and Richard Ortega, state vice president for Aerospace Education.

Busy in Kentucky

National Director Russell Dougherty spoke at a February meeting of the Louisville, Ky., chapter named for him.

According to Chapter President James B. Brown, he spoke to the **Gen. Russell E. Dougherty Chapter** about the Air Force's development since 1947, the need to retain airpower resources, and some of the long-range planning USAF is now undertaking. He also related anecdotes from his USAF career and saluted chapter member Philip P. Ardery as one of his role models.

Now an attorney, Dougherty served as commander in chief of Strategic Air Command and chief of staff of NATO's Allied Command Europe. He was AFA Executive Director from 1980 to 1986. As a native of Glasgow, Ky., he has many strong ties to the Bluegrass State and graduated from Western Kentucky University and the University of Louisville Law School.

Brown reported that Dougherty's appearance brought out one of the largest turnouts for any recent AFA state event—more than 100 people. Special visitors included National Director Harold F. Henneke, who drove in from Indianapolis, Ind.

In January, E. Daniel Cherry, Sec-

Photo by Kathy Recktenwald

Having started out as a bugler with the Kentucky National Guard, Russell Dougherty (left) was quite familiar with the memento he received from Gen. Russell E. Dougherty (Ky.) Chapter President James Brown.

retary of the Kentucky Justice Cabinet, spoke at a meeting cosponsored by the **Lexington (Ky.) Chapter** and the Aviation Museum of Kentucky.

Cherry flew nearly 300 combat missions in the Vietnam War, but Chapter President Daniel G. Wells said the guest speaker's talk focused mainly on his experiences as leader of the Thunderbirds.

The Secretary of the Justice Cabinet is responsible for operations of the corrections, state police, criminal justice training, and juvenile justice departments. Cherry is a member of the **West Kentucky Chapter.**

Also in January, the Lexington Chapter sponsored its second annual reception for AFROTC cadets at the University of Kentucky in Lexington. Sixteen cadets and six chapter representatives socialized at the mixer.

Col. Craig L. Koontz, the cadets' instructor, asked his fellow chapter members at the reception to summarize their USAF careers for the cadets. One of the most interesting descriptions came from Walker "Russ" Reynolds, a veteran of World War II, Korea, and Vietnam, who spoke about search-and-rescue missions in Vietnam.

For Art's Sake

Civil Air Patrol cadets in the 46th Composite Squadron at Tehachapi, Calif., saw a metal lithograph at an annual AFA awards banquet early last year and liked it so much that they struck a bargain with the **Antelope Valley (Calif.) Chapter** to earn a copy of it for their unit.

The artwork depicts test pilot Robert L. Cardenas, a **San Diego (Calif.) Chapter** member, flying a jet-powered YB-49 Flying Wing in 1948.

To earn the artwork, the cadets performed community service at the Phillips Laboratory Propulsion Directorate at Edwards AFB, Calif., last summer. They completed more than 250 hours of cleanup work and painting, despite days when temperatures reached more than 100°, according to Victor H. Sternberg, Antelope Valley Chapter president.

The CAP cadets also toured the Phillips facilities at the 65-square-mile Propulsion Directorate, including a "windshield tour," with a stop at the 26-story rocket test stands, and "Rocketry 101"—exhibits at the orientation center that cover rocket propulsion history.

Sternberg presented the artwork to the group at a gathering of 30 cadets and other guests at the CAP facility at Tehachapi Airport. Ranney Adams, Phillips Laboratory Propulsion Directorate public affairs director, also presented the volunteers with a framed print—a montage of photos illustrating the lab's accomplishments in rocket propulsion over the past 50 years.

Flying at Vero Beach

Several **Indian River (Fla.) Chapter** members volunteered at Aviation Day, sponsored by Vero Beach, Fla., in November.

The two-day event at Vero Beach Municipal Airport offered aircraft on static display, commercial displays, tours of the air traffic control tower, and flybys.

The open house allowed the public to view a restored Stearman owned by chapter member Robert V. Russell, a Navy P-3, an Army AH-64 Apache helicopter, a Coast Guard Dauphin helicopter, a three-quarter-size version of a P-51 Mustang, and the latest aircraft from The New Piper Aircraft, Inc., headquartered in Vero Beach.

Chapter member Robert Tenbus had a Cessna 421 twin-engine Gold-

Braving the wind, Karen Eskew (center, wearing cap), Antelope Valley (Calif.) Chapter Aerospace Education vice president, and Highland High School Det. CA-944 students operated an AFA booth at an Edwards AFB open house.

US Air Force Academy Superintendent Lt. Gen. Paul Stein accepted a framed version of the AFA fiftieth-anniversary collage from National Director William Croom, Jr. (left), and Colorado Springs/Lance Sijan Chapter President Charles Zimkas (right) after a chapter membership drive.

en Eagle from his company on display.

Among five private aircraft giving rides that day (for a fee donated to a local charity) was a Piper Arrow piloted by Robert B. Fox, the chapter's vice president for Government Relations.

According to Robert B. Stiastny, chapter president, the most memorable highlight of Aviation Day was the flyby of a C-47. About 20 World War II veterans, attired in uniforms from that era, parachuted out of the restored "Gooney Bird."

Jenny and the Jets

A float sponsored by the **Longs Peak (Colo.) Chapter** headed up the Colorado State University homecoming parade, leading a procession of more than 100 floats and 15 bands through the streets of Fort Collins, Colo.

A model of a World War I JN-4 "Jenny" and a model of an F-16 were mounted on the float, illustrating a banner that proclaimed, "From Jennys to Jets: 50-Year Salute to AFROTC, Sponsored by Your Air Force Association."

The chapter borrowed the replicas, and the truck to pull the trailer that they were mounted on, from an Air National Guard recruiting station in Greeley, Colo. Edmund L. Robert, a former chapter president, directed the project and drove the truck in the parade.

The night before the parade, chapter members were special guests at an ROTC ball celebrating 50 years of Air Force ROTC and 80 years of Army ROTC at the university. Those attending included Philip Moore, chapter president; Sheldon I. Godkin, a

AFA and the Air Force want you to be part of **Air Force Fifty**—the celebration of USAF's fiftieth anniversary in Las Vegas April 22–26, 1997.

Huge crowds are expected to attend. This is a once-in-a-lifetime event you don't want to miss.

be there.

- Two days of airshows, featuring the USAF Thunderbirds and other aerial demonstration teams.
- Acres of fascinating exhibits and displays.
- Reunion group activities. So far, 152 veterans groups and other organizations have made plans to hold reunions in conjunction with Air Force Fifty.
- An opportunity to see historic aircraft.
- A spectacular multimedia historical retrospective of the first fifty years of the US Air Force.
- An international airpower symposium. Among the dignitaries expected to attend are 108 chiefs of foreign air forces.

For registration information, write to:

Air Force Fifty
Air Force Association
1501 Lee Highway
Arlington VA 22209-1198

or call AFA's Fax on Demand System
(800) 232-3563 and order document number 1997

Air Force Fifty staff can be reached at (800) 552-5427

or visit the Web site: http://www.usaf50thafa.org/

AIR FORCE ASSOCIATION
50 YEARS USAF
LAS VEGAS, NEVADA
APRIL 22-26, 1997

former chapter president; and James S. Strickland, also a former chapter president and now state vice president (North).

Also in the Centennial State, the **Colorado Springs/Lance Sijan Chapter** held a membership drive at the US Air Force Academy for two weeks in early winter. When the drive concluded, the chapter hosted a reception at the Academy's Officers' Club for new members among the cadets and staff.

To mark the event, Chapter President Charles P. Zimkas, Jr., and National Director William D. Croom, Jr., presented to Academy Superintendent Lt. Gen. Paul E. Stein a framed version of the AFA fiftieth-anniversary collage created by artist Lawrence M. Romorini. The artwork compiles more than 225 mementos and miniaturized covers of *Air Force* Magazine.

The annual membership drive at the Academy is one of two membership campaigns the chapter holds each year aimed at active-duty USAF personnel. The other was scheduled for mid-February and encompassed Peterson AFB, Falcon AFB, and Cheyenne Mountain AS, Colo.

More Chapter News

Pioneer Valley (Mass.) Chapter members Winston S. Gaskins, who is also Massachusetts state vice president; Col. James P. Czekanski, 439th Airlift Wing (AFRES) commander at Westover ARB, Mass.; C. O. Bost, Jr.; and Massachusetts State President Francis F. Carmichael, Jr., an **Otis Chapter** member, were among those involved in the drive last year to establish a second veterans cemetery in the Bay State. In December, a site at Agawam was chosen. It will be the first state-owned military cemetery in Massachusetts.

The **Ark-La-Tex (La.) Chapter** presented four AFROTC scholarships at a dining-in at Grambling State University, La., in December. Chapter Vice President William F. Cocke and Treasurer James E. Huggins presented $500 scholarships to cadets Katasha A. Johnson and Kesha Butler of Grambling and Eron Borne and Shaun J. Landry of Louisiana Tech University, in Ruston, La. They were selected for their citizenship, integrity, leadership, academic performance, and financial need. The chapter's Community Partner program raises the funds for these scholarships.

At their annual Christmas brunch at the base's officers' club in December, the **Richard S. Reid (Ariz.) Chapter** donated more than 50 toys and $145 to the Santas in Blue program of Davis-Monthan AFB, Ariz. Chapter member Col. Thomas E. Booth, commander of the 355th Support Group, and the chairman of the Santas program, SSgt. Robert J. Reynolds, of the 355th Logistics Group, accepted the donation. Santas in Blue are volunteers from the 355th Fighter Wing and 305th Rescue Squadron (AFRES). They have brought Santa and his toys to children on reservations in the Tucson area for 31 years.

AEF Vice President Earl D. Clark, Jr., was special guest at the Missouri State AFA executive council quarterly meeting in Overland Park, Kan., in December. James M. Snyder, Missouri state president; Paul S. "Scott" Land, **Central Missouri Chapter** past president; Robert L. Boot, **Spirit of St. Louis Chapter** vice president; James F. Watkins, **Harry S. Truman Chapter** president; and John G. Bauer, **Ozark Chapter** president, attended the meeting.

Have AFA/AEF News?

Contributions to "AFA/AEF National Report" should be sent to *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. ■

Coming Events

May 2–3, **South Carolina State Convention,** Clemson, S. C.; May 9–11, **New Jersey State Convention,** Atlantic City, N. J.; May 16, **Alaska State Convention,** Elmendorf AFB, Alaska; May 16–17, **Tennessee State Convention,** Chattanooga, Tenn.; May 31, **Massachusetts State Convention,** Hanscom AFB, Mass.; June 6–7, **New York State Convention,** Niagara Falls, N. Y.; June 13–14, **North Dakota State Convention,** Fargo, N. D.; June 20–21, **Arkansas State Convention,** Hot Springs, Ark.; June 27–28, **Missouri State Convention,** Whiteman AFB, Mo.; July 11–12, **Colorado State Convention,** Colorado Springs, Colo.; July 18–19, **Alabama State Convention,** Birmingham, Ala.; July 18–19, **Kansas State Convention,** McConnell AFB, Kan.; July 18–20, **Texas State Convention,** Fort Worth, Tex.; July 25–26, **Georgia State Convention,** Robins AFB, Ga.; July 25–26, **Mississippi State Convention,** Biloxi, Miss.; July 25–27, **Florida State Convention,** Panama City, Fla.; July 25–27, **Pennsylvania State Convention,** Pittsburgh, Pa.; August 9–10, **Iowa State Convention,** Cedar Rapids, Iowa; August 14–17, **California State Convention,** Riverside, Calif.; August 15–16, **Oklahoma State Convention,** Oklahoma City, Okla.; August 16, **Connecticut State Convention,** East Hartford, Conn.; August 16, **Indiana State Convention,** Indianapolis, Ind.; September 6, **Delaware State Convention,** Dover, Del.; September 15–17, **AFA National Convention and Aerospace Technology Exposition,** Washington, D. C.

Unit Reunions

Altus Aces Reunion, Altus AAF, Okla., personnel (World War II). September 1997, in Omaha, Neb. **Contact:** Lester K. Glaze, P. O. Box 309, Broken Bow, NE 68822. Phone: (308) 872-2842.

Birkenfeld AB, West Germany, personnel (1948–69). September 1997, in New Orleans, La. **Contact:** Jackie D. King, 212 Islandia Ct. W., Nashville, TN 37217. Phone: (615) 366-5626.

Bolling AFB B-25 Bunch, 1101st Maintenance Squadron, Bolling AFB, D. C. May 19–22, 1997, at Wright-Patterson AFB, Ohio. **Contact:** Clifford J. Smith, 5249 Old A&P Rd., Ripley, OH 45167-9747. Phone: (937) 375-4671.

Burtonwood Ass'n. October 7–11, 1997, in Nashville, Tenn. Civilian and military personnel who were stationed at RAF Burtonwood, UK, are invited. **Contact:** George W. Nelson, 578 E. Limewood Dr., Battle Creek, MI 49017. Phone: (616) 660-0279.

Fighter Pilots Reunion, hosted by the New Zealand Federation of Brevet Clubs, New Zealand Fighter Pilots Association, New Zealand Fighter Pilots Museum, and Pacific Fighter Pilots Association. October 24–27, 1997, in Wanaka, New Zealand. **Contact:** Edward Howard, The Brevet Club (Canterbury) Inc., Box 31 Cust, North Canterbury, New Zealand.

Ground Electronics Engineering Installation Agency (GEEIA) and Mobile Depot Activity (MDA) personnel. June 13–15, 1997, at the Radisson Inn–Oklahoma City in Oklahoma City, Okla. **Contacts:** Sophia Bronson, 2203 White Oak Circle, Norman, OK 73071. Phone: (405) 329-6991. Walter Chapman, RR4, Box 3567, Stigler, OK 74462. Phone: (918) 452-2313.

9th Air Force Historical Society, Penn. Chapter. June 6–8, 1997, in Reading, Penn. **Contacts:** Arthur or Carolyn Swanson, P. O. Box 102, Warminster, PA 18974-0511. Phone: (717) 687-6257.

Meet You in Las Vegas

The following reunion and affinity groups and other participating organizations have notified AFA as of February 7, 1997, that they will be at Air Force Fifty in Las Vegas, Nev., in April. The point of contact for this list is the Air Force Association, Attn.: Shirley Bledsoe, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (800) 727-3337, extension 4875.

2d Bombardment Association
3d Military Airlift Squadron, ATS/MAS
5th Bomb Group Association
8th Air Force Historical Society
9th Air Force Association
9th Bomb Wing
11th Air Force Association
12th Air Force Association
15th Air Force Association
15th Troop Carrier Squadron
15th/20th Weather Squadrons Association
18th Fighter-Interceptor Squadron
20th Air Force Association
25th Bomb Group Association
28th Military Airlift Squadron Historical Association
31st Fighter Officers Association
33d Fighter Group (58th, 59th, and 60th Fighter Squadrons)
38th Tactical Reconnaissance Squadron
Cadet Class 40-H
Class 41-1 AAC Engineering Officers
Class 41-G
Pilot Class 43-D "Delta Eagles"
43-K Aviation Cadet Association and B-47 Association
Pilot Class 44-E
46th Tactical Fighter Squadron
47th Bomb Squadron
Pilot Training Class 49-B
51st Fighter Squadron Association
Pilot Training Class 52-A
Pilot Training Class 52-D, Webb AFB, Tex.
Pilot Training Class 53-A
Pilot Training Class 53-B
54th Troop Carrier Wing (Army Air Forces)
Class 55-B "Melonheads"
Class 55-C, Officer Candidate School
55th Weather Reconnaissance Association
56th USAF Hospital, Nakhon Phanom, Thailand
Class 58-D, Officer Candidate School
63d Troop Carrier Squadron
Pilot Training Class 63-D
Class 66-C, Reese AFB, Tex.
68th Fighter-Interceptor Squadron (1950–55)
68th Fighter Squadron Association (World War II)
71st/341st Air Refueling Squadrons (4060th Air Refueling Wing)
Pilot Training Class 72-07
75th Fighter Squadron Association
86th Fighter-Bomber Group (525th, 526th, and 527th Squadrons)
92d Fighter Squadron (81st Fighter Group)
152d Fighter-Interceptor Squadron
306th Bomb Wing Association
307th Bomb Group/Wing (1946–54)
308th Fighter-Interceptor Squadron
315th Bomb Wing (Guam)
319th Fighter-Interceptor Squadron
344th Fighter Squadron
348th Bomb Squadron (99th Bomb Group)
381st Bomb Group Memorial Association
384th Bomb Group (8th Air Force)
388th Fighter-Bomber Wing
405th Fighter-Bomber Group
447th Bomb Group–PX
449th Bomb Group Association
449th Bomb Squadron Association
452d Bomb Squadron Association
459th Bomb Group Association
460th Bomb Group (World War II, 15th Air Force)
465th Bomb Group Association
465th Troop Carrier Wing (780th, 781st, and 782d Squadrons)
474th Tactical Fighter Wing "Roadrunners"
481st Tactical Fighter Squadron
490th Bomb Group Association
504th Bomb Group Association
6147th Tactical Control Group "Mosquitos"
7499th Support Group (7405th, 7406th, and 7407th Squadrons)
A-37 Dragonfly
Aeromedical Evacuation Association
Air Commando Association
Air Force Enlisted Widows Home Foundation
Air Force Navigators Observers Association
Air Force Public Affairs Alumni Association
Air Force Security Police Association
Air Force Sergeants Association
Air Force Village Foundation
Air Force Village–West
Air University Foundation
Air Transport Command (North African Division)
Air War College Alumni Association
American Air Museum in Britain
American Fighter Aces Association
Association du Personnel Navigant Forme en Amérique
Association of Old Crows, Silver State Chapter
Austin (Tex.) Chapter
Aviation Cadet Museum Inc.
B-24 Liberator Club
B-47 Stratojet Association
Berlin Airlift Veterans Association
Collings Foundation
Colorado State AFA
Confederate Air Force
Delaware Valley Historical Aircraft Association
Distinguished Flying Cross Society
Doolittle Tokyo Raiders
Edgar Allen Poe Literary Group (The Raven)
Embry-Riddle Aeronautical University
F-4 Phantom II Society
F-86 Sabre Pilots Association
Far West Region AFA
Flying Tigers of the 14th Air Force Association, Inc.
Former Air Commanders United of Air National Guard
General B. A. Schriever Los Angeles (Calif.) Chapter
Hawaii Joint Police Association
International Order of Characters, Inc., Aviation
Italian Air Force Association
Japan Association of Defense Industry
Linebacker II (Vietnam)
Lockbourne AFB, Ohio, Officers
MacDill F-84 Hog Drivers Association
MacDill Triple Nickel Association
Miami (Fla.) Chapter
Mighty Eighth Air Force Heritage Museum, The
Moroccan Association, Inc.
Nagoya/Komaki AB (Japan) Association
National Aviation Hall of Fame
National Guard Association of the US
New Mexico State AFA
New Zealand Fighter Pilots Museum
New Zealand Wings Reunion Group
One Patriot's Saga
Order of Daedalians
Oregon State AFA
Oscar Deuce Association
P-47 Thunderbolt Pilots Association
RAF Benevolent Fund
RAF Station Manston, UK
Red River Valley Fighter Pilots Association
Reserve Officers Association of the US
Royal Air Force (UK)
Salute to American Veterans
Sampson AFB (N. Y.) Veterans Association
Silver Wings (Belgian pilots)
Society of Strategic Air Command
Stalag Luft I, Hungry Hollow, Room 7 (World War II)
Texas State AFA
The Retired Officers Association
Tuskegee Airmen (332d Fighter, 477th Bomb, and 96th Service Groups)
U-2 Pilots/Navigators
USAF Helicopter Association
USAF Vietnam Veterans Reunion 1997
Utah State AFA
Washington State AFA
Wild Weasels (1965–96)
Women's Airforce Service Pilots (WASPs), World War II
World War II Memorial

Unit Reunions

8th Attack Squadron Ass'n, including the 8th Aero, Attack, Bomb, and Special Operations Squadrons. May 28–31, 1997, at Hurlburt Field, Fla. **Contacts:** Andrew H. Weigel, 2512 Fairmount St., Colorado Springs, CO 80909. Phone: (719) 632-8576. Ed Shook, 1900 Park Hill Dr., Arlington, TX 76012. Phone: (817) 265-2662.

9th Bomb Group Ass'n. August 27–30, 1997, at the Marriott Crystal Gateway in Arlington, Va. **Contact:** Herbert W. Hobler, 295 Mercer Rd., Princeton, NJ 08540. Phone: (609) 921-3800.

20th Troop Carrier Squadron. April 17–19, 1997, at the Ramada Inn Bayview in Pensacola, Fla. **Contact:** James R. Willis, 602 S. E. 27th Dr., Homestead, FL 33033-5212. Phone: (305) 230-0113.

Pilot Class 43-D Ass'n. May 21–24, 1997, at the Little America Hotel and Towers in Salt Lake City, Utah. **Contact:** Jack Carlson, 3045 Silverview Dr., Cuyahoga Falls, OH 44224. Phone: (216) 688-4848.

48th Troop Carrier Squadron, 313th Troop Carrier Group (World War II). October 14–16, 1997, in Jekyll Island, Ga. **Contact:** Robert H. Lynn, 398 Clifton Dr., Dawsonville, GA 30534. Phone: (706) 265-4331.

Class 54-M. June 13–15, 1997, at the Marriott Hotel in Oklahoma City, Okla. **Contact:** Lt. Col. Jack R. Seay, USAF (Ret.), 1219 E. 13th St., Tulsa, OK 74120-5093. Phone: (918) 583-3181 (work) or (918) 599-9803 (home).

Class 56-Q and 09 (Big Spring, Del Rio, and Lackland AFB, Tex., Marianna, Fla., and Malden AFB, Mo.). June 27–28, 1997, at Wright-Patterson AFB, Ohio. **Contacts:** Ned E. Derhammer, 211 Quincy St., West Lafayette, IN 47906-3024. Phone: (765) 743-4988. Robert Marken, 1671 Hwy. 36 E., Milner, GA 30257. Phone: (770) 358-0513 or (800) 763-7596.

56th Fighter Group, including assigned squadrons (1941–97). June 19–22, 1997, at the Executive Inn in Evansville, Ind. **Contact:** Leo Lester, 600 E. Prospect, Kewanee, IL 61443. Phone: (309) 856-6826.

90th Bomb Squadron (Korea). October 16–19, 1997, in Hampton, Va. **Contact:** George B. Pittelkau, 5670 S. W. Fernbrook Way, Lake Oswego, OR 97035-7726. Phone: (503) 639-5077.

315th Fighter Squadron, 324th Fighter Group (World War II). June 4–8, 1997, at the Marriott Airport in Edmundson, Mo. **Contact:** Eugene J. Orlandi, 311 Third St., East Northport, NY 11731. Phone: (516) 368-9193.

344th Bomb Group (M) Ass'n. August 27–31, 1997, in Seattle, Wash. **Contact:** Lambert Austin, 5747 Darnell St., Houston, TX 77096. Phone: (713) 774-3030.

466th Bomb Group Ass'n "Flying Deck" (World War II). May 21–25, 1997, at the Park Tucson Hotel and Conference Center in Tucson, Ariz. **Contact:** Louis Loevsky, 16 Hamilton Dr. E., North Caldwell, NJ 07006. Phone: (201) 226-4624.

497th/460th Fighter-Interceptor Squadron Ass'n. May 22–24, 1997, in Portland, Ore. **Contact:** Richard E. Chandler, 29932 Peckenpaugh Rd., Shedd, OR 97377. Phone: (541) 491-3621.

500th Bomb Squadron, 345th Bomb Group (World War II). August 31–September 5, 1997, in San Antonio, Tex. **Contact:** William J. Cavoli, 2320 Encino Cliff, San Antonio, TX 78259. Phone: (210) 497-3580. Fax: (210) 497-7980.

Mail unit reunion notices well in advance of the event to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

3910th Bomb Group, 7th Air Division, and permanent party personnel stationed at RAFs Wyton, Upper Heyford, Mildenhall, and Lakenheath (1950–53). June 6–10, 1997, in Biloxi, Miss. **Contact:** Bill G. Parkhurst, P. O. Box 2881, Tulsa, OK 74101. Phone: (918) 446-6400.

The following reunions will be held in conjunction with USAF's fiftieth-anniversary celebration:

Pilot Class 50-A. April 22–26, 1997, in Las Vegas, Nev. **Contact:** Charles V. Costantino, 4435 Rachel Blvd., Spring Hill, FL 34607-2538. Phone: (352) 596-8464.

481st Tactical Fighter Squadron Alumni. April 24–26, 1997, at the Treasure Island at the Mirage in Las Vegas, Nev. **Contact:** Lt. Col. Bob Finley, USAF (Ret.), 6618 E. Valle di Cadore, Tucson, AZ 85750. Phone or fax: (520) 577-1006. ■

Bulletin Board

Seeking **Ralph Mitchell,** 8th Air Force, who worked with RAF Wing Cmdr. Jim Fordham, RAF Bomber Command "Pathfinders," in 1944. **Contact:** Jerry S. Stover, 4025 Druid Lane, Dallas, TX 75205.

Seeking the whereabouts of **SSgt. John Shaw and A1Cs David Keane, Richard Norris, William Remus, John Selby, and John Young,** all of the 820th Civil Engineering Squadron, Plattsburgh AFB, N. Y., 1959–62. **Contact:** Eugene C. Nelson, 7203 Shelton Ct., Chesterfield, VA 23832-6667.

Seeking information on the airdrop testing of a **T-24 Weasel** tracked cargo vehicle from a Lancaster (PM-N) bomber at Wright Field, Ohio, during World War II. **Contact:** Charles G. Jarrells, P. O. Box 340365, Dayton, OH 45434-0365.

Seeking information on **307th Bomb Group B-24 Liberators** during World War II. **Contact:** Russell E. Fink, 4 Eaton Ct., Hopewell, NJ 08525.

Seeking information on the **B-29 *Tiny Tim,*** assigned to the 43d Bomb Squadron, 29th Bomb Group, 314th Bomb Wing, which did not return from a mission to Tokyo, March 10, 1945. **Contact:** SMSgt. Jack L. Goddard, USAF (Ret.), 801 W. Collins, Goreville, IL 62939-2639.

Seeking contact with former **301st and 376th Bomb Wing** personnel, Lockbourne AFB, Ohio. **Contact:** Lt. Cmdr. Rick Morgan, USN (Ret.), 3404 Flint Hill Pl., Woodbridge, VA 22192.

Seeking contact with **1st Lt. Martin Sobel,** assigned to the 389th Bomb Squadron, 312th Bomb Group, Luzon, the Philippines, in 1945. He is originally from Long Island, N. Y. **Contact:** Lt. Col. Donald K. Longer, USAF (Ret.), 1410 Tredegar Dr., Fort Myers, FL 33919-2224.

Seeking the whereabouts of former WB-50 pilot **Maj. Nick Kantor,** radio operator **SSgt. Stanley Stephanowski,** and weatherman **CMSgt. Gregory Gregoire. Contact:** CMSgt. Richard H. Langill, USAF (Ret.), P. O. Box 162, Plainfield, NH 03781-0162.

Seeking information on **John De Marco,** originally from Buffalo, N. Y., who was based in England in June 1945. **Contact:** Gillian McClinton, 78 Queens Park, Glengormley, Newtownabbey, Antrim BT36 8HT, Northern Ireland, UK.

Seeking contact with **Maj. Bud McKinley (or MacKinley)** who served with the No. 2 Stores Department in Sydney, Australia, 1960–64, and may be living in Florida. His wife is named Patricia. **Contact:** Fr. Desmond O'Neill, St. Boniface Rectory, 330 Gregory St., Rochester, NY 14620.

Seeking contact with personnel from the **2d Airborne Air Control Squadron,** Elemendorf AFB, Alaska, 1950–52. **Contact:** Oscar L. Hinton, 489 Live Oak Church Rd., Selma, NC 27576.

Seeking original B-58 Hustler **patches,** especially a 43d Bomb Wing Hustler M-2 shoulder patch. Also seeking B-58 crew photographs and desk models. **Contact:** Dale R. Messimer, P. O. Box 4571, Mountain View, CA 94040-4571.

Seeking contact with **SSgt. Marty Van Buren,** a B-52G gunner with the 379th Bomb Wing, Wurtsmith AFB, Mich., in 1987, and with test pilots for KC-135s, C-130s, F-106s, and U-2s out of **Hanscom Field, Mass.,** in the 1960s. Also seeking a photo of a 1972 Thunderbirds **missing man formation. Contact:** Andrew S. Biscoe, 3659 W. Ridge Dr., Post Falls, ID 83854.

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 recollections and photographs from former **612th, 613th, and 614th Tactical Fighter Squadron** personnel who served at Torrejon AB, Spain, 1983–92. **Contact:** Manuel Carazo Garcia, Avda. de España 107, Chalet 18, Las Rozas, 28230 Madrid, Spain.

Seeking contact with personnel assigned to the **NATO base in Chateauroux, France,** 1967–76. **Contact:** Carole Hus, Cecilia Morel, DDB Cybertime, 55 rue d'Amsterdam, 75391 Paris Cedex 08, France.

Seeking photos of **C-130B #58-0711,** LAC #3506, in yellow paint, assigned to the 6091st Reconnaissance Squadron in Japan before 1966. **Contact:** Don A. Rogers, P. O. Box 1413, Brandon, FL 33509-1413.

Seeking information on **Charles Bradley,** an air policeman who served at RAF Croughton, UK, in the 1950s. He is originally from San Pedro, Calif. **Contact:** Quentin Dwane, 4 Browns Quay, Thomondgate, Limerick, Ireland.

Seeking information on, photos of, and patches, hats, and scarves from the **96th Air Refueling Squadron,** Altus AFB, Okla., 1955–65. **Contact:** 2d Lt. William T. England, 96 ARS/CCE, 7 W. Arnold St., Suite 102, Fairchild AFB, WA 99011.

Seeking contact with **Ray Austin, William P. Blackwell, James E. Glass, Robert D. Hranac, and Bill Payne,** and other personnel stationed with the 1932-4 Airborne Air Control Squadron Detachment on Padloping Island, Canada, in 1950. **Contact:** Walt J. Ziemke, 110 Courtney Ct., Neenah, WI 54956-2349.

Seeking the whereabouts of **Lt. Col. Franklin Bernard Waddell,** who was stationed at Langley AFB, Va., and served in the Persian Gulf War. **Contact:** Aaron Waddell, 15 Park Rd., Sawtry, Cambridgeshire PE17 5TA, UK.

Seeking information on units sent to **Yosemite National Park** in the summer of 1943, especially any **IV Fighter Command** units, including those commanded by Lt. Gilbert W. Jones or Lieutenant Ward. **Contact:** Azia Yerne, 1603 Church St., San Francisco, CA 94131.

Seeking contact with former members of the **86th Bomb Squadron,** 47th Bomb Group, stationed at RAF Sculthorpe or RAF Alconbury, UK, during the 1950s. **Contact:** Glenn Ludlow, 135 Ferncliff Cres. S. E., Calgary, Alberta T2H 0V5, Canada.

Seeking **aircraft models** given as manufacturers' promotions. Also seeking to have built civilian and military aircraft models that manufacturers have never produced. **Contact:** William Reid, 1600 Prairie, Essexville, MI 48732.

Seeking official USAF **yearbook/photo album** from Wheelus Field, Libya, 1954. **Contact:** K. F. "Bud" Trill, 255 Colonial Blvd., Palm Harbor, FL 34684-1316.

Seeking information on **Wing Cmdr. John Robert Baldwin,** RAF, who flew as an exchange officer with the 16th Fighter-Interceptor Squadron, 51st Fighter-Interceptor Wing, in Korea and failed to return from a weather reconnaissance mission in the Sariwon area, March 15, 1952. **Contact:** Cmdr. T. E. Vaughn, USNR, 5310 Meadowbrook Lane, Chattanooga, TN 37411-5322.

Seeking photos of the **B-24G #42-78243 *Dallas Lady,*** which served with the 885th Squadron in Algeria and was lost on a supply mission to Italy, September 12, 1944. **Contact:** L. M. Bridier, 3550 Ranch House Rd., Weatherford, TX 76087-7655.

Seeking a copy of ***Sank Same,*** a book about the early history of the Civil Air Patrol submarine patrol off New Jersey. **Contact:** Alfred E. Anscombe, 249 S. Cayuga Rd., Buffalo, NY 14221.

Seeking information on **Stevens model 22-410 guns** used by the Army Air Forces in World War II. **Contact:** Alonzo "Butch" Paige, 1607 4th Ave. N., Grand Forks, ND 58203-3043.

Seeking information on the **P-47 *Estes Park Avenger*** purchased by Estes Park, Colo., in 1943 through a war bond drive. **Contact:** Duke Sumonia, Box 114, Glen Haven, CO 80532.

Seeking to correspond with **aviation enthusiasts. Contact:** John F. Haldeman, P. O. Box 494, Elmhurst, IL 60126-0494.

Seeking information on personnel of the **779th Troop Carrier Squadron,** Pope AFB, N. C., 1955–59. **Contact:** Robert G. Straub, 1225 5th St. S. W., Winter Haven, FL 33880-3728.

Seeking information on and photos of squadron markings for **AT-6s** assigned to the Army Air Forces Training Command for advanced single-engine training at Craig Field, Ala., 1944–45. **Contact:** John Meyer, 830 N. W. 57th St., Seattle, WA 98107.

Seeking the whereabouts of **1st Lt. Jim Farquar, 2d Lt. Martin Berman, Douglas Baryns, Jack Bensing, Roy Gimson, and Gerard I. Morris. Contact:** Robert Greeley, 1560 Adelaide St., #13, Concord, CA 94520.

Seeking photos of Navy **carrier-based aircraft** in flight or landing on a carrier, World War II to present. **Contact:** Christopher C. Klug, 999 Broadway Dr., Suite A-6, Hattiesburg, MS 39401.

Seeking contact with or information on members of the **2186th Communications Squadron,** especially those stationed in Spain, 1966–67. **Contact:** Frank C. Davis, 4453 S. W. 32d Pl., Ocala, FL 34474-4327.

Seeking to correspond with members of **USAFE NCO Academy Class 57-D,** Freising, Germany. **Contact:** MSgt. Thomas W. Young, Sr., USAF (Ret.), 830 W. Amsden St., Denison, TX 75020-7929.

Seeking contact with KC-135 instructors **Major Callan and Captain Burroff,** who were at Castle AFB, Calif., in June and July 1964. **Contact:** P. B. Yollant, rte. de Buglose, 40990 Gourbera, France.

Seeking pilot **Norman M. Jones,** 97th Bomb Group, who operated a flight school in Indianapolis, Ind. Last known address was Anchorage, Alaska, in 1974. **Contact:** Howard E. Reeder, 9436 Cedar Dr., Bon Aqua, TN 37025-1502.

Seeking information about a **US pilot** who was picked up about 10 miles from Phan Thiet, South Vietnam, by a South Vietnamese O-1 pilot, perhaps in November 1967. **Contact:** Col. Philip J. Conran, USAF (Ret.), 314 Olde Post Rd., Niceville, FL 32578-3904.

Seeking photo of a 13th Aero Squadron **Spad XIII** flown from 1917 to 1918 with a "running skeleton" logo on the fuselage. **Contact:** W. A. "Bill" Cowan, P. O. Box 79568, Saginaw, TX 76179-0568.

Seeking information on **B-26 #131576 AN-Z *Dinah Might*** of the 553d Bomb Squadron, 386th Bomb Group, that was shot down over Germany November 18, 1944. **Contact:** Marc Eskenazi, 4833 38th N. E., Seattle, WA 98105.

Seeking contact with and information on pilots and test pilots of the **XF-85 Goblin and Republic F-84,** which were dropped from the bomb bay of a B-36 Peacemaker. **Contact:** Ronald Savich, 13 Midwood Rd., Marlton, NJ 08053.

Seeking an eight-by-10 color photo of a **B-25. Contact:** Frank A. Lucia, 326 E. Main St., Patchogue, NY, 11772-3122.

Seeking information on and photos from the **Gentrix** balloon/camera photoreconnaissance program in January and February 1956. **Contact:** Paul Keck, 313 Linda Ave., Hawthorne, NY 10532.

Seeking information on the **Sikorsky S-39B, tail number NC803W,** flown by Civil Air Patrol Maj. Hugh R. Sharp, Jr., and CAP Lt. Edmond I. Edwards July 21, 1942. **Contact:** Col. George H. Damato, USAF (Ret.), New England Air Museum, Bradley IAP, Windsor Locks, CT 06096.

Seeking contact with members of **RAF Second Tactical Air Force** squadrons with knowledge of the Luftwaffe bombing of Allied airfields in the Netherlands, Belgium, and France on January 1, 1945. **Contact:** Ron W. M. A. Putz, Tarwehof 66, 6418 KM Heerlen, the Netherlands.

Seeking aviation cadet **class photos,** 1931–39. **Contact:** Col. Robert N. Maupin, USAF (Ret.), 4980 Delos Way, Oceanside, CA 92056-7408.

Seeking contact with **Capt. Rodney Fisher,** who was with the 461st Bomb Wing, Amarillo AFB, Tex., 1966. Also seeking information on **Lt. Bert Stiles,** subject of *Serenade to the Blue Lady: The Story of Bert Stiles,* including his group, squadron, and where he is buried. **Contact:** Henry J. Barrows, Jr., 10960 Miller Ave., Canal Winchester, OH 43110.

Seeking contact with the family of **Capt. Billy J. Perkins,** who was killed in a T-33 accident near Phalsbourg, France, in 1958. **Contact:** Donald D. Watt, 22 Alexander Dr., Hampton, VA 23664-1747.

Seeking contact with personnel involved in recovery at a B-24 crash site at Tucson IAP, Ariz., February 17, 1943, including **Fred Eachus, Hurst Gentry, Thomas K. Lee, G. Oberdorf, William Robinson, and E. F. White. Contact:** Scott P. Posvistak, 3721 W. Spinnaker Lane, Tucson, AZ 85742.

Seeking contact with **Wallace Bryant,** or his family, who were stationed at Gunter AFB, Ala., in 1956. **Contact:** Dr. Albert Giannone, 1 Arlington Ave., Malverne, NY 11565.

Seeking contact with or information on graduates of **Pilot Class 44-C,** Moore Field, Tex. **Contact:** Maj. Gen. Wayne C. Gatlin, USAF (Ret.), 1814 E. 5th St., Duluth, MN 55812.

Seeking **336th Fighter Squadron** photos, patches, and other memorabilia. **Contact:** 1st Lt. Rick Kaplan, USAF, 106 S. Andrews Ave., Goldsboro, NC 27530.

Seeking the whereabouts of **Ron Abbott,** who was in Newport News, Va., or Henderson, N. C., in January 1949 and who knew Sarah Richardson. **Contact:** Brenda Penney, 455 N. W. 100th St., Ocala, FL 34475.

Seeking contact with **Maj. Dudley M. Eager,** his wife, Johanna Eager, and their children, who were in Hamamatsu, Japan, 1953–56. Last known address was in Ocean Spring, Miss. **Contact:** Teiko Terada, c/o Mr. Kawano, 1-36-3-806, Higashi-Ikeburo, Toshimaku, Tokyo 170, Japan.

Seeking **B-17 Flying Fortress** enthusiasts for an association. **Contact:** Maj. Donald R. Hayes, USAF (Ret.), 1640 Cambridge Dr., Walla Walla, WA 99362.

Seeking contact with **Capt. Wayne McKay,** who was in London, UK, in September and October 1951. **Contact:** Emerson C. Price, 445 S. 8th Ave., Absecon, NJ 08201.

Seeking contact with **Aircraft Control and Warning personnel** stationed in northern Honshu and Hokkaido, Japan, from the 1940s until the Air Defense System was turned over to the Japanese Air Self-Defense Force. **Contact:** Donald D. Simmons, 704 S. Grove Rd., Richardson, TX 75081-5116.

Seeking whereabouts of **Capt. Jack W. Thomas,** an A-10 pilot based with the 355th Tactical Fighter Squadron during Operation Desert Storm. **Contact:** Pete Nelson, 2711 Prospect Ave., Concord, CA 94518.

Seeking patches or emblems from units that flew the **A-37 Dragonfly. Contact:** Oliver A. Maier, 306 Village W., San Marcos, TX 78666-9436.

Seeking old-style **senior and chief master sergeant stripes,** not subdued, with or without diamond. **Contact:** SMSgt. Donald B. Probst, USAF (Ret.), 709 E. Church St., Lock Haven, PA 17745.

Seeking information on and stories about **B-36 operations** in the UK. **Contact:** Brian D. Jones, 20 Masefield Crescent, Abingdon, Oxfordshire OX14 5PH, UK.

Seeking **George Grey (Gray),** from Massachusetts, who served with 8th Air Force in London, UK, and in the Post Department at Royston, UK, in August 1945. **Contact:** Jacky Pregle, 16 Farndale Gardens, Hazlemere, High Wycombe, Buckinghamshire HP15 7HE, UK.

Seeking contact with **Christian pilots. Contact:** Mitch Sirota, P. O. Box 939, Goldenrod, FL 32733.

Seeking contact with **David Schulstead,** who was stationed at Orlando AFB, Fla., in the 1950s. **Contact:** Jimmy King, 1580 Blueberry Dr., Titusville, FL 32780.

Seeking information on a pilot with the **462d Fighter Squadron,** 506th Fighter Group, 7th Air Force, stationed at North Field, Iwo Jima, who was missing in action June 1, 1945. **Contact:** Richard Smith, 9430 Research Blvd., Suite 390, Austin, TX 78759.

Seeking photos of **B-47 Stratojets** in flight, refueling, taking off, landing, or parked. **Contact:** Bob Dennison, 11200 Kolina Lane, Sun City, AZ 85351-4300.

Seeking contact with pilots who graduated May 10, 1963, at **Laughlin AFB, Tex. Contact:** Dr. Joachim Bordt, Miltenberger Str. 6, D-60599 Frankfurt, Germany.

Seeking contact with **SSgt. Danny M. Dunlap,** who was stationed at Scott AFB, Ill., in 1967, and **MSgt. Joseph Davis,** who was at Empire AFB, Mich., around 1968. **Contact:** Kenneth F. Bryson, P. O. Box 337, Kalkaska, MI 49646.

Author seeking active-duty or retired service personnel to contribute to a book on the role of **women in the military** from 1978 to the present. **Contact:** Hans Halberstadt, 240 S. 13th St., San Jose, CA 95112.

Seeking contact with a US serviceman, probably with the **406th Fighter-Bomber Group,** based at RAF Station Manston, UK, and living at Minster, Kent, 1951–56, who knew Joy Harless of Minster. **Contact:** S. D. Willmott, 22 Viking Ct., Cliftonville Ave., Cliftonville, Margate, Kent CT9 2AH, UK.

Seeking contact with anyone who met or saw the USO magician **William Dixon "Poogie-Poogie" Alstrand** in the Pacific and European theaters during World War II. **Contact:** Gary T. Alstrand, 509 Labrador Way, Suisun City, CA 94585.

Seeking contact with US airmen who were **POWs** in the hospital in **Schleiz, Germany,** and treated there by a British doctor. **Contacts:** Tony Crook, M. C. Colley Farm, Bridport, Dorset DT6 5PU, UK. Stew Cooper, 76 Fieldstone Dr., Springfield, NJ 07081.

Seeking information on 8th Air Force member **Morrisey,** from New York, who was with a B-24 group stationed at Honington, UK, in July 1945. Also seeking information on 15th Air Force member **Edmond C. Lange,** who was in Sardinia in December 1943. **Contact:** Braxton Bradford, 4513 S. Oak Dr., Q 72, Tampa, FL 33611.

Seeking photos of men and women who built, maintained, supported, or ferried B-26s or were crew members on **B-26s** in World War II. **Contact:** B-26 Marauder Historical Society, 1109 Jenniper Lane, Annapolis, MD 21403.

Seeking memorabilia on the **509th Operations Support Squadron** and its predecessor organizations that provided support services for the **509th Composite Group or 509th Bomb Wing. Contact:** 1st Lt. Benjamin D. Phillips, USAF, 509th Operations Support Squadron, Airfield Operations Flight, 785 Arnold Ave., Suite 2A, Whiteman AFB, MO 65305-5026.

Seeking contact with service personnel who were in the **intelligence** section during and just after World War II. **Contact:** Dwain D. Christian, 226 Primrose Dr., Prattville, AL 36067-2618.

For a book, seeking information and memorabilia on the **421st Night Fighter, Tactical Fighter, and Fighter Squadrons. Contact:** Jeffrey L. Kolln, 15946 86th Ave. S. E., Yelm, WA 98597.

Seeking contact with **James E. "Bones" Hamilton,** Pilot Class 45-F, Enid AAF, Okla. **Contact:** Richard P. Culleton, 543 E. Nugent St., Lancaster, CA 93535-3116.

Seeking contact with officers commissioned through **AFROTC Det. 800,** University of Tennessee at Knoxville. **Contact:** Frankie Gorman, AFROTC Det. 800, 215 Stokely Athletic Center, University of Tennessee, Knoxville, TN 37996-3120. ■

Pieces of History

Photography by Paul Kennedy

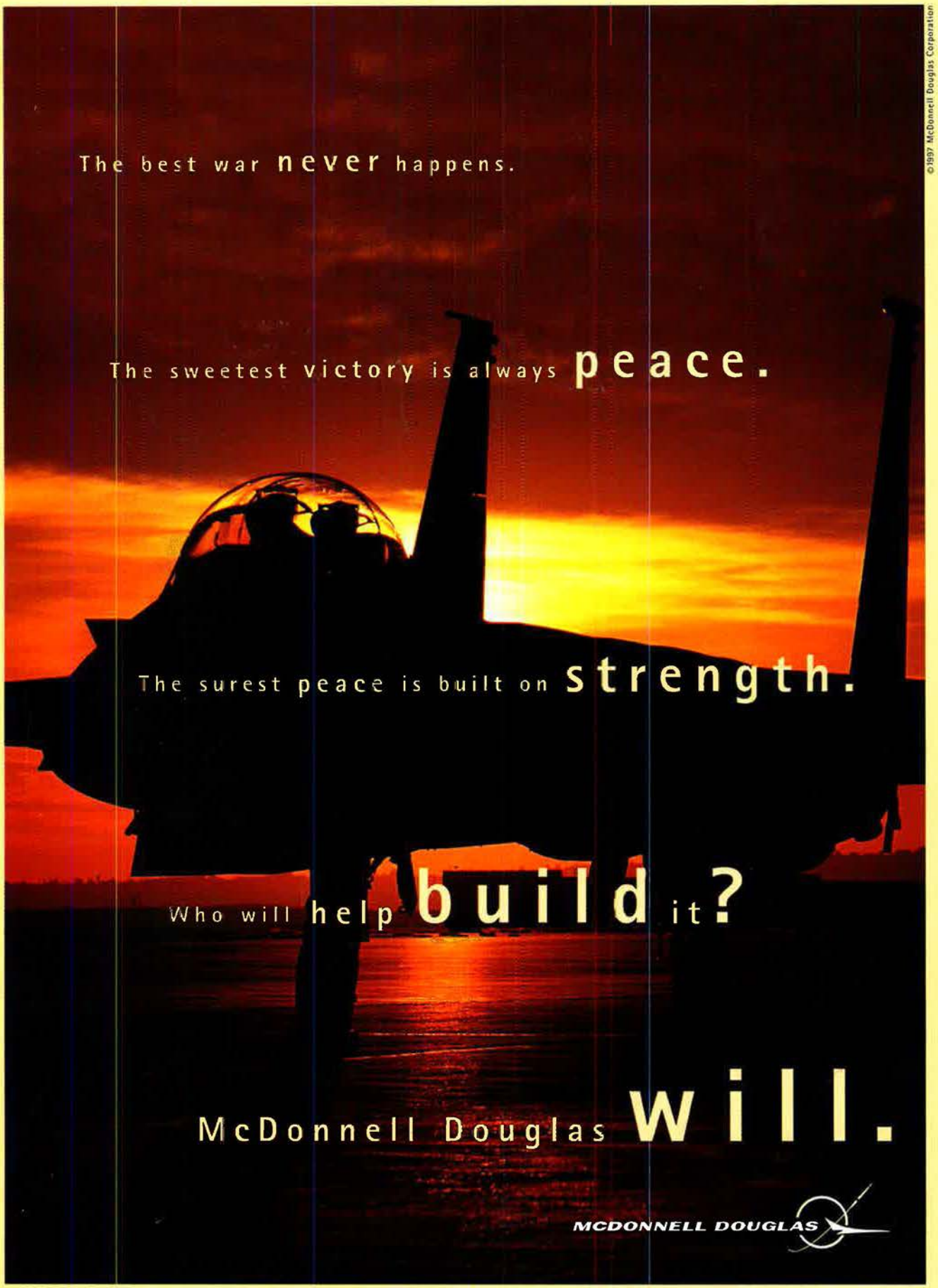
Watching the Skies

The attack on Pearl Harbor and the predations of German U-boats along the Atlantic Seaboard caused widespread concern on the home front in the early days of World War II. About 1.5 million Americans volunteered for duty in the Ground Observer Corps and kept an around-the-clock vigil for the early signs of an invasion that never came. Studying aircraft silhouettes and raising binoculars to the sky, the volunteers felt connected to the war effort during their two-hour shifts. Even today, airplane enthusiasts study aircraft silhouettes and take pride in how many different types they have spotted.

We got it off the ground.

We not only had a great idea.

What once was only a vision of a revolutionary new military aircraft has now become a reality. The first production representative Bell Boeing V-22 Osprey Tiltrotor has successfully completed its inaugural flight, and much of the credit for this remarkable achievement belongs to you, the men and women of the Marines, SOCOM, the Navy and the Air Force. Your unswerving support was invaluable in the initial stages of its development, and your unwavering belief in the project's inevitable success resulted in an outstanding "mission accomplished." From all of us at Bell Boeing, we salute you. The Tiltrotor Team



McDonnell Douglas is proud to build the F-15 Eagle, the most advanced and superior ty and interdiction fighter in service today. www.mdc.com