

August 2005/\$4

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JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE

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By Robert S. Dudley, Editor in Chief

The Tale of Two Wars

DONALD H. Rumsfeld, testifying in mid-2001 about the nation's "two-war" strategy, observed that it reflected an "obsession" with "a few dangers" that "may be familiar rather than likely." His criticism was a case of unfortunate timing.

Within weeks, in the wake of the Sept. 11 attacks, the Secretary of Defense had not only reaffirmed the two-war standard but added to it. His "1-4-2-1" policy called for a force able to defend the homeland, deter aggression in four theaters, defeat enemies simultaneously in two theaters, and occupy one of these nations. Wars in Afghanistan and Iraq followed.

For all that, the basic issue never died away. What is the best yardstick for determining the proper size of conventional forces? The question first came up around 1990 with the end of the Cold War. Fifteen years later, the argument still rages.

Indeed, the two-war concept is again under attack, as was made plain in a July 5 leak to the *New York Times*. "The Pentagon's most senior planners," stated the *Times*, now believe that they want "to shape the military to mount one conventional campaign" while "devoting more resources to defending American territory and anti-terrorism efforts."

The well-informed trade publication *Inside the Pentagon* noted that the concept has been unofficially dubbed "1-1-1," denoting homeland defense, the war on terror, and conventional war. The shift, if it actually occurs, could lead to the diversion of money from "traditional warfare areas" such as regional conflicts, said *ITP*.

Dissatisfaction with the two-war standard is nothing new. It has always been opposed by doves who would like to limit or reduce US power. Even some hawkish defense figures warn that the standard thwarts development of future forces.

Thus, the new policy battle is a case of *déjà vu* all over again, and it is worth recalling the tale's many twists and turns through the years. Probably the best single summary can be found in the 2003 study, "Strategy, Requirements, and Forces," by John T.

Correll, a former Editor in Chief of *Air Force Magazine*. It is available online at www.afa.org/media/reports.

In 1990, with Soviet power collapsing, US forces faced fundamental questions about their future, especially their size and mission. Gen. Colin Powell, the Chairman of the Joint Chiefs of Staff, proposed reducing the 2.1-million-strong Cold War force to a 1.6-million-man "Base Force" able to fight two "major regional conflicts" at a time.

The new policy battle is a case of *déjà vu* all over again.

Two months after coming to office in January 1993, the Clinton Administration slashed the Pentagon budget and then launched its notorious 1993 "Bottom-Up Review." It was an *ex post facto* attempt to devise a plausible strategy and force structure to fit under a previously decided funding level.

However, the Clinton Administration was stuck with the two-MRC standard, which prevented wholesale reductions in force. Secretary of Defense Les Aspin tried to get around the problem with a concept called "Win-Hold-Win"—fighting in one theater but conducting a holding action in a second area until US forces could be redeployed. Aspin's trial balloon was laughed out of town, and he returned to the two-war standard.

Clinton never provided forces sufficient to actually fight two overlapping MRCs, and the search for a new standard resumed with the Quadrennial Defense Review in 1997. Once again, DOD sought to change the two-war concept but found the move to be untenable. It revalidated the two-war yardstick (changing MRC to MTW, for "major theater war"), but then cut forces even further.

Rumsfeld came to the Pentagon in early 2001 amid reports that he would kill the two-war standard and cut fighters, carriers, and divisions. He was in

fact skeptical of the strategy, which he saw as a reason the US had, in his view, "failed to invest adequately in the advanced military technologies." Even so, he wound up accepting it—though evidently not permanently.

The history of the strategy points to several conclusions that are relevant to the current debate:

- The two-war standard has survived because the US, as a superpower, had no obvious alternative. Planners eventually were persuaded that a US President, working with a mere one-war force, might find that he was inviting dangerous military aggression in one area by responding with military force in another.

- The concept has, over the years, served as a bulwark against politically appealing but strategically unwise reductions in air, sea, and land forces. Without it, USAF could find itself facing attacks not only on the F/A-22 fighter but also its lineup of 10 Air and Space Expeditionary Forces.

- For all its faults, the two-war concept has been reasonably useful as a way to size the conventional force and determine its required budget. Problems stem not from the concept itself but from the emergence of additional threats such as proliferation.

- The real questions about the strategy are not military but economic. Funding a two-war force is expensive. Clinton did not provide required resources. The Bush Administration is having difficulty doing so, though defense spending, as a share of GDP, is still at historically modest levels.

Spokesmen insist the Pentagon has made no final decision. The matter is being studied as part of a new 2005 Quadrennial Defense Review, a major military assessment, and the results are not due on Capitol Hill until early 2006.

It is possible that the Pentagon leaked word about its deliberation as a trial balloon, and that critics will shoot it down. That would be a good thing. The two-war strategy has served the nation well. The shape of US armed forces—and perhaps the nation's military capability—could hinge on its continuation. ■



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The Last Attack?

In your excellent editorial ["Airpower Fiction and Fact," p. 2] for April, you quoted former Secretary of the Air Force Donald Rice as saying, "The last time an American soldier was killed by air attack was in April 1953." Do you have the details on that? I have always said that after we had destroyed the North Korean Air Force in the first three weeks of the war and had established complete air supremacy, no United Nations troops were ever fired on by enemy aircraft—Russian, Chinese, or North Korean. Am I wrong?

Lt. Gen. Charles Cleveland,
USAF (Ret.)
Montgomery, Ala.

■ Here are the facts, courtesy of the USAF Historian Office: The last time US ground forces were attacked from the air was on April 15, 1953. On that day, Communist aircraft (believed to be propeller-driven) attacked the island of Ch'o Do, off the west coast of North Korea. There, the US operated several radar installations. The raid killed two US Army anti-aircraft artillerymen. You are right that the Communist air forces did very little damage after the first weeks—but they did some.—THE EDITORS

Good Enough

Whenever I read of the three variants of the F-35, a small voice keeps nagging at me: "Do the services really need three distinct series?" [See "The F-35, Ready for Prime Time?," June, p. 28.] Unless there is a serious and considerable performance deficit in the F-35C vs. the F-35A, it seems to me that the carrier-capable aircraft would serve USAF equally well and, at the same time, save the taxpayers a pot of money. I would very much like to see this question argued out by truly knowledgeable parties.

Col. Robert J. Powers,
USAF (Ret.)
Shreveport, La.

[The article] could have been written back in the early 1960s when the F-111 was well into its R&D phase—just substitute F-111 for F-35. As future articles on the F-35 emerge, they are more

than likely to address cost increases, a stretch in the production line, reduced procurement, weight penalties, and performance reduction for some versions.

One of the lessons learned from the F-111 program is to put the Navy in charge. That makes it difficult for them to pull out as they did with the F-111.

Col. Robin Hansen,
USAF (Ret.)
Prescott, Ariz.

Full Day and More

I am writing on "Full Day" [June, p. 54] about the F-105 Wild Weasel missions flown by Maj. Leo Thorsness and Capt. Harry Johnson in April 1967. We EB-66 guys flew, lived, drank, and ate with Weasel guys, and I take my hat off to them.

You did not mention the EB-66s. We flew mission orbits that surrounded the Hanoi area on each side. One mission package orbit was northwest of Hanoi on a northeast/southwest heading between the Red and Black Rivers. This sort of lined us up with the normal penetration route over Thud Ridge into the Hanoi area so that our jamming patterns protected the F-105 strike aircraft's ingress routes.

I was on the April 30 mission supporting the late morning strike on the orbit northwest of Hanoi. I was an EWO on an EB-66B, part of the 355th TFW at Takhli RTAB. We orbited in sync with the various strike packages and were normally on station for about 30 minutes while the strike packages ingressed and egressed the target areas. It is still the saddest day of my life. We no sooner had hit our orbit when we heard,

Do you have a comment about a current article in the magazine? Write to "Letters," Air Force Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS



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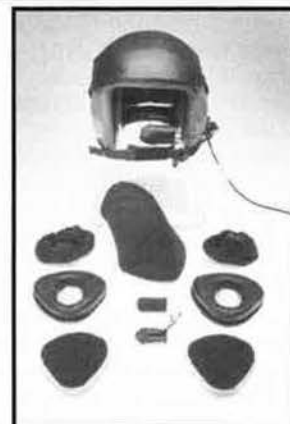
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"One's hit. Two's hit." As it turned out, it was Carbine 03 and 04. Being only a few miles away, hearing the Mayday calls, and not being able to do anything about it, just made us miserable. After we landed, we found out that it was Thorsness and Johnson.

We were pretty much spectators with front row seats, hearing and sometimes seeing what was occurring over North Vietnam. I did fly my 100 missions from January-August 1967. I would like you to mention the EB-66 when you discuss strike and mission support packages over North Vietnam. We were the primary Elint and jamming support aircraft supporting North Vietnam strikes.

Thanks for the article; it brought back lots of memories.

Maj. Ted Koscheski,
USAF (Ret.)
Santa Clarita, Calif.

I assure you that Leo Thorsness did not arrive at Takhli for Wild Weasel duty in October 1996. I suspect it was 1966 as his missions were still being talked about when I arrived in October 1968.

Tex Houston
Colorado Springs, Colo.

■ We regret the typographical error and have corrected the online version.—THE EDITORS

I enjoyed your article on Colonel Thorsness. I thought that you might like to know, if you don't already, that, as the result of a substantial gift from Smith Barney, the Col. Leo K. and Gaylee Thorsness Endowed Chair in Ethical Leadership has been established at the University of Richmond's Jepson School of Leadership Studies.

Ed Rodriguez
Fairfax, Va.

Most Provocative

Your June issue was the finest I have read in a very long time. Far and away your most provocative article was James Kitfield's "Dragon, Eagle, and Rising Sun." [See p. 62.]

I grew up in postwar Japan, the son of American missionaries, and served in Japan five years with the Air Force (three of those were as an exchange professor at the Japan Air Self-Defense Force Command and Staff College in Tokyo). I found my Japanese colleagues extremely devoted and professional in every respect, with a thirst for international affairs and strategic thinking a cut above most of my American contemporaries. They were avid readers of every US defense or military journal or book and continually questioned me about all roles of airpower (this in the 1980s).

Letters

There are a few areas of Kitfield's fine article that should be clarified. First, the map showing US bases in Japan omits the US Army's Camp Zama in Tokyo or any mention of its role as a headquarters echelon for a conflict in Korea.

Second, both the F-15J and the P-3J were produced in Japan under US license. Another American exchange officer, an aeronautical engineer serving with the JASDF Air Proving Wing, told me the Japanese-produced versions of the planes were essentially handmade and far superior in quality of workmanship to USAF versions, although they lacked some of the avionics of US-built models.

Japanese defense capabilities have improved over the past 20 years. With the addition of aerial refueling in 2006, one wonders how long it will be before Japan starts acquiring aircraft carriers again.

Lt. Col. Joseph G. Meeko IV,
USAF (Ret.)
Boring, Ore.

The ICBM Force

This article tells me that interservice competition got us a lot better strategic force than we would be able to get today, what with downsizing of the defense industry and increasing pressure to move toward "jointness." [See "How the Air Force Got the ICBM," July, p. 68.]

Lt. Col. Roger D. Scow,
USAF (Ret.)
New Braunfels, Tex.

If It Ain't Broke ...

Before we continue to tweak the number of bases and who is stationed where, we should remember: Mother Nature is not making any more land.

Every time we relinquish ownership of an established base, that means it is gone forever. [See "Washington Watch: BRAC Signals Cuts in Force Structure," July, p. 10.] You can't hit the undo button. I started reading through all the moves and shifts recommended for Texas. What a bunch of piddling [moves]. If it ain't broke, don't fix it. I do not think a lot of these moves really make any sense.

I got irritated at some of the previous BRAC moves. If you can prove to me that Reese AFB, Tex., was too expensive to keep open, I will buy you a big rib eye steak. It was 15 miles out in the middle of a cotton patch, for goodness sake. What was so expensive, water?

Why would you want to close Ellington AFB, Tex.? What are you going to do with all the NASA support equipment? Why not just charge NASA for enough rent to pay most of the base expenses? Why close the Guard and Reserve facilities? When you start making the troops drive two to three times as far just to meet roll call on Saturday or Sunday, you are going to see enrollment drop off faster than it has already.

Right now, we need another round of BRAC like we need another hole in the head. Sliding all of our eggs into one or more baskets makes very lucrative targets of them all. I think somebody needs to ask a lot of very pointed questions of the BRAC committee.

Lt. Col. Ed Skeen,
USAF (Ret.)
Garland, Tex.

The Searchers

"The Search Goes On," [p. 67] by Bruce D. Callander in the June issue, was very nostalgic for me. Thirty years after the Vietnam War, we are still try-

ing to find more than 1,800 Americans who didn't come home. I have a special appreciation for the men and women who are searching for them.

Of the 30 years I served in the US military, the assignment I treasured most was the year I spent with the Joint Casualty Resolution Center (JCRC), headquartered in Nakhon Phanom, Thailand. It was our job to locate servicemen who were missing in action.

From May 1974 to April 1975, as an Air Force officer on joint assignment, I served as the JCRC public affairs officer, responding on casualty resolution matters to the news media, Congress, and the general public. During that year, I accompanied search and recovery teams throughout much of South Vietnam—where we located and exhumed remains. Over the years I have been asked many times if serving with JCRC was depressing work. In some ways it was, but it was also one of the most satisfying jobs I ever had in the military. Each time JCRC positively identified a serviceman who was killed in action, one more next of kin could quit wondering if he was alive or dead. We helped bring closure to grieving families, and nothing else I ever did in the military could compare with that.

Lt. Col. Donald L. Gilleland,
USAF (Ret.)
Suntree, Fla.

Kelly and the Works

As Walter Boyne points out in "Lord of the Skunk Works" [June, p. 76], Kelly Johnson had two powerful protectors, Lockheed CEO Robert Gross and Vice President-Engineering Hall Hibbard. On the U-2 and Mach 3 A-12 programs, his CIA counterpart, Richard Bissell,



She's more than an airman.

also had two powerful protectors who were personally involved: President Dwight Eisenhower and CIA Director Allen Dulles.

Today no government or industry program managers get the protection Kelly Johnson and Richard Bissell got, which is a serious handicap for all of them.

Sherman N. Mullin,
Ret. Pres., Lockheed Skunk Works
Oxnard, Calif.

Boyne wrote a very comprehensive article on Kelly Johnson and the great accomplishments of the Lockheed Skunk Works. I was privileged to be assigned in the initial cadre of the 9th Strategic Reconnaissance Wing at Beale AFB, Calif., as a Category III test engineer from September 1965 to July 1968.

Kelly and members of his Skunk Works staff visited the 9th frequently to stay abreast of flight crew concerns and operational status. Kelly would talk to every person, regardless of rank, title, or job assignment, and all of us respected and liked Kelly and his people. He showed every blue-suiter great respect. For one of his stature, he ranks very high in my books as a great person and a great American patriot.

Col. Robert Joe Wicke,
USAF (Ret.)
Las Cruces, N.M.

Military Space 101

I was appalled by the statement in your June "Verbatim" [*And, As for Space,* p. 9] attributed to retired Maj. Gen. Robert Scales Jr., former head of the Army War College. General Scales needs a course in Military Space 101. He would then learn that a GPS-directed JDAM, dropped by a Navy, Air Force,

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or Marine aircraft using GPS navigation, would take care of the door and a little bit more, saving the Army the trouble of walking around in hostile, dark rooms.

George Paulikas
Palos Verdes Estates, Calif.

Unfair Comment?

Retired Lt. Col. George Crowl's letter [*What Wasn't Said,* p. 6] contained, in my opinion, an unfair comment on Air Force F-4 operations in South Vietnam. I, too, was a controller, an O-2 FAC, and enjoyed a close-up view of lots of air strikes. Almost all were daytime. If, in his experience, release altitudes seemed high during night strikes, who am I to argue, though we all know lots of things come into play, including the type of ordnance (slick bombs vs. high drags, etc.). Dropping in the next grid square? Come on. Misidentification of the target in the first place, maybe?

I controlled quite a few F-4s on strikes ranging from tree busters to troops in

contact, and it was my experience that when our guys on the ground needed support, high-drag bombs, napalm, and 20 mm ("snake and nape") were delivered the same by all weapons platforms—low. And by "low" I mean, any lower and the bombs wouldn't have had time to arm. Those Air Force F-4 crews did a fine job.

The "organizational and cultural" issues mentioned by Colonel Crowl, assuming he is referring to close air support, escaped my notice during my tour in SEA. Whether they now exist for real or only in the political arena populated by high-ranking folks of all services is something on which I'll not speculate.

Lt. Col. Paul Burrows,
USAFR (Ret.)
Summerville, S.C.

Correction

Brooke Army Medical Center was misidentified as Brooks in "Civilians in Harm's Way," July, p. 52.

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Washington Watch

By John A. Tirpak, Executive Editor

Pentagon Criticizes Officials; Will There Be New Tankers in 2008?; Unhappy ANG

IG Calls Four "Accountable" for Tanker Deal

The Air Force and Pentagon should have defied a 2001 act of Congress ordering them to lease Boeing KC-767 tankers.

That's the upshot of a seven-month investigation by the DOD inspector general, Joseph E. Schmitz, into the botched effort to rapidly recapitalize the aging KC-135 tanker fleet.

In his report, Schmitz argued that the controversial lease provision—Section 8159 of the Fiscal 2002 appropriations bill—was at odds with other laws. Military officials, faced with conflicting instructions, ignored previous laws governing such a contract, he contended, but they instead should have challenged the lawmakers.

The IG acted at the request of the Senate Armed Services Committee. He released the results June 7.

In assessing blame, Schmitz fingered four individuals, claiming that they are "accountable but not culpable." The four were Edward C. Aldridge Jr., former undersecretary of defense for acquisition, technology, and logistics; Michael W. Wynne, Aldridge's deputy; James G. Roche, the Air Force Secretary at the time; and Marvin R. Sambur, former USAF assistant secretary for acquisition.

He noted the culpability of Darleen A. Druyun, the former top civilian USAF acquisition official, who is serving time in federal prison for illegally favoring Boeing in awarding contracts.

Instructed by the legislation to proceed with the novel lease of Boeing 767 tankers, the acquisition officials believed they were absolved from complying with long-standing acquisition rules and regulations, which, had such rules been applied, would have scuttled the plan for various reasons, Schmitz said.

He noted that the proposed arrangement—in which Boeing would supply 100 KC-767 tankers in what amounted to a lease-to-buy contract—"had support of White House officials, members of Congress, senior officials of both the Department of Defense and Air Force, and the Boeing Company."

The lease idea was put forward to get more tankers into service rapidly and modernize a badly aged element of the Air Force fleet.

The first flaw in that plan, Schmitz argued, was that, "before and immediately after Sept. 11, 2001, the Air Force had neither identified nor funded an urgent requirement for the replacement of its existing fleet of tankers."

Next, he charged, the Air Force failed to conduct the standard analysis of alternatives (AOA) as to whether there might be other—possibly more cost-effective—means of supplying the needed refueling capability. The senior officials believed that the law—which specified the Boeing 767 as the solution, since there was no other boom-type tanker available worldwide—relieved them of the need to conduct an AOA.

In addition, Schmitz went on, the officials failed to conduct



Boeing photo by Keith Skellon

The Air Force wanted 100 of these KC-767s.

various normally required "best practices" actions, as well as additional checks usually required in a lease situation. These last regulations specified that a lease could be undertaken only if time was of the essence or if the cost did not exceed that of an outright purchase by a certain degree.

Schmitz claimed DOD and Air Force officials acted "as if Section 8159 ... had waived various legal requirements—statutory checks and balances—that that section had not."

The IG recommended a recommitment to the existing acquisition regulations in all matters, especially a program of such size, potentially exceeding \$20 billion.

Gordon R. England, the acting deputy secretary of defense, informed the Senators that DOD has already tightened regulations to make them conform to existing acquisition laws, clarified rules about who can enter into a contract, changed the curriculum at the Pentagon's acquisition school, and rewritten several handbooks as to how to go about buying and leasing.

However, said England, "the final answer to past problems may lie in a complete restructuring of the way the department accomplishes acquisition for all of its goods and services." He promised a comprehensive review of the system, going back to the 1986 Goldwater-Nichols legislation that set up the existing system.

New Tanker Plan Could Appear in 2008 Budget

The Air Force will put funds in its Fiscal 2008 budget to begin a tanker recapitalization effort, acting Air Force Secretary Michael L. Dominguez reported.

Speaking at a Washington, D.C., seminar in June, Dominguez said the Air Force expects to release this month an analysis of alternatives on how to approach tanker modernization.

The report itself will not be sufficient to serve as a plan,

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USAF photo by MSgt. Jim Varhegyi



Dominguez offers his own scenario.

however. Dominguez said study will continue through Fiscal 2007.

"The most likely scenario [for funding to appear and for a program to get under way] is the FY08 President's budget," said Dominguez, and "the program will flow from that."

Given the unraveling of an attempt to lease tankers from Boeing, "the acquisition strategy is almost certainly going to be procurement," he asserted, noting that the Air Force will buy the aircraft outright and "own them for a very, very long time."

The KC-135 is approaching an average age of 45 years. The last won't leave service for another 20 years.

Dominguez underlined the importance of the tankers, noting they are the means by which most of the US air fleet gets to the scene of action. Tankers are "the single choke

point" of military operations, he said, and America's status as a superpower "flies on the back of a Boeing 707," on which the KC-135 is based.

The delay in getting the program launched will complicate the range of options available. Boeing's 767 production line has nearly finished up all of its existing orders, and Boeing has said it can't realistically keep the line open just on the chance that the Air Force will wish to order some of the aircraft.

In fact, Boeing said last year that the line would close in 2005 without more firm orders, but it is trying to be flexible enough to accommodate the Air Force.

Meanwhile, European Aeronautic Defence and Space Co. has developed a boom tanker version of its A330 transport and has plans to produce the aircraft in Alabama if it successfully competes for some of the tanker work. (See "Aerospace World: EADS Chooses Alabama Site," p. 18.)

Air Guard Takes Aim at BRAC

Some Air National Guard leaders are none too happy about the Pentagon's base realignment and closure proposals, released in May. They are worried that the air mission for many units will disappear completely. They are taking their case directly to the BRAC Commission.

Meanwhile, House members unhappy with the BRAC process within the Pentagon, and its affect on their states' Guard units, have petitioned the chairman of the House Armed Services Committee, Rep. Duncan Hunter (R-Calif.), to launch hearings on the issue.

At a Heritage Foundation symposium in Washington, the New Hampshire adjutant general, Maj. Gen. Kenneth R. Clark, said the Air Guard was not consulted on the BRAC recommendations before they were publicly announced, even though the recommendations were more than two years in the making.



Retired Brig. Gen. Stephen M. Koper, president of the National Guard Association of the United States, said that, while he doesn't have a problem with closing or realigning bases per se, he objected to the Air Force's withdrawal of aircraft and missions from various bases and airports without consultation.

Clark said that maybe the hand-in-glove relationship touted between USAF and the Guard isn't "the partnership you thought."

Maj. Gen. Francis D. Vavala of Delaware, a vice president of the Adjutants General Association of the United States, said Guard leaders across the US, including overseas territories, have voted unanimously to oppose the BRAC recommendations.

"This is the message coming from all 54 of us," he said.

Vavala's home state of Delaware could lose all its C-130s and its flying mission. Clark's state actually stands to gain some KC-135 aircraft, but he said the Guard associations are standing united in their opposition to the process so far.

An Air Force delegation to Capitol Hill to answer staffer questions on the Air Guard changes left many dissatisfied. Staffers reported that the Air Force's choices seemed inconsistent, arbitrary, and didn't always follow written rules or measures.

Six states or territories are slated to lose all their aircraft. Guard members said they worry that this policy will oblige Guardsmen to travel hundreds of miles to other bases for drill, which could hurt recruiting and retention.

Minnesota Gov. Tim Pawlenty (R), whose state would lose its F-16s, told the Associated Press that "we can't get people too excited about joining and being there and being retained if we don't have a mission that's relevant to them." Duluth, which hosts the Air Guard F-16s, would revert to an "air sovereignty" base, also called an "enclave," a term that describes a base that can be in perpetual standby status.

"If you're an air sovereignty alert site and you have no airplanes, that creates a real problem," Pawlenty said.

In a letter to Hunter, 23 House members said they are "very concerned" about the idea of enclaves, noting the action may be an "effort to circumvent" BRAC and ultimately close the facilities without due process.

"The Air Force has indicated that these bases will be kept in anticipation of follow-on missions," the representatives wrote. However, "we have seen no evidence that the Air Force has made any adjustments to its budgeting policies to accommodate the enclave concept." They questioned whether, without funding, mission, or equipment, the bases would shrink so much over time that they couldn't grow back to handle a new mission, once identified.

"It is not clear that an enclave base can sustain expeditionary combat units. Once flying units are removed from the enclave bases, many will no longer be able to support military or civilian aircraft operations," the letter went on. The loss of rated firefighters at a base "will lead many shared airports to lose FAA ratings and fail to meet minimal Air Force and civilian criteria for landing and unloading."

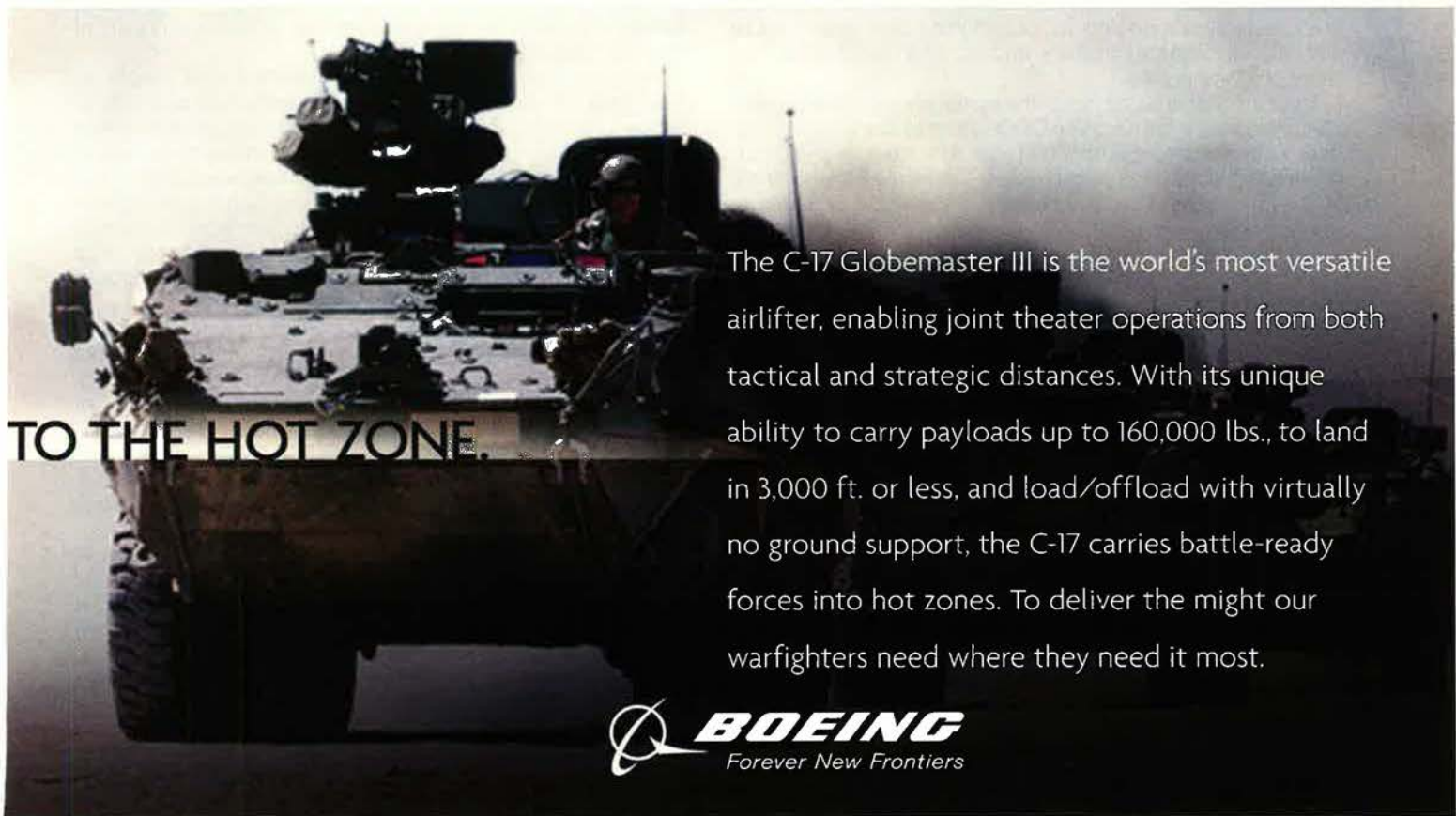
The Congressmen also noted that nowhere in the BRAC charter is the concept of enclaves even "mentioned as an option."

"Finally, we are concerned that enclaves simply will not meet the homeland security needs of governors. ... We have seen little analysis to support this new concept."

No "Overt" Religious Discrimination Found at USAFA


According to an Air Force look into the question of potential religious discrimination at the Air Force Academy, the Colorado Springs school suffers from "a lack of awareness over where the line is drawn between permissible and impermissible expression of beliefs."

Lt. Gen. Roger A. Brady, deputy chief of staff for personnel, conducted the review at the request of acting Air Force Secretary Michael Dominguez. It claimed that there was no evidence of systematic Christian evangelism among the faculty at the academy.



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Some students—and Lutheran chaplain Capt. Melinda S. Morton, who resigned from the academy over the issue—had complained that cadets who are not evangelical Christians are subjected to unwanted proselytizing and a culture of religious bias from evangelicals in the main body of the staff and cadet corps.

Despite his finding of no discrimination, Brady, at a Pentagon press conference, said academy officials need to address problems such as the failure to respect the religious needs of cadets of all religions. Such respect would include allowing cadets of different faiths time to pursue their own religious traditions.

He acknowledged a number of cases of “concern,” including seven referred for further investigation. He declined to be specific, but allowed that some involved professors.

Brady’s report lauds outgoing academy superintendent Lt. Gen. John W. Rosa Jr. for responding to complaints early in his tenure and launching a broad effort to incorporate reforms.

In a letter to the academy Board of Visitors, Dominguez said he supports Brady’s conclusions and recommendations and will “personally track ... progress” in implementing the recommendations. He said the academy and the Air Force “will be better for having had this experience.”

A week after the report was released, Dominguez announced the appointment of Rabbi Arnold E. Resnicoff to be an advisor to the Secretary and Chief of Staff of the Air Force on drafting guidelines for the expression of faith while on active duty. Resnicoff is former director of interreligious affairs for the American Jewish Committee.

Resnicoff, speaking at a press briefing, said that the Air Force is taking on the religious bias issue throughout the service, not just at the academy, and that Dominguez and USAF Chief of Staff Gen. John P. Jumper “could not be taking this matter any more seriously than they are.”

China's Buildup Alarms Pentagon

Secretary of Defense Donald H. Rumsfeld has now concluded that the Chinese military is substantially and unexpectedly expanding its capabilities and spending in virtually all areas of military endeavor, a development of “concern,” in his view.

Speaking at a June security conference in Singapore, Rumsfeld said a forthcoming DOD report to Congress warns that “China’s defense expenditures are much higher than Chinese officials have published. It is estimated that China’s is the third largest military budget in the world and clearly the largest in Asia.”

China “appears to be expanding its missile forces, allowing them to reach targets in many areas of the world, not just the Pacific region, while also expanding its missile capabilities within this region,” Rumsfeld continued. “China also is improving its ability to project power and developing advanced systems of military technology.”

The report to which Rumsfeld referred is required annually by Congress. Previous versions have noted Beijing’s efforts to develop a blue-water navy with both advanced attack submarine and aircraft carrier capabilities, as well as development of satellite-guided precision munitions now believed to be copied from the American Joint Direct Attack Munition guidance system.

“Since no nation threatens China, one must wonder: Why this growing investment? Why these continuing large and expanding arms purchases? Why these continuing robust deployments?” Rumsfeld asked rhetorically.

The growth of China’s military spending has paced its economic development, Rumsfeld said, but he noted that



Courtesy “Chinese Defence Today” www.sfnodefence.com

China’s J-10 (and other systems) make Rumsfeld wonder.

“a growth in political freedom has not yet followed suit.” He suggested that China will soon face “important decisions” about its goals and future and that, “ultimately, China likely will need to embrace some form of a more open and representative government if it is to fully achieve the political and economic benefits to which its people aspire.”

Also sounding an alarm about China is CIA Director Porter J. Goss, who told the Senate Intelligence Committee on June 1 that China’s military improvements and buildup “could tilt the balance of power in the Taiwan Strait.”

He said Beijing perceives the US as trying to “contain or encircle” China and that in response China is taking steps to secure needed energy resources and raw materials in other countries, is gaining a larger voice in international affairs, and is obtaining military systems with which it could challenge the US.

Goss said China would respond militarily if Taiwan takes any further steps toward proclaiming independence from China. Though the two have been separate for 50 years, China considers Taiwan a breakaway province still part of the mainland nation.

According to published accounts, the Pentagon’s report to Congress will note the recent successful launch of the JL-2, a new Chinese submarine-launched ballistic missile with a range of 6,000 miles, allowing China to strike at targets in the US from the waters near the Chinese mainland. Land-based variants are also in development. China is thought to have deployed a copy of the US Aegis air defense system deployed on surface vessels and has stepped up the pace of importing military hardware, particularly combat aircraft and attack submarines from Russia.

The US also put the brakes on arms transfers to Israel in June, displeased at continuing reports that Tel Aviv has been supplying advanced weapons technology to Beijing. Israel was reportedly helping China develop a derivative of an Israeli unmanned aircraft. Israel also supplied extensive assistance to China in developing the J-10, China’s new fighter. The J-10 bears a striking resemblance to the Lavi, a canceled Israel-US joint venture to develop an Israeli indigenous fighter based on the American F-16.

Part of the rebuke was the denial of Israel’s request to get involved with development of the F-35 fighter. Israel said it would report to the US any military ties with China. The US wants details on 60 transactions between the Israeli military and Beijing.

Nevertheless, Chinese diplomats visiting Israel in late June said military cooperation was on the agenda. ■



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Aerospace World

By Adam J. Hebert, Senior Editor

QDR Scrutinizes F/A-22 Risk

The Pentagon's Quadrennial Defense Review is considering a wide range of numbers as the buy objective for the F/A-22 Raptor, and the final call will be a figure based on "risk calculation," acting Air Force Secretary Michael L. Dominguez said June 21.

The Air Force maintains it needs 381 F/A-22s to equip 10 Air and Space Expeditionary Forces (AEFs) with one squadron each, Dominguez said. However, he added that the currently funded target of about 170 would be "a formidable force ... in many, many contingencies."

The Pentagon is evaluating "lots of other numbers ... in the structure of the joint air dominance study. Those numbers will help define where we want to go," Dominguez said. However, while the 170 aircraft might be sufficient in some scenarios, yet to be determined is the size force that will be necessary for the long run.

"Are they sufficient as you think into the future, for a 30-year future, maybe a 50-year future? Are they sufficient for the range of threats that we may see out there? Are they sufficient to maintain dominance of the global commons of air and space? And those are the kinds of questions we should be exploring?" Dominguez asked.

The "risk calculation" he said, will be affected by assumptions made "about the proliferation of capable advances in surface-to-air missiles" and the needs of the United States as it confronts emerging powers "in this multipolar world" that will "inevitably" challenge US interests.

Airman Dies in U-2 Crash

A U-2 surveillance and reconnaissance aircraft crashed in the United Arab Emirates on June 22. The pilot, Maj. Duane W. Dively, was killed. Dively was assigned to the 1st Reconnaissance Squadron at Beale AFB, Calif. The Air Force said the cause of the crash was still under investigation, and Pentagon officials reported that hostile fire was not involved. They also said the aircraft was supporting Operation Enduring Freedom in the Southwest Asia theater. Published reports say the accident occurred while the aircraft was landing at Al Dhafra Air Base.



USAF photo by A1C Desiree Hayden

On June 30, loadmaster MSgt. Sean Ballard nudges a container delivery system bundle out the back of a C-130J for Operation Enduring Freedom. It was the first combat airdrop from the newest version of the tactical airlifter. The crew for the mission was from the Rhode Island Air National Guard.

Schwartz To Go to TRANSCOM

President Bush on June 14 nominated Air Force Lt. Gen. Norton A. Schwartz to be the next commander of US Transportation Command, at Scott Air Force Base in Illinois. If confirmed by the Senate, Schwartz would be promoted to general and would replace Gen. John W. Handy, who is retiring.

At the time of the announcement, Schwartz was serving as director of the Joint Staff at the Pentagon.

Although Handy (and all previous TRANSCOM commanders) had simultaneously served as chief of USAF's Air Mobility Command, the President did not immediately nominate Schwartz for the AMC position in the June 14 announcement.

Schwartz has spent much of his career flying special operations C-130 transports. His previous assignments include stints as commander of the 16th Special Operations Wing at Hurlburt Field, Fla., and commander of Alaskan Command and 11th Air Force at Elmendorf AFB, Alaska.

DOD Identifies Vietnam MIAs

The Defense Department recently

announced that it had recovered and identified two airmen missing in action since the Vietnam War. The remains of Col. James L. Carter of Johnson City, Tenn., and 1st Lt. Lee A. Adams of Willets, Calif., were recently returned to their respective families for burial.

Carter was a C-123 aircraft commander who in 1966 took off on a supply mission from Khe Sanh, headed to Dong Ha. His aircraft was not found until local villagers took investigators to various crash sites beginning in 1993.

Specialists from the Joint POW/MIA Accounting Command (JPAC) performed four excavations between 2000 and 2003, recovering "human remains, personal effects, and other debris," a news release stated.

JPAC's forensic scientists analyzed the remains, and dental records eventually helped to positively identify Carter, according to a June 10 release.

DOD announced Adams' identification May 31, and a memorial service with full military honors was held for him June 1 at Beale AFB, Calif.

Adams was an F-105 Thunderchief pilot in Vietnam. On April 19, 1966, his airplane went down while he was attack-



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ing targets in North Vietnam. "As other pilots in the flight watched, his plane failed to pull out of the dive, crashed, and exploded," the release explained.

In 1993, a local resident turned over to a US-Vietnamese search team a "skeletal fragment he had found near the site of the crash." Officials used DNA testing and other methods to identify Adams.

Million-Pound Mobility Days Seen

Air Force mobility personnel continue to move cargo at near-record rates, nearly four years after Operation Enduring Freedom began and two years after the beginning of Operation Iraqi Freedom.

Mobility forces moved more than 1.05 million pounds of cargo on June 13, Central Command Air Forces officials recently announced.

This was almost two-thirds more than the post-9/11 daily mobility average and represented the highest airlift total in four months.

"Cargo included everything from food, equipment, and medical supplies to up-armored Humvees," stated a June 14 press release.

The record day for airlift during the global war on terrorism also came earlier

Global Strike Task Force Set for Guam

The Air Force in May announced details of the service's goal to build a Global Strike Task Force on the island of Guam. Strike, mobility, and intelligence-surveillance-reconnaissance aircraft would all operate from the Western Pacific island, which is a United States territory.

The proposal would permanently base 12 aerial refueling tankers and three Global Hawk unmanned aerial vehicles at Guam's Andersen Air Force Base.

The "strike" portion of the task force would be provided by "48 fighter and six bomber aircraft [which] would rotate to Andersen AFB from bases in the 50 states," according to a May 18 notice in the Federal Register.

Approximately 2,400 additional military, civilian, and contractor personnel would be required to support the Global Strike Task Force, according to the notice. "The action would also result in facility construction, addition, and alteration projects."

The Air Force and US Pacific Command have long had their eye on Guam as a logical place to increase American military power.

The island is in the same region as potential hot spots such as the Taiwan Strait, the Korean Peninsula, and the Strait of Malacca, but it is also far enough into the Pacific Ocean to be reasonably safe from enemy counterattack.

Andersen also has long runways, large parking areas, and enormous weapons and fuel storage capacity. Officials are fond of noting that the base hosted hundreds of B-52s during the later days of the Vietnam War, and that the base's infrastructure has continuously been modernized.

Flight Control Failure Caused F/A-22 Crash

An Air Force accident investigation recently found that a fault in an F/A-22's flight control system (FCS) led to the crash and destruction of the aircraft at Nellis AFB, Nev., last Dec. 20. The pilot, Maj. Robert A. Garland, safely ejected moments before the aircraft crashed on takeoff.

The Raptor "broke into several pieces, leaving a debris field scattered over the departure end of [the] runway."

The dysfunctional FCS rendered the mishap aircraft "uncontrollable," said the accident report, released June 8. The F/A-22's three rate sensor assemblies, which measure acceleration in three directions for the avionics system, all failed.

Consequently, the mishap aircraft "began a series of uncommanded and progressively more violent yaw, roll, and pitch transients" as soon as it left the ground, the investigation found.

A momentary power interruption had rendered the Raptor's FCS inoperative. The only way to identify this problem was through an "initiate built in test," or IBIT. Before takeoff, Garland started the engines, "performed an IBIT, and had a fully functioning flight control system," investigators determined.

Subsequently, in order to perform a maintenance operation, the engines were shut down, which momentarily interrupted the aircraft's power flow and caused the flight control failure. The pilot did not believe another IBIT was necessary after the engine shutdown, however, because the Raptor's auxiliary power system had been continuously running.

Garland was hardly alone in thinking an additional test was unnecessary. The "belief was based on academic training," along with "ambiguous" technical data descriptions, the report noted. The misperception "was shared by most F/A-22 personnel interviewed."

Col. Stanley T. Kresge, president of the accident investigation board, noted in his statement of opinion that, prior to this mishap, a catastrophic triple rate sensor assembly failure was "considered nearly impossible."

this year, when 1.1 million pounds were moved in one day in February.

Collectively, coalition airlift forces have "moved more than 1.3 million tons of cargo and nearly 2.7 million troops," for the operations in and around Iraq and Afghanistan, CENTAF reported.

PACAF Opens Warfighting HQ

Pacific Air Forces on June 1 established the provisional George C. Kenney Headquarters at Hickam AFB, Hawaii. The warfighting headquarters (WFHQ) will focus on preparations for air combat operations in the Pacific and is expected to become permanent this fall.

The Kenney Headquarters "will serve as the premier joint forces air and space command and control organization," said PACAF commander Gen. Paul V. Hester, in a May 31 press release. The warfighting headquarters is linked to the Pacific Air Operations Center at Hickam.

The center's namesake served as commanding general of Allied Air Forces in the Southwest Pacific during World War II.

The provisional Kenney Headquarters is led by Lt. Gen. Victor E. Renuart Jr., who is also vice commander of Pacific Air Forces.

Once it becomes permanent this fall, most of the Kenney Headquarters personnel will continue to be drawn from relocated numbered air force staff, a spokeswoman said.

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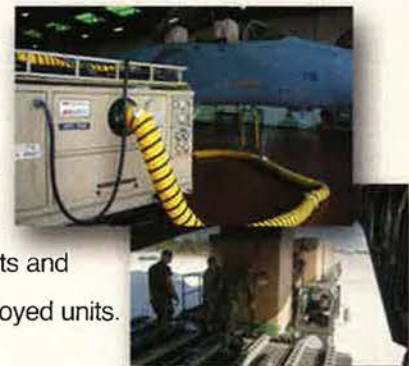
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The first woman selected to fly with the Thunderbirds—USAF's 52-year-old aerial demonstration squadron—is Capt. Nicole Malachowski, an F-15E pilot at RAF Lakenheath, UK. After F-16 conversion training and practice with the team, Malachowski is slated to fly in the No. 3 position beginning in the 2006 season.

EADS Chooses Alabama Site

If the Air Force picks the European Aeronautic Defence and Space Co. to build aerial tankers, the company will perform final assembly of the aircraft in Mobile, Ala., EADS officials announced June 22.

The Brookley Industrial Complex site was chosen because of its existing long runways and proximity to a deepwater port, company officials said. The marine facility is important because EADS would transport large sections of its KC-330 tanker to Alabama via ship.

The site was chosen over competing locations in Florida, Mississippi, and South Carolina.

Should EADS be selected for the

tanker work, the company said, it will invest \$600 million in the site and hire up to 1,000 workers. The facility envisioned would be able to produce up to 24 aircraft a year.

The Air Force is studying ways to recapitalize the aging KC-135 tanker fleet. It is expected that the Air Force will hold a competition between EADS and Boeing for an initial tranche of up to 100 aircraft, which could be a winner-take-all or a split buy with annual competitions to supply the remainder of a 400-aircraft fleet.

USAF Attracts Large New Class

The Air Force Academy's incoming freshman class of 1,418 cadets for the

fall of 2005 is the academy's largest since 1992. It is more than 100 students larger than last year's class, which enrolled 1,305 officer candidates.

Over the past decade, incoming academy classes have averaged about 1,250 students, the *Colorado Springs Gazette* reported. The record class came in 1975, when 1,626 cadets were enrolled.

Looney Takes Command at AETC

Gen. William R. Looney III took command of Air Education and Training Command June 17 at Randolph AFB, Tex., in a flight-line ceremony that included the retirement of his predecessor, Gen. Donald G. Cook.

New Aircraft at Cope Thunder

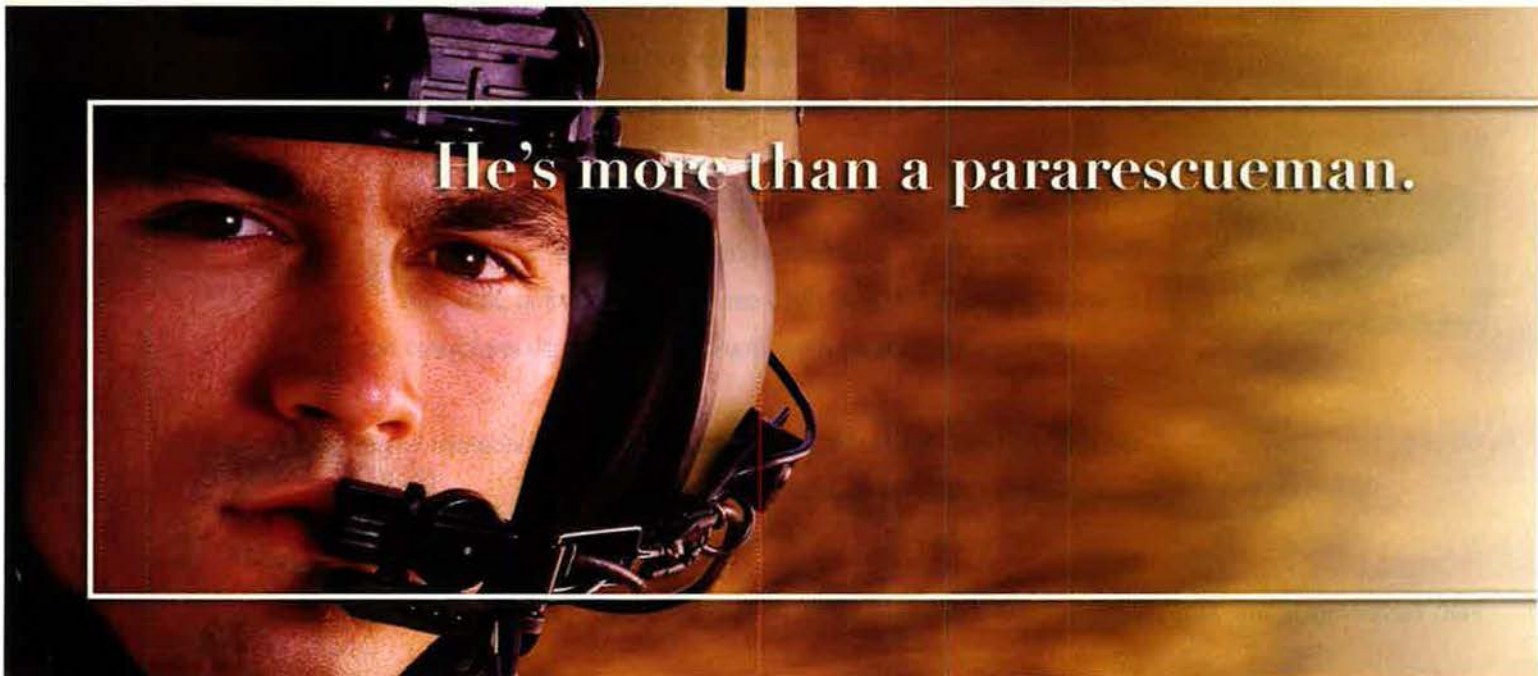
Japan recently brought its F-15J fighters and E-767 battle management aircraft to the Cooperative Cope Thunder exercise in Alaska for the first time. This is Japan's third year as a CCT participant, the Air Force announced in June, but 2005 marks the first time these advanced aircraft have participated in the large-scale, composite force exercises.

The F-15J is a Japanese derivative of the Boeing F-15C air defense fighter, and the E-767 is an airborne warning and control aircraft with a radar "saucer" like that of the USAF's E-3 Airborne Warning and Control System. It is based on the Boeing 767 platform.

Cooperative Cope Thunder is the largest realistic training event in the Pacific Theater. This year's iteration ran from June 9 to June 24 at the ranges near Alaska's Eielson and Elmendorf Air Force Bases.

F-16 Aids Recovery Operation

An Air Force F-16 provided close air support to ground forces engaged



in a fight to recover the bodies of two US helicopter crewmen in Iraq, officials recently announced. The F-16 helped to hold off the attacking insurgents by dropping a laser guided bomb, which suppressed the enemy small-arms fire, according to a press release.

On May 26, a pair of OH-58 Kiowa helicopters came under small-arms fire near Baquba, Iraq, about 40 miles northeast of Baghdad. The two soldiers aboard one of the aircraft died when the helicopter went down. The other Kiowa was able to return to base.

"The ground troops had to battle terrorist insurgents while performing search and recovery operations," said a May 31 press release. "An Air Force joint terminal attack controller embedded with the Army ground troops communicated with the F-16, ultimately directing the pilot to the target."

An MQ-1 Predator unmanned aerial vehicle also aided the mission by providing video surveillance of the combat zone.

Corley Nominated To Be Vice Chief

President Bush nominated Lt. Gen. John D.W. Corley on June 29 to be promoted to four stars and assume the duties of vice chief of staff of the Air Force. If confirmed by the Senate, Corley would replace Gen. T. Michael Moseley, who was recently confirmed by the Senate to be USAF Chief of Staff.

Corley is principal deputy, assistant secretary of the Air Force for acquisition, and military director of the Air Force Scientific Advisory Board. Previously, he was the director of USAF global power programs, and during that assignment, directed the combined air operations center during the early phase of Operation Enduring Freedom. He graduated from the Air Force Academy in 1973. ■

Military Remains Public's Most Trusted Institution

Despite the difficulty US military forces are having securing peace in Iraq, the American public still finds the military to be the most trusted US institution. Nearly three in four Americans expressed "a great deal" or "quite a lot" of confidence in the military, according to a June Gallup poll.

"Only two other institutions—the police and the church—score above 50 percent [confidence] in this year's survey," Gallup officials wrote.

While 74 percent confidence in the military is down slightly compared to the 82 percent expressing confidence in 2003, it is still historically high. Only four times has the public expressed higher confidence in the military—in 1991 (just after the Persian Gulf War), 2002, 2003, and 2004.

Gallup has tracked this issue since 1975. Confidence in the military bottomed out in 1981, at 50 percent, just before the Reagan defense buildup.

Americans also feel the military budget is appropriate. Spending on military and national defense accounts was deemed "about right" by a plurality of 38 percent of respondents. Identical 30 percent portions of the public thought defense spending to be "too little" or "too much."

The last time a plurality of Americans felt too little was being spent on national security was about six months before the 9/11 terrorist attacks. In February 2001, 41 percent said there was not enough defense spending, while 38 percent found it about right, and 19 percent believed there was too much.

The last time Gallup found a plurality believing too much was being spent on the military was in March 1993, when 42 percent of the respondents held that opinion.

Stealth Fighters Deploy to South Korea

The Air Force in May sent 15 of its F-117 stealth fighters to South Korea as part of an Air and Space Expeditionary Force (AEF) rotation.

Communist North Korea immediately called for the withdrawal of the radar-evading attack aircraft—and other US military forces—from the Korean Peninsula.

The F-117s from Holloman AFB, N.M., will fly from Kunsan Air Base for about four months. While deployed, the aircraft bolster the defense of South Korea, are a visible show of force to North Korea, and give the Nighthawk pilots the opportunity to train alongside F-16s in poor weather rarely seen in New Mexico.

The US has had forces in South Korea for mutual defense and as a deterrent to North Korea for more than 50 years. This is of little consequence to the North Korean regime.

"The United States would be well-advised to promptly take out of South Korea the F-117 stealth fighter bombers and other hardware, stop its war moves against the North, and withdraw its aggression forces at an early date," said North Korea's official news agency.

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Gen. Bernard A. Schriever, 1910-2005

Gen. Bernard A. Schriever, father of the ballistic missile and space programs and one of the most significant figures in USAF history, died June 20 in Washington, D.C., at the age of 94.

Schriever was a relentless innovator who, at a time of urgent national competition with the Soviet Union, led the design, development, test, and introduction of the Atlas, Titan, and Minuteman, America's first intercontinental ballistic missiles. In the process, he invented many of the Air Force's research and development organizations, fostered a service culture of technological advancement, and spearheaded the development of a US space and missile industry.

His leadership also paved the way for the early US civilian space program, as the Mercury and Gemini astronauts rode to space atop modified Atlas and Titan missiles.

He organized and was the first leader of Air Force Systems Command, later blended into Air Force Materiel Command, where his methods and insight were applied to programs across the range of Air Force endeavors.

After retirement, he continued to serve on technology and policy advisory committees. His counsel on technology, management, and leadership was sought right up until the time of his death. Schriever developed a reputation for forthrightness and had a knack for building bridges between the worlds of science and industry to the operational Air Force.

Born in Bremen, Germany, in 1910, Schriever came to America with his family just months before the US entered World War I in 1917. He became a naturalized citizen at the age of 13 and graduated near the top of his class at Texas A&M College in 1931. He was commissioned as an officer of field artillery, but switched to aviation.

Schriever graduated from flying school in 1933. He flew B-4 and B-10 bombers under the command of then-Lt. Col. Henry H. "Hap" Arnold, who later led the Army Air Forces in World War II and would come to rely on Schriever to handle many technical programs.

Schriever survived the Army's disastrous stint flying the airmail through all weather without instruments, but soon after, Depression-era cutbacks forced him out of uniform. Between 1935 and 1936, he ran a Civilian Conservation Corps camp for 200 boys in New Mexico. He returned briefly to active duty but then accepted a job flying for Northwest Airlines.

When regular commissions became available in 1938, Schriever returned to the Army, again as a second lieutenant. This time, though, he advanced rapidly, as a test pilot at Wright Field, Ohio. He graduated from the Air Corps Engineering School in 1941.

When World War II broke out, Schriever asked for a combat assignment. He got one in 1942 and was promoted to major. He promptly volunteered for combat duty and was assigned to the Pacific Theater. There he flew mostly B-17s but also B-25s and C-47s. He also used his engineering skills to develop, test, and refine flares that could be used to illuminate target areas in night attacks. He received decorations for valor and for being wounded in combat.

Although his unit rotated to the US, Schriever remained in theater, taking over ever-greater responsibilities for technical innovation and the management of maintenance. Eventually, he was in charge of maintenance for Fifth, Seventh, and Thirteenth Air Forces. Now a colonel, Schriever returned to the States as chief of the Scientific Liaison Section in the Office of the Deputy Chief of Staff, Materiel. In this position, he met and cultivated relationships with many of the leading scientists, engineers, and industrialists of the time.

Through his association with these scientists, Schriever became aware of the possibility of building nuclear weapons



USAF photo by MSgt. Jim Verhegry

Gen. Bernard Schriever, known as the father of the Air Force's ballistic missile and space program, is shown here at the groundbreaking ceremony for the USAF Memorial last year.

at less than half their previous design weight, making it far more feasible to put them on rockets with intercontinental range. He helped win for the Air Force the duty of developing intercontinental ballistic missiles and then, as brigadier general, was put in charge of the project.

By 1954, the Atlas missile—America's first ICBM—had become the Air Force's top priority. Schriever assumed command of the Western Development Division, headquartered in Inglewood, Calif., to carry out the program.

Although a large program, Atlas suffered from budget cutbacks until 1957, when the Soviet launch of the Sputnik satellite prompted the government to provide all the funding Schriever needed to finish the job.

Schriever personally developed the organization and infrastructure to make the missile possible. He tirelessly shuttled between drawing rooms, universities, factory floors, and launchpads, keeping the missile program on track. He oversaw the organization, as well as the construction of the massive physical infrastructure necessary to complete the mission. It was Schriever who came up with the revolutionary approach of concurrent development, in which various pieces of a project were developed simultaneously, instead of sequentially. This approach saved years of effort.

The Western Development Division became the Ballistic Missile Division in 1957. Soon after, more than 70,000 people were working for Schriever, either directly or indirectly.

The first Atlas was launched in 1957. It had gone from operational requirement to operational status in just five years. By 1963, Strategic Air Command had 127 Atlas missiles in 13 squadrons.

Schriever wasn't solely focused on Atlas. Well before the missile flew, he was at work on the Titan, the Thor intermediate-range nuclear missile, and the solid-fueled Minuteman, all of which were operational by 1962. Schriever had supervised the creation of a national missile industry in just nine years.

As a three-star general, Schriever headed Air Research and Development Command. While orchestrating missile development, he received his fourth star, in 1961. In 1963, he created Project Forecast, intended to anticipate the future technologies the Air Force would need.

In 1966, Schriever retired from the Air Force, after 33 years of active service, but he scarcely slowed down. He served on numerous committees and panels.

Schriever was honored by the Air Force Association in 2003 with its Lifetime Achievement Award. Falcon AFB, Colo., was renamed in his honor in 1998. ■



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Operation Iraqi Freedom—Iraq Casualties

By July 8, a total of 1,752 Americans had died supporting Operation Iraqi Freedom. The total includes 1,747 troops and five Defense Department civilians. Of those fatalities, 1,348 were killed in action by enemy attack, and 404 died in noncombat incidents. There have been 13,336 troops wounded in action during OIF. This includes 6,844 who returned to duty within 72 hours and 6,492 who were unable to quickly return to action.

Fighters Kill 40 Insurgents

USAF F-16s providing close air support for marines in Western Iraq killed approximately 40 insurgents during a June 11 battle. The F-16s delivered five 500-pound GBU-12 Paveway laser guided bombs (LGBs) and two 500-pound GBU-38 Joint Direct Attack Munitions, destroying terrorist hideouts.

"These successful strikes resulted from close coordination with the coalition ground forces who had requested immediate air support," read a June 12 press release from Central Command Air Forces. In the mission, enemy forces had "taken refuge in buildings in an attempt to shield themselves from coalition attack," the release stated. "Airpower was the only effective way to eliminate this threat." Air Force KC-10 and KC-135 refueling tankers supported the strike aircraft, "so they could stay on station until all targets were destroyed." The air strikes began before noon local time and lasted until 4 p.m.

The release noted that nearly 70 percent of all munitions used by coalition air forces in Iraq have been precision guided. The 500-pound JDAM was first used in Iraq last September and is valuable for its satellite-guided accuracy and low collateral damage, compared to the 2,000-pound JDAM. And in clear conditions, LGBs such as the Paveway can deliver near-pinpoint accuracy.

CENTAF officials called Operation Iraqi Freedom "the most deliberate, disciplined, and precise air campaign in history."

Operation Enduring Freedom—Afghanistan Casualties

By July 8, a total of 213 Americans had died supporting Operation Enduring Freedom, primarily in and around Afghanistan. The total includes 99 troops killed in action and 114 who died in nonhostile incidents such as accidents. A total of 511 troops have been wounded in Enduring Freedom. They include 182 who were able to return to duty within three days and 329 who were not.

B-52 Reprises CAS mission

The B-52 bomber, which became the poster child for defense transformation when 40-year-old BUFFs began performing close air support attacks in Afghanistan, recently reprised its role as a CAS aircraft.

The Air Force announced June 3 that troops in Afghanistan's Oruzgan Province "came under small-arms fire, and the B-52 responded."

The venerable B-52 dropped three satellite-guided Joint Direct Attack Munitions on a cave sheltering the attackers, "killing two and leading to the capture of 10 others by coalition ground forces," a press release stated. The bombs "hit the cave dead-on and closed all three entrances," said the unidentified mission lead. The B-52, permanently stationed at Minot AFB, N.D., was deployed with the 40th Air Expeditionary Group.

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News Notes

By Tamar A. Mehuron, Associate Editor

■ Northrop Grumman began construction in June of the X-47B Joint Unmanned Combat Air Systems (J-UCAS) aircraft, the first unmanned surveillance attack aircraft designed to operate from both land bases and aircraft carriers. Final assembly of the first X-47B begins this summer at Northrop's Palmdale, Calif., facility.

■ A fourth Predator squadron will stand up at Creech AFB, Nev., according to a USAF announcement June 3. Air Force Special Operations Command will run it. The first three squadrons are under Air Combat Command.

■ AMC commanders can now plan, schedule, and track all mobility airlift and aerial refueling missions at both unit and force levels, thanks to a new command and control system. Currently used at Scott AFB, Ill., and at McChord AFB, Wash., the system will be installed throughout the command through August 2006.

■ Warfighters in search of a single source for employing space assets in combat need look no further than the Joint Space Operations Center, which opened at Vandenberg AFB, Calif., on May 18. For the first time, all joint-space assets will be handled under one roof. The center will provide shared situational awareness to commanders and troops in the field.

■ Air National Guard C-130J-30s from California, Maryland, and Rhode Island arrived in early June in Southwest Asia to conduct airlift missions to Iraq, Afghanistan, and the Horn of Africa. The 746th Expeditionary Airlift Squadron is comprised of airmen and aircraft from California's 146th AS, Maryland's 135th AS, and Rhode Island's 143rd AS.

■ An accident investigation board report, released June 10, concluded that pilot error was to blame for the Nov. 24 crash of an MQ-1 Predator unmanned aerial vehicle at a military installation in CENTCOM's area of responsibility. During the landing process, he failed to disengage the airspeed hold, as required by the landing checklist. This caused the aircraft to be incorrectly configured for landing. The Predator crashed near the runway and was destroyed.

■ During a solo training flight June 8 at Columbus AFB, Miss., a T-37 Tweet trainer rolled off the runway. The student pilot suffered no injuries. The aircraft sustained damage to its left wing, creating a small fuel spill.

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NOMINATIONS: To be General: Norton A. **Schwartz**. To be Lieutenant General: Michael W. **Peterson**. To be Brigadier General: David G. **Ehrhart**, Richard C. **Harding**, William N. **McCasland**. To be ANG Major General: Charles W. **Collier Jr.**, Scott A. **Hammond**, Henry C. **Morrow**, Roger C. **Nafziger**, Gary L. **Saylor**, Darryll D.M. **Wong**. To be ANG Brigadier General: Michael D. **Akey**, Frances M. **Auclair**, Kathleen F. **Berg**, James A. **Buntyn**, Stanley E. **Clarke III**, James F. **Dawson Jr.**, Michael D. **Gullihur**, Tony A. **Hart**, Martin K. **Holland**, Mary J. **Right**, James W. **Kwiatkowski**, Ulay W. **Littleton Jr.**, Patrick J. **Moisio**, Loda R. **Moore**, Thomas A. **Peraro**, William M. **Schuessler**, Robert M. **Stonestreet**, Jannette **Young**.

CHANGES: Brig. Gen. (sel.) Salvatore A. **Angelella**, from Exec. to Cmdr., SHAPE, NATO, Casteau, Belgium, to Cmdr., 35th FW, PACAF, Misawa AB, Japan ... Brig. Gen. Kathleen D. **Close**, from Vice Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla., to Dir., Mission Spt., AFMC, Wright-Patterson AFB, Ohio ... Maj. Gen. Scott S. **Custer**, from Dir., LL, OSAF, Pentagon, to Asst. DCS, Air & Space Ops., USAF, Pentagon ... Maj. Gen. Daniel J. **Darnell**, from Cmdr., Space Warfare Center, AFSPC, Schriever AFB, Colo., to Dir., LL, OSAF, Pentagon ... Brig. Gen. (sel.) Richard T. **Devereaux**, from Cmdr., 100th ARW, USAF, RAF Mildenhall, UK, to Dir., Regional Affairs, Dep. UnderSECAF, Intl. Affairs, Pentagon ... Brig. Gen. Daniel R. **Dinkins Jr.**, from Dir., Jt. Single Integrated Air Picture Sys. Engineering Orgn., OSAF, Warfighting Integration & CIO, Pentagon, to Dep. Dir., Policy, Planning, & Resources, OSAF, Pentagon ... Brig. Gen. William J. **Germann**, from Cmdr., 89th Medical Gp., AMC, Andrews AFB, Md., to Command Surgeon, AFMC, Wright-Patterson AFB, Ohio ... Maj. Gen. Charles B. **Green**, from Cmdr., 59th Medical Wg., AETC, Lackland AFB, Tex., to Asst. Surgeon Gen., Health Care Ops., Office of the Surgeon Gen., Bolling AFB, D.C. ... Brig. Gen. Gregory J. **Ihde**, from Cmdr., 57th Wg., ACC, Nellis AFB, Nev., to Vice Cmdr., George C. Kenney Hq. (Provisional), Hickam AFB, Hawaii ... Brig. Gen. (sel.) Susan K. **Mashiko**, from Dep. Sys. Prgm. Dir., National Polar-orbiting Env. Satellite Sys., Silver Spring, Md., to Vice Cmdr., Air Armament Center, AFMC, Eglin AFB, Fla. ... Gen. T. Michael **Moseley**, from Vice C/S, USAF, Pentagon, to C/S, USAF, Pentagon ... Lt. Gen. (sel.) Michael W. **Peterson**, from Dir., Info., Svcs., & Integration, OSAF, Pentagon, to Chief, Warfighting Integration & CIO, OSAF, Pentagon ... Maj. Gen. (sel.) Melissa A. **Rank**, from Dep. Asst. Surgeon Gen., Medical Ops., Office of the Surgeon Gen., Bolling AFB, D.C., to Asst. Surgeon Gen., Medical Force Dev., USAF, Bolling AFB, D.C. ... Brig. Gen. William J. **Rew**, from Cmdr., 35th FW, PACAF, Misawa AB, Japan, to Cmdr., 57th Wg., ACC, Nellis AFB, Nev. ... Brig. Gen. (sel.) Stephen D. **Schmidt**, from Dir., Log., AETC, Randolph AFB, Tex., to Cmdr., E-3A Component, NATO, Airborne Early Warning Force, Geilenkirchen, Germany ... Brig. Gen. Larry O. **Spencer**, from Dir., Mission Spt., AFMC, Wright-Patterson AFB, Ohio, to Vice Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Brig. Gen. Thomas W. **Travis**, from Cmdr., 311th Human Systems Wg., ASC, AFMC, Brooks-City Base, Tex., to Cmdr., 89th Medical Wg., AMC, Andrews AFB, Md. ... Brig. Gen. (sel.) David B. **Warner**, from Dir. Info. Systems for C4, JFCOM, Norfolk, Va., to Dep. Dir., Ops. & Spt. Integration, OSAF, Pentagon ... Brig. Gen. (sel.) Janet C. **Wolfenbarger**, from Cmdr., C-17 Sys. Gp., ASC, AFMC, Wright-Patterson AFB, Ohio, to Dir., Acq. Center of Excellence, Asst. SECAF (Acq.), Pentagon. •

News Notes cont. from p. 22

■ William Winkwerder Jr., assistant secretary of defense for health affairs, changed the Tricare policy May 3 for transitional survivors of those who have died in service. Active duty family members on accompanied orders outside the continental United States who suffer the loss of a spouse are now eligible for Tricare Prime benefits overseas during the three-year transitional survivor period.

■ An Air Force accident investigation determined that a B-1B mishap Nov. 23 at Ellsworth AFB, S.D., was caused by incorrectly aligned rollers on the crew entry ladder assembly that created an abort-takeoff condition. The brakes overheated from the high-speed abort, leading to an explosion and a fire in the No. 8 landing gear.

■ All four main subassemblies for the first F-35 have been joined, and fabrication of parts for the second F-35 has begun, Lockheed Martin announced June 13 at the Paris Air Show.

■ Hq. US Air Forces in Europe received the Air Force Organizational Excellence Award for outstanding service from July 1, 2002, to June 30, 2004. The award honors units with exemplary performance and stellar achievements.

■ Lockheed Martin on June 10 achieved a second successful test firing of a hybrid motor, a key component of the Falcon Small Launch Vehicle program, at the Air Force Research Laboratory, Edwards AFB, Calif. The first test firing took place in January. The program aims to create an affordable and responsive spacelift capacity able to speedily launch a small satellite into low Earth orbit.



Air Force Memorial Begins to Rise



The Air Force Memorial is beginning to rise in Washington, D.C. Photo at left shows a sample section of its stainless steel spires. Top left, spire assembly jigs are laid out. Photo at top shows the spire foundations being readied for concrete. The memorial (bottom illustration) is to be dedicated in October 2006. Officials say fund-raising continues, aiming at raising the final \$2 million needed.

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Action in Congress

By Tom Philpott, Contributing Editor

Covering the Billion-Dollar Gap; Vet Benefits Up 50 Percent; Big Four Amendments

VA Shortfall Addressed

Congress rushed in late June to pass a \$1.5 billion emergency supplemental bill to eliminate a 2005 funding shortfall for the Department of Veterans Affairs health care system. VA officials had been slow to reveal the problem.

Rep. Steve Buyer (R-Ind.), chairman of the House Veterans' Affairs Committee, grilled a senior VA official at a June 23 hearing on the department's cost-forecasting model and learned for the first time that VA health care programs were short this year by at least \$1 billion.

Jonathan B. Perlin, VA's undersecretary for health, admitted that the VA would come up short in 2005.

When asked earlier this year, VA officials had told lawmakers the 2005 budget was adequate.

At least one lawmaker, Democrat Patty Murray (Wash.), was skeptical. Murray, who serves on the VA, budget, and appropriations committees, tried to insert extra money for the VA into the war on terror emergency spending bill. The Administration said the funding was not necessary.

Republicans and Democrats alike expressed dismay over the VA revelation.

Murray called news of the shortfall "appalling but not surprising." At a press conference following the session, Buyer and Sen. Larry Craig (R-Idaho), his counterpart in the Senate, promised that Congress would close the funding gap.

By the time Congress learned of the funding shortfall, it already had approved a \$71 billion 2006 VA budget, which is \$450 million higher than the President requested and \$1.2 billion above the 2005 VA budget.

Behind the Shortfall

Committees in both the House and Senate on June 28 held emergency hearings to explore what happened and how VA proposed to handle the shortfall.

VA Secretary R. James Nicholson testified that the primary culprit was



Nicholson on hot seat for funding gap.

the agency's forecasting model, which works from data that is three years old. He said federal agencies that use "actuarial modeling to project resource requirements two-and-one-half to three years hence push the performance envelope." Most private companies work with models using one-year-old data.

Nicholson said a secondary problem was the VA estimate that the agency would see fewer than 24,000 veterans of the war on terror using VA health care in 2005. The new estimate is around 103,000, leaving the VA short by about \$273 million—or 28 percent of the total shortfall.

The VA's initial plan to cover the shortfall would have used \$375 million earmarked for 2006 and deferred \$300 million in capital improvements slated for 2005. That would have pushed the problem forward, shorting the 2006 budget, which now is suspect as well.

Modest Steps

In early June, before the funding shortfall came to light, Craig touted Nicholson's support for the Veterans

Health Care Act of 2005 (S 1182). The act offers numerous enhancements. It would:

- Eliminate co-payments for hospice care and for long-term care of former prisoners of war.
- Allow the VA to provide hospital care for newborns of female veterans.
- Grant authority to the VA to pay for emergency treatment for veterans who must use non-VA hospitals.
- Increase funding for groups that give shelter to homeless veterans.
- Allow the VA to provide licensed family counseling sessions for veterans and improve VA mental health care outreach programs to the nation's National Guard troops.
- Enable the VA to conduct cost-comparison studies within its health care system to determine the most efficient means of delivering services.

Craig noted during a late May hearing that veterans still must wait almost six months, on average, to have their initial claims either approved or denied. The VA backlog in claims stands at more than 340,000.

More than 12 percent of claims denied are appealed. The appeal process itself generates a more extensive VA review process that can take, on average, three years to complete.

Craig did say, though, that benefits paid to veterans and their survivors this year will total more than \$32 billion, an increase of more than 50 percent since 2000.

Defense Bill Delayed

Senate Majority Leader Bill Frist (R-Tenn.) has decided to delay until mid-July, and possibly until September, full Senate consideration of the 2006 defense authorization bill.

The House passed its defense authorization bill (HR 1815) in May. That same month, the Senate Armed Services Committee marked up its version (S 1042). Typically, a majority leader will refer the authorization bill to the floor to begin debate and vote on amendments, followed by full Senate passage and scheduling of a House-

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Senate conference to iron out differences between the two versions.

The delay froze a queue of amendments important to military reservists and retirees.

Republican leaders faced the prospect of Senators from states slated to lose military installations using the defense bill to argue for their bases to remain open, in hopes of influencing the base closure commission recommendations. And lawmakers critical of ongoing operations in Iraq were expected to use hours of debate on defense issues to underscore their viewpoints.

What's at Stake

Four planned amendments to the Senate's 2006 defense authorization bill are priorities for military associations and beneficiary groups. Here's what the amendments would do:

- **Expand Tricare for Reservists.** Sen. Lindsey Graham (R-S.C.), chairman of the armed services subcommittee on personnel, will introduce an amendment to provide a premium-based Tricare Standard program to drilling National Guard or Reserve members and their families who need health insurance.

"He's committed to it," said a Senate aide, who dismissed the notion that Graham might shelve his amendment at the urging of defense officials who have complained openly in recent months about soaring military health care costs. The aide emphasized that Graham had made the amendment "his first priority."

A similar amendment inserted into the House defense authorization bill by Rep. Gene Taylor (D-Miss.) was pulled, ostensibly because it violated a budget law that requires any increase in entitlement spending to be offset elsewhere.

Under Taylor's amendment, drilling reservists would be eligible for Tricare Standard, the military's traditional fee-for-service health insurance, if they paid monthly premiums of \$75 for member-only coverage or \$233 for family. The plan would cost the government \$3.85 billion over five years.

Congress last year approved Tricare Reserve Select (TRS), a scaled down version of Standard, but opened it only to reservists deactivated from post-9/11 deployments who agreed to remain in drill status during the period of TRS coverage. Graham and Taylor argue that TRS fails to properly reward reserve component members and their families for the burden they now carry for the nation's defense.

Whether Armed Services Committee chairman Warner goes along will be key to approving this amendment.

So far, said an aide, "Warner likes the idea of tying medical benefits to mobilization" as required under TRS.

"Graham doesn't dispute that [logic], but he ties it to readiness and reliance on the reserves," said the staffer.

- **Expand death benefits eligibility.** Sens. John Kerry (D-Mass.) and Carl Levin (D-Mich.), ranking Democrat on the Armed Services Committee, will press to extend the \$238,000 retroactive increase in military death benefits—which Congress approved with a provision in the 2005 wartime supplemental funding bill for combat-related deaths only—to all active duty deaths since Oct. 7, 2001, the start of Operation Enduring Freedom in Afghanistan.

Helping that effort are warnings from the Joint Chiefs of Staff about a negative effect on morale from having two levels of death benefits—one for combat-related deaths and lesser payments for other active duty deaths.

- **End DIC/SBP offset.** Sen. Bill Nelson (D-Fla.) will offer as an amendment a bill (S 185) to eliminate the drop in Survivor Benefit Plan (SBP) annuities that occurs when surviving spouses receive VA Dependency and Indemnity Compensation.

DIC is paid to surviving spouses if service members die on active duty, veterans die of service-related conditions, or certain veterans die who were being paid 100 percent VA disability compensation. Under current law, if the surviving spouse of a retired member is also covered by SBP, that

monthly payment is reduced dollar-for-dollar by tax-free DIC, now set at \$993 a month. SBP premiums associated with the lost payments are returned.

The offset currently affects more than 52,000 military widows.

The amendment's cost—\$6 billion over 10 years—and death benefit gains voted earlier this year, dampen prospects for Nelson's amendment, said a Senate staff member.

"There was force behind the argument if you kept the death gratuity at \$12,000 and Servicemembers' Group Life Insurance at \$250,000," he said. "There was an argument that, well, this particular income stream shouldn't end and the way to do it is eliminate the offset, so full SBP and DIC can be paid." However, others cried enough because Congress had "just raised the death gratuity to \$100,000 and SGLI by \$150,000."

- **Accelerate CR for IU retirees.** Sen. Harry Reid (D-Nev.) is expected to offer an amendment to match a House-passed plan that would accelerate phase in of concurrent receipt of military retired pay and VA compensation for 28,000 military retirees drawing 100 percent disability compensation for being rated unemployable (or IU) by the VA. Reid's measure, like the initiative from Rep. G.K. Butterfield (D-N.C.) that the House approved, would end offset of IU retirees on Oct. 1, 2009, instead of January 2014.

Speculating that Reid's amendment would pass, the Senate staffer explained that there is "a lot of sympathy" for the IU retirees. He asked, "Who is going to say this group is not deserving?"

Reid may press colleagues to eliminate the entire phase-in schedule for IU retirees or, as he has in the past, propose lifting the entire ban on concurrent receipt to restore full retired pay immediately to any military retiree also receiving disability pay.

Health Savings Accounts

The House Government Reform Committee voted to allow service personnel and federal civilian employees to establish health savings accounts (HSAs) so they can pay any out-of-pocket health care costs, such as Tricare enrollment fees or Federal Employees Health Benefits Program premiums, using tax deferred dollars.

The bill (HR 994), sponsored by Rep. Tom Davis (R-Va.), had attracted 212 co-sponsors by late June.

However, the Armed Services and Ways and Means committees share oversight responsibility for the HSA bill, complicating its passage. Similar legislation in the past failed. ■

AP photo by Ted S. Warren



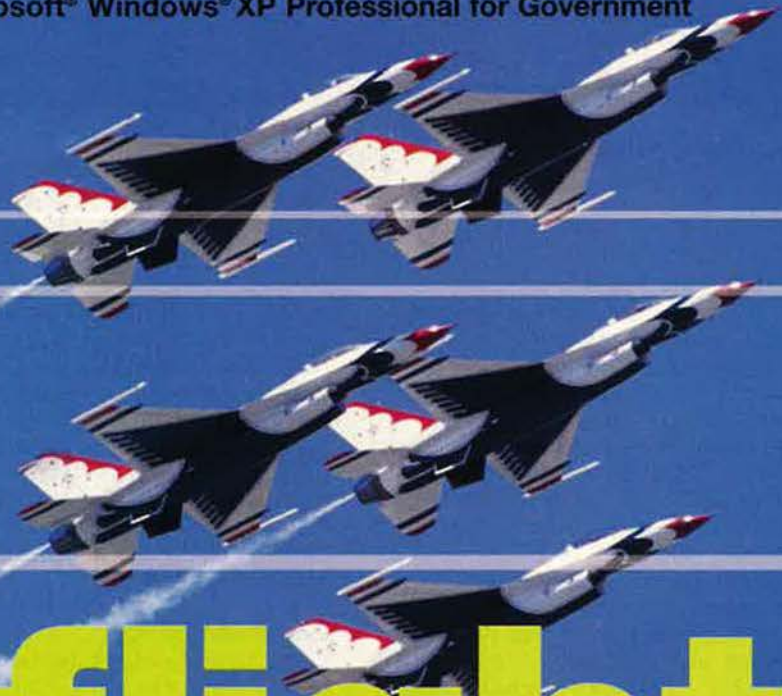
Kerry presses to expand death benefit.

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Verbatim

By John T. Correll, Contributing Editor

Call Out the Posse

"If the US government continues to shirk its responsibility, Amnesty International calls on foreign governments to uphold their obligations under international law by investigating all senior US officials involved in the torture scandal. And if those investigations support prosecution, the governments should arrest any official who enters their territory and begin legal proceedings against them. The apparent high-level architects of torture should think twice before planning their next vacation to places like Acapulco or the French Riviera."—**William F. Schulz, executive director, Amnesty International USA, May 25. Among those listed for possible arrest: President George W. Bush, Secretary of Defense Donald H. Rumsfeld, and former CIA director George J. Tenet.**

The Real Heroes

"You are the bravest. You are the strongest. There's a big difference between the movies and reality. In the movies, I'm the action hero. [But] you are all the true action heroes."—**Gov. Arnold Schwarzenegger, speaking to 2,000 troops and their families at a military appreciation day, Los Angeles Times, June 5.**

Durbin Speaks ...

"When you read some of the graphic descriptions of what has occurred [at Guantanamo prison for captured terror suspects]—I almost hesitate to put them in the record. ... You would most certainly believe this must have been done by Nazis, Soviets in their gulags, or some mad regime—Pol Pot or others—that had no concern for human beings. Sadly, that is not the case. This was the action of Americans in the treatment of their prisoners."—**Sen. Richard Durbin (D-Ill.), Senate speech complaining that some prisoners had been subjected to heat, cold, loud music, and so forth, June 14.**

... and Backtracks

"On June 14, I took the floor of the Senate to speak about genuine heartfelt concerns about the treatment of prisoners and detainees at Guantanamo and other places. ... I made reference to the Nazis, Soviets, and other repressive regimes. ... I have come to understand

that was a very poor choice of words. ... I'm sorry if anything that I said caused any offense or pain to those who have such bitter memories of the Holocaust. ... I'm also sorry if anything I said in any way cast a negative light on our fine men and women in the military. ... I never, ever intended any disrespect for them. Some may believe that my remarks crossed a line. To them, I extend my heartfelt apologies."—**Durbin, floor speech, June 21.**

Department of Pork

"It's officially called the Department of Defense, but to many politicians, the label misstates its function. Judging from their reaction to proposed base closures, they'd like to rename it the Department of Jobs, Pork, Community Uplift, and Incumbent Protection. That way, no one would get distracted by the petty business of protecting America."—**Columnist Steve Chapman, Chicago Tribune, May 22.**

No Torture

"If you're in my shoes and you thought Abu Farraj al-Libbi had planned an attack on America, would you use any means necessary to get the information from him? The decision I have made is, 'No, we will not.' And let's just pray he doesn't have that information. And when I told the American people we're not torturing, we're not torturing."—**Bush, in an interview with radio and television editors, New York Daily News, June 4.**

Good for Everybody

"There is no point living in the past. Look at where we are now. Everyone, all freedom-loving people, would be better off with a genuinely representative, effective, free government in Iraq, whatever your feelings are about what went on before."—**Former President Bill Clinton, Associated Press, May 19.**

Army Won the Wars

"In all of these [World War I, World War II, and the Korean War], it was the skill of American soldiers, not our technology or overwhelming numbers, that secured our victories. America's unconventional wars, such as in the Philippines and Vietnam, are even more telling. They show the Army can fight

with skill, honor, and dedication in even the most trying circumstances. The lessons from Vietnam bore themselves out in the Army's swift victory in the Persian Gulf War."—**Michael Schellhammer, Department of Defense intelligence specialist (and Army Reserve officer), Washington Times, June 1.**

Rods From God

"Now come the newest stories that echo down the interconnected corridors of the American mainstream media, about 'killer satellites' and 'death stars' and 'Rods from God' bombardment systems. ... Scary tales about US 'death stars' hovering over target countries promising swift strikes from space rely merely on readers not understanding the basics of orbital motion in space. A satellite circles Earth in an ever-shifting path that passes near any particular target only a few times every 24 hours, not every 10 minutes. It's quicker and cheaper to strike ground targets with missiles launched from the ground."

—**James Oberg, retired space scientist and author, USA Today, June 14.**

Closer to Pre-emption

"Nuclear deterrence requires that the threat of retaliation be credible. It would be out of the question, for example, for France to [threaten to] nuke Iran—no one believes we would ever do it. But if we could strike at strategic targets with a minimum of collateral damage, that might force people to think."—**French Army Gen. Henri Bentegeat, briefing reporters on criteria for using nuclear weapons, Aviation Week & Space Technology, June 6.**

Plenty of Bombs

"I should say that we have enough nuclear bombs to defend against a US attack. As for specifically how many we have, that is a secret."—**Kim Gye Gwan, North Korea's vice foreign minister, Associated Press, June 9.**

Cyber Smart, Too

"North Korea is capable of cyber attacks on both the command and control system of the US Pacific Command and the critical infrastructures of the US mainland, such as electric power."—**Byun Jae-jung, researcher at South Korea's Agency for Defense Development, Korea Herald, June 3.**

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Airborne troops prepare for a mass airdrop from C-17s during Operation Iraqi Freedom. The C-17 has proved indispensable in Southwest Asia, but it has been ridden hard.

Air Mobility in the Do

Will it take an airlift failure in wartime to get the Pentagon off the dime?



Drums

By John A. Tirpak, Executive Editor

The problem of aging aircraft is taking a bite out of America's lift capability. Airplanes are grounded—with more to come—and each time it happens, mobility forces must scramble to find more work-arounds to meet the airlift needs of a nation at war. The problem of old airplanes is beginning to limit military options, and there is no prospect of a quick solution. Things will get worse before they get better.

"I would hope we never have to fail to make the point," said Gen. John W. Handy, the commander of US Transportation Command and USAF's Air Mobility Command. However, Handy has had to remove aircraft from flying status because of age problems that are not easily or cheaply fixed, and he finds it increasingly difficult to meet the demands of the war effort.

The issue of recapitalizing the mobility fleet comes to a head this summer, as the Joint Staff at the Pentagon moves to release a long-delayed Mobility Capability Study. The study updates one that came out just before Sept. 11, 2001, and became instantly obsolete. That one said the US in 2001 already had a severe shortage of airlift, even before going into the war on terror. Now, two airlift-intensive military campaigns later and in the midst of a herculean sustainment effort, the airplanes are four years older, in heavier use, and little has been done to turn things around.

In a recent interview, Handy, who retires in October after a 39-year career spent mostly in the airlift world, gave a snapshot view of how TRANSCOM and AMC are coping with high demands



and diminishing assets. He also offered his views on what he hopes the MCS will—and will not—say about the future of lift.

Neither TRANSCOM nor AMC are involved in developing the mobility study. Handy said his role has been merely to provide data when asked and observe the process from a distance. However, he's uneasy about the potential conclusions of the MCS. Specifically, he's worried that the Joint Staff will decide that, in a surge situation, much more can be done with nonorganic capabilities—whether they be aircraft or people.

Handy said he would be concerned if the report concludes there should be greater reliance on the Civil Reserve Air Fleet.

Keep "Reserve" in CRAF

CRAF is a program under which civilian airlines and air cargo companies volunteer their aircraft for wartime "call-up" to support a military deployment. CRAF has only been activated a couple of times since its inception and should not be confused with the routine hiring of commercial carriers to move military cargo and people, something that happens virtually every day.

"We probably get as much today as we're ever going to be able to get out of our commercial endeavors," Handy asserted.

His concern is that a decision to rely routinely on CRAF call-ups—rather than to invest in organic capabilities—will discourage companies from participating at all.

"If you had ... routine activation of the CRAF to get the job done, how



USN photo by PH2 David C. Mercal

At top, airmen unload a C-5 during an exercise. With modernization, C-5s should last another 20 years. Above, marines and their gear are loaded onto a C-17. Both transports have played crucial roles in recent years.

could those business people plan a commercial business?... If we activate them, they lose the routes, potentially, to competitors" that either do not participate or are not called in the first stages of CRAF.

Civilian operators "have committed all they can possibly commit, and we should exercise that CRAF activation very, very judiciously," Handy maintained. CRAF, he believes, should be held in a true reserve, for times of extreme national need. A similar program exists for sealift carriers, and those participants face the same dangers if they, too, are obliged routinely to fill the gaps in organic lift capability.

The Bush Administration has also made liberal use of the Guard and Reserve in meeting manpower require-

ments, but Handy is worried that this reliance, too, poses risks.

"You've got to be careful that you don't assume" that authority to call up the Guard and Reserve in a future conflict is "going to be automatic," Handy noted. "There are many, many scenarios that I've been involved in, over my ... 39 years in this business, that we might have liked to mobilize the Guard and Reserve, but it wasn't possible, for a whole lot of other reasons." He cautioned that the Joint Staff should be wary of assuming the reserve forces will be activated early in a crisis, because "my experience says that doesn't happen."

Handy asserted that "when you strip away some of these assumptions—or these desires—about early mobilization or CRAF activation, you have to realize

that you have to have some distinct, organic capability—air, land, or sea—and it has to be by active duty people with the right, modern weapon systems to do the country's bidding."

The reserve issue in particular is in high profile right now, because AMC's mobilization authority will run out in December, and many reservists now bearing some of the crushing mobility load will go home.

"There are some units that might go into their second year; that'll get us into 2006," Handy said. However, there must be some reduction in commitments to give the reserve force time to rest and reconstitute.

There has been some abatement in operating tempo, Handy said, despite the near-constant need to deploy and

redeploy troops throughout Southwest Asia, all the while not missing a beat on the regular, "peacetime" commitments to other regions.

Part of the reduction stems from practice.

"We have achieved efficiencies ... at TRANSCOM," Handy said, that have flowed from lessons learned "into processes improved and documented." TRANSCOM also reaped benefits when Defense Secretary Donald H. Rumsfeld assigned "distribution process ownership" to TRANSCOM, enabling the command to decide how it will move needed gear and supplies from "factory to foxhole," Handy reported. Cutting out middlemen in the form of multiservice logistical bureaucracies has not only sped up the process but saved hundreds of millions of dollars, a figure that is "auditable," Handy said at an Air Force Association symposium in February.

At the same time, the military services are now well practiced with repeated deployments, Handy noted.

"They're current and qualified. ... They've learned their lessons. ... They've documented their lessons, and those lessons are in their tactics, techniques, and procedures today, so that the whole system has become more efficient."

A Limit to Efficiency

While all this has allowed TRANSCOM to do more, with fewer assets, there's no reason to assume that such improvements will continue indefinitely. Handy said that TRANSCOM and AMC have achieved "amazing efficiencies,"



Lockheed Martin photo by John Rossino

The Pentagon reversed its decision to terminate the C-130J, shown here. The J model is urgently needed to replace the oldest C-130s, which are grounded with structural problems.

leading some to think there is no need for more. In fact, senior Air Force officials said the MCS had been sent back for rework because the Joint Staff questioned the way airlift requirements traditionally are expressed—which is in millions of ton miles per day.

"If that's not the metric you want to use, fine, but give me some other metric that's relevant," a senior USAF official commented. By early summer, there was still disagreement about how requirements should be measured.

Senior USAF officials suggested that the Office of the Secretary of Defense wanted to discard the million ton miles/

day metric because they are unwilling to spend the money necessary to fulfill the requirement.

"If you don't have a number you have to meet, you can't be accused of not meeting it," said one.

Since February, Handy has ordered the grounding of 37 C-130Es discovered to have severe cracking in main structural members. The 45-year-old aircraft are no longer flyable. The critical center wing boxes, which hold the aircraft together and bear much of the dynamic load, have reached the end of their planned service lives. Still, they had been kept in service because of the demands of the war. Some had to be pulled out of workhorse duty in Iraq, to be replaced with less geriatric models. Seven of the grounded C-130Es were retired by early June.

Another 57 C-130s, a mix of Es and early H models, were restricted because they are "approaching the point where they may end up being grounded, too," Handy said. These aircraft are limited to flying passengers or light cargo loads, but have to avoid stressful conditions such as high speeds, violent maneuvers, and turbulence. Such an injunction is almost ludicrous, Handy has noted, as turbulence can rarely be seen and avoided.

Continuing to press on with such debilitated equipment can have potentially disastrous consequences.

"A lot of people recall the C-130 that folded its wings" on a fire-fighting mission in California in 2002, Handy noted. "That's the dramatic picture we

Video still courtesy KOLO-TV



AMC's nightmare is an in-flight structural failure, such as when this civilian fire-fighter C-130's wings tore off during a 2002 flight, killing three. This aircraft was of the same vintage as many in USAF service.



Controversy over how to replace it has pushed the use of the KC-135 fleet out even further. Every day of operating 45-year-old warplanes is a calculated risk.

have in our minds, that if these things fail, that's the outcome."

The aged civilian aircraft—which had received certified maintenance to the wing box—was on a routine maneuver, dropping fire retardant, when its wings snapped off and it crashed, killing three crew members.

To get the 30 grounded C-130s flying again would cost \$270 million; fixing all 87 that are affected by the wing box problem would cost \$783 million. Air Mobility Command does not have the funds.

The C-130s are not the only capability loss issue. Handy also had to take 29 KC-135E tankers off flying status because of corrosion problems in the engine struts. To give each airplane a temporary fix would cost "several hundred thousand dollars," Handy said. A permanent fix would cost \$4.5 million per airplane, or \$126 million total—another sum AMC doesn't happen to have on hand. The quandary is whether to spend that money on aircraft that have already served 45 years and whose true life expectancy is "unknowable," Handy asserted.

These tanker decisions will have to wait for yet another long-delayed study on aerial tanker alternatives. It was to be completed by November 2004, but it was still in revision this summer.

Handy said he would "vote" not to spend substantial money on an airplane that old. He said he's "anxious" to see the tanker alternatives analysis so that AMC can begin making plans.

The Air Force wanted to retire 41 KC-135Es, including the 27 with the strut problems, this year. However,

Congress enjoined the Air Force from retiring any tankers until it completes the tanker alternatives study and decides how to proceed. If Congress doesn't renew the injunction this year, the Air Force probably will simply retire the afflicted KC-135Es in 2006.

With the 29 KC-135Es out of action, AMC has begun reshuffling its tanker assets and personnel to minimize the impact of the loss.

"We're replacing those E models in the Guard and Reserve—and that's where they all are—with R model aircraft out of the active component. And we're retaining the manpower

in the active units and increasing the manpower in the reserve components," Handy reported. Also, crew ratios have been raised. That means that the KC-135Rs, because they have received new engines and other upgrades over the years, can fly more frequently and take up some of the slack.

The Seven-Percent Solution

"The analysis shows us, in the first 30 days of a major theater conflict, we'd only lose five to seven percent of our air refueling requirements," Handy said. "That's not bad." He added that, as TRANSCOM commander, he considers the reduction a "reasonable risk to assume" in the short term.

However, the projection of a five-to-seven-percent loss in capability assumes that no additional aircraft are sidelined by structural problems. This is a dangerous assumption, given the age of the tanker fleet. Even the upgraded KC-135Rs average more than 43 years of age. Keeping that fleet viable is expensive; Gen. John P. Jumper, Chief of Staff, said that KC-135s are virtually "remanufactured" during depot maintenance, a process that requires the machining and certification of individual parts out of series production for decades.

One aging aircraft crisis narrowly has been averted. In December, the Pentagon ordered the Air Force to end production of new C-130Js in Fiscal 2006. That decision has now been reversed, as it became clear that it would cost less to complete a multiyear buy of 62 airplanes



Pictured is a C-130E pressed into fire-fighting duty. Age is not the only factor affecting the tactical airlift fleet. Violent maneuvers at low level—the hallmark of combat operations—put stresses on the aircraft that hasten structural exhaustion.



Keeping the KC-135 fleet "viable" means constant work for machine shops to produce parts long out of regular production. Even though no replacement plan is set, AMC has been forced to retire its oldest tankers.

than to pay the contract termination and shutdown costs. (See "Washington Watch: Rumsfeld Retreats From C-130J Termination Plans," July, p. 12.)

Handy said the C-130J has been a star performer and that USAF should continue to buy enough to at least replace most antiquated aircraft in the Hercules fleet. Two C-130Js were sent to Iraq in late fall 2004, and since then, they've performed "at an incredible rate," Handy reported. "The two of them are equal to roughly three C-130E models, and so that gives us some additional capability."

He said the J model aircraft can in a single day complete missions that the E models need two days to complete.

"That has an impact on crew duty day and crew utilization, so, the more Js we get into the fight, the better off we'll be," he asserted.

The Joint Staff's mobility study also is examining the C-17 used in the intratheater role, traditionally the province of the C-130 alone. The C-17 has indeed been used—and extensively—providing lift within the Southwest Asia theater, but Handy said it should not be seen as a substitute for the C-130 in that role.

"If the cargo volume is sufficient, then we can run C-17s in there and get it done, but it doesn't make any sense to have a C-17 hauling C-130-sized loads."

Handy has said repeatedly that AMC is not looking for a single aircraft other than what is required to do the mission.

Handy had high praise for the performance of the C-17 in Iraq and Afghanistan, noting, "It's done everything we ever dreamed we'd do, to include going up close and personal in combat. A lot of people said, 'You'll never put this airplane under threat,' but we have, and we do."

The Mobility Requirements Study-2005, which was completed before 9/11, established a notional airlift requirement for a fleet of 222 C-17s, compared to the 180 now on contract. However, Handy says the new requirement is likely to be closer to 300 C-17s.

The C-17 has been so heavily used that Handy worries about its long-term life expectancy.

"We are flying the C-17 and all our weapon systems at a much higher flying hour rate than we ever anticipated or programmed," Handy said. "What service life we have eaten up on the far end of the C-17, ... we just don't know about. ... We've eaten up some service life rather dramatically in the near term."

He said he had instructed USAF engineers to develop a way to assess how much C-17 service life is being consumed by the high operating tempo.

Handy would like for commercial entities to buy C-17s for the civilian oversize lift market. Such firms would then participate in CRAF in exchange for some compensation and preference for other government contracts, such as airlifting humanitarian relief supplies.

"Right now, the unfortunate part of that equation is, while I support it, I

need every C-17 I can get my hands on," Handy said. He is loathe to let one off the assembly line that doesn't go right into USAF service.

"We need to continue the C-17 buy," he said flatly.

The C-5 Galaxy has also been a large part of the sustainment operation in Southwest Asia.

Two C-5s are undergoing a structural teardown analysis to see if there is any reason the aircraft can't reasonably be upgraded to serve 20 more years.

"I'm not aware of any ... surprises that may have come out of the teardown," he said. "That's good news, because we need the airplane. It's an incredible performer for us, so I'm hopeful that continued analysis will support our assumptions." If so, he said, the C-5 Avionics Modernization Program and Reliability Enhancement and Re-engining Program upgrades—the AMP and the RERP—can go forward.

Risky Business

Handy believes that the Joint Staff study will conclude that the US must keep the level of risk in the airlift world at a "moderate" or "low" level.

"Some days, I have felt we were getting into the 'high' risk [area] because we just couldn't snap our fingers and make everything happen the way we really needed to, to support either Gen. [Tommy R.] Franks or Gen. [John] Abizaid today." Franks and Abizaid are the two most recent commanders of US Central Command. Handy said he doesn't know what level of risk the MCS will assume, but "it certainly cannot be, in my humble opinion, 'high risk.'" The Air Force can't afford a high risk mobility structure because that brings danger to troops in combat. Handy also said he realizes that fiscal constraints limit what can be done to reverse the graying of the airlift fleet, or, for that matter, the rest of the Air Force.

"I can give you the same pitch for F-15s, F-16s, the fact that we need the F/A-22 in a tremendous way," he said. However, "when it comes to a war, especially a world war, people tend to put aside their concerns over finances and want the job done—not tomorrow, not next week, but right now." He added that "we cannot keep debating, ... keep analyzing, ... keep wringing our hands" about the aging of the fleet. "We have to do something about it." ■

Pilots from all services and many allied nations flew 29,000 sorties—real, simulated, and computerized.

Red Flag With a

An F-15 Eagle from Langley Air Force Base's 94th Fighter Squadron takes off on a night sortie during Joint Red Flag 2005, at Nellis AFB, Nev.

They hesitate before they say it, but many veterans of the wars in Iraq, Afghanistan, and even the 1991 Gulf War reluctantly admit that their Red Flag experience in the skies over Nevada was tougher than anything they faced in actual combat.

This is exactly what Air Force and Red Flag commanders want to hear, because the goal of USAF's premier combat training exercise is to subject airmen to the most extreme environments imaginable—but over friendly territory. That way, aircrews that go to war overseas are battle tested and familiar with the capabilities and problems of the forces around them. Stress, confusion, and the “fog of war” will be nothing new, and life-threatening mistakes are reduced.

This spring, a new version of Red

Flag was held in the Air Force's vast training ranges north of Nellis AFB, Nev., and at dozens of other sites nationwide. The first-ever Joint Red Flag (JRF) provided combat training that went far beyond stylized dogfights between friendly “Blue” and hostile “Red” fighter forces.

Joint Red Flag was the Air Force's largest realistic training event of the year, and it represented the largest-ever use of simulators for training. More than 10,000 people participated at 44 sites nationwide.

Joint Red Flag, sponsored by US Joint Forces Command, combined live, virtual, and “constructive” (computer-generated) missions to give airmen, troops from the other US services, and coalition partners an opportunity

to work together and face rigorous challenges before actually heading off to combat.

JRF generated about 29,000 sorties of all kinds. Most of the action took place at locations other than Nellis. Officials noted that fewer than 4,000 Joint Red Flag sorties were “live combat training missions.” Some 6,500 were virtual sorties “flown” on a simulator. The great majority—18,500 sorties—came via computer as constructive missions.

Red Flag now serves as the final “spin up” for forces about to deploy on Air and Space Expeditionary Force (AEF) assignments overseas. Crews from around the country that will soon fight together get the opportunity to meet and hone their skills as a team.

March's Joint Red Flag was attended

Difference

By Adam J. Hebert, Senior Editor

by aircrews, crew chiefs, and air operations center (AOC) personnel belonging to the Air Force's AEF 5 and AEF 6. Many of them are now deployed to Iraq and other foreign hot spots.

Joint and international participation was prominent. There was a full range of coalition aircraft, ground troops, and AOC personnel on hand.

Like all other Red Flags, JRF was designed with an eye toward "Blue Four"—the inexperienced wingman who has not yet been to war. By thrusting lieutenants and captains into realistic, chaotic combat situations, the Air Force greatly increases their chances of survival and success when the bullets start flying.

The Joint Red Flag scenario overlaid on the southwestern United States a

fictional nation, "Heartland," stretching from Las Vegas in the west to El Paso, Tex., in the east. Nearby in the Mojave Desert was the tiny, friendly nation "Enclave." Heartland was flanked by two hostile states, "Eureka" in the California area and "El Dorado," which encompassed eastern New Mexico and most of Texas. For purposes of this joint exercise, which included Navy participation, much of Mexico was treated as water.

The mission—defend friendly territory and destroy the enemy's long-term ability to wage war—was simple but not easy.

Joint Red Flag was linked to the Army's Roving Sands wargame, held at the same time. Kirtland, Cannon, and Holloman Air Force Bases in

New Mexico and Ft. Bliss and Ft. Hood in Texas hosted major portions of the exercise. At Nellis, 71 aircraft and 1,700 airmen supported Joint Red Flag. In New Mexico, another 59 aircraft and 600 personnel were dedicated to the Roving Sands portion of the exercise.

Joint Red Flag became more challenging as its two-week run progressed, said Col. Michael McKinney, commander of the 414th (Red Flag) Combat Training Squadron. Early in the exercise, enemy surface-to-air missile operators would fire a shot and then wait to shoot again, McKinney explained. Red air also regenerated slowly in the early days. Over time, though, Red teams became more aggressive.

The graduated approach is important,



Joint Red Flag gave airmen such as the crew of this B-1B the opportunity to train against likely threats. Simulators allowed for nationwide participation, and computer-generated "constructive" sorties kept the CAOC busy.

because organizers do not want to demoralize younger pilots. Experienced Red Flag aggressors have the ability to repeatedly "cream" them in the early days of the exercise, said Lt. Col. Jeffrey H. Wilson, assistant operations director for the 414th. Facing even basic tactics and old equipment is "tough" for the newer pilots, he said.

The Joint Red Flag officials said air-

crew success comes not from "winning" but through participation. "Eighty to 90 percent of the value is in the process," said Maj. Gen. Stephen M. Goldfein, commander of Nellis' Air Warfare Center. The pilots and first-time mission commanders gain essential skills by working through problem sets, which the commanders strive to "keep in balance," Goldfein said.

The balance is between current needs and future possibilities. Current needs include honing the counterterrorism techniques and urban close air support skills airmen need before heading to Iraq or Afghanistan.

Final Spin Up

Matching up Joint Red Flag with the AEF rotations offers an orderly way to assign forces to the limited number of flag-level events each year, Goldfein told *Air Force Magazine*.

The other side of the equation entails training airmen for what McKinney described as the "absolute worst case scenario."

Officials are loath to pin their exercises to specific threats, such as China or North Korea, but, in the last phase of JRF, airmen were battling an enemy with weapons of mass destruction, advanced fighters, and targets defended by heavy concentrations of mobile surface-to-air missiles.

Being engaged by enemy forces is a Joint Red Flag goal, not a failure. If strike packages fly and drop bombs uncontested, Wilson asked, "What have they learned? Nothing."

Airmen are involved in every aspect of mission planning. The daily debriefing process takes hours, as every shot fired and every mistake made is

Joint Red Flag Operating Locations

Map by Zaur Eylanbekov



reviewed in excruciating detail in front of one's peers.

The pilots learn quickly as the intensity grows. By the end, when Joint Red Flag is "gloves off," the aircrews can handle it, Wilson said.

Being able to handle the intensity does not mean Blue forces win. The later missions are "designed to be almost impossible," said Capt. Jeremy Holmes, a B-52 pilot and flight safety officer at Minot AFB, N.D. Holmes flew several JRF missions, going after "bomber-size targets" such as an airfield and a WMD facility.

There was a full range of moving and static aim points to attack after during JRF. The Nellis range alone has 1,600 "bombable" targets. Airfields, parked aircraft, defensive bunkers, missile sites, vehicle convoys, and tanks are all available, and the attacks are closely monitored and recorded for later evaluation.

Holmes' B-52 was "shot down" on its first mission, but this was hardly unique—another officer said B-52s were getting shot down almost every day. Holmes noted, however, that his crew always released its bombs before being targeted.

A major benefit of Joint Red Flag, Holmes said, was the ability to fly and integrate with the aircraft that would



USAF photo by TSgt. Kevin J. Gruenwald

The opportunity to fly realistic, large-package combat missions is a key Joint Red Flag benefit. JRF allows aircrews to work with foreign partners and other services. Here, Navy F/A-18 mechanics prepare a Hornet for flight.

accompany a BUFF on a real combat mission. The realism of flying in large strike packages was repeatedly cited as one of JRF's primary benefits.

The B-52 teams saw what the F-15Cs (providing air-to-air cover) and E-3 Airborne Warning and Control System aircraft (directing traffic and warning of threats) could and could not do.

Another benefit was that, contrary to being handed a final mission plan as in Afghanistan and Iraq, during JRF the bomber crews were involved in the mission planning from the outset, said Holmes.

Stressing the AOC

Getting air operations center personnel out of their comfort level was difficult. For the AOC personnel, even the combined live and virtual portions of Joint Red Flag would have been "not particularly stressing," said Lt. Col. Rob Vanderberry, commander of the 505th Operations Squadron, which runs the Nellis combined air operations center, or CAOC-N. This is what made the constructive portion of JRF so important.

For Joint Red Flag, CAOC-N was manned partly by crews from 12th Air Force's AOC at Davis-Monthan AFB, Ariz.

The 12th Air Force crews were on hand as spin up for their own deployment. Some of the same international staff that would be present at the CAOC in Southwest Asia were there as well. The exercise was a rare opportunity to give them their own taste of Red Flag

intensity. Making the CAOC personnel manage the virtual and constructive sorties exposed them to "the mass and the stress they need," said Vanderberry.

Command and control personnel were trained in all the skills they would likely use on deployment, and emerging targets were used extensively as a way to introduce "fog and friction" into the scenarios.

The CAOC manages the air tasking order, and, at any given time, four different days' worth of ATOs are being planned and executed. Targeting is a dynamic process, said Col. Jeff Mineo, who was deputy CAOC director at Joint Red Flag. The CAOC personnel plan against emerging targets "for a living," Mineo said. The challenge is that "there are more targets than resources, typically," which makes prioritization key.

If a Scud were launched or an enemy aircraft suddenly appeared, Joint Red Flag had aircraft waiting on ground alert, explained A1C Joshua Cook, who worked in CAOC-N's replanning cell. The highest priority targets were always pushed first, he said. Some fighters were armed and ready to launch in five minutes.

Other time critical targets that could be hit in, say, six hours, got more deliberate but still dynamic planning. Changes would include adding tanker and intelligence-surveillance-reconnaissance aircraft support as needed.

During JRF, 2nd Lt. Lisa M. Vandergraaf worked as a liaison between intelligence and mobility staffs inside





US service forces and coalition troops worked side by side at Joint Red Flag. At Nellis, A1C Alicia McClelland from Ellsworth AFB, S.D., and RAF Cpl. Andy Hanely from RAF Marham, UK, inspect flight helmets and oxygen masks.

CAOC-N. Because aerial tankers are big, slow, and vulnerable, but also critical to the success of a mission, intelligence staffs must give them the “best threat picture and keep them out of threat areas,” Vandergraaf said. Airmen had to set up refueling tracks well away from enemy SAMs and areas where Red air was likely to be active.

Intelligence also played a key role in mission planning for the pilots.

Hands-On Mission Planning

In the mission planning room on March 30, goals for the day were to gain air superiority, destroy enemy weapons of mass destruction, render Red command and control ineffective, and eliminate the terrorist and insurgent threat to coalition operations.

Blue forces were dealing with an enemy that would not retreat unless absolutely forced to do so, that was willing to launch surface-to-surface missiles, and that had “sufficient parts, maintenance, and expertise to regenerate most systems,” according to a mission overview.

Also complicating the planning was the assumption that the “enemy retains WMD capability and will employ it against coalition forces.”

Dozens of aircraft in packages of different sizes, with different missions, had to be coordinated. A software program called Falcon View was used for mission planning. It shows the actual flight paths and times over target, allowing planners to spot pos-

sible schedule and location conflicts, eliminate them, and begin planning the takeoff times, tanker support, and ISR taskings.

One new wrinkle at JRF was the addition of Army air defense teams. Both of the Army’s air missile defense task force units, which combine Patriot, Avenger, and Stinger missile batteries, participated in the exercise. Since fratricide is always a concern, assimilating with the Army air defense presence on the battlefield is something the Air Force needs “to work out, so we don’t frat our own folks,” explained Maj. Robert Cunningham,

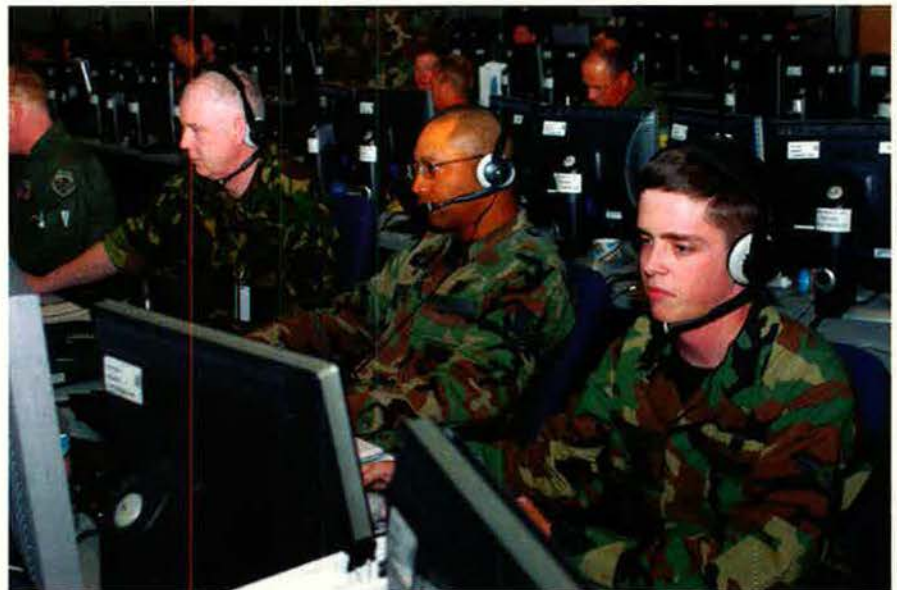
Joint Red Flag air boss. During Iraqi Freedom, Patriot batteries engaged coalition aircraft on three occasions and shot down two friendly fighters. For Joint Red Flag, Patriots were only to engage if a target was declared hostile by the appropriate controller, or in self-defense.

Midway through the day in the mission planning room came an update. The enemy leadership had dispersed, creating a dynamic situation in Red territory. Su-27, Su-30, and MiG-29 fighters were all still in theater, and there were “lots” of SA-6 SAMs arrayed against Blue forces, the briefer said. The SAMs were “moving nonstop.”

A series of ATO change requests had come in by this point: B-52 Gamble wanted some cruise missiles; four-ship Rocket 51 was now a two-ship mission; somebody needed to swap the times over target for Tiger and Maul; and a flight of AV-8 Harriers was dropping 1,000 feet in altitude so that a tanker could set up an orbit above them.

This level of dynamism is not always present even in real war. Capt. Curt Green, an HH-60 combat search and rescue tactics officer, said that at Joint Red Flag, the best-laid plans got “messed up.” JRF planners often did this deliberately, and the participants learned from the experience.

Green had previously deployed for Operation Iraqi Freedom, where he normally “sat alert all day long” in the north. At JRF, the HH-60 teams had the opportunity to fly and recover downed aircrews with the A-10 escorts



Using the Nellis CAOC, JRF gave these airmen a version of the “first 10 combat missions,” by having them prepare air tasking orders and plan time-critical missions.

and E-3 controllers they would team with on actual rescue missions. That is nearly impossible to do when training at a home station.

Red Flag's Origins

Red Flag was an outgrowth of the Air Force's difficult Vietnam War experience. In the Korean War, USAF downed up to 10 enemy aircraft for every one it lost in air-to-air combat. In Vietnam, the ratio fell to two-to-one, and for a period in the spring of 1972, more USAF aircraft were being shot down than enemies. The Air Force needed to know why this was happening.

The famous "Red Baron" study identified three primary problems that led to the Air Force's poor tactical performance in Vietnam. First, combat pilots were flying such a diverse set of missions that they could not become experts in any of them. Second, most pilots who were shot down never saw their attackers—because they were not properly trained to look for smaller, agile MiGs. Finally, USAF pilots never developed tactics to exploit enemy weaknesses.

Meanwhile, other studies of pilot losses found that surviving the first 10 combat missions is critical. Experienced pilots are much more proficient and more likely to survive.

These findings led the Air Force to push for a wide range of tactical air force improvements that ultimately coalesced into Red Flag.

Needs included dissimilar combat training (so that large, heavy F-4s were not "fighting" only against other F-4s); realistic domestic combat training, so that young pilots could perform their first 10 combat missions in a controlled environment; "Red Teams" utilizing enemy tactics; and focused mission training to build mission expertise.

It was not easy to implement these reforms, because the post-Vietnam training priority was safety, not combat effectiveness. But by the end of Vietnam, the Navy had already begun improving its aerial combat results after starting a dissimilar combat training program with its "Top Gun" school.

Maj. Richard "Moody" Suter was Red Flag's advocate. He proposed that "green" Air Force pilots be given 10 simulated combat missions during realistic training exercises. The environment was designed to be a learning experience and not a "make or break" evaluation.

The "Virtual" Flag

From a distance, this year's inaugural Joint Red Flag looked like any other Red Flag event. F-15s and F-16s crowded the flight line at Nellis AFB, Nev., parked alongside British Tornados, Marine Corps Harriers, Navy F/A-18 Hornets, and distinctively painted "aggressor" F-16s.

One March morning, as a dozen or so crew chiefs sought shade under the canopy of an outbuilding near the flight line, a series of B-1B Lancers taxied out and took off, headed for the vast Nellis range and the day's missions. The fighters promptly followed.

But the "live fly" at Nellis, large as it was, was just one part of Joint Red Flag. The "Virtual Flag" portion of the event brought airmen and aircraft from the eastern United States into the event by integrating them with the flying participants through the use of simulators.

These participants flew the simulators as if they were also in the desert and were tasked just like on-site aircrews. It was up to individual pilots to contribute to the campaign—or get shot down. The "man in the loop" trains both the pilots in the simulators and the command and control personnel overseeing the mission.

Even more sorties were flown by "constructive" participants—"basically a video game," said Lt. Col. James E. Murray, combat planning director for 12th Air Force. The constructive missions played out independently, he said, and were used to keep the air operations center (AOC) personnel busy and to "stress" them.

The data from all the live-virtual-constructive forces were then "merged" by computer to "create a common tactical picture all the participants can see," explained a Joint Forces Command news release.

Thousands of sorties, using actual wartime tactics and equipment, collectively gave the AOC personnel their version of their first 10 combat missions, Murray said—before they deployed for the real thing.

Constructive sorties are also efficient. Murray noted that REFORGER exercises in Germany used to cost "a couple hundred million dollars," while Joint Red Flag, with more than 10,000 participants, was but a fraction of that cost.

Suter briefed the concept to Gen. Robert J. Dixon, Tactical Air Command chief, who immediately approved it. In November 1975, Red Flag was born.

In its early years, a safety conscious time for the Air Force, Red Flag mishap rates were four times higher than TAC averages. But the operational benefits to the combat forces were clear, and the concept quickly took hold.

"Realistic training initiatives completely transformed the culture of Air Force training," wrote Maj. Alexander Berger in USAF's *Air & Space Power Journal*. "With the advent of Red Flag," the train-the-way-you-fight mentality "became firmly entrenched in the vernacular of aircrews everywhere."

Safety has also improved. Though two fighters crashed at Nellis while Joint Red Flag was in progress, they were Nellis aircraft and not part of the exercise. The last time an airplane crashed during a Red Flag was in 2000, when an F-15 visiting from RAF Lakenheath, UK, went down.

Safety regulations are strictly enforced, and airspace "deviations" will bring the offending pilot an automatic grounding. One pilot commented that it was "amazing" there are not crashes "every day, with all those planes zip-ping around out there."

The Red Flag model was widely replicated. Proliferating flag-level events included Pacific Air Forces' Cope Thunder and Canada's Maple Flag exercises frequented by US aircrews. Blue Flag was established for command and control personnel, and Green Flag battle-tested electronic warfare personnel. Today, Black Demon now tests information warfare capabilities, and Eagle Flag provides realistic training for personnel establishing expeditionary bases.

Joint Red Flag is an important part of the Air Force's overall training regime, said Goldfein, because the service needs to maintain a full range of opportunities to provide "breadth" in training. USAF has found that even if airmen perform narrow missions while deployed, their Red Flag experiences are "still useful," Goldfein said.

But not every exercise needs to be a Red Flag, because home station "two vs. two" training is still important, he said. Home station training builds the basic combat and flight skills that are then expanded upon in large events such as Joint Red Flag.

"One lesson constantly relearned is to integrate, not deconflict," Goldfein noted, and JRF offered airmen the rare opportunity to coordinate and team with all the parts of a force package. ■

2005 Space AI

Stratosphere begins 10 miles

Limit for turbojet engines 20 miles

Limit for ramjet engines 28 miles

Astronaut wings covered 50 miles

Low Earth orbit begins 60 miles

0.95G 100 miles

Medium Earth orbit begins 300 miles

The US military space operation in facts and figures.

manac

Comp led by **Tamar A. Mehuron**, Associate Editor, and the staff of *Air Force Magazine*

Hard vacuum 1,000 miles

Geosynchronous Earth orbit 22,300 miles

0.05G 60,000 miles

NASA photo/staff illustration by Zaur Eylanbekov

Illustration not to scale

US Military Missions in Space

Space Force Support

Launch of satellites and other high-value payloads into space and operation of those satellites through a worldwide network of ground stations.

Space Force Enhancement

Provide satellite communications, navigation, weather, missile warning, and intelligence to the warfighter.

Space Control

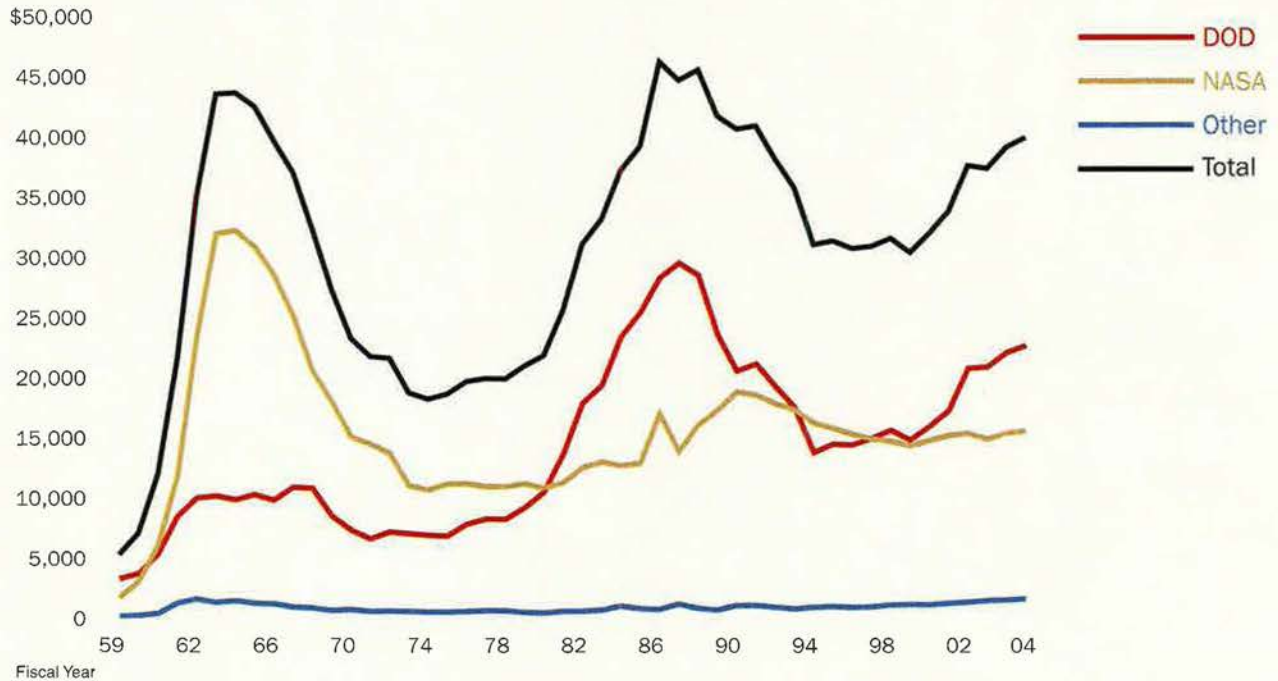
Assure US access to and freedom of operation in space and deny enemies the use of space.

Space Force Application

Pursue research and development of capabilities for the probable application of combat operations in, through, and from space to influence the course and outcome of conflict.

US Space Funding

Millions of constant FY06 dollars



FY	NASA	DOD	Other	Total	FY	NASA	DOD	Other	Total
1959	1,769	3,321	230	5,320	1983	12,536	17,867	648	31,051
1960	3,078	3,738	287	7,103	1984	13,026	19,364	750	33,140
1961	6,109	5,370	449	11,928	1985	12,696	23,409	1,070	37,175
1962	11,738	8,479	1,300	21,517	1986	12,891	25,416	858	39,165
1963	23,381	9,995	1,657	35,033	1987	17,035	28,285	809	46,129
1964	31,929	10,178	1,356	43,464	1988	13,883	29,494	1,236	44,613
1965	32,191	9,862	1,510	43,562	1989	16,073	28,504	892	45,469
1966	30,839	10,284	1,303	42,426	1990	17,308	23,585	764	41,657
1967	28,524	9,827	1,258	39,609	1991	18,909	20,554	1,119	40,583
1968	25,107	10,893	987	36,988	1992	18,574	21,141	1,123	40,837
1969	20,532	10,814	915	32,261	1993	17,848	19,272	999	38,119
1970	18,027	8,528	717	27,272	1994	17,340	17,532	842	35,714
1971	15,096	7,361	788	23,245	1995	16,247	13,788	983	31,018
1972	14,487	6,637	629	21,753	1996	15,807	14,480	1,041	31,328
1973	13,739	7,209	655	21,602	1997	15,314	14,416	971	30,701
1974	11,041	7,067	633	18,740	1998	14,908	14,954	1,016	30,878
1975	10,692	6,940	579	18,210	1999	14,751	15,631	1,163	31,545
1976	11,180	6,875	584	18,639	2000	14,337	14,817	1,209	30,363
1977	11,198	7,852	630	19,680	2001	14,818	15,957	1,183	31,958
1978	10,961	8,283	684	19,928	2002	15,206	17,255	1,311	33,773
1979	10,954	8,252	674	19,881	2003	15,389	20,777	1,398	37,564
1980	11,208	9,215	553	20,977	2004	14,915	20,889	1,529	37,333
1981	10,839	10,483	509	21,830	Total	\$715,736	\$638,505	\$42,436	\$1,396,676
1982	11,302	13,655	639	25,596					

The Year in Space

Aug. 31, 2004

Lockheed Martin launches 63rd and final Atlas II ... NRO payload boosted to orbit from Cape Canaveral AFS, Fla. ... Atlas II sustained perfect launch record since 1991.

Sept. 2

Hurricane Frances forces mass evacuation of Patrick AFB, Fla., and the East Coast Launch Facility ... First since 1989's Hurricane Hugo ... Significant destruction across facility spares Delta II, Delta III, and Titan IVB launch vehicles on pads at Cape Canaveral.

Sept. 24

USAF achieves initial operational capability with Counter Communications System ... Designed to disrupt enemy communications satellites using reversible, nondestructive means.

Sept. 29

Privately built *SpaceShipOne* achieves suborbit, reaching 62.2 miles on the first of two record-setting flights ... Captures Ansari X Prize of \$10 million and Collier Trophy ... Demonstrates low-cost access to space and boosts prospects for eventual commercial space tourism.

Oct. 1

AFSPC establishes National Security Space Institute, Colorado Springs, Colo. ... NSSI serves as DOD's primary center for space education and training ... Incorporates Space Operations School formerly run by Space Warfare Center, Schriever AFB, Colo.

Oct. 1

"Navy Fence" network of nine antenna sites that identify satellites passing over the

contiguous US becomes "Air Force Fence" ... Operated by AFSPC's 20th Space Control Squadron, Det. 1, located at Naval Network and Space Operations Command, Dahlgren, Va.

Oct. 4

Air Force Col. Gordon L. Cooper Jr. (Ret.), youngest of NASA's seven original Mercury astronauts, dies at home in Ventura, Calif., at age 77.

Oct. 7

AFSPC officials unveil new single space badge, replacing current space and missile functional badge and "pocket rocket" missile operator's badge.

Nov. 6

A Boeing Delta II launched by AFSPC operators at Cape Canaveral boosts a Lockheed Martin-built GPS satellite into orbit to replace one of the satellites in the GPS constellation.

Dec. 10

Missile Defense Agency places interceptor at Vandenberg AFB, Calif. ... Part of MDA network of interceptors—six previously installed at Ft. Greely, Alaska. System developed to protect against ballistic missile attack.

Dec. 21

Boeing achieves first flight of its new Delta IV heavy lift rocket.

Feb. 3, 2005

Crews at Cape Canaveral launch last of Lockheed Martin's Atlas III rockets ... Boosts NRO satellite into orbit.

Feb. 11

Air Force space operators at Vandenberg take delivery of first Atlas V launcher.

March 25

Peter B. Teets, acting Secretary of the Air Force, resigns ... Had served as undersecretary of the Air Force, director of the NRO, and DOD executive agent for space since late 2001.

April 11

An Orbital Sciences Minotaur rocket boosts a microsatellite into polar orbit from Vandenberg ... Weighing only 220 pounds, and self-maneuvering, XSS-11 will rendezvous with a satellite and conduct standoff inspection and circumnavigation, among other capabilities.

April 26

USAF announces consolidation of ASPC's Space Warfare Center and Air Combat Command's Air Warfare Center to shed artificial distinction between airpower and space power ... New organization dubbed Air Force Warfare Center ... Located at Nellis AFB, Nev. ... Assigned to ACC.

April 29

Space operators at Cape Canaveral conclude 40-year history with launch of facility's last Titan IVB expendable launch vehicle.

May 2

Boeing and Lockheed Martin join forces to supply evolved expendable launch vehicle services for government payloads ... Move will reduce cost by combining launch support for Boeing's Delta IV and Lockheed's Atlas V EELVs.

June 29

Northrop Grumman completes delta preliminary design review, a major milestone for NPOESS program.

Space and Missile Badges

CURRENT



Space Badge



Astronaut

HISTORICAL



Space/Missile Badge



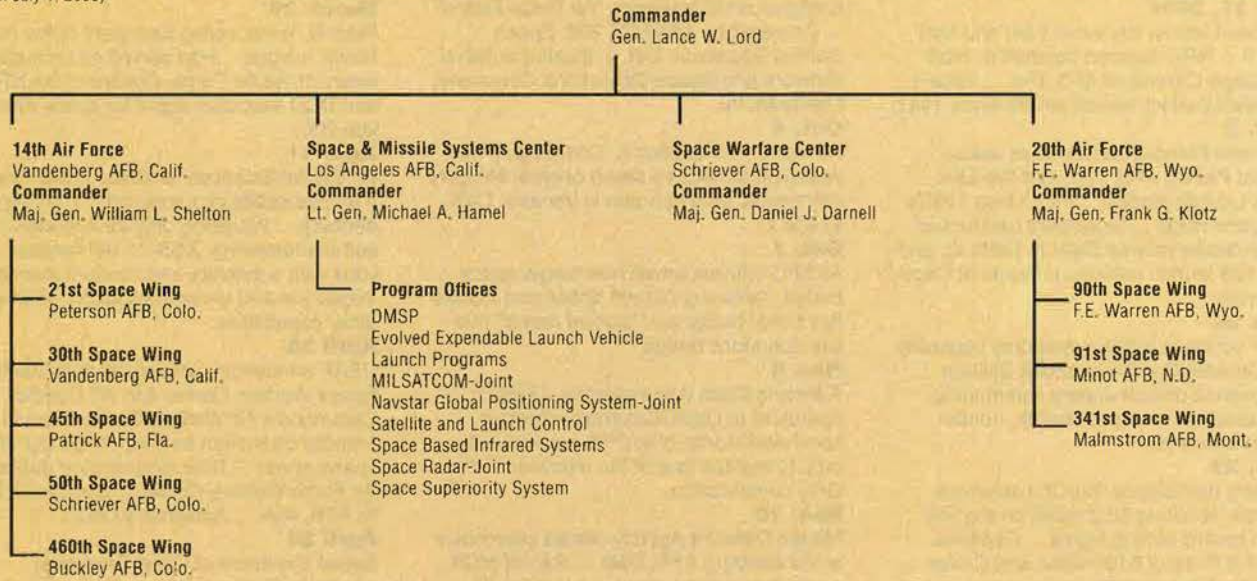
Missile Badge



Missile Badge With Operations Designator

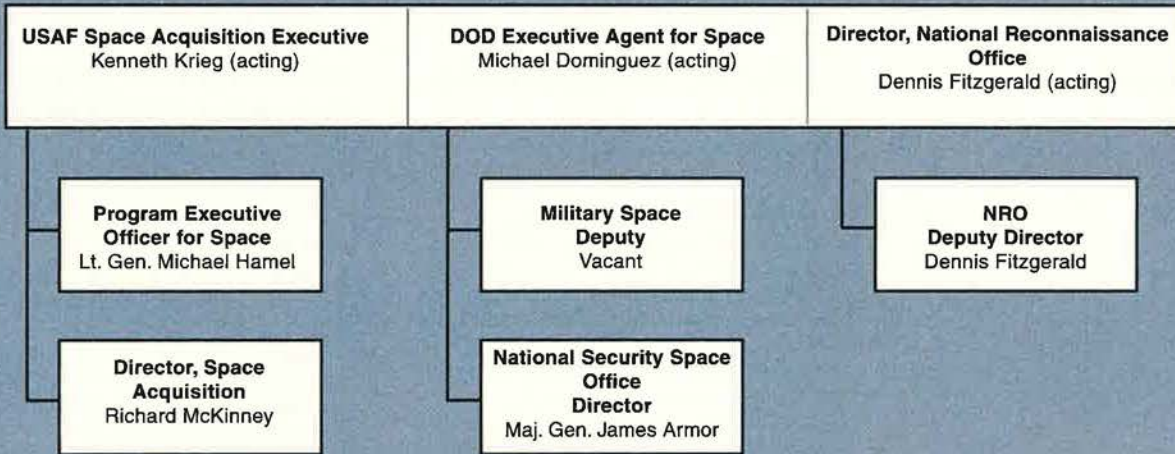
Air Force Space Command, Peterson AFB, Colo.

(As of July 1, 2005)



Air Force Space Bases, Stations, and Space Surveillance Network

USAF Elements in National Security Space



Space Leaders

(As of July 9, 2005. A = Acting)

US Space Command		
Gen. Robert T. Herres	Sept. 23, 1985	Feb. 5, 1987
Gen. John L. Piotrowski	Feb. 6, 1987	March 30, 1990
Gen. Donald J. Kutyna	April 1, 1990	June 30, 1992
Gen. Charles A. Horner	June 30, 1992	Sept. 12, 1994
Gen. Joseph W. Ashy	Sept. 13, 1994	Aug. 26, 1996
Gen. Howell M. Estes III	Aug. 27, 1996	Aug. 13, 1998
Gen. Richard B. Myers	Aug. 14, 1998	Feb. 22, 2000
Gen. Ralph E. Eberhart	Feb. 22, 2000	Oct. 1, 2002

US Strategic Command		
Adm. James O. Ellis Jr.	Oct. 1, 2002	July 9, 2004
Gen. James E. Cartwright, USMC	July 9, 2004	

US Space Command was inactivated Oct. 1, 2002, and its mission transferred to US Strategic Command.

Air Force Space Command		
Gen. James V. Hartinger	Sept. 1, 1982	July 30, 1984
Gen. Robert T. Herres	July 30, 1984	Oct. 1, 1986
Maj. Gen. Maurice C. Padden	Oct. 1, 1986	Oct. 29, 1987
Lt. Gen. Donald J. Kutyna	Oct. 29, 1987	March 29, 1990
Lt. Gen. Thomas S. Moorman Jr.	March 29, 1990	March 23, 1992
Gen. Donald J. Kutyna	March 23, 1992	June 30, 1992
Gen. Charles A. Horner	June 30, 1992	Sept. 13, 1994
Gen. Joseph W. Ashy	Sept. 13, 1994	Aug. 26, 1996
Gen. Howell M. Estes III	Aug. 26, 1996	Aug. 14, 1998
Gen. Richard B. Myers	Aug. 14, 1998	Feb. 22, 2000
Gen. Ralph E. Eberhart	Feb. 22, 2000	April 19, 2002
Gen. Lance W. Lord	April 19, 2002	

Army Space & Missile Defense Command		
Lt. Gen. John F. Wall	July 1, 1985	May 24, 1988
Brig. Gen. R.L. Stewart (A)	May 24, 1988	July 11, 1988
Lt. Gen. Robert D. Hammond	July 11, 1988	June 30, 1992
B.Gen. W.J. Schumacher (A)	June 30, 1992	July 31, 1992
Lt. Gen. Donald M. Lionetti	Aug. 24, 1992	Sept. 6, 1994
Lt. Gen. Jay M. Garner	Sept. 6, 1994	Oct. 7, 1996
Lt. Gen. Edward G. Anderson III	Oct. 7, 1996	Aug. 6, 1998
Col. Stephen W. Flohr (A)	Aug. 6, 1998	Oct. 1, 1998
Lt. Gen. John Costello	Oct. 1, 1998	March 28, 2001
Brig. Gen. J.M. Urias (A)	March 28, 2001	April 30, 2001
Lt. Gen. J.M. Cosumano Jr.	April 30, 2001	Dec. 16, 2003
Lt. Gen. Larry J. Dodgen	Dec. 16, 2003	

Army Space and Missile Defense Command was the Army Strategic Defense Command until August 1992 and the Army Space and Strategic Defense Command until October 1997.

National Reconnaissance Office		
Joseph V. Charyk	Sept. 6, 1961	March 1, 1963
Brockway McMillan	March 1, 1963	Oct. 1, 1965
Alexander H. Flax	Oct. 1, 1965	March 11, 1969
John L. McLucas	March 17, 1969	Dec. 20, 1973
James W. Plummer	Dec. 21, 1973	June 28, 1976
Thomas C. Reed	Aug. 9, 1976	April 7, 1977
Charles W. Cook (A)	April 7, 1977	Aug. 3, 1977
Hans Mark	Aug. 3, 1977	Oct. 8, 1979
Robert J. Hermann	Oct. 8, 1979	Aug. 2, 1981
Edward C. Aldridge Jr.	Aug. 3, 1981	Dec. 16, 1988
Martin C. Faga	Sept. 26, 1989	March 5, 1993
Jimmie D. Hill (A)	March 5, 1993	May 19, 1994
Jeffrey K. Harris	May 19, 1994	Feb. 26, 1996
Keith R. Hall (A)	Feb. 27, 1996	March 27, 1997
Keith R. Hall	March 28, 1997	Dec. 13, 2001
Peter B. Teets	Dec. 13, 2001	March 25, 2005
Dennis D. Fitzgerald (A)	March 25, 2005	

Naval Space Command		
RAdm. Richard H. Truly	Oct. 1, 1983	Feb. 28, 1986
Col. R.L. Phillips, USMC (A)	March 1, 1986	April 30, 1986
RAdm. D. Bruce Cargill	April 30, 1986	Oct. 24, 1986
RAdm. Richard C. Macke	Oct. 24, 1986	March 21, 1988
RAdm. David E. Frost	March 21, 1988	April 2, 1990
Col. C.R. Geiger, USMC (A)	April 2, 1990	May 31, 1990
RAdm. L.E. Allen Jr.	May 31, 1990	Aug. 12, 1991
RAdm. Herbert A. Browne Jr.	Aug. 12, 1991	Oct. 28, 1993
RAdm. Leonard N. Oden	Oct. 28, 1993	Jan. 31, 1994
RAdm. Lyle G. Bien	Jan. 31, 1994	Dec. 13, 1994
RAdm. Phillip S. Anselmo	Dec. 13, 1994	April 18, 1995
RAdm. Katharine L. Laughton	April 18, 1995	Feb. 28, 1997
RAdm. Patrick D. Money maker	Feb. 28, 1997	Sept. 10, 1998
Col. M.M. Henderson, USMC (A)	Sept. 10, 1998	Oct. 1, 1998
RAdm. Thomas E. Zelbor	Oct. 1, 1998	June 8, 2000
RAdm. J.J. Quinn	June 8, 2000	March 31, 2001
RAdm. Richard J. Mauldin	March 31, 2001	Dec. 10, 2001
RAdm. John P. Cryer	Dec. 10, 2001	July 12, 2002

Naval Network & Space Operations Command		
RAdm. John P. Cryer	July 12, 2002	Feb. 3, 2005
RAdm. Gerald R. Beaman	Feb. 3, 2005	

Naval Space Command and Naval Network Operations Command merged July 12, 2002.

Major Military Commands With Space Functions

The Unified Command

US Strategic Command

Headquarters: Offutt AFB, Neb.
Established: June 1, 1992
Cmdr.: Gen. J.E. Cartwright, USMC

MISSIONS

Establish and provide full-spectrum global strike and coordinated space and information operations capabilities

Deliver operational space support and integrated missile defense

Provide global C4ISR and specialized joint planning expertise

The Service Components

Air Force Space Command

Headquarters: Peterson AFB, Colo.
Established: Sept. 1, 1982
Cmdr.: Gen. Lance W. Lord

MISSIONS

Operate and test USAF ICBM forces for STRATCOM; missile-warning radars, sensors, and satellites; national space launch facilities and operational boosters; worldwide space surveillance radars and optical systems; worldwide space environmental systems

Provide command and control for DOD satellites; ballistic missile warning to NORAD and STRATCOM; space weather support to entire DOD

Track space debris

Develop tactics, techniques, and procedures to integrate space capabilities with air, land, and sea capabilities

Produce and acquire advanced space systems

Naval Network & Space Operations Command

Headquarters: Dahlgren, Va.
Established: July 11, 2002
Cmdr.: RAdm. Gerald R. Beaman

MISSIONS

Operate and maintain the Navy's space and global telecommunications systems and services

Support warfighting operations and command and control of naval forces

Promote innovative technological solutions to warfighting requirements

US Military Payloads by Mission, 1958-2004

(Orbital only)

Applications	350
Communications	126
Weather	44
Navigation	94
Launch vehicle/spacecraft tests	3
Other military	83
Weapons-Related Activities	46
SDI tests	11
Antisatellite targets	2
Antisatellite interceptors	33
Reconnaissance	436
Photographic/radar imaging	250
Electronic intelligence	49
Ocean surveillance	46
Nuclear detection	12
Radar calibration	40
Early warning	39
Total	832

Major US Agencies With Roles in Space

Central Intelligence Agency

Headquarters: McLean, Va.
Established: 1947
Director: Porter J. Goss

Mission

Provide national security intelligence to senior US policy-makers

Direct Space Role

Support the National Reconnaissance Office in designing, building, and operating satellite reconnaissance systems

National Geospatial-Intelligence Agency

Headquarters: Bethesda, Md.
Established: Nov. 24, 2003
Director: James R. Clapper Jr.

Mission

Provide geospatial intelligence (analysis and depiction of Earth's physical features and geographic references) to aid national security operations

Formerly National Imagery and Mapping Agency (NIMA).

National Reconnaissance Office

Headquarters: Chantilly, Va.
Established: September 1961
Director: Dennis D. Fitzgerald (acting)

Mission

Design, build, and operate reconnaissance satellites

Acquire innovative technology

Provide systems engineering

Support monitoring of arms control agreements, military activities, natural disasters, and other worldwide events of interest to the US

National Security Agency

Headquarters: Ft. Meade, Md.
Established: 1952
Director: William Black (acting)

Mission

Protect US communications

Produce foreign signals intelligence information

Army Space & Missile Defense Command

Headquarters: Arlington, Va.
 Established: Oct. 1, 1997
 Cmdr.: Lt. Gen. Larry J. Dodgen

MISSIONS

Manage Army space and information operations and global strike, integrated missile defense, and C4ISR capabilities

Provide worldwide space support, including employment of satellite communications and theater missile warning to warfighters

Oversee Army space and missile R&D and development of Army space doctrine and concepts

AFSPC Personnel Deployed by Unified Command

Total deployed 729

USCENTCOM	630
USEUCOM	14
USJFCOM	0
USNORTHCOM	37
USSOUTHCOM	44
USSOCOM	0
USPACOM	4
USTRANSCOM	0

Western and Southern Europe

Germany	6
UK	0
Italy	3
Turkey	0
Spain	1
Other countries	4

East Asia and Pacific

Japan/Okinawa	0
South Korea	0
Other countries	4

Africa, Near East, South Asia

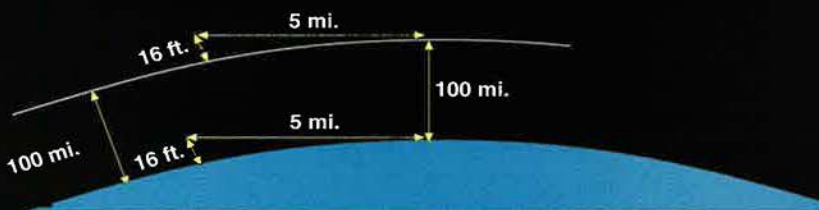
Saudi Arabia	1
Egypt	0
Other countries	629

Western hemisphere

Canada	0
Other countries	81

Orbits

Orbits result from the mutual attraction of any two bodies with a force proportional to the product of their individual masses and inversely proportional to the square of the distance between them. The curvature of the Earth, on average, drops 16 feet below the horizontal over a distance of about five miles. A spacecraft circling above would "fall" that same amount over the same distance. It travels five miles in one second if gravitational pull equals one G. Therefore, spacecraft velocity of five miles per second (18,000 mph) produces perpetual orbit at sea level, unless the spacecraft's flight is upset by perturbations, such as solar wind or mechanical anomalies.

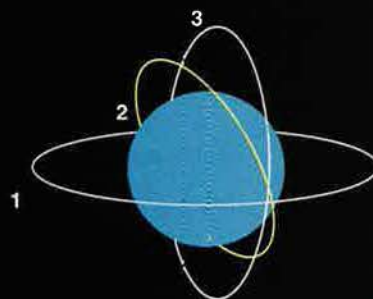
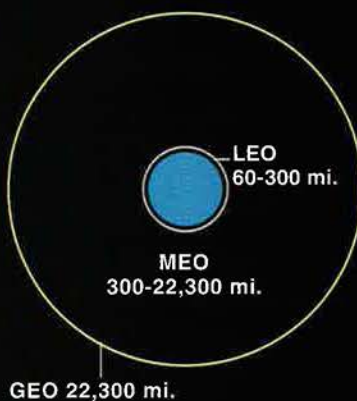


Orbital Altitude

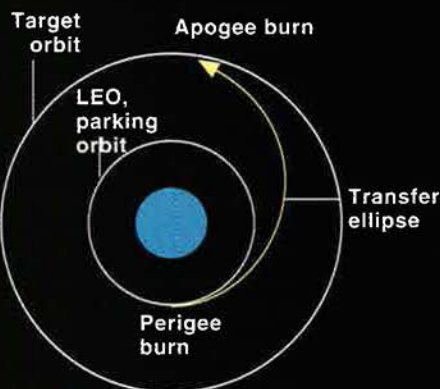
LEO Low Earth orbit
 MEO Medium Earth orbit
 GEO Geosynchronous Earth orbit
 HEO High Earth orbit

Orbital Inclinations

1 Equatorial
 2 Sun synchronous
 3 Polar



Geosynchronous Transfer Orbit



It is common procedure to pick an initial "parking" orbit, usually at LEO, then boost payloads to higher altitude. Engines are fired first (at perigee) to reach the apogee of an elliptical transfer orbit and then are fired again to put the spacecraft into a circular orbit at that higher altitude.

Illustrations are not drawn to scale.

US Military/Civil Launches

(As of Dec. 31, 2004)

Year	Military	Civil	Total	Year	Military	Civil	Total	Year	Military	Civil	Total	Year	Military	Civil	Total
1958	0	7	7	1970	18	11	29	1982	6	12	18	1994	11	15	26
1959	6	5	11	1971	16	16	32	1983	8	14	22	1995	9	18	27
1960	11	5	16	1972	14	17	31	1984	11	11	22	1996	11	22	33
1961	19	10	29	1973	11	12	23	1985	4	13	17	1997	9	28	37
1962	32	20	52	1974	8	16	24	1986	4	2	6	1998	5	29	34
1963	25	13	38	1975	9	19	28	1987	6	2	8	1999	7	23	30
1964	33	24	57	1976	11	15	26	1988	8	4	12	2000	11	17	28
1965	34	29	63	1977	10	14	24	1989	11	7	18	2001	7	14	21
1966	35	38	73	1978	14	18	32	1990	11	16	27	2002	1	16	17
1967	29	29	58	1979	8	8	16	1991	6	12	18	2003	11	16	27
1968	23	22	45	1980	8	5	13	1992	11	17	28	2004	5	12	17
1969	17	23	40	1981	7	11	18	1993	12	11	23	Total	583	718	1,301

Data changes in prior years reflect recategorization from civil to military launches.

Sites for Space Launches, 1957-Present

As of Dec. 31, 2004

Launch Site	Operator	Total Launches
Plesetsk	Russia	1,547
Tyuratam/Baikonur, Kazakhstan	Russia	1,221
Vandenberg AFB, Calif.	US	629
Cape Canaveral AFS, Fla.	US	612
Kourou, French Guiana	ESA	173
JFK Space Center, Fla.	US	134
Kapustin Yar	Russia	101
Xichang	China	39
Tanegashima	Japan	37
Shuang Cheng-tsu/Jiuquan	China	34
Kagoshima	Japan	30
Wallops Flight Facility, Va.	US	31
Taiyuan	China	21
Edwards AFB, Calif.	US	20
Sriharikota	India	19
Pacific Ocean Platform	Sea Launch	14
Indian Ocean Platform	US	9
Palmachim	Israel	6
Hammaguir, Algeria	France	4
Svobodny	Russia	4
Woomera, Australia	Australia	4
Kodiak, Alaska	US	3
Alcantara	Brazil	1
Barents Sea	Russia	1
Kwajalein, Marshall Islands	US	1
Musudan ri	North Korea	1
Tennerife, Canary Islands	US	1
Total		4,697

What's Up There

As of May 31, 2005

Country Organization	Payloads in Orbit			Total
	Satellites	Space Probes	Debris	
Russia*	1,358	35	2,672	4,065
US	920	54	2,977	3,951
People's Republic of China	47	0	305	352
France	42	0	294	336
Japan	86	7	54	147
India	30	0	107	137
European Space Agency	34	5	32	71
Intl. Telecom Sat. Org.	61	0	0	61
Globalstar	52	0	0	52
Orbcomm	35	0	0	35
European Telecom Sat. Org.	26	0	0	26
Canada	22	0	1	23
Germany	20	2	1	23
United Kingdom	22	0	1	23
Sea Launch	1	0	13	14
Italy	11	0	2	13
Luxembourg	13	0	0	13
Australia	9	0	2	11
Brazil	10	0	0	10
Intl. Maritime Sat. Org.	10	0	0	10
Sweden	10	0	0	10
Argentina	9	0	0	9
Indonesia	9	0	0	9
NATO	8	0	0	8
South Korea	8	0	0	8
Spain	8	0	0	8
Arab Sat. Comm. Org.	7	0	0	7
Mexico	6	0	0	6
Saudi Arabia	6	0	0	6
Czech Republic	5	0	0	5
Israel	5	0	0	5
Netherlands	5	0	0	5
Turkey	5	0	0	5
Other**	42	3	0	45
Total	2,942	106	6,461	9,509

* Russia includes Commonwealth of Independent States (CIS) and former Soviet Union.

** Other refers to countries or organizations that have placed fewer than five objects in space.

US Satellites Placed in Orbit/Deep Space

(As of Dec. 31, 2004)

Year	Military	Civil*	Total	Year	Military	Civil*	Total	Year	Military	Civil*	Total	Year	Military	Civil*	Total
1958	0	7	7	1970	23	8	31	1982	8	9	17	1994	18	19	37
1959	6	5	11	1971	26	18	44	1983	16	12	28	1995	15	24	39
1960	12	5	17	1972	18	14	32	1984	17	16	33	1996	16	24	40
1961	20	12	32	1973	14	10	24	1985	13	17	30	1997	10	82	92
1962	35	20	55	1974	11	8	19	1986	7	4	11	1998	7	90	97
1963	33	22	55	1975	12	16	28	1987	10	1	11	1999	8	73	81
1964	44	25	69	1976	17	12	29	1988	11	9	20	2000	12	40	52
1965	49	39	88	1977	14	6	20	1989	15	9	24	2001	8	24	32
1966	52	47	99	1978	16	17	33	1990	22	16	38	2002	2	25	27
1967	51	34	85	1979	10	7	17	1991	17	18	35	2003	11	12	23
1968	35	26	61	1980	12	4	16	1992	12	17	29	2004	5	12	17
1969	32	27	59	1981	7	10	17	1993	12	18	30	Total	821	970	1,791

*Includes some military payloads.

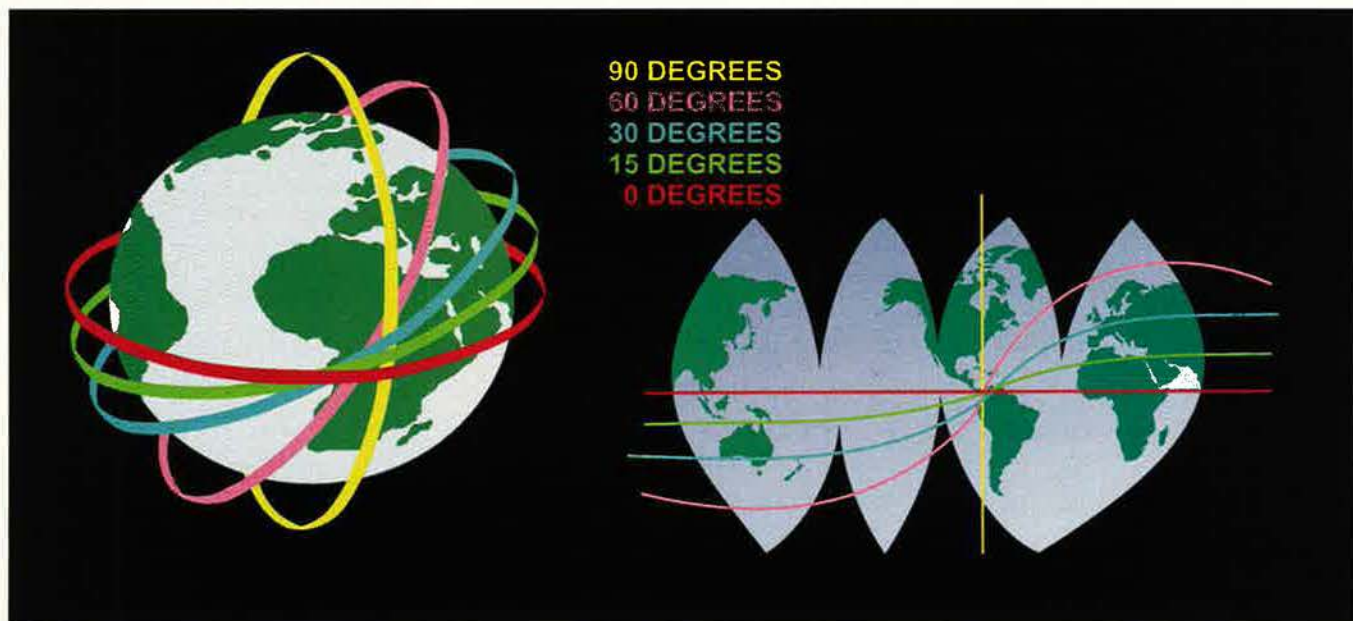
Air Force Personnel in Space

As of May 1, 2005

	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
Active Duty Air Force	23,214	22,224	21,049	19,198	18,201	17,337	17,004	19,064	19,495	19,862
Selected Guard and Reserve										
Air National Guard	0	0	0	285	285	354	354	519	519	649
Air Force Reserve Command	308	336	435	508	629	699	705	847	987	1,024
Total Guard and Reserve	308	336	435	793	914	1,053	1,059	1,366	1,506	1,673
Direct-hire Civilian	4,971	4,758	4,740	4,354	4,140	4,351	4,665	6,325	6,333	6,396

Satellite Inclination

Inclination is the angle between the Earth's equatorial plane and a satellite's orbital plane. A satellite at the wrong inclination—passing over the wrong spot on Earth—may hinder its ability to perform its mission.



DOD Image

US Space Launch Sites

Alaska Spaceport

Location: 57.5° N, 153° W.

Type: Commercial.

Mission/operations: Polar and near-polar launches of communications, remote sensing, and scientific satellites up to 8,000 pounds.

Operator: Alaska Aerospace Development Corp.

Launches: Eight.

Launch vehicles: Athena I, suborbital.

History: Established in 1998; funded through AADC.

Cape Canaveral AFS, Fla.

Location: 28.5° N, 80° W.

Type: Military, civil, commercial.

Mission/operations: Geosynchronous launches for civil, military, and commercial missions and military ballistic missile tests.

Operator: USAF.

Launches: 612 (from 1957).

Launch vehicles: Athena I, II; Atlas II, III, V; Delta II, III, IV; Titan IV.

History: Designated in 1950 Operating Sub-Division #1; changed to Cape Canaveral Auxiliary AFB, then Cape Canaveral Missile Test Annex, Cape Kennedy Air Force Station, Cape Canaveral Air Force Station, Cape Canaveral Air Station, and, in 2000, back to Cape Canaveral AFS.

Florida Space Authority

Location: 28.5° N, 80° W.

Type: Civil, commercial.

Mission/operations: Florida, through FSA, developed, financed, or owns infrastructure at launch complexes 46 and 47 and manages a multiuser launch control facility, space experiments research and processing laboratory, and other facilities.

Operator: FSA.

Launches: 4.

Launch vehicles: Athena I, II; Super Loki; Terrier; Viper.

History: Established in 1989.

John F. Kennedy Space Center, Fla.

Location: 28° N, 80° W.

Type: Civil, commercial, military.

Mission/operations: Primary space shuttle facility.

Operator: NASA.

Launches: 134.

Launch vehicles: Pegasus, space shuttle, Taurus.

History: NASA acquired land in 1962; by 1967, Complex 39 was operational; modified in 1970s to accommodate space shuttle program.

Mid-Atlantic Regional Spaceport

Location: 38° N, 76° W.

Type: Civil, commercial.

Mission/operations: Maryland and Virginia cooperative. Launches to inclined and sun-synchronous orbits; recovery support for ballistic and guided re-entry vehicles; vehicle and payload storage and processing facilities; two commercial pads; suborbital launch rails for civil, commercial, and military scientific missions.

Operator: Virginia Commercial Spaceflight Authority.

Launches: 13 (since 1995).

Launch vehicles: Athena I, II; Black Brant; Falcon; Lockheed Martin HYSR; Minotaur; Orion; Pegasus; Taurus; Terrier.

Sea Launch

Location: Equator, 154° W, Pacific Ocean.

Type: Commercial.

Mission/operations: Heavy lift GTO launch services. Owned by an international partnership: Boeing, RSC Energia, Kvaerner ASA, and SDO Yuzhnoye/PO Yuzhmash.

Operators: Partners listed above.

Launches: 14.

Launch vehicles: Zenit-3SL.

History: Established in April 1995; demonstration launch March 1999.

Spaceport Systems Intl., L.P.

Location: 34.70° N, 120.46° W.

Type: Commercial, civil, military.

Mission/operations: Polar and near-polar LEO launches; small to medium launch vehicles up to one million pound thrust; payload processing facility for small and heavy satellites.

Operator: Spaceport Systems Intl.

Launches: Three.

Launch vehicles: Minotaur.

History: SSI, a limited partnership formed by ITT and California Commercial Spaceport, Inc., achieved full operational status of the spaceport in May 1999.

Vandenberg AFB, Calif.

Location: 35° N, 121° W.

Type: Military, civil, commercial.

Mission/operations: Launches into polar orbits; sole site for test launches of USAF ICBM fleet; basic support for R&D tests for DOD, USAF, and NASA space, ballistic missile, and aeronautical systems; facilities and essential services for more than 60 aerospace contractors.

Operator: USAF.

Launches: 629.

Launch vehicles: Athena I; Atlas II, III, V; Delta II, III, IV; Pegasus; Taurus; Titan II, IV.

History: Originally Army's Camp Cooke; turned over to USAF 1957; renamed Vandenberg Oct. 4, 1958.

Wallops Flight Facility, Va.

Location: 38° N, 76° W.

Type: Civil, military, commercial.

Mission/operations: Suborbital research launch site.

Operator: NASA

Launches: 30.

Launch vehicles: 14 suborbital sounding rockets.

History: Established in 1945, it is one of world's oldest launch sites.

AFSPC Squadrons by Mission Type

(As of Sept. 30, 2004)

Component	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
Active force										
ICBM	14	14	14	14	14	14	14	14	11	11
Space operations	10	10	10	10	10	8	8	8	8	9
Space communications	1	1	1	1	1	1	1	0	0	6
Space warning	8	8	8	8	8	7	7	8	8	6
Space surveillance	6	6	6	6	6	6	4	3	3	3
Space launch	5	5	5	5	5	3	3	3	4	4
Range	2	2	2	2	2	2	2	2	2	2
Space control	1	1	1	1	1	2	3	3	3	3
Space aggressor	0	0	0	0	0	0	0	0	1	1
Total active force	47	47	47	47	47	43	42	41	40	45
Reserve forces										
ANG										
Space operations	0	0	0	0	0	0	1	1	3	4
Space warning	0	0	0	0	0	0	1	1	1	2
AFRC										
Space operations	3	3	3	3	3	4	4	4	4	4
Space warning	1	1	1	1	1	1	1	1	1	1
Space aggressor	0	0	0	0	0	0	0	0	1	1
Total reserve forces	4	4	4	4	4	5	7	7	10	10
Total all components	51	51	51	51	51	48	49	48	50	67

The Constellations

Multiple satellites working in groups to perform a single mission can provide greater coverage than a single satellite, enabling global coverage or increasing timeliness of coverage.

Navigation constellations provide simultaneous signals from multiple satellites to a location on the ground.

Communications constellations ensure at least one satellite is in line of sight of both ends of the communications link.

Weather and **reconnaissance** constellations generally contain both high and low altitude systems.

Some **surveillance** systems need continuous access to areas of interest, calling for high altitude, long dwell time orbits.

The Golden Age of NASA

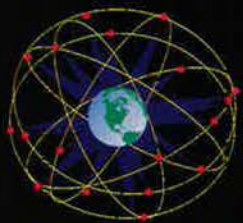
Name Project Mercury
Duration Nov. 3, 1958-May 16, 1963
Cost \$392.1 million (cost figures are in then-year dollars)
Distinction First US manned spaceflight program
Highlight Astronauts are launched into space and returned safely to Earth
Number of flights Six
Key events **May 5, 1961** Lt. Cmdr. Alan B. Shepard Jr. makes first US manned flight, a 15-minute suborbital trip
Feb. 20, 1962 Lt. Col. John H. Glenn Jr. becomes first American to orbit Earth
May 15, 1963 Maj. L. Gordon Cooper Jr. begins flight of 22 orbits in 34 hours

Name Project Gemini
Duration Jan. 15, 1962-Nov. 15, 1966
Cost \$1.3 billion
Distinction First program to explore docking, long-duration flight, rendezvous, space walks, and guided re-entry
Highlight Dockings and rendezvous techniques practiced in preparation for Project Apollo
Number of flights 10
Key events **June 3-7, 1965** Flight in which Maj. Edward H. White II makes first space walk
Aug. 21-29, 1965 Cooper and Lt. Cmdr. Charles "Pete" Conrad Jr. withstand extended weightlessness
March 16, 1966 Neil A. Armstrong and Maj. David R. Scott execute the first space docking
Sept. 15, 1966 Conrad and Richard F. Gordon Jr. make first successful automatic, computer-steered re-entry

Name Project Apollo
Duration July 25, 1960-Dec. 19, 1972
Cost \$24 billion
Distinction Space program that put humans on the moon
Highlights Neil Armstrong steps onto lunar surface. Twelve astronauts spend 160 hours on the moon
Number of flights 11
Key events **May 28, 1964** First Apollo command module is launched into orbit aboard a Saturn 1 rocket
Jan. 27, 1967 Lt. Col. Virgil I. "Gus" Grissom, Lt. Cmdr. Roger B. Chaffee, and White die in a command module fire in ground test
Oct. 11-22, 1968 First manned Apollo flight proves "moonworthiness" of spacecraft
Dec. 21-27, 1968 First manned flight to moon and first lunar orbit
July 16-24, 1969 Apollo 11 takes Armstrong, Col. Edwin E. "Buzz" Aldrin Jr., and Lt. Col. Michael Collins to the moon and back
 Armstrong and Aldrin make first and second moon walks
Dec. 7-19, 1972 Final Apollo lunar flight produces sixth manned moon landing

US Manned Spaceflights

Year	Flights	Persons
1961	2	2
1962	3	3
1963	1	1
1964	0	0
1965	5	10
1966	5	10
1967	0	0
1968	2	6
1969	4	12
1970	1	3
1971	2	6
1972	2	6
1973	3	9
1974	0	0
1975	1	3
1976	0	0
1977	0	0
1978	0	0
1979	0	0
1980	0	0
1981	2	4
1982	3	8
1983	4	20
1984	5	28
1985	9	58
1986	1	7
1987	0	0
1988	2	10
1989	5	25
1990	6	32
1991	6	35
1992	8	53
1993	7	42
1994	7	42
1995	7	42
1996	7	43
1997	8	53
1998	5	33
1999	3	19
2000	5	32
2001	6	38
2002	5	34
2003	1	7
2004	0	0
Total	143	736



Navigation



Communications



Reconnaissance



Intelligence and Weather



Surveillance

DOD image

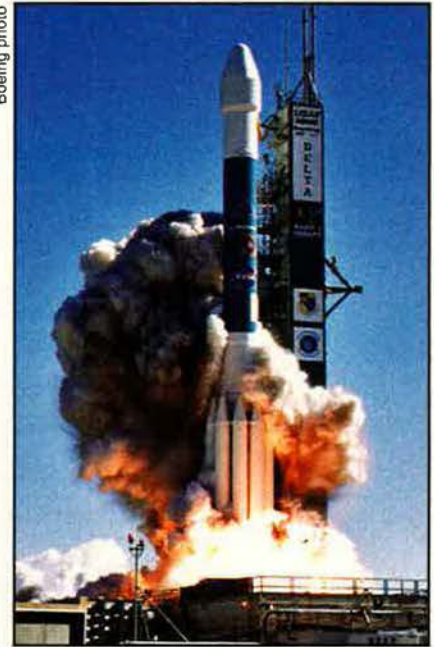
USAF photo

**Athena II**

USAF photo

**Atlas V**

Boeing photo

**Delta II**

Major US Launchers in US Military Use

Athena I

Function: lift low to medium weights.
 First launch: Aug. 22, 1997.
 Launch site: CCAFS, VAFB.
 Contractor: Lockheed Martin.
 Stages: two.
 Propulsion: stage 1 (Thiokol Castor 120 Solid Rocket Motor), 435,000 lb thrust; stage 2 (Pratt & Whitney Orbus 21D SRM), 43,723 lb thrust.
 Dimensions: length 62 ft, max body diameter 7.75 ft.
 Weight: 146,264 lb.
 Payload: 1,750 lb to LEO.

Athena II

Function: lift low to medium weights.
 First launch: Jan. 6, 1998.
 Launch site: CCAFS, VAFB.
 Contractor: Lockheed Martin.
 Stages: three.
 Propulsion: stages 1-2 (Castor 120 SRMs), 435,000 lb thrust; stage 3 (Orbus 21D SRM), 43,723 lb thrust.
 Dimensions: length 93 ft, max body diameter 7.75 ft.
 Weight: 266,000 lb.
 Payload: 4,350 lb to LEO.

Atlas V

Function: lift medium to heavy weights.
 Variants: 400 and 500 series.
 First launch: Aug. 21, 2002.
 Launch site: CCAFS, VAFB.
 Contractor: Lockheed Martin.
 Stages: two.
 Propulsion: (400 and 500 series) stage 1: one RD AMCROSS LLC RD-180 engine with two chambers, 860,200 lb thrust; stage 2: Centaur, one or two Pratt & Whitney RL10A-4-2 engines, 22,221-44,442 lb thrust. Strap-on solid rocket boosters, up to three (400), up to five (500).
 Dimensions: (stage 1) length 106.5 ft, max

body diameter 12.5 ft; (stage 2) length 41.6 ft, max body diameter 10 ft.
 Weight: 741,061 lb-1.2 million lb.
 Payload: (400 series) 27,558 lb to LEO, 10,913-16,843 to GTO; (500 series) 22,707-45,238 lb to LEO, 8,752-19,114 lb to GTO. (500 series supports 16.5 ft diameter payload fairing.)

Delta II

Function: lift medium weights.
 First launch: Feb. 14, 1989.
 Launch site: CCAFS, VAFB.
 Contractor: Boeing.
 Stages: up to three.
 Propulsion: stage 1 (Boeing RS-27A), 237,000 lb thrust; stage 2 (Aerojet AJ10-118K), 9,753 lb thrust; stage 3 (Thiokol STAR 48B SRM), 14,920 lb thrust; nine strap-on SRMs (Alliant Techsystems), 100,270 lb thrust.
 Dimensions: length 125.2 ft, max body diameter 8 ft.
 Weight: 511,790 lb.
 Payload: 11,330 lb to LEO.

Delta IV

Function: lift medium to heavy weights.
 Variants: Medium, Medium-Plus, and Heavy.
 First launch: Nov. 20, 2002.
 Launch site: CCAFS, VAFB.
 Contractor: Boeing.
 Stages: two.
 Propulsion: stage 1 (Rocketdyne RS-68 (Heavy, two additional core engines), 650,000 lb thrust; stage 2 (Medium), P&W RL10B-2, 1,750 lb thrust.
 Dimensions: (core booster, all versions) length 125 ft, max body diameter 16.7 ft.
 Weight: (Medium) 64,719 lb; (heavy) 196,688 lb.
 Payload max: (Medium) 2,508 lb to GEO, 20,075 lb to LEO; (Medium-Plus) 4,489-

6,142 lb to GEO, 27,116-30,575 lb to GEO; (Heavy) 13,837 lb to GEO, 48,264 lb to LEO. (Heavy supports 16.6 ft diameter payload fairing.)

EELV

Function: lift medium to heavy weights.
 Note: Atlas V and Delta IV (see individual entries) are participating in USAF's evolved expendable launch vehicle (EELV) modernization program to cut launch costs by 25 to 50 percent. These systems will replace Delta II, Atlas II, Titan II, and Titan IV launch vehicles.

Pegasus

Function: lift low weights.
 Variants: Standard and XL.
 First launch: (Standard) April 5, 1990; (XL) June 27, 1994.
 Launch site: dropped from L-1011 aircraft.
 Contractor: Orbital Sciences, Alliant.
 Stages: three.
 Propulsion: (XL) (all Alliant Techsystems) stage 1, 109,400 lb thrust; stage 2, 27,600 lb thrust; stage 3, 7,800 lb thrust.
 Dimensions: length 49 ft, wingspan 22 ft, diameter 4.17 ft.
 Weight: 42,000 lb.
 Payload max: (Standard) 850 lb to LEO; (XL) 1,050 lb to GEO.

Space shuttle

Function: lift heavy weights.
 First launch: April 12, 1981.
 Launch site: KSC.
 Contractor: Boeing (launch).
 Stages: delta-winged orbiter.
 Propulsion: three main engines, 394,000 lb thrust; two SRMs, 3.3 million lb thrust.
 Dimensions: system length 184.2 ft; span 76.6 ft.
 Weight: 4.5 million lb (gross).
 Payload max: 55,000 lb to LEO.

Boeing photo



Space shuttle

USAF photo



Taurus

USAF photo



Titan IVB

Taurus

Function: lift low weights.
 Variants: Standard and XL.
 First launch: March 13, 1994.
 Launch site: CCAFS, VAFB, Wallops Island.
 Contractor: Orbital Sciences.
 Stages: three.
 Propulsion: Castor 120 SRM, 495,400 lb thrust; stage 1, 109,140 lb thrust; stage 2, 26,900 lb thrust; stage 3, 7,200 lb thrust. (Stages 1-3, Alliant Techsystems)
 Dimensions: length 89 ft, max body diameter 7.6 ft.
 Weight: 5C 000 lb.
 Payload max: 3,000 lb to LEO.

Titan IVB

Function: lift heavy weights.
 First launch: (IVB) Feb. 23, 1997.
 Launch site: CCAFS, VAFB.
 Contractor: Lockheed Martin.
 Stages: two; may add Centaur or inertial upper stages (IUS).
 Propulsion: two SRM Upgrades (Alliant Techsystems), 1.7 million lb thrust each; stage 1 (LR87-AJ-11), 552,500 lb thrust; stage 2 (LR91-AJ_11), 105,000 lb thrust. (Stages 1-2 Aerojet); Centaur, 33,000 lb thrust; IUS (Boeing), 41,700 lb thrust.
 Dimensions: length (stage 1-2) 119.2 ft, max body diameter 10 ft.
 Weight: 1.9 million lb.
 Payload max: 47,800 lb to LEO.

Major Military Satellite Systems

Advanced Extremely High Frequency Satellite Communications System

Common name: AEHF
 In brief: successor to Milstar, AEHF to provide assured strategic/tactical, worldwide C2 communications with at least 10 times the capacity of Milstar II but in a smaller package.
 Function: EHF communications.
 Operator: MILSATCOM JPO (acquisition); AFSFC.
 First launch: April 2008, planned.
 On orbit: three-five.
 Orbit altitude: 22,300 miles.

Defense Meteorological Satellite Program

Common name: DMSP
 In brief: satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations. Operational control transferred to NOAA in 1998; backup operation center at Schriever AFB, Colo., manned by Air Force Reserve Command personnel.
 Function: environmental monitoring.
 Operator: NPOESS Integrated Program Office.
 First launch: May 23, 1962.
 On orbit: two (primary).
 Orbit altitude: approx 575 miles.

Defense Satellite Communications System III

Common name: DSCS
 In brief: nuclear-hardened and jam-resistant spacecraft used to transmit high-priority C2 messages to battlefield commanders.
 Function: SHF communications.
 Operator: AFSPC.
 First launch: October 1982.
 On orbit: five (primary).
 Orbit altitude: 22,000+ miles.

Defense Support Program

Common name: DSP
 In brief: early warning spacecraft whose infrared sensors detect heat generated by

Major Military Satellite Systems, Continued

a missile or booster plume.

Function: strategic and tactical missile launch detection.

Operator: AFSPC.

First launch: November 1970.

On orbit: classified.

Orbit altitude: 22,000+ miles.

Enhanced Polar System

Common name: EPS

In brief: next generation polar communications to replace interim polar system (see Polar Military Satellite Communications, below), which provides only a fraction of the polar communications capability required by aircraft, submarines, and other forces operating in the high northern latitudes. Pre-acquisition, system definition, and risk reduction efforts start in Fiscal 2006.

Function: EHF communications.

Operator: MILSATCOM JPO (acquisition); AFSPC.

First launch: circa 2013.

On orbit: none.

Orbit altitude: 22,300+ miles.

Global Broadcast System

Common name: GBS

In brief: wideband communications program, initially using leased commercial satellites, then military systems, to provide digital multimedia data directly to theater warfighters.

Function: high-bandwidth data imagery and video.

Operator: Navy.

First launch: March 1998 (Phase 2 payload on UHF Follow-On and continued on Wideband Gap-filler).

On orbit: three.

Orbit altitude: 23,230 miles.

Global Positioning System

Common name: GPS

In brief: constellation of satellites used by military and civilians to determine a precise location and time anywhere on Earth. Block IIR began replacing older

GPS spacecraft in mid-1997; first modified Block IIR-M with military (M-code) on two channels launches in 2005. Next generation Block IIF with extended design life, faster processors, and new civil signal on third frequency launches in 2007. Generation after next GPS III with advanced antijam and higher quality data is slated for initial launch in 2013.

Function: worldwide navigation and precise time transfer.

Operator: AFSPC.

First launch: Feb. 22, 1978 (Block I).

On orbit: 28.

Orbit altitude: 12,600 miles.

Milstar Satellite Communications System

Common Name: Milstar

In brief: joint communications satellite that provides secure, jam-resistant communications for essential wartime needs.

Function: EHF communications.

Operator: AFSPC.

First launch: Feb. 7, 1994.

On orbit: five.

Orbit altitude: 22,300 miles.

Mobile User Objective System

(also known as Advanced Narrowband System)

Common name: MUOS

In brief: next generation narrowband UHF tactical communications satellite to replace the UHF Follow-On Satellite (see below at right). Concept study contracts awarded in 1999; production award to Lockheed Martin in September 2004; initial launch in 2009.

Function: UHF tactical communications.

Operator: Navy.

First launch: 2009, planned.

On orbit: none.

Orbit altitude: 22,300 miles.

Polar Military Satellite Communications

(also known as Interim Polar and Adjunct Polar)

Common name: Polar MILSATCOM

In brief: USAF deployed a modified EHF

payload on a host polar-orbiting satellite to provide an interim solution to ensure warfighters have protected polar communications capability. Polars 2 and 3 slated for launch in 2005 and 2007, respectively.

Function: EHF polar communications.

Operator: Navy.

First launch: 1997.

On orbit: one.

Orbit altitude: 25,300 miles (apogee).

Space Based Infrared System High

Common name: SBIRS High

In brief: advanced surveillance system for missile warning, missile defense, battlespace characterization, and technical intelligence. System initially will complement, then replace, Defense Support Program spacecraft (see p. 57).

Function: infrared space surveillance.

Operator: AFSPC.

First launch: 2007, planned.

On orbit: none.

Orbit altitude: 22,300 miles.

Space Radar

Common name: SR

In brief: spaceborne capability, providing deep look, all weather, day and night forward presence and situation awareness for the Intelligence Community and joint warfighters.

Function: track moving ground targets.

Operator: AFSPC.

First launch: 2015, planned.

On orbit: none.

Orbit altitude: LEO.

Space Tracking and Surveillance System (formerly SBIRS Low).

Common name: STSS

In brief: infrared surveillance and tracking satellites to detect and track ballistic missiles from launch to impact. System is sensor component of layered ballistic missile defense system and will work with SBIRS High (see above).

Function: infrared surveillance.

Operator: MDA (acquisition); AFSPC.

First launch: 2007 for R&D, planned.

On orbit: none.

Transformational Satellite Communications System

Common name: TSAT

In brief: joint communications satellite being designed to provide Internet-like connectivity to warfighters. It will feature laser crosslink and greatly reduced transmission time to users on the ground. Intended to replace Advanced Extremely High Frequency system (see p. 57), it is slated for launch around 2012. Currently in design and risk-reduction phase.

Function: EHF communications.

Operator: MILSATCOM JPO (acquisition); AFSPC.

First launch: 2013, planned.

On orbit: none.

Orbit altitude: 22,300 miles.

UHF Follow-On Satellite

Common name: UFO

In brief: new generation satellites providing secure, antijam communications;

Boeing photo illustration



Global Positioning System



L. S. Air Force photo by Kevin Robertson

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Major Military Satellite Systems, Continued

replaced FLTSATCOM satellites.

Function: UHF and EHF communications.

Operator: Navy.

First launch: March 25, 1993.

Constellation: four primary, four redundant.

On orbit: nine.

Orbit altitude: 22,300 miles.

Wideband Gap-filler System

Common name: WGS

In brief: high data rate satellite broadcast system (primarily commercial product) meant to bridge the communications gap between current systems—DSCS and GBS—and TSAT (see p. 57 and 58).

Function: wideband communications and point-to-point service (Ka-band and X-band frequencies).

Operator: AFSPC.

First launch: 2006, planned.

On orbit: none.

Orbit altitude: Geostationary.

Dark and Spooky

A number of intelligence satellites are operated by US agencies in cooperation with the military. The missions and, espe-

cially, the capabilities are closely guarded secrets.

Most of the names of satellites, such as White Cloud (ocean reconnaissance),

Aquacade (electronic ferret), and Trumpet (Sigint), are essentially open secrets but cannot be confirmed by the Intelligence Community.



Wideband Gap-filler System

Major Civilian Satellites in US Military Use

Geostationary Operational Environmental Satellite

Common name: GOES

In brief: in equatorial orbit to collect weather data for short-term forecasting.

Function: storm monitoring and tracking, meteorological research.

Operator: NOAA.

First launch: Oct. 16, 1975 (GOES-1).

Constellation: two, with on-orbit spare.

Orbit altitude: 22,300 miles.

Globalstar

Common name: Globalstar

In brief: mobile communications with provision for security controls.

Function: communications.

Operator: Globalstar L.P.

First launch: February 1998.

Constellation: 48.

Orbit altitude: 878 miles.

Ikonos

Common name: Ikonos

In brief: one-meter resolution Earth imaging. Stated for shutdown in 2007.

Function: remote sensing.

Operator: Space Imaging, Inc.

First launch: Sept. 24, 1999.

Constellation: one.

Orbit altitude: 423 miles.

Inmarsat

Common name: Inmarsat

In brief: peacetime mobile communications services, primarily by US Navy.

Function: communications.

Operator: International Maritime Satellite Organization.

First launch: February 1982 (first lease), Oct. 30, 1990 (first launch).

Constellation: nine.

Orbit altitude: 22,300 miles.

Intelsat

Common name: Intelsat

In brief: routine communications and distribution of Armed Forces Radio and TV Services network.

Function: communications.

Operator: International Telecommunications Satellite Organization.

First launch: April 6, 1965 (Early Bird).

Constellation: 20.

Orbit altitude: 22,300 miles.

Iridium

Common name: Iridium

In brief: voice, fax, data transmission. Function: handheld, mobile communications.

Operator: Iridium L.L.C.

First launch: May 5, 1997

Constellation: 66 (six on-orbit spares).

Orbit: 485 miles.

Landsat

Common name: Landsat

In brief: imagery use includes mapping and planning for tactical operations.

Function: remote sensing.

Operator: NASA.

First launch: July 23, 1972.

Constellation: one.

Orbit altitude: 438 miles (polar).

National Polar-orbiting Operational Environmental Satellite System

Common name: NPOESS

In brief: advanced joint civil-military polar environmental satellite that provides weather, atmosphere, ocean, land, and near-space data. Managed by tri-agency (DOD, Department of Commerce, and NASA) integrated program office. Designed to replace USAF's DMSP and NOAA's Polar-orbiting Operational Environmental Satellite (POES) (see p. 61).

Function: worldwide environmental forecasting.

Operator: IPO (AFSPC for acquisition and launch; NOAA for operations).

First launch: 2008, planned.

Constellation: two.

On orbit: none.

Orbit altitude: 22,300 miles.

Orbcomm

Common name: Orbcomm

In brief: potential military use under study in Joint Interoperability Warfighter Program.

Function: mobile communications.

Operator: Orbcomm Global L.P.

First launch: April 1995.

Constellation: 35.

Orbit altitude: 500-1,200 miles.

Pan Am Sat

Common name: Pan Am Sat

In brief: routine communications providing telephone, TV, radio, and data.

Function: communications.

Major Civilian Satellites in US Military Use, Continued

Operator: Pan Am Sat.
First launch: 1983.
Constellation: 21.
Orbit altitude: 22,300 miles.

Polar-orbiting Operational Environmental Satellite

(also known as NOAA-K, L, and M before launch; NOAA-15, 16, and 17, respectively, once on orbit).

Common name: POES

In brief: two advanced third generation environmental satellites (one morning orbit and one afternoon orbit) provide longer-term weather updates for all areas of the world. Final two spacecraft in this series are NOAA-N (slated for launch in 2005) and N Prime. To be replaced by NPOESS.

Function: extended weather forecasting.

Operator: NOAA (on-orbit); NASA (launch).

First launch: May 13, 1998 (NOAA-15).

Constellation: two.

Orbit altitude: 517 miles.

Quickbird 2

Common name: Quickbird 2
In brief: high-resolution imagery for mapping, military surveillance, weather research, and other uses.

Function: remote sensing.

Operator: DigitalGlobe.

First launch: Oct. 18, 2001.

Constellation: one.

Orbit altitude: 279 miles.

Satellite Pour l'Observation de la Terre

Common name: SPOT

In brief: terrain images used for mission-planning systems, terrain analysis, and mapping.

Function: remote sensing.

Operator: SPOT Image S.A. (France).

First launch: Feb. 22, 1986.

Constellation: three.

Orbit altitude: 509 miles.

Telstar

Common name: Telstar

In brief: commercial satellite-based, rooftop-to-rooftop communications for US

Army and other DOD agencies.

Function: communications.

Operator: Loral Skynet.

First launch: November 1994.

Constellation: three.

Orbit altitude: 22,300 miles.

Tracking and Data Relay Satellite System

Common name: TDRSS

In brief: global network that allows other spacecraft in LEO to communicate with a control center without an elaborate network of ground stations.

Function: communications relay.

Operator: NASA.

First launch: April 1983.

Constellation: six.

Orbit altitude: 22,300 miles.

Major US Military Ground-based Space Surveillance Systems

Air Force Space Surveillance System

Common name: Air Force Fence

In brief: continuous wave radars located across the southern US to track man-made objects in Earth orbit.

Function: space surveillance.

Operator: AFSPC.

Operational: March 31, 1959 (US Navy).

Unit location: Dahlgren, Va. (command & control); receivers in Arkansas, California, Georgia, Mississippi, and New Mexico; transmitters in Alabama, Arizona, and Texas.

Components: One command & control center, six receiver sites, and three transmitter sites.

AN/FPS-85 Phased-Array Radar

Common name: Eglin radar

In brief: active phased-array radar used in all weather to track man-made objects in Earth orbit.

Function: space surveillance.

Operator: AFSPC.

Operational: Jan. 29, 1969.

Unit location: Eglin AFB, Fla.

Components: AN/FPS-85 solid-state phased-array radar.

Ballistic Missile Early Warning System

Common name: BMEWS

In brief: phased-array radar used for tactical warning and attack assessment and tracking Earth-orbiting satellites.

Function: ballistic missile attack and space surveillance.

Operator: AFSPC.

Operational: 1959 (Trinidad, British West Indies); July 1, 1961 (Clear AFS, Alaska).

Unit location: Clear AFS, Alaska; RAF Fylingdales, UK; Thule AB, Greenland.

Components: (Clear AFS) AN/FPS-120

solid-state phased-array radar (SSPAR) with two faces; computers for radar control and data processing.

Ground-based Electro-optical Deep Space Surveillance

Common name: GEODSS

In brief: optical system that tracks objects such as Earth-orbiting satellites in deep space.

Function: space surveillance.

Operator: AFSPC.

Operational: June 30, 1982.

Unit location: Det. 1, Socorro, N.M.; Det. 2, Diego Garcia, Indian Ocean; Det. 3, Maui, Hawaii.

Components: three telescopes, low-light-level EO cameras, and high-speed computers.

Moron Optical Space Surveillance

Common name: MOSS

In brief: optical system that tracks objects such as Earth-orbiting satellites in deep space.

Function: space surveillance.

Operator: AFSPC.

Operational: June 1998.

Unit location: Det. 4, Moron, Spain.

Components: optical telescope and high-speed computers.

Pave Phased-Array Warning System

Common Name: Pave PAWS

In brief: Phased-array radar used to detect and track sea-launched and intercontinental ballistic missiles, as well as Earth-orbiting satellites.

Function: missile warning and space surveillance.

Operator: AFSPC.

Operational: August 1980.

Unit location: Beale AFB, Calif.; Cape Cod AFS, Mass.

Components: AN/FPS-115 phased-array radar; computers for radar control and data processing.

Perimeter Acquisition Radar Attack Characterization System

Common name: PARCS

In brief: Provides ICBM and SLBM warning and space surveillance of Earth-orbiting satellites in deep space.

Function: ballistic missile warning and space surveillance.

Operator: AFSPC.

Operational: 1977.

Unit location: Cavalier AFS, N.D.

Components: One AN-FPQ-16 single-faced, phased-array radar.



SSgt. Paul Brawner studies a radar screen for the AN-FPS-115 Pave PAWS phased-array warning system radar.

USAF photo by CMSgt. Don Sutherland

Milestones in Military Space

March 22, 1946. JPL-Ordnance WAC, first US rocket to leave Earth's atmosphere, reaches 50-mile height after launch from White Sands Proving Ground, N.M.

Oct. 4, 1957. USSR launches Sputnik 1, first man-made satellite, into Earth orbit.

Jan. 31, 1958. US launches its first satellite, Explorer 1.

Dec. 18, 1958. Project Score spacecraft conducts first US active communication from space.

Feb. 28, 1959. USAF successfully launches Discoverer 1 (of then-classified Corona program), world's first polar-orbiting satellite, from Vandenberg AFB, Calif.

April 6, 1959. The first military unit to be charged with conducting military satellite operations, USAF's 6594th Test Wing, is established at Palo Alto, Calif.

April 13, 1959. Air Force Thor/Agema A boosts into orbit Discoverer 2 satellite, first satellite to be stabilized in orbit in all three axes, to be maneuvered on command from Earth, to separate a re-entry vehicle on command, and to send its re-entry vehicle back to Earth.

Aug. 7, 1959. Explorer 6 spacecraft transmits first television pictures from space.

June 22, 1960. US launches Galactic Radiation and Background (GRAB) satellite, the nation's first successful reconnaissance spacecraft. It collects electronic intelligence (Elint) from Soviet air defense radars.

Aug. 18, 1960. Discoverer/Corona satellite takes first image of Soviet territory ever snapped from space.

April 12, 1961. Soviet cosmonaut Yuri Gagarin pilots Vostok 1 through nearly

one orbit to become first human in space.

May 5, 1961. Lt. Cmdr. Alan B. Shepard Jr., aboard Freedom 7 Mercury capsule, becomes first American in space, climbing to 116.5 miles during suborbital flight lasting 15 minutes, 28 seconds.

Feb. 20, 1962. Project Mercury astronaut Lt. Col. John H. Glenn Jr., aboard Friendship 7 capsule, completes first US manned orbital flight.

May 15, 1963. USAF Maj. L. Gordon Cooper Jr. makes nearly 22 orbits in spacecraft Faith 7, becoming the first American astronaut to perform an entirely manual re-entry.

Oct. 17, 1963. Vela Hotel satellite performs first space-based detection of nuclear explosion.

March 18, 1965. First space walk conducted by Alexei Leonov from Soviet Voskhod 2.

June 4, 1965. Gemini 4 astronaut USAF Maj. Edward H. White II performs first American space walk.

June 18, 1965. USAF accepts Titan III, first Air Force vehicle specifically designed and developed as a military space booster.

Dec. 15, 1965. Crews of Gemini 6 and Gemini 7 rendezvous in space. Navy Capt. Walter M. Schirra and USAF Maj. Thomas P. Stafford in Gemini 6 maneuver to within a foot of Gemini 7 crew.

Jan. 25, 1967. Soviets complete first successful fractional orbital bombardment system test, deorbiting Kosmos 139 satellite re-entry vehicle to an impact point within Soviet Union.

July 3-4, 1967. Air Force, Army, and Navy

conduct first satellite-based tactical communications.

Oct. 20, 1968. Soviet Kosmos 249 spacecraft carries out first co-orbital antisatellite test, exploding Kosmos 248 target satellite into cloud of debris.

July 20, 1969. At 10:56 p.m. EDT, Apollo 11 astronaut Neil A. Armstrong puts his foot on the surface of the moon, becoming the first human to do so.

November 1970. USAF launches first classified Defense Support Program satellite, whose infrared sensors provide space-based early warning of missile launches.

April 19, 1971. First space station, Salyut 1, goes aloft.

Feb. 22, 1978. Atlas booster carries first Global Positioning System Block I satellite into orbit, paving way for a revolution in civil, commercial, and military navigation.

April 12-14, 1981. Space shuttle performs its first orbital flight and becomes first reusable spacecraft to land back on Earth.

Aug. 30, 1983. USAF Col. Guion S. Bluford Jr. becomes the first African American in space, as a mission specialist aboard *Challenger*.

Sept. 13, 1985. First US antisatellite intercept test destroys Solwind scientific satellite by air-launched weapon.

Jan. 17, 1991. What USAF calls "the first space war," Operation Desert Storm, opens with air attacks.

Jan. 13, 1993. USAF Maj. Susan J. Helms, flying aboard space shuttle *Endeavour*, becomes first US military woman in space.

Major Space Treaties and Laws

Long Title	Nickname	Entry Into Force
Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water	Nuclear Test Ban	Oct. 10, 1963
Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies	Outer Space Treaty	Oct. 10, 1967
Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space	Rescue Agreement	Dec. 3, 1968
Convention on International Liability for Damage Caused by Space Objects	Liability Convention	Sept. 1, 1972
Convention on Registration of Objects Launched Into Outer Space	Registration Convention	Sept. 15, 1976
Agreement Governing the Activities of States on the Moon and Other Celestial Bodies	Moon Agreement	July 11, 1984

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Space Terms

Aerospace. A physical region made up of Earth's atmosphere and the space beyond.

Apogee. The point of greatest distance from Earth (or the moon, a planet, etc.) achieved by a body in elliptical orbit. Usually expressed as distance from Earth's surface.

Atmosphere. Earth's enveloping sphere of air.

Boost phase. Powered flight of a ballistic missile—i.e., before the rocket burns out.

Burn. The process in which rocket engines consume fuel or other propellant.

Circumterrestrial space. "Inner space" or the atmospheric region that extends from 60 miles to about 50,000 miles from Earth's surface.

Constellation. A formation of satellites orbiting for a specific combined purpose.

Deep space. All space beyond the Earth-moon system, or from about 480,000 miles altitude outward.

Eccentric orbit. An extremely elongated elliptical orbit.

Ecliptic plane. The plane defined by the circle on the celestial sphere traced by the path of the sun.

Elliptical orbit. Any non-circular, closed spaceflight path.

Exosphere. The upper limits of Earth's atmosphere, ranging from about 300 miles altitude to about 2,000 miles altitude.

Ferret. A satellite whose

primary function is to gather electronic intelligence, such as microwave, radar, radio, and voice emissions.

Geostationary Earth orbit. A geosynchronous orbit with 0° inclination in which the spacecraft circles Earth 22,300 miles above the equator and appears from Earth to be standing still.

Geosynchronous Earth orbit (GEO). An orbit at 22,300 miles that is synchronized with Earth's rotation. If a satellite in GEO is not at 0° inclination, its ground path describes a figure eight as it travels around Earth.

Geosynchronous transfer orbit (GTO). An orbit that originates with the parking orbit and then reaches apogee at the GEO.

Ground track. An imaginary line on Earth's surface that traces the course of another imaginary line between Earth's center and an orbiting satellite.

High Earth orbit (HEO). Flight path above geosynchronous altitude (22,300 to 60,000 miles from Earth's surface).

Ionosphere. A region of electrically charged thin air layers that begins about 30 miles above Earth's atmosphere.

Low Earth orbit (LEO). Flight path between Earth's atmosphere and the bottom of the Van Allen belts, i.e., from about 60 to 300 miles altitude.

Magnetosphere. A region dominated by Earth's magnetic field, which traps charged particles, including those in the Van Allen belts. It begins in the

upper atmosphere, where it overlaps the ionosphere, and extends several thousand miles farther into space.

Medium Earth orbit (MEO). Flight path between LEO and GEO.

Mesosphere. A region of the atmosphere about 30 to 50 miles above Earth's surface.

Orbital decay. A condition in which spacecraft lose orbital altitude and orbital energy because of aerodynamic drag and other physical forces.

Orbital inclination. Angle of flight path in space relative to the equator of a planetary body. Equatorial paths are 0° for flights headed east, 180° for those headed west.

Outer space. Space that extends from about 50,000 miles above Earth's surface to a distance of about 480,000 miles.

Parking orbit. Flight path in which spacecraft go into LEO, circle the globe in a waiting posture, and then transfer payload to a final, higher orbit.

Payload. Any spacecraft's crew or cargo; the mission element supported by the spacecraft.

Perigee. The point of minimum altitude above Earth (or the Moon, a planet, etc.) maintained by a body in elliptical orbit.

Period. The amount of time a spacecraft requires to go through one complete orbit.

Polar orbit. Earth orbit with a

90° inclination. Spacecraft on this path could pass over every spot on Earth as Earth rotates under the satellite's orbit (see orbital inclination).

Rocket. An aerospace vehicle that carries its own fuel and oxidizer and can operate outside Earth's atmosphere.

Semisynchronous orbit. An orbit set at an altitude of 12,834 miles. Satellites in this orbit revolve around Earth in exactly 12 hours.

Stratosphere. That section of atmosphere about 10 to 30 miles above Earth's surface.

Sun synchronous orbit. An orbit inclined about 98° to the equator and at LEO altitude. At this inclination and altitude, a satellite's orbital plane always maintains the same relative orientation to the sun.

Thermosphere. The thin atmosphere about 50 to 300 miles above Earth's surface. It experiences dramatically increased levels of heat compared to the lower layers.

Transfer. Any maneuver that changes a spacecraft orbit.

Troposphere. The region of the atmosphere from Earth's surface to about 10 miles above the equator and five miles above the poles. This is where most clouds, wind, rain, and other weather occurs.

Van Allen belts. Zones of intense radiation trapped in Earth's magnetosphere that could damage unshielded spacecraft.

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Figures that appear in this section will not always agree because of different cutoff dates, rounding, or different methods of reporting. The information is intended to illustrate trends in space activity.

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Chelsea Goritz	Tucson, AZ	Savannah Knight	Sanford, FL	Gregory Scott	Philadelphia, PA
Laura Stussie	Tucson, AZ	Derek Wong	Sanford, FL	Nicholas Tassos	Philadelphia, PA
Monique Payne	Brawley, CA	Kelly Bucher	Sanford, FL	Wil Stokes	Sumter, SC
Melanie Barnes	Poway, CA	Kyle Addington	Sanford, FL	Shane Shackelford	Sevierville, TN
Andrew Roblye	Colorado Springs, CO	Logan Stokely	Titusville, FL	Britton Smith	Sparta, TN
Emma Young	Colorado Springs, CO	Melissa Duffey	Titusville, FL	Julia Kuludziej	Sparta, TN
Melissa Hallenbecke	Colorado Springs, CO	Nicole Polodorn	Titusville, FL	Jordan Maxwell	Sparta, TN
Jasmine Vidrio	Erie, CO	Grant Arakawa	Honolulu, HI	Callie Hanson	Abilene, TX
Stephen Wakefield	Gilcrest, CO	Charles Kim	W Chicago, IL	Sharon Bryant	Abilene, TX
David Sindel	Gales Ferry, CT	Andrew Powell	Baxter Springs, KS	Monica Ek	Austin, TX
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Daniel Freeman	Newberry, FL	Lauren Vignaly	West Boylston, MA	Ian Ping	Charles Town, WV
Ashley Van Galen	Pace, FL	Kristopher Austin Poskey	Hopes Mill, NC	Jacob Ritenour	Charles Town, WV
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The Air Force's air liaison officers are advancing the art of close air support.

BOMBS ON

“It’s a beautiful morning,” said Army Col. Joseph Anderson, commander of 2nd Brigade, 101st Airborne Division, in early April 2003. “Kio-was, Black Hawks, JDAMs, mortars, smoke.”

Anderson’s words, recorded by military writer Rick Atkinson in the April 6, 2003, *Washington Post*, were eyewitness testimony to a stunning and successful integration of air and surface fires in Operation Iraqi Freedom—integration that is underwriting US success in the Global War on Terror.

That scene owed much to a special breed of airmen known as air liaison officers, or ALOs. They are pilots, navigators, and weapon systems officers who leave the cockpit behind for a tour with Army units. Their perspective puts them literally on the front line of changes in the air-ground relationship.

On Nov. 19, 2001, Northern Alliance troops watched as US air strikes pounded Taliban positions near Khanabad, Afghanistan. Air liaison officers embedded with the coalition ground forces were instrumental in bringing air and space power to bear.

TARGET

By Rebecca Grant

ALOs also know that relations between airmen and soldiers can draw close, then drift apart. As good as firepower from the air has been in Afghanistan and Iraq, the historical pattern signals caution. ALOs have their hands full anticipating new challenges in the air-ground domain.

Experienced airmen acknowledge that the air-ground relationship faded after Operation Desert Storm in 1991. To be sure, coalition airmen littered Kuwait with Iraqi tanks and artillery, but Desert Storm was mainly an air interdiction war. There were only four days of true, classical close air support (CAS) during the final 100-hour ground offensive.

Paths Diverge

The early 1990s found the Air Force wrestling with the question of the role

of CAS in the age of precision. In 1994, Air Force Chief of Staff Gen. Merrill A. McPeak famously offered to cede the mission to the Army, along with A-10s designed to do the job, if the Army thought it could do CAS better. For its part, the Army focused on building up its organic artillery, the Army Tactical Missile System, and helicopter "fires" for deep attack.

The trend unwittingly set up some of the problems that flared in a March 2002 Afghanistan operation called Anaconda.

Col. John V. Allison, an A-10 pilot and former ALO now at the Joint Air-Ground Operations (JAGO) Office at Air Combat Command, offered an additional explanation. "I think part of it was the 10-year hangover of Southern Watch," he said. "For 10 years of Southern Watch, we knew what

every target was; everything relied on precision and ISR and having total [situational awareness] on what it was you were going to go after."

Doctrine, philosophy, and even terminology were limiting factors, too. Airmen flinched at the restrictive connotations of the Army term "fires," for example. Brig. Gen. (sel.) Michael A. Longoria, an experienced ALO, recalled, "About 10 years ago, if you were on the Air Staff and you said, 'The Air Force delivers fires,' well, to the Billy Mitchell airpower group, that would have been a heinous term. Now everybody in the Air Force says fires this, fires that."

Fast forward to 2001 and the start of Operation Enduring Freedom in Afghanistan. Technological improvements in airpower were about to propel the air-ground relationship to new

AP photo by Ivan Sekretov





On duty in Afghanistan, Capt. Danny Stout communicates with F-16 pilots overhead. Stout is a B-52 bomber pilot serving temporarily as an ALO. Modern combat requires a ground warrior with enough knowledge of airpower to be able to integrate it into a battle plan.

heights of effectiveness—and create crisis at the highest levels.

Airpower Buffet

“[The success of airpower in] Afghanistan, in my mind, was almost a dream come true,” said Longoria, who in 2001 was commander of the 18th Air Support Operations Group, owned by 9th Air Force and providing air liaison for engaged US Central Command forces. He noted that 45 small special operations teams fanned out over Afghanistan, and each took air controllers to help bring to bear precision firepower. The result was “an airpower buffet, available 24 hours a day, with multiple aircraft with very precise weapons.” By the end of November, the fight with the Taliban for control of Afghanistan’s major cities and towns was over.

Airmen and ground troops alike were surprised by the rapid success in Afghanistan. “No one at any command level thought it could happen that quickly,” said Longoria.

He credited three factors:

First was mass precision, courtesy of Global Positioning System satellite navigation. GPS signals offered high accuracy in the form of the Joint Direct Attack Munition (JDAM).

Second was the small, tactical PRC-117 satellite multiband radio, which gave ground forces anywhere in Afghanistan

the power to reach back to the air operations center and call for fire.

Third was a decision to spread ground forward air controllers across the battlefield, embedding them with highly trained special operations forces (SOF).

Still, those involved saw problems emerging. Success outran doctrine and training and left airmen and soldiers scrambling to deal with it all.

“We didn’t draw traditional lines on the ground to separate the Army and Air Force battlespace,” said Longoria. Lack of lines was appropriate for the widely spaced fight, but no-fire areas formed like bubbles over the heads of SOF teams on the ground, according to Longoria.

Airspace control was also affected. “We mucked up the ground space enough that it became a problem,” said Longoria. Eventually there were so many no-fire areas that, on the airspace control order map, it looked “like Afghanistan developed the measles.”

Longoria noted that the land and air components “needed to have worked that airspace control order with a little greater fidelity.” The components, engaged in hot pursuit of al Qaeda, had little time to scrub the system.

Longoria said that, in retrospect, the components should have had “the discipline” to go back to the no-fire zones

and take some of them off the order. Instead, said Longoria, “as we worked up to Anaconda in early 2002, the airspace control order was populated with over 350 no-fire areas.” The land force, Task Force Mountain, went into the targeted Shah-e-Kot Valley with too many controllers on the ground in too tight a space and little appreciation for onrushing problems.

Cuts and Bruises

The Anaconda experience has been well documented elsewhere; see, for example, “The Echoes of Anaconda,” in the April *Air Force Magazine*. Suffice it to say that highly questionable criticisms of Air Force operations by Army Maj. Gen. Franklin L. “Buster” Hagenbeck and others set teeth on edge. The bruising encounters after Anaconda threatened to plunge air-ground relations to a new low.

Nonetheless, airmen in theater quickly reviewed Anaconda’s lessons and raced to improve ties with the land component in time for Operation Iraqi Freedom. Air support was successful in Gulf War II and the ongoing stability operations in the CENTCOM theater. Working level contacts continued via close air support “integrated product teams.”

However, senior leaders recognized it was better not to leave cooperation to the last minute.

That led to the stand up in October 2004 of the JAGO Office. Longoria was tapped to head the office. “The official guidance was: Improve the air-ground domain,” said Longoria. “The unofficial guidance to me was: Create constant fervor in this domain.” Upset the applecart if necessary—“because we need to get broader,” as Longoria recalled the words of Gen. Hal M. Hornburg, then ACC commander.

JAGO was also chartered to provide inputs to a new Army-Air Force general officer forum chaired by the operations deputies—AF/XO and Army G-3—at the Pentagon. The forum will field issues presented by the major commands of both services. “We wanted to make sure there was a corporate structure,” said Longoria. “Our relationship with the Army has to be institutionalized.”

Building up the institutional relationship may help with one core issue: trust. Airmen consistently cite land component mistrust of airpower as a roadblock to improving air support.

Trust comes from experience. However, as seen by the ALOs, combined

arms exercises did not always provide it. Capstone training events that included close air support were often run under artificial conditions because close engagement was the main training objective. "When the CAS aircraft would find the enemy prior to contact and employ against them quite effectively," said Allison, "the exercise did not allow that effect to be played out" if that kept the Army "from having its ground battle."

Allison went on, "They brought up a whole generation of Army leadership that really didn't have the opportunity to learn what airpower can do for them. Exercises were run in a vacuum. The brigade combat team on the ground, in the box working, did not get to experience what air supremacy and what air dominance across the theater could do."

Allison summed up, "When the Army's paying a million dollars a day for a tank battle, they're going to get a tank battle."

Lt. Col. Greg Myers, an experienced ALO currently with the 15th Air Support Operations Squadron, found trust to be a key point, too. Among senior Army leaders at past exercises, Myers found "the level of trust or faith in the Air Force is pretty much personality dependent—[based on] past experiences that they've had, or maybe just general personality."

When soldiers were exposed to airpower, the results were better. "I've had some really good experiences with senior Army division leaders, corps leaders, who really understand what the Air Force can provide, understand its limitations as well, and listen to the advisors—the ALOs they have available to them—and trust them. That's when you get the real synergistic effects of the joint fires," Myers said.

Afghanistan and Iraq have ensured many ground commanders got firsthand experience. "The brigade commanders, with Iraq experience, with Afghanistan experience, are aware of airpower" and their reliance on it, observed Longoria. Myers added, "It's an educational process. That's why we live on Army posts and train with them."

JTACs and JFOs

Beyond trust, Army transformation concepts are driving new requirements in the air-ground domain. "The Army is transforming and becoming leaner and lighter. Their organic fires capability has

declined a little bit because it's just too massive for them to move," said Myers. "They are relying on the Air Force more now—and will in the future—for the fires that we can provide."

"It's driven by the desire to be strategically deployable" and once in theater to increase the "agility" of the unit of action, said Alan Vick, co-author of the March 2005 RAND report "Beyond Close Air Support." The Army will rely more on joint fires, and "most of it is liable to come from naval or land-based air."

That creates a dilemma for joint tactical air controller (JTAC) manning and the role of joint fires observer (JFO). The Army, notes Vick, wants "the smallest deployed force to have access to the full range of joint fires," which leads the Army to insist that every ground maneuver company have its own JTAC.

"There's a different approach that we have in the Air Force," explained Longoria. Maneuver companies will be assigned JTACs when needed, but not as permanent manpower slots. The Air Force will give the Army a JTAC capability—not ownership. "They will have the capability but not the resident manpower attached at the company," said Col. Ronald L. Watkins of the JAGO Office.

"In other words, in combat, when you absolutely need it, you're going to get it," Longoria said, "but every single day? No. We simply can't do that. That would be tantamount to saying all of

our airmen are going to be completely organic down to the company level."

JTACs are not made overnight. Becoming familiar enough with air support to integrate it into a battle plan takes more than seeing a bomb hit a target. The job of the JTAC includes control, deconfliction, respecting availability times, clearing aircraft off to tankers, and so forth.

As Vick and his co-authors concluded, "The JTAC program was created to ensure that TAC standards are uniform across the services, not to produce a vast new pool of TACs."

Battlespace density is also a key variable in determining how many JTACs to send in and how to use them effectively. When companies are shoulder to shoulder in an engagement, one JTAC may serve several. In the close-packed Anaconda battle, more than 30 air controllers worked in an 8-mile by 8-mile area with conflicting lines of sight. One al Qaeda mortar round, and "you might get seven or eight JTACs calling for fires," said Longoria, adding, "More JTACs is not necessarily a good thing."

Vick foresaw another problem. "Don't be surprised if, in four or five years, the Army comes back and says we need [JTACs] with every platoon. You can imagine the limit, the extreme future force, where every soldier needs that capability."

Enter the JFO

Everyone wants to guarantee that ground units can call for fires. That's



USAF photo by TSgt. Eric M. Grill

The war in Afghanistan gave many ground commanders firsthand experience with airpower. A-10s such as this one were made all the more effective by the input of air liaison officers.



Airpower is enhanced not only by the ALOs, but also by tactical air control party airmen. These enlisted troops, often called "the Air Force's infantry," provide close air support guidance control and usually travel with special operations forces. Here, A1C James Blair brings in precise air support for the US Army's 10th Mountain Division.

where the JFOs come in. "We want any Army element, down to a single individual in a convoy, platoon, or company, to be able to call for fire through a JFO," said Watkins.

However, "calling in air isn't just about target location and description," said Vick. "It's also about controlling the aircraft, and that's where it differs from forward observer skills. Being a forward observer is challenging enough, but the person who's working with the aircraft also has to deconflict the aircraft, deal with fuel states—lots of things that you don't worry about with artillery," Vick said.

Current plans aim to resolve those issues. The key point is to disaggregate the skill set.

Longoria said a JTAC will be teamed with an Army JFO, who is a trained universal observer. JFOs can control artillery and naval gunfire. According to Longoria, JFOs will also get "an airpower course that's much like a JTAC course, but not as extensive," and be expected to maintain currency requirements—again, not as extensive as those of the JTAC.

The JFOs will most likely be found at platoon and company level. They will be experts at the target. JFOs may also be tapped to provide rapid battle damage assessment. JTACs then do the

airspace deconfliction and other tasks necessary to complete the strike.

Army plans call for expanding the number of brigades even though troop levels will stay constant. The new structure will by itself increase demand for controllers.

Currently there are more than 700 JTACs, with plans to go up to about 1,100. It won't be easy to keep up the numbers.

"The Army wants to have a lot of their 13Fs—artillery guys—become JTACs," explained Myers. "The problem with that is, there isn't a separate school for them to go to, and they don't have the structure in place to be able to do that. The system that the Air Force has is just barely keeping up with our requirements, and, of course, our requirements are growing."

The Air-Ground Operations School at Nellis AFB, Nev., has worked hard to get more JTACs through the course, said Myers, but capacity is limited, and subsequent training can be spotty.

"It's difficult to ramp up the number

of quality, confident TACs rapidly," said Vick. "If you put people out there who aren't up to it, you end up either killing friendlies and civilians and/or not killing the enemy," he said. "That's too high a price to pay."

However, technology will lend a hand. Vick said he expects upgrades to laser range finders and other new initiatives to make the fires observer's job easier.

Training will also evolve. Myers praised the Indirect Fire-Forward Air Control Trainer simulator—known as I-FACT—which is entering widespread service for squadron-level training. "We're hoping that this will lead us to more realistic training," he said.

Joint fires is not the only challenge. The air and ground components are facing a potential battle over airspace control as unmanned vehicles proliferate in the battlespace. Low airspace is becoming a contested commodity, with land forces often asking to own it up to 3,000 feet. "Every attempt to raise the altitude will inhibit the precise application of airpower," said Watkins.

Clamoring

Success in the air-ground domain depends on good command relationships and on harmonizing tactical and operational concepts. Serving in the air-ground domain is now more popular than ever. "There's been a sea change in the last three years," said Longoria. "I have people clamoring [to become ALOs]. When these young captains get an ALO assignment now, they're excited about it. They know they're going to war."

Today's ALOs are also a long-term investment in future leadership. In Longoria's view, the young officers serving as ALOs come out of the experience with unique credentials.

"Some of those guys are going to be joint force commanders at the one-, two-, or three-star level and above," he said. "They will look at their Army counterparts and say, 'I've been in air combat, and I've been in ground combat.' There will be nothing that an Army infantry officer has over them in terms of combat credentials." ■

Rebecca Grant is a contributing editor of Air Force Magazine. She is president of IRIS Independent Research in Washington, D.C., and has worked for RAND, the Secretary of the Air Force, and the Chief of Staff of the Air Force. Grant is a fellow of the Eaker Institute for Aerospace Concepts, the public policy and research arm of the Air Force Association's Aerospace Education Foundation. Her most recent article, "The Echoes of Anaconda," appeared in the April issue.

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The 920th Rescue Wing at Patrick AFB, Fla., can boast of 26 combat “saves” in Iraqi Freedom.

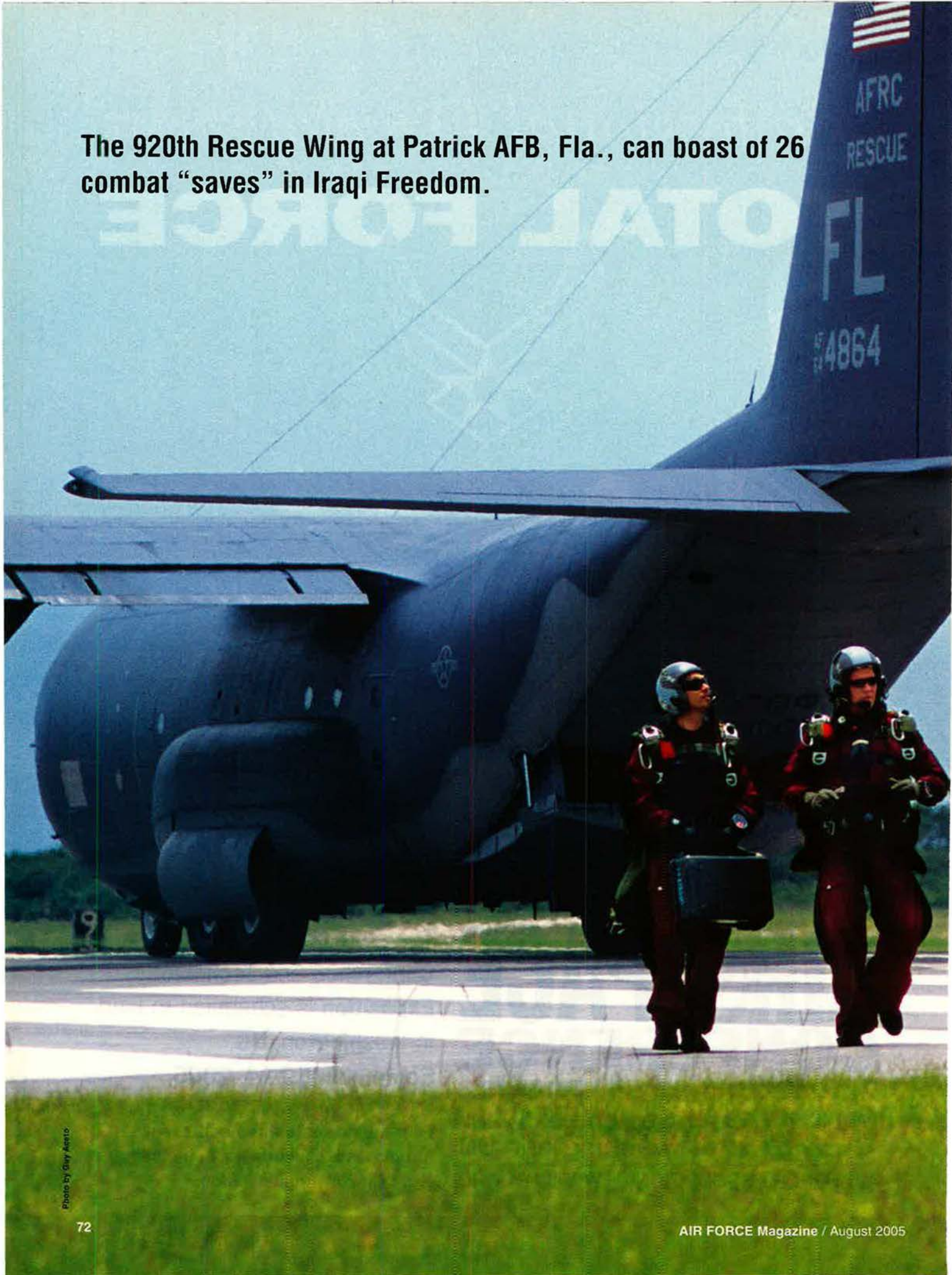


Photo by Guy Aerts

RESCUE 920

Photography by Guy Aceto



Training jumps are a routine part of the job for the pararescue jumpers, or PJs, located at Patrick AFB., six of whom are shown here suited up for the task. In the background is one of the wing's specialized HC-130 aircraft.

Patrick AFB, Fla., is the home of the 920th Rescue Wing, an element of Air Force Reserve Command that trains and equips roughly 1,200 airmen in the art and science of recovering US military personnel. It is the only rescue outfit in AFRC. Wing detachment personnel serve at Davis-Monthan AFB, Ariz., and alongside Air National Guard units in Portland, Ore.

At right, HH-60G Pave Hawks of the 301st RS stand ready for launch.

After the Sept. 11 terrorist attacks, USAF activated about 400 of the wing's airmen for two years. Crews can boast of 26 Iraqi Freedom "saves." Examples: the rescue of an A-10 pilot forced to eject after a mission over Baghdad, and the recovery behind enemy lines of a Marine Corps team pinned down near Nasiriyah. The wing has a colorful history. In the 1960s, during the early days of the manned space program, the wing's aircraft and airmen assisted in the recovery of US astronauts after splash-down into the Atlantic.



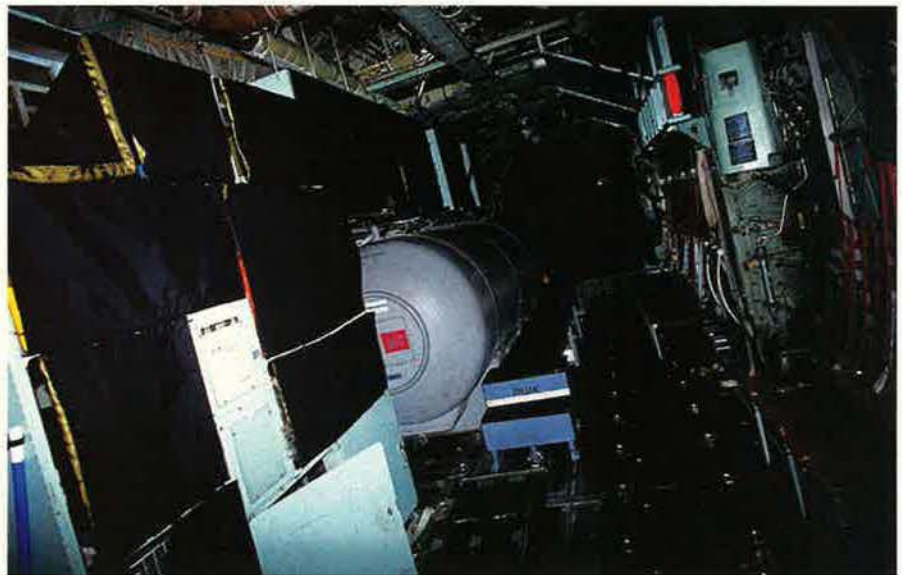
At left, an airman works on a rotor while, above, a Pave Hawk flies on a training sortie. The 920th works with local law enforcement and also helps boaters in distress off the coast of Florida.

The 39th RS at Patrick operates five tactical transports—a mix of HC-130Ps and HC-130Ns. The aircraft are old but expertly maintained and are veterans of many modifications. In the photo at right, one sees two adaptations that are useful for the rescue mission—the forward-looking infrared (FLIR) pod just under the nose of the aircraft and the nonstandard observation window aft of the nose landing gear.





In photo at top, an HC-130 taxis to a stop after landing on a small strip at Cape Canaveral AFS, Fla. The wing's aircrews regularly practice short-field takeoffs and landings as well as nighttime operations. Given the frequency of the wing's nighttime missions, it is imperative that the pilots master the art of flying with the aid of night vision goggles. Some 70 percent of the wing's sorties are flown in the dark.



The HC-130 interior pictured above features an internal fuel tank, which is used to gas up forward deployed rescue helicopters. Wing maintainers keep their aircraft immaculate. Even so, there is no denying the age of the equipment; the tail code at left shows that this airplane was acquired in 1964.

Maintenance is critical; the aircraft must perform perfectly in the risky business of rescue, which frequently takes place over water or in a hostile combat zone. At right, workers open up a Hercules for the kinds of checks and repairs that 40-year-old airplanes inevitably require. Each of the 39th's five HC-130 machines receives a semi-annual inspection, during which every panel is opened and every system given fine-grain scrutiny.



Everything needed for rescue must be ready to go at a moment's notice. At left, all-terrain vehicles are packaged with parachutes, prepared for a combat drop, mounted on shock-absorbing material that will cushion the jolt of a landing on hard ground. The PJs themselves are responsible for keeping their Zodiac boats, medical gear, and weapons in top condition and primed for action, but support personnel have recently been made available to tend to the equipment while the PJs are "on assignment."

The pararescue career field is small but critical, and in the reserves, draws people from all walks of civilian life: firefighters, emergency medical technicians, and paramedics, for example.

First Lieutenant Ross Wilson (center of the photo at right) is one of a new breed of PJs—a combat rescue officer, or CRO. Nearly all CROs are formerly enlisted PJs. Here, Ross straps gear into a Stokes metal-framed litter, used to bring out an immobilized injured person. Though they are getting ready for a training mission, this crew will carry all of the gear they need in case they are suddenly diverted to a real-world rescue.



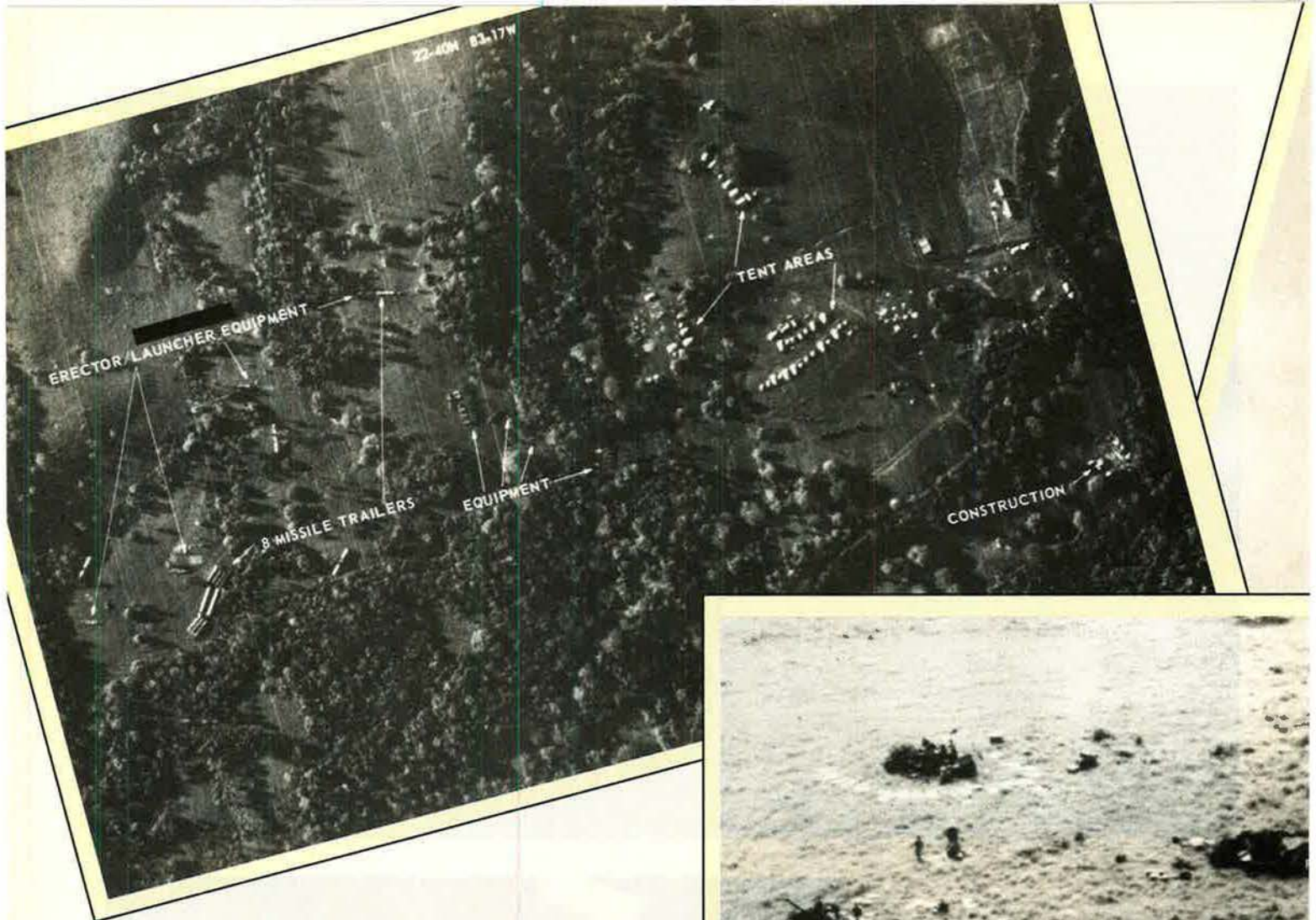


Neither sleek nor fast, the Pave Hawk of the 920th is still a thing of beauty to those in need of rescue from a bad situation. The Pave Hawk in the photo at top is making an approach on a training sortie.

At right, SSgt. Omar Rivera, a flight engineer, sets the switches for the Pave Hawk's pilots. Below, Rivera does a preflight walk-around check of the Pave Hawk. While most pilots prefer to do their own preflight, if they can, these aircraft are kept at a constant state of readiness for a mission. Often, they lift off as soon as the pilots can strap in.



At left, a Pave Hawk embarks at dusk on a training mission. Though daylight may be waning, the mission continues apace. The helicopter carries a door gunner; he is charged with keeping an eye out for the enemy, much as he will in the unit's upcoming deployment to Afghanistan. ■

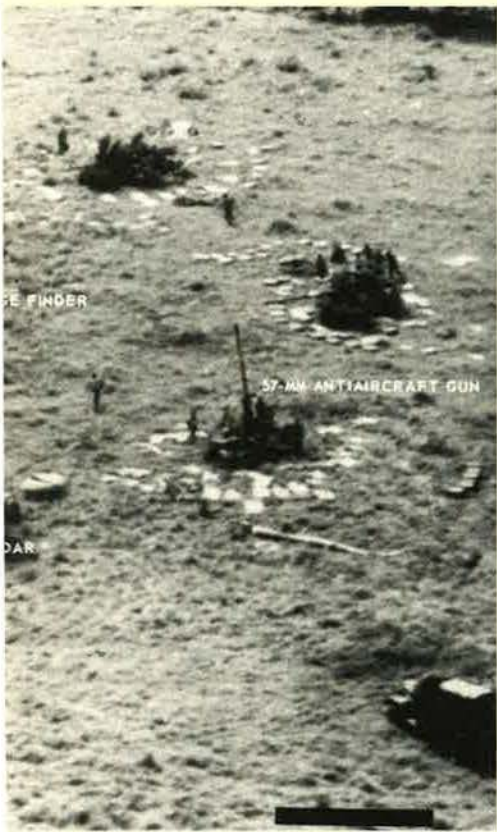
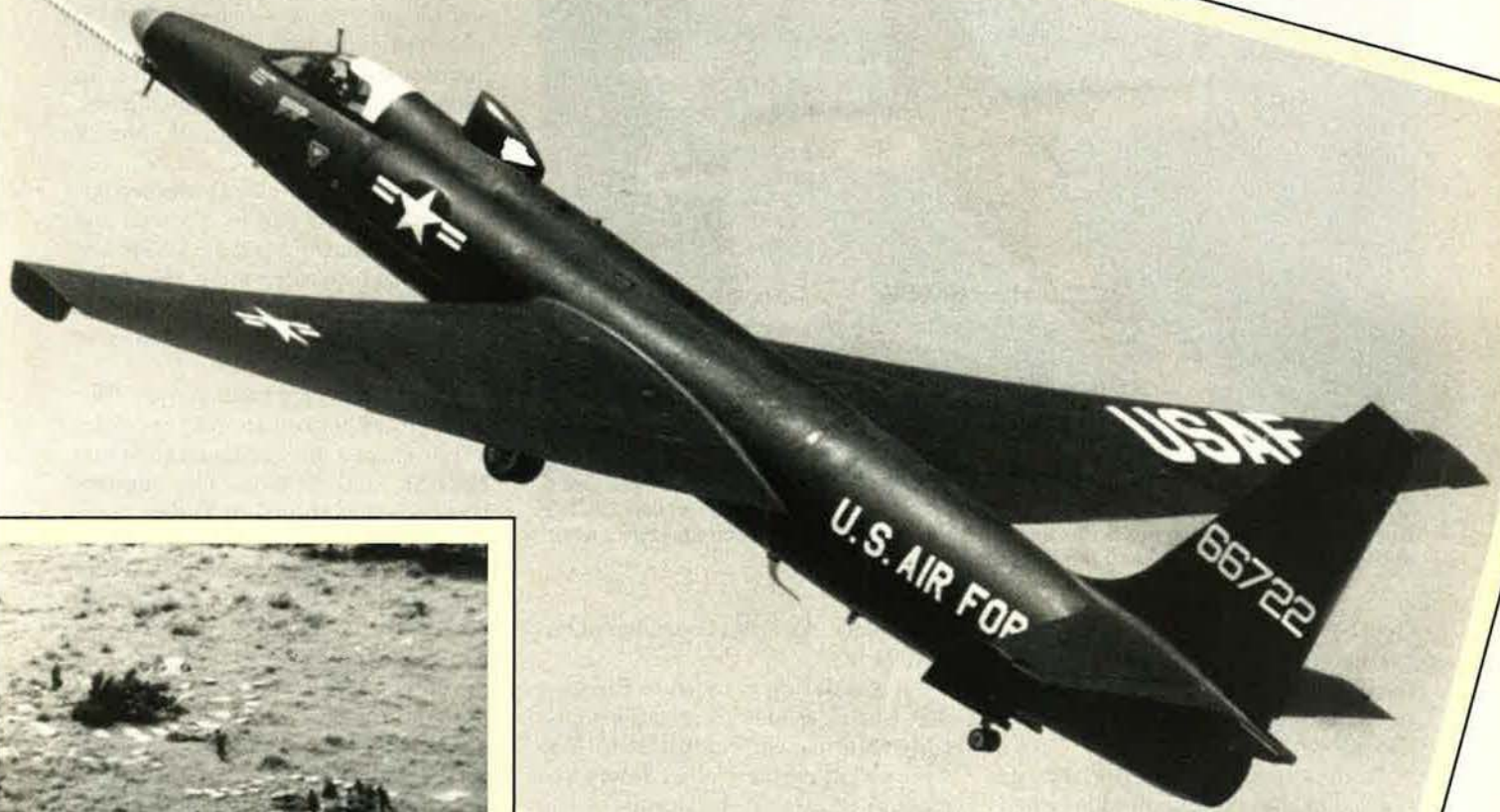


This "smoking gun" reconnaissance photo of San Cristobal, Cuba (above), revealed the presence of Soviet medium-range ballistic missiles. It was obtained by a high-flying U-2 spyplane such as the one at far right. A low-flying Air Force RF-101 or Navy RF-8 snapped the close-up at right of anti-aircraft artillery and radars being erected near the missile sites.



Airpower and the Cuban Miss

The Russians hoped to have their missiles in operation before the Americans discovered them. They almost made it.



e Crisis

By John T. Correll

IN THE summer of 1962, a conspicuous military buildup was under way in Cuba. US aerial surveillance in July reported an exceptional number of Soviet ships moving toward the island. They rode high in the water, suggesting military cargo—such as missiles, which occupied considerable space in relation to their weight.

In August, US intelligence received reports of sightings by ground observers of Russian-built MiG-21 fighters and Il-28 light bombers.

CIA U-2 spyplanes overflew Cuba twice a month. On Aug. 29, they found SA-2 surface-to-air missile sites at eight different locations. That was of interest but of no great concern. SAMs were defensive weapons.

The U-2s also found MiG-21s, confirming the earlier sighting reports. Possibly, though, these aircraft were

simply upgrades from the older MiGs the Cubans already possessed.

CIA director John A. McCone was suspicious. In an Aug. 10 memo to President Kennedy, he guessed that Russia was about to introduce ballistic missiles into Cuba. Why, he asked, would they be deploying SAMs, except to protect something important, like offensive missile sites?

For Kennedy, the question had political as well as military implications.

In late August, Sen. Kenneth B. Keating (R-N.Y.)—whose sources were probably Cuban exiles in Florida—said there was evidence of Soviet “rocket installations” in Cuba and urged Kennedy to act. Others, notably Sen. Homer E. Capehart (R-Ind.), joined in the call for action.

Strangely, U-2 flights ceased for more than a month, from Sept. 5 to



Maj. Rudolf Anderson Jr. was shot down while piloting a U-2A like this one. The U-2 Cuba mission had been passed from the CIA to the Air Force. Kennedy didn't want another Gary Powers-like flap if a CIA airplane went down.

Oct. 14. One reason was bad weather, but another was anxiety on part of the President's advisors, who worried about the consequences of a U-2 shootdown.

To the dismay of the CIA, the Air Force took over the U-2 missions when they resumed. The first flight was by Maj. Richard S. Heyser on Oct. 14.

When CIA analysts on the next day pored over Heyser's reconnaissance film, they found SS-4 medium-range ballistic missiles. Senior Administration officials were told that night. The President was notified early on the morning of Oct. 16.

The Cuban missile crisis had begun. By the time the public was informed one week later, the U-2s had also discovered an SS-5 intermediate-range ballistic missile site and Il-28 bombers.

President Kennedy spoke to the nation on television Oct. 22 and announced "unmistakable evidence" of Russian missiles in Cuba. He declared a naval "quarantine" and said any missile fired from Cuba would be treated as a Soviet attack on America.

On Oct. 27, a Russian SAM crew shot down a U-2, killing the pilot, Air Force Maj. Rudolf Anderson Jr. The White House decided not to retaliate.

On Oct. 28, the Russians bowed to overwhelming US strategic power and agreed to withdraw their missiles.

It was as close as the Cold War ever came to World War III.

Khrushchev's Gambit

As Soviet leader Nikita Khrushchev

told it later, the crisis began the previous April.

"It was during my visit to Bulgaria that I had the idea of installing missiles with nuclear warheads in Cuba without letting the United States find out they were there until it was too late to do anything about them," he said in *Khrushchev Remembers*, published in 1970.

He was reacting, superficially at least, to the Jupiter intermediate-range ballistic missiles the United States had recently installed in Turkey. More important, though, Khrushchev wanted to compensate for Russia's strategic disadvantage in long-range missiles.

"In addition to protecting Cuba," he acknowledged in his memoirs, "our missiles would have equalized what the West likes to call 'the balance of power.'"

Protecting Cuba had little to do with it. Khrushchev saw the possibility of an instant strategic adjustment. IRBMs based in Cuba could reach US targets as easily—and faster—as ICBMs from launch sites in the Soviet Union.

Missiles had recently taken center stage in the Cold War. Ironically, one of Kennedy's issues in the 1960 election was an alleged "missile gap," with the Russians ahead. There was indeed a missile gap, but it was in favor of the United States.

The Russians had only four ICBMs in 1961. By the time of the Cuban missile crisis, they probably had several dozen, although some estimates went as high as 75. What the Russians did have was

medium-range ballistic missiles, about 700 of them.

The United States had 170 ICBMs, and the number was rising rapidly. It also had eight ballistic missile submarines with 128 Polaris missiles. To make matters worse for Khrushchev, the Soviet missiles were of inferior quality.

Khrushchev had added to the perception of a missile gap by his loud and untruthful boasting that the USSR was turning out missiles "like sausages" and his claims of long-range missile capabilities he was nowhere close to having.

The US Air Force had deployed Thor and Jupiter intermediate-range missiles to Europe as a direct counter to Soviet MRBMs and IRBMs. The Jupiters had been operational in Turkey since April 1962.

Fidel Castro agreed readily to accept the Soviet missiles in his country. He did not see a need for them for Cuba's defense, but he was eager to be part of the communist team, the point man in the Western Hemisphere.

The ill-fated Bay of Pigs invasion in 1961 had failed to oust Castro, but he remained on Washington's hit list. "Operation Mongoose," a scheme to undercut the Castro regime, was still running.

Castro welcomed the installation of the Russian missiles as an opportunity to stick it to the Yanquis.

A survey team, led by Marshal Sergei Biryuzov, chief of the Soviet Rocket Forces, visited Cuba prior to the deployments. Upon his return, Biryuzov assured Khrushchev that the missiles would be concealed and camouflaged by the palm trees. Khrushchev believed him.

The force proposed for Cuba included 24 MRBM launchers and 16 IRBM launchers. There were two missiles (one as a spare) and one nuclear warhead for each launcher. There would also be four combat regiments, 24 SA-2 batteries, 42 MiG-21 interceptors, and 42 Il-28 bombers.

The ships began moving from the Black Sea in the middle of July. The first MRBMs arrived at the Cuban port of Mariel aboard *Poltava* on Sept. 15.

"Soon, hell will break loose," Khrushchev told an aide at the end of September.

The U-2

The state of the art in aerial photo intelligence was the Lockheed U-2.

Reconnaissance satellites were coming along, but the technology was not yet fully mature.

The U-2 was developed in the 1950s by the fabled Lockheed Skunk Works under the direction of the equally fabled Clarence L. "Kelly" Johnson. The prime customer was the CIA, but the Air Force was also offered a share of the program.

At first, according to a declassified CIA history of the U-2, Gen. Curtis E. LeMay, commander in chief of Strategic Air Command, said that "if he wanted high-altitude photographs, he would put cameras in his B-36 bombers and added that he was not interested in a plane that had no wheels or guns."

The Air Force bought some U-2s anyway. They were assigned to SAC's 4080th Bomb Wing at Laughlin Air Force Base, near Del Rio, Tex. The aircraft began arriving in June 1957. Mostly, the Air Force U-2 pilots flew missions around the Soviet periphery and in the Far East.

The U-2 was built to go high and far. The wingspan was 80 feet, almost twice the length of the body of the aircraft, which was not quite 50 feet. It flew at 72,500 feet, more than 13 miles high.

To get range, altitude, and endurance, the Skunk Works had traded off everything else. The U-2 was not very fast. Cruise speed was 460 mph.

"One unusual design feature was the tail assembly, which—to save weight—was attached to the main body with just three tension bolts," the CIA history said. "The wings were also unique. Unlike conventional aircraft, whose main wing spar passes through the fuselage to give the wings continuity and strength, the U-2 had two separate wing panels, which were attached to the fuselage sides with tension bolts.

"The fragility of the wings and tail section, which were only bolted to the fuselage, forced Kelly Johnson to look for a way to protect the aircraft from gusts of wind at altitudes below 35,000 feet, which otherwise might cause the aircraft to disintegrate. ... The U-2 remained a very fragile aircraft that required great skill and concentration from its pilots."

Flying the U-2 at altitude also demanded precision.

"The air was so thin it could barely support the weight of the plane, and the difference between maximum and minimum speeds was a scant six knots (seven mph)," a *Washington Post* re-

porter wrote after interviewing Air Force pilot Heyser. "If he flew too fast, the fragile [aircraft] would fall apart. If he flew too slow, the engine would stall, and he would nose-dive."

At the end of each wing of the U-2 was a "pogo," an outrigger with a wheel on it, to keep the wingtips from dragging on takeoff. When the aircraft broke ground, the pogos dropped away. The wingtips had skids for landing.

USAF Takes the Flights

The U-2 cameras carried 5,000 feet of film. Had it all been spooled on the same side of the camera, the weight of the film—about 300 pounds—would have thrown the airplane out of balance. Thus the film was divided into two strips, each nine inches wide, feeding from opposite directions. It would be recombined in the laboratory to produce images 18 inches square.

Each U-2 mission took about 4,000 pictures.

The U-2's free run of crossing Soviet territory came to an end on May 1, 1960, when CIA pilot Francis Gary Powers, flying out of Pakistan, was shot down over Sverdlovsk by a Russian SA-2 SAM and captured.

There was great political uproar, both in the United States and abroad. President Eisenhower, who had detailed knowledge of the overflights and who approved the missions, denied his involvement and canceled the overflights of Russia.

The CIA U-2s continued to fly other reconnaissance missions, including the

semimonthly passes over Cuba in the summer of 1962. At that point, two events, neither of them the doing of the CIA, intervened.

On Aug. 30, a SAC U-2 on a mission unrelated to Cuba overflew Sakhalin Island in the Far East by mistake. The Soviets protested and the US apologized. On Sept. 9, a Taiwanese U-2 was lost, probably to a SAM, over western China. Taiwan had bought its own U-2s from Lockheed.

Secretary of State Dean Rusk and National Security Advisor McGeorge Bundy became concerned that one of the SAMs in Cuba might shoot down a U-2, setting off an international controversy. So—just as the missile shipments were approaching port in Cuba—the U-2 missions stopped. There were no overflights from Sept. 5 to Oct. 14, although the CIA was allowed to fly peripheral runs, taking pictures from slant range, 15 miles offshore.

On Sept. 28, Navy reconnaissance aircraft photographed large crates on the deck of the Soviet ship *Kasimov*, on its way to Cuba. The size and shape of the crates indicated that they contained Il-28 light bombers, which was later confirmed.

On Oct. 12, the Administration transferred responsibility for U-2 overflights of Cuba to the Air Force. Various reasons were given, but the real explanation was that the Administration did not want another CIA U-2 flap and believed that it would be easier to concoct a cover story if the missions over Cuba were flown by the Air Force.



Anatomy of a crisis: At the top are the SS-5 missiles, housed in long tents. At the center is a launch control building, surrounded by service roads, missile erectors, and camouflage netting.

There is also some indication that the Department of Defense and the Air Force pressed hard to get the mission. McCone was away when it happened.

According to the CIA history, "The acting DCI [director of central intelligence], Lt. Gen. Marshall S. Carter, US Army, reacted strongly to the Air Force takeover of a major CIA operation. At one point, he remarked, 'I think it's a hell of a way to run a railroad. It's perfectly obviously a geared operation to get SAC in the act.'"

Dino A. Brugioni, whose book *Eye-ball to Eyeball* is a detailed remembrance from inside the CIA, said Carter was surprised to learn that McCone had previously mentioned to the President "that the U-2 missions were getting progressively hazardous and he might want to consider a transfer of the responsibilities to the military."

No matter how Carter and the CIA felt about it, the Air Force had the job, and the missions would be flown in the best models of the U-2, which the CIA had and the Air Force didn't.

In 1962, the most experienced pilots at Laughlin were Heyser, of Apalachicola, Fla., and Anderson, of Greenville, S.C. They went to Edwards AFB, Calif., for familiarization in the U-2Cs and to bring back two of them, which the Air Force was borrowing from the CIA. The U-2C could fly 5,000 feet higher than the Air Force's U-2As.

Finding Missile Sites

It is sometimes reported that An-

derson flew the first Air Force mission over Cuba, the one that found the missiles, or that he and Heyser both flew that day. That was a public relations maneuver instigated by the Pentagon after Anderson was shot down. The fact is, Heyser flew the first mission alone, from Edwards. Anderson was the backup.

Heyser took off from California in the middle of the night on a schedule that would put him over Cuba an hour after sunrise on Sunday, Oct. 14.

It took five hours for him to reach the Gulf of Mexico. He swung wide around the western end of Cuba and approached the island from the south. He crossed the Isle of Pines at 7:31 a.m. and turned on the cameras.

Heyser flew north, across San Cristobal, west of Havana. San Julian airfield was off to his left. He exited Cuban airspace at 7:43 a.m. He landed at McCoy Air Force Base at Orlando, Fla., where an airplane was waiting to take the film to Washington, D.C. At the debriefing, Heyser described the mission as "a milk run."

The film was delivered to the CIA's National Photographic Interpretation Center. Analysis on Oct. 15 revealed components of SS-4 missile batteries at San Cristobal and II-28 bombers at San Julian. No nuclear warheads were seen. That evening, Administration officials were tracked down and notified.

President Kennedy was informed at 8:45 a.m. on Oct. 16. On his orders, the Air Force U-2s began flying as many as six missions a day over Cuba. "Ex-

Com," an executive committee of the National Security Council, was formed to work the crisis.

On Oct. 17, the U-2s found an SS-5 IRBM site (the first of three to be identified). The range of the SS-5 was 2,531 miles, double that of the SS-4. It could reach any point in the United States except for the Pacific Northwest. (Although the sites were under construction, no SS-5s reached Cuba. They were on ships that turned back.)

By Oct. 19, US intelligence had discovered 16 operational SS-4 launchers, 22 II-28 bombers, 24 SA-2 SAM sites, and a nuclear warhead storage bunker.

In his memoirs, Khrushchev blustered, "We hadn't had time to deliver all our shipments to Cuba, but we had installed enough missiles already to destroy New York, Chicago, and the other huge industrial cities, not to mention the little village of Washington."

Some Administration advisors agonized that Cuba was within its rights as a sovereign nation in permitting an ally to install nuclear missiles. Kennedy understood, however, that a nuclear missile threat 90 miles off the Florida coast could not be tolerated.

Showdown

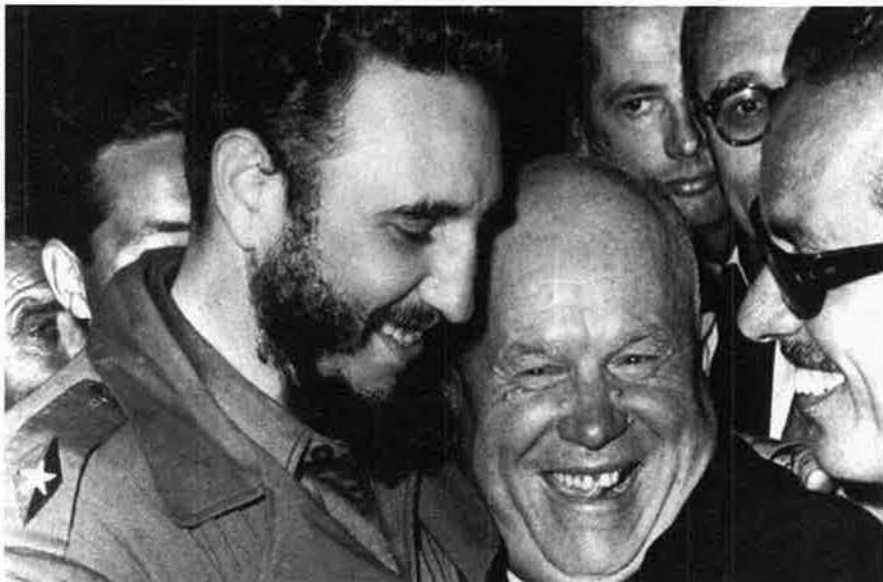
The public learned of the crisis when President Kennedy spoke to the nation on television. He said that the United States would "regard any nuclear missile launched from Cuba against any nation in the Western Hemisphere as an attack by the Soviet Union on the United States, requiring a full retaliatory response against the Soviet Union."

He also announced a naval "quarantine" of Cuba, avoiding the term "blockade," which is an act of war. The Organization of American States supported the quarantine.

For the first time in history, Strategic Air Command went to DEFCON 2, one step short of general war. Up to a third of the B-52s were on airborne alert, and the rest of the fleet was ready to take off in 15 minutes. The North American Air Defense Command moved fighter-interceptors and Hawk and Nike Hercules anti-aircraft battalions to the southeastern United States.

While the U-2s continued to work at high altitude, other Air Force and Navy aircraft flew photo missions over Cuba at lower altitudes. The Air Force RF-101 used six cameras that could photograph the missile sites from treetop level.

AP photo by Marty Lederman



Castro (left) knew the missiles might provoke a US invasion of his country, but he was anxious to be a player on the world stage. Khrushchev (right) believed the missiles could be installed and hidden before the US knew what was happening.



President Kennedy (right) and his brother Robert, the attorney general, confer during the 1962 crisis. Kennedy recognized the courageous efforts of the reconnaissance pilots and crews for helping resolve the crisis.

There was some talk of a “surgical strike” to take the missiles out, but with the capabilities and bombing accuracies of the day, that was not to be. The Air Force told the President that it would take hundreds of sorties to be sure of getting 90 percent of the missiles.

That was a *ro go*.

Meanwhile, Castro—who had been steadily ignored by both the Russians and the Americans—was growing impatient. He had anti-aircraft guns of his own scattered around the island, and he ordered the Cuban gunners to shoot down the American airplanes. The Soviet ambassador tried to persuade Castro to cancel his order, but he refused.

That was the situation on the morning of Oct. 27, when Anderson took off from McCoy Air Force Base in a U-2. He crossed the northern coastline of Cuba at 9:15 a.m., flew south, over Guantanamo Bay, and then back northward. The SAM site at Banes, on the northeastern coast, picked him up about 10 a.m.

The Cuban gunners couldn't reach Anderson at the altitude he was flying, so the Soviet SAM crewmen at Banes decided they ought to help their allies. The overall Soviet commander, Gen. Issa Pliyev, could not be found at that critical moment. The SAM battery fired three rockets, two of which hit Anderson's U-2 and knocked it out of the sky.

There were mild reprimands from Moscow and orders not to shoot down any more U-2s. Khrushchev lied about it, of course. “Castro gave an order to

open fire, and the Cubans shot down an American U-2 reconnaissance plane,” he said in his memoirs.

ExCom had decided earlier that if a U-2 were shot down, the SAM site would be attacked and destroyed. Accordingly, the Air Force prepared an F-100 strike on Banes, but President Kennedy would not allow it.

A week after the shootdown, the Cubans turned over Anderson's body to a United Nations representative. Kennedy personally ordered the Air Force to award posthumously to Anderson the Air Force Cross—the first ever presented.

End Game

On Oct. 27, the same day Anderson was shot down, the Air Force put its first 10 Minuteman I missiles on alert at Malmstrom AFB, Mont. It was another reminder to Khrushchev that he was years away from achieving strategic parity with the United States, and he knew it.

“We could see that we had to reorient our position swiftly,” he said in *Khrushchev Remembers*, claiming fear that Kennedy would not be able to control the warlike US military leaders. He notified Kennedy, “We agree to remove our missiles and bombers on the condition that the President give us his assurance that there would be no invasion of Cuba.”

Khrushchev pulled back from the confrontation in a Radio Moscow broadcast Oct. 28, declaring that he had ordered “the dismantling of the weapons which you describe as ‘offensive,’ and their crating, and return to the Soviet Union.”

“Eyeball to eyeball, they blinked first,” Secretary of State Dean Rusk told a reporter. That was so, but the United States also made a concession, which was not announced. The Jupiter missiles would be pulled out of Turkey.

Attorney General Robert F. Kennedy told Soviet ambassador Anatoly Dobrynin, back-channel, that “within a short time after this crisis was over, those missiles would be gone.” It was no great loss to the United States or NATO. The Jupiters were obsolete, and the mission they were performing was taken over by Polaris nuclear submarines.

Photoreconnaissance on Nov. 1 confirmed that the MRBM sites had been bulldozed. Ships began taking missiles and other equipment back to the Soviet Union on Nov. 5. SAC went back to its normal alert posture on Nov. 20, and the naval quarantine ended.

Khrushchev was removed from power in 1964. The reasons were mostly domestic, but the Cuban missile fiasco had cost him support.

Years later, it was revealed that, in addition to the missiles, there had been 40,000 Soviet troops in Cuba, many more than the US had estimated. There were also about 20 nuclear warheads in Cuba, although none of them had been mounted on the missiles.

On Nov. 26, at Homestead AFB, Fla., Kennedy presented the Presidential Unit Citation to the 4080th Strategic Wing and the 363rd Tactical Reconnaissance Wing. He also visited and thanked Navy fliers at Key West, Fla.

“I may say, gentlemen, that you take excellent pictures and I have seen a good many of them, beginning with the photographs which were taken on the weekend in the middle of October which gave us the conclusive proof of the buildup of offensive weapons in Cuba,” Kennedy said to the U-2 crews.

“The 4080th contributed as much to the security of the United States as any unit in our history and any group of men in our history.” ■

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, “How the Air Force Got the ICBM,” appeared in the July issue.

Gen. Lauris Norstad worked well behind the scenes, and his quiet actions had a decisive impact on US defense.

Airman in the Shadows

By Herman S. Wolk

Gen. Lauris Norstad could be described as the most important Air Force officer in history who remains a virtual unknown.

Norstad was a principal architect of the modern US national defense establishment. For the better part of a decade, he served in the highest allied posts. He played an indispensable role in the structuring of the 1947 National Security Act and formation of the independent Air Force.

Yet, four decades after his retirement (in 1963, as Supreme Allied Commander Europe), Norstad is little known even in Air Force circles. Sometimes, he is put down as having been a mere “staff officer.” This is far from accurate.

Norstad was a shadowy figure who worked well behind the scenes. His enormous negotiating skills and outstanding political instincts enabled him to work with the leaders of Europe and, when necessary, to confront them.

His resume, however, includes quite a great deal more than his postwar political achievements. Equally great—and equally underappreciated—were his



Lauris Norstad was a key figure in World War II air operations, defense reorganization, and creation of the Air Force, yet his contributions aren't well-known. He is pictured as a major general above.

contributions to air operations in North Africa, Europe, and the Pacific. The toughness of the man was manifest in his wartime roles.

In 1942, Gen. Henry H. “Hap” Arnold, Commanding General of the Army Air Forces, brought the 35-year-old Norstad—then a lieutenant colonel—into his personal advisory council just before sending him to England and North Africa as assistant chief of staff for operations, Twelfth Air Force. Norstad conducted the air planning for the Allied North African invasion. In

1943, then-Brigadier General Norstad planned air operations for Northwest African Air Forces before moving to Italy to become director of operations for Mediterranean Allied Air Forces.

However, things were about to change. Arnold in early 1944 had established Twentieth Air Force in the Pacific. (See “The Twentieth Against Japan,” April 2004, p. 68.) The commander was to report directly to him as executive agent of the Joint Chiefs of Staff. Early B-29 operations—code-named Matterhorn—had been launched in

1944 from the Chengtu valley in west China, but things had not gone well; air operations were slowed by bad weather and massive logistical difficulties, with the B-29s even being used to haul fuel from India to western China.

Back to Washington

Arnold was determined to get results with the B-29 effort against the Japanese home islands, and he thought he knew the man he needed. In mid-1944, the AAF Chief traveled to Italy, to inform Norstad that he was being pulled back to Washington to oversee B-29 bomber operations in the Far East.

Norstad was reluctant to leave. He had played a major role in the Italian campaign and wanted to see it through to the end. However, the younger officer failed to persuade Arnold, who named him in July 1944 to be chief of staff, Twentieth Air Force.

Brig. Gen. Haywood S. Hansell Jr. had preceded Norstad as the Twentieth's chief of staff. In the summer of 1944, Arnold directed Hansell, as commander of the XXI Bomber Command, to take the first Superfortresses to the Marianas Islands.

Over several months in late 1944, however, Hansell's operations out of the Marianas failed to produce the results that Arnold expected. In January 1945, Arnold replaced Hansell with Maj. Gen. Curtis E. LeMay, who had been running the Matterhorn B-29 operation out of India. Hopes for improvement ran high.

However, LeMay's initial operations during January and February fared no better than had Hansell's. Norstad, who as chief of staff of Twentieth was close to Arnold and met him on a daily basis, saw that the AAF commander had staked everything on the B-29 offensive and that he was becoming increasingly frustrated. Norstad, well aware of Arnold's thinking, contacted LeMay and put it all on the line.

He wrote: "If you don't get results, you will be fired. There will never be any Strategic Air Forces of the Pacific after the battle is fully won in Europe and those European forces can be deployed to the Pacific. If you don't get results, it will mean eventually a mass amphibious invasion of Japan, to cost probably a half a million more American lives."

Norstad's brutal warning had its effect. LeMay before too long made one of the most critical decisions of the war: Without informing Arnold—thereby absolving him of any responsibility



Norstad (right) converses with Gen. Dwight Eisenhower, the Army Chief of Staff. In 1947, Ike appointed Norstad to be director of plans and operations. Norstad energized lagging negotiations for an independent Air Force.

for failure—he sent the B-29s on the night of March 9-10 over Tokyo at low level, the most destructive single bombing of the war.

The massive incendiary attacks against Japan's urban areas marked a turning point in the world conflict and signaled a new phase in the bomber offensive. The raids were devastatingly effective.

Norstad praised LeMay for "solving an acute operational problem by using high-altitude Superfortresses at low level to achieve the unloading of a large tonnage of bombs in a short time." His hand in the episode did not show.

In the summer of 1945, Arnold appointed Norstad to be assistant chief of the air staff for plans. Norstad's task was to make certain that the postwar AAF organization was compatible with an independent Air Force.

Reorganization

The postwar drive in Congress for defense reorganization started before war's end. The War Department and Army Air Forces favored a single national defense establishment, with a new, independent Air Force. The Navy, led by Secretary James V. Forrestal, opposed reorganization.

Arnold and his successor, Gen. Carl A. "Tooley" Spaatz, received strong support for air independence from Gen. Dwight D. Eisenhower, Army Chief of Staff. In late 1945, President Harry S. Truman delivered to Congress a special message on defense that sent a clear signal. He wanted a

single Department of National Defense, headed by a civilian Secretary and to include an independent USAF. The Navy, however, continued to oppose unification.

In the unification battle, Norstad was the AAF's chief planner. He and Vice Adm. Arthur W. Radford, deputy chief of naval operations (air), were named as advisors to a Senate military affairs subcommittee charged with writing the legislation.

Norstad enjoyed Ike's backing, and he worked closely with W. Stuart Symington, assistant secretary of war for air, and Robert P. Patterson, Secretary of War. After negotiations dragged in 1946, Truman increased pressure on the subcommittee and the services to reach agreement. At this point, Forrestal replaced Radford with Vice Adm. Forrest P. Sherman, who supported a balanced fleet and independent air force.

Radford subsequently noted that the work of Norstad and Sherman "removed the impasse between the services."

In 1947, Eisenhower appointed Norstad as director of plans and operations for the War Department, making him only the second airman to hold this position, after Brig. Gen. Frank M. Andrews. This gave Norstad greater leverage in unification talks, where he had the complete confidence of Eisenhower and Patterson. He and Sherman thus were able to work out draft unification legislation.

Despite his high-level support, however, Norstad realized that some in AAF Headquarters remained fearful



Norstad was sent from Europe to the Pacific to stiffen the B-29 offensive. When the mission flagged, he privately lit a fire under Maj. Gen. Curtis LeMay. Above, B-29s fly over China en route to Japan.

that he might give away too much in the negotiations.

"If I sensed dissent," he observed, "I tried to get the argument from the dissenter, but never to let him think for a minute that he was participating in this because then I would have been obliged to compromise. When you are in this kind of battle, you don't compromise."

First, Norstad and Sherman tackled the question of unified commands, since, in principle, the services agreed—based on wartime experience—that this was a necessity. During the war in Europe, unified command had been established—service component commanders, under an overall unified commander, supported by a staff from the components under his command.

In the Pacific, however, creation of unified command proved intractable. Agreement could not be reached between Army Gen. Douglas MacArthur, Southwest Pacific area commander, and Adm. Chester W. Nimitz, commanding Central Pacific area.

"Time Had Come"

Norstad discussed this key issue with Eisenhower in the autumn of 1946, and it became clear that the Joint Chiefs as well as the Army and Navy leaders supported the concept of combined operations under unified command. It was, Norstad emphasized, "an idea whose time had come."

Norstad and Sherman drafted the landmark "Outline Command Plan," the first of its kind. It was approved by

the Joint Chiefs of Staff and signed by President Truman in December 1946. This plan created theater commanders responsible to the Joint Chiefs, with a joint staff and three service commanders under the theater commander.

In this plan, Norstad and Sherman solved the problem in the Pacific by creating two commands—Pacific Command and Far East Command. Seven unified commands were created. Service roles were to train, organize, and equip forces for operations within the theater, under unified command. This system remained basically stable for the next half-century.

Also noteworthy, the Joint Chiefs recognized Strategic Air Command, formed in 1946, as a specified command reporting directly to the JCS, an outgrowth based on organization of Twentieth Air Force during the war.

Still, Norstad and Sherman faced the enormous task of resolving other deep-seated service conflicts and crafting strong legislation to create a new national security organization.

"It was clear," Norstad observed, "that there were differences between us, certainly in degree. But it was characteristic of our relationship, due more to him than to me perhaps, that we never wasted time rearguing established differences between the services."

Working with the Senate Military Affairs Committee, the airman and naval officer were able to outline service functions and draft a national security setup. Norstad had the support of Patterson, Eisenhower, Symington, and Spaatz, who in early 1946 became AAF commander.

In January 1947, Patterson and Forrestal informed Truman that, based on the work by Norstad and Sherman, the Senate Military Affairs Committee had approved a draft organization calling for a Secretary of National Defense and Departments of the Army, Navy, and Air Force.

In February, Truman sent Congress a draft of the National Security Act of 1947, including the formation of the Air Force. The Senate and House approved the bill and, on July 26, 1947,



Gen. Henry "Hap" Arnold (left) recognized Norstad's planning capability and toughness, sending him to break bottlenecks in operations in Europe and the Pacific. Above, Arnold meets with President Roosevelt in Sicily.



President Kennedy awards Norstad the Distinguished Service Medal for his service as Supreme Allied Commander Europe. It was Norstad's third DSM and marked his retirement from the Air Force.

Truman signed the Executive Order 9877, detailing the functions of the military services.

The National Security Act of 1947 was a compromise. The Army and its airmen succeeded in having the Air Force established and roles and missions promulgated by executive order rather than written into the act as desired by the Navy. The Navy kept its air element, and Forrestal won his point on structuring the Office of the Secretary of National Defense as a coordinator rather than as a true administrator.

Criticism

Norstad's role in establishing an independent United States Air Force and National Military Establishment failed to meet with everyone's approval. There were those in the Air Force who criticized him for giving in to the Navy on land-based air, for—as Norstad put it—“not diminishing the naval air service.”

Norstad's view was that naval aviation had “some very special missions which are quite separate and distinct, and the Marine Corps has some.”

Even Arnold had reservations, but he quickly realized that Norstad had done an effective job. Symington noted that passage of the act was merely a start and that the new organization would be evolutionary in character. “Norstad should get the most credit for unification,” Symington emphasized. “In the days when it looked grim, he stuck to it.”

With creation of USAF in September

1947, Norstad was promoted to lieutenant general and named deputy chief of staff for operations, Headquarters USAF.

He later went to Europe, first as commander in chief of US Air Forces in Europe. There, he once again found himself working with Eisenhower, who was the Supreme Allied Commander Europe. Eisenhower gave Norstad the task of coordinating the mission of Strategic Air Command with SACEUR's plans.

Norstad made four stars in mid-1952 and was appointed air deputy to the SACEUR in 1953. Three years later, he was named SACEUR.

In this key role, Norstad gained the respect of European leaders such as West Germany's Konrad Adenauer and France's Charles de Gaulle. When de Gaulle returned to power in 1958, he pressured Norstad to give the French nuclear weapons. The US had built bases and atomic storage facilities in France. De Gaulle, however, refused to give Norstad permission to store the weapons on French soil unless the NATO commander turned the weapons over to Paris.

Norstad made very clear to de Gaulle that this was impossible. As Norstad recalled, his response was: “Over my dead body!” He then moved his atomic-

trained fighter-bomber units to Britain and West Germany.

From that point on, he and de Gaulle got along famously. Norstad noted: “I needed his respect, and I knew that he respected power. He used it and he respected it. I was going to show him that I damn well had it. From then on, I was an authority, I was a power.”

Like Eisenhower, Norstad believed in unity of command, with an integrated allied headquarters and command structure.

Nuclear Dimension

Also like Ike, he believed in the efficacy of nuclear weapons as the absolute deterrent. He did not support a strategy of graduated deterrence or flexible response. Therein lay his difficulties in the early 1960s with officials of the Kennedy Administration.

Norstad was convinced that, should the Soviet Union mount an attack in Europe, nuclear weapons employment would be inevitable. Graduated deterrence was not a strategy that would work against the Soviets, he concluded.

This was also Eisenhower's view, but, when Ike left office in 1961, Norstad lost the support of the White House. Also, the Berlin crisis of 1961 convinced the Kennedy Administration that nuclear superiority had its limits as a political-military strategy. Kennedy and Robert S. McNamara, the Pentagon chief, wanted more emphasis on conventional forces.

The fact is, Kennedy and McNamara were never comfortable with Norstad, a SACEUR who had commanded in the field for years. McNamara, especially, wanted his own man in the SACEUR post. Norstad however, refused to retire within two months, as McNamara desired. With important talks ongoing with European allies, Norstad insisted on staying longer, and Kennedy agreed.

As it turned out, with the onset of the Cuban missile crisis, Norstad was asked by McNamara to stay on, and he did not retire until 1963.

Norstad, with his enormous willpower, was that rare combination of exceptional planner/operator and skilled negotiator, who as NATO commander had the ability and toughness to engage and confront European leaders. ■

*Herman S. Wolk is senior historian at the Air Force Historical Research Agency's Washington, D.C., operating location. He is the author of *The Struggle for Air Force Independence, 1943-1947* (1997) and *Fulcrum of Power* (2003). His most recent article for *Air Force Magazine*, “*Knerr the Crusader*,” appeared in the December 2004 issue.*



2005-06 AFA Nominees



Condon



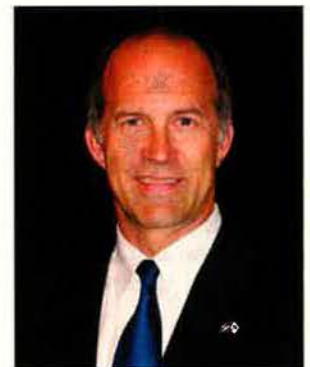
Largent



Kemp



Cummock



Lundgren

The Air Force Association Nominating Committee, which consists of the five most recent past National Presidents (not serving as Chairman of the Board) and one representative from each of the 14 US regions, met in Dallas on April 22 and selected a slate of candidates for the four national officer positions and six elective positions on the Board of Directors. This slate will be presented to the delegates at the National Convention in Washington, D.C., in September.

Stephen P. "Pat" Condon of Ogden, Utah, was nominated for his second one-year term as Chairman of the Board. He formerly served as National President, an AFA National Director, Northern Utah Chapter President,

Chairman of AFA Focus on Defense Symposium, Chairman of the Constitution Committee, and member of both the AFA Executive and Resolutions Committees. Among his many awards, Condon has received the AFA Medal of Merit, the Utah State AFA Presidential Citation, and Program of the Year Award.

Condon joined the Air Force in August 1964 at Wright-Patterson Air Force Base in Ohio. A veteran of 33 years, Condon spent the majority of his career in Air Force science and technology, research and development, acquisition, test, and logistics support. He commanded the Air Force Armament Laboratory, Arnold Engineering Development Center, and Ogden Air Logistics Center and served at the

NASA Manned Spacecraft Center. Additionally, he was the Deputy Assistant Secretary, Management Policy and Program Integration, in the Office of the Assistant Secretary of the Air Force for Acquisition. Condon retired as a major general in 1997. A well-decorated officer, Condon has received many awards, including the Distinguished Service Medal, the Legion of Merit, and the Meritorious Service Medal.

Currently, Condon is an aerospace consultant and senior associate at Dayton Aerospace, Inc., Dayton, Ohio. He is a graduate of the University of Oklahoma with a bachelor of science degree in mechanical engineering; the Air Force Institute of Technology with a master of science degree in aerospace-mechanical engineering;

and the University of Texas at Austin with a doctorate degree in aerospace engineering.

He and his wife, Judy, have two children.

Robert E. "Bob" Largent of Perry, Ga., was nominated for his second one-year term as National President. He is a Life Member and has been active in AFA since 1974. He has served as the Carl Vinson Memorial Chapter Vice President and Vice President, Leadership Development; Georgia State President and Vice President, Awards and Leadership Development; and as Southeast Region President. He has been a member of the AFA Membership Committee, the Long-Range Planning Committee, and the AFA Organizational Review Group. In addition to chapter and state awards, he has received the national Medal of Merit, Exceptional Service Award, and Presidential Citation.

Largent was commissioned through ROTC in 1968 and served for more than 24 years in various strategic missile operations assignments, including Minuteman Combat Crew, Squadron Operations Officer, Chief of Wing Training, Chief of Wing Plans, Squadron Commander, and Assistant Deputy Commander for Wing and Group Operations. He has also served in a variety of staff assignments, including Special Assistant to the Air Force Chief of Staff, in the Office of the Joint Staff Director, Joint Chiefs of Staff; Military Assistant to the Commander in Chief, Pacific; and Chief, Strategy Division, Headquarters US Pacific Command. Largent retired in 1992 as a colonel and has received, among other awards, the Legion of Merit, Defense Meritorious Service Medal, and the Air Force Meritorious Service Medal.

He currently is the owner and principal of an organizational and leadership development consulting firm with a practice that includes an array of national and international clients. Largent is involved in a variety of local civic and community activities, as well as those of AFA, including Rotary, Chamber of Commerce, serving as the Chair of the Business Development Committee, and Houston County Planning and Zoning Commission.

Largent graduated from the University of Arkansas with a degree in business administration and has a master's degree in public administration from the University of Oklahoma. He is also a resident graduate of the

Air War College.

He and his wife, Becky, have three children and five grandchildren.

Thomas J. Kemp of Fort Worth, Tex., was nominated for his third one-year term as AFA National Secretary. He joined AFA in December 1964 and became a Life Member in 1982. He served as an AFA National Director and has been a member of AFA's Audit, Executive, Finance, Membership, and Resolutions Committees. Kemp has also served as Texoma Region President, Texas State President and Vice President, and Fort Worth Chapter President. He has received personal recognition as AFA's National Member of the Year in 2002 and as Texas State Member of the Year. He received AFA's Presidential Citation in 2000, Exceptional Service Awards in 1990, 1991, and 1994, and a Medal of Merit in 1987. He has also received the Oklahoma State Medal of Merit.

Kemp was commissioned in the Air Force in December 1964 and was trained as both a navigator and a pilot. His 20-year career included service in the C-130, C-141, OV-10, and B-52. He held increasingly responsible staff positions in plans, operations, and training. Following retirement, he has worked in instructional systems and course-work design and most recently as Manager, Integrated Logistics Support, for Siemens ElectroCom, in development of bar code sorters for the US Postal Service. He graduated from Loras College in Iowa with a bachelor of arts degree in business (accounting) and from St. Mary's University in San Antonio, with a master's degree in systems management.

He and his wife, Ruth, have four children.

The Nominating Committee is submitting two names—David R. Cummock and Steven R. Lundgren—for consideration for a one-year term as National Treasurer:

David R. Cummock of Port Orange, Fla., is a Life Member of AFA. He has served AFA in appointed and elected positions at all levels. He held positions as Chapter and State President in Massachusetts; as Chapter, State President, and Region President in Florida; as a National Director; and as an Aerospace Education Foundation Trustee. He is the current AEF Secretary/Treasurer. He has served as a member and chairman of the AFA Veterans/Retirees Council and the Long-Range Planning Committee. He currently serves on the AFA

Finance Committee and on the AFA21 Task Force. In addition to AFA awards from both Massachusetts and Florida, he has received three National Medals of Merit, an Exceptional Service Award, and two National Presidential Citations.

Cummock entered the Air Force in 1957 as an aviation cadet pilot trainee and received his wings and commission in 1958. He received a regular commission in 1959 and continued to serve 10-and-a-half years on active duty and 19 years in the Massachusetts Air National Guard. Cummock served as 131st Tactical Fighter Squadron Commander for two years and 104th Tactical Fighter Group Commander for five-and-a-half years. In 1979, he was the first ANG pilot combat ready in the A-10. Cummock was one of the youngest B-47 and B-58 aircraft commanders. One of the many unit accomplishments during his tenure as commander included winning the Winston P. Wilson Trophy as the best fighter unit in the ANG. He retired as a colonel.

Cummock graduated from East High School, Salt Lake City, in 1955. He completed a College GED in 1958 and additional course work at the University of Utah, Boise Junior College, and the University of Arkansas. He is a graduate of the Squadron Officers School and the Counter Insurgency Indoctrination Course (with distinction) in 1966. He is a 1975 graduate of Air Command and Staff and a 1981 graduate of National Defense University.

Cummock's wife, Marguerite, is a retired business executive who is also a Life Member of AFA, an active volunteer, and current President of the Brig. Gen. James R. McCarthy Chapter and AFA Florida Assistant Treasurer. They have two daughters, Tracy and Dawn, who are both AFA members.

Steven R. Lundgren of Fairbanks, Alaska, is a 20-year AFA member, having begun as a Community Partner. He has served AFA in many leadership positions, including Chapter, State, and Region President. He currently serves on the AFA Finance Committee. Lundgren is the AFA Alaska Leadership Development Director and the Fairbanks Chapter Community Partner Vice President. He has received an Exceptional Service Award and the Presidential Citation.

Lundgren is a member of the Alaskan Command Civilian Advisory Board; a member and Vice Chair of the Alaska



Lesniok



Bienvenue



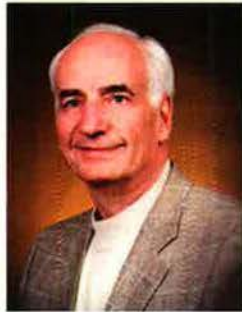
Nunamann



Hansen



Bolton



Thomas



Lauducci



Morley

State Committee for Employer Support of the Guard and Reserve (ESGR); and a member of the Board of the Greater Fairbanks Chamber of Commerce and its Military Affairs Committee. He is active as a leader in other civic organizations, having served as a Director of the Interior Alaska Builders Association and the United Way of the Tannana Valley, as well as the President of the Fairbanks Rotary Club and Interior Alaska Credit Union League. He has received numerous awards, including the 2004 ESGR Spirit of Volunteerism Award.

Lundgren's 25-year professional career has been in the financial services industry. He is currently Senior Vice President and member of the senior management committee for Mt. McKinley Bank, the largest community bank in the Fairbanks area. His primary day-to-day job as a commercial lender requires budget analysis, financial statement analysis, trend analysis, risk analysis, and general oversight of a \$60-plus million securities portfolio and a \$60-plus million commercial loan portfolio.

Lundgren graduated from Oregon State University with a bachelor's degree in business administration and has completed graduate studies at Portland State University and the University of Alaska. He attended the American Bankers Association National Commercial Lending School in 1991 and

the ABA National Commercial Lending Graduate School in 1992 at the University of Oklahoma.

He and his wife, Susan, have three children.

The AFA Constitution directs that one-third of the 18 elected Directors be elected at the National Convention each year. For the 2005 election, the Great Lakes, Northeast, Northwest, Southeast, and Southwest Regions have Director positions open, and there are two Director positions open to be elected at large.

The nominees for Director to be chosen by their regions are:

Great Lakes: **J. Ray Lesniok**, Ohio. Former Ohio State President, State Vice President, State VP for Leadership Development, State VP for Aerospace Education, Chapter President, Chapter Secretary, and Chapter VP for Communications. Current Chapter Treasurer and Great Lakes Region President.

Northeast: **Robert Bienvenue**, New York. Former Vice President of the Western Region, New York State Secretary, State VP for Membership, Chapter President, Chapter Vice President, and Chapter Secretary. Current New York State Treasurer.

Robert Nunamann, New Jersey. Former New Jersey State President, State Vice President, VP for Communications, VP for Leadership Development, and VP for Membership. Current New Jersey Chairman of the Board.

Northwest: **O. Thomas Hansen**, Washington. Former Washington State President, State VP for Aerospace Education, State VP for Leadership Development, Chapter President, Chapter Vice President, Chapter VP for Aerospace Education. Current Northwest Region President.

Southeast: **Michael J. Bolton**, Georgia. Former Georgia State President, State Vice President, State VP for Veterans Affairs, Chapter President, and Chapter VP for Veterans Affairs. Current State VP for Leadership Development.

Southwest: **Charles Thomas**, New Mexico. Former National Director, Southwest Region President, New Mexico State President, State Vice President, Chapter President, and Chapter Vice President. Current State VP for Leadership Development.

The Nominating Committee is submitting two names for consideration for the office of National Director at Large:

James R. Lauducci, Virginia. Former member of the AFA Membership and Nominating Committees, Virginia State Vice President for Membership, and Chapter President. Current Virginia State President and member of the AFA21 Task Force.

Lynn Morley, Georgia. Former Chapter Vice President and VP for Awards. Current Carl Vinson Memorial Chapter President. ■



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By Frances McKenney, Assistant Managing Editor

Volunteers in the Volunteer State

Air Force Association Chairman of the Board Stephen P. "Pat" Condon attended the Tennessee State Convention, hosted by the **Everett R. Cook Chapter** at Memphis in May.

James A. Van Eynde, chapter vice president, reported that Condon's speech was entitled "Where Do We Find These Men?" and recounted the stories of military personnel who have performed exemplary service.

Condon spoke at the convention's awards banquet, where James C. Kasperbauer, Tennessee state president; Winston J. Daws, Cook Chapter president; and Glenn L. Fuller, chapter treasurer, also took part in the program. Among the award recipients that evening was Maj. John A. Trautman, commander of the 164th Security Squadron (ANG), Memphis, who was named Air National Guardsman of the Year. Everett Chapter member George M. Livers received the state's Volunteer of the Year award.

Livers was elected state president during the convention's business session, which took place the next day at

the 164th Airlift Wing (ANG), Memphis Airport.

The convention concluded with a tour of a C-5 transport named *Memphis Belle X*. ANG TSgt. James Atkins, a crew chief, conducted the orientation. The original *Memphis Belle*, a World War II B-17, was one of the first Army Air Forces bombers to complete 25 missions. It returned to the US for a war bond tour and has been in Memphis since 1946.

Takeoff Meeting

In April, the **Flying Yankees-Gen. George C. Kenney Chapter** held its first meeting since the two Connecticut chapters merged.

The chapter hosted what its secretary, William H. Forthofer, called a "Takeoff Meeting" at the Pratt and Whitney hangar in East Hartford, Conn.

Retired Maj. Gen. George N. Williams was guest speaker. Williams retired in November 2003 as commander of 21st Air Force, McGuire AFB, N.J. He spoke about his experiences directing mobility forces for Operation Iraqi Freedom.

Lloyd W. "Fig" Newton, a retired USAF four-star and a chapter member, served as host for the meeting and encouraged the audience of more than 200 guests to become more involved in the chapter as a way to support national defense and the Air Force.

The Takeoff Meeting included presentation of the chapter awards, as well as honors for eight new Community Partners. Eric P. Taylor, New England Region president, presented the awards.

AFA National Director Emeritus Joseph R. Falcone received a special award from Chapter President Craig Hancock, in recognition of nearly 60 years of dedication to AFA. Falcone qualified as an aerial gunner, flight engineer, and radio operator during World War II. In October 1946, he was sitting in the nose wheel of a B-25 at Clark Field, Philippines, when a sergeant came by and asked him to join AFA. Falcone signed up as a charter member of the association, which had incorporated in Washington, D.C., only eight months before.

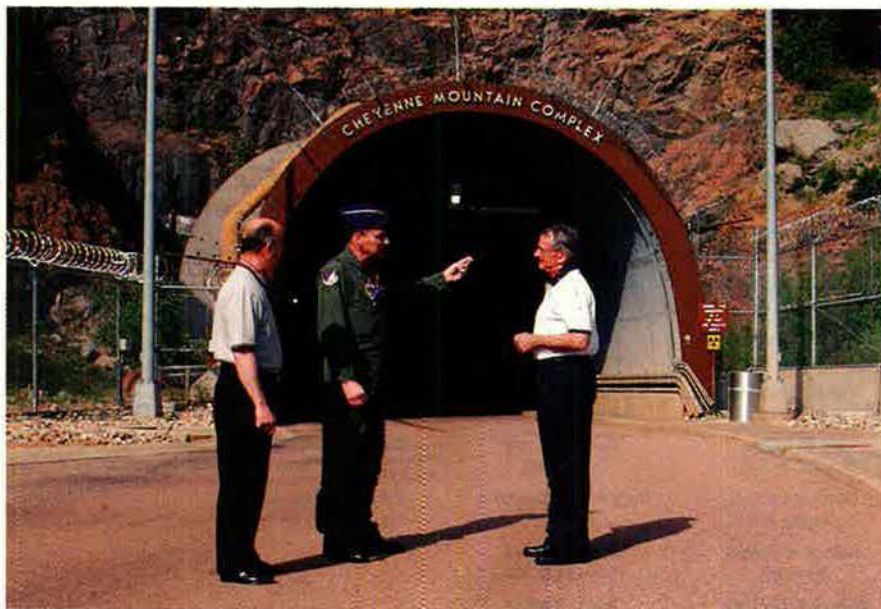
Successful Membership Drive

The **Carl Vinson Memorial Chapter (Ga.)** signed up 187 new members almost as easily as Falcone was "recruited" for AFA 58 years ago.

The chapter recently completed its membership drive, led by Capt. John S. Nolan Jr. and 1st Lt. Brian R. Baggett. The two volunteers organized a team of 59 and gave them a goal of rounding up 130 new members. The "recruiters" surpassed this number by going to staff meetings, commanders' calls, and other organizational gatherings, as well as buttonholing potential AFAers for one-on-one talks about the association's mission and benefits.

The chapter singled out four team members as significant to this membership drive's success. SMSgt. Fannie Worthy of the 78th Logistics Readiness Squadron at Robins AFB, Ga., personally recruited 32 new AFA members. SMSgt. Clarence R. Bocook Jr. of the 78th Mission Support Squadron signed up 18 new members. Second Lieutenant Jeremy W. Sheppard and MSgt. Carlos Dorego, both from the 78th Security Forces Squadron, each persuaded a dozen people to join AFA.

USAF photo by Maj. David Patterson



Brig. Gen. Duane Deal welcomes AFA Board Chairman **Pat Condon** (right) to the **Cheyenne Mountain Operations Center, Colo.**, for an orientation on its missions. At left is **Charles Zimkas Jr.**, **Rocky Mountain Region** president.

CENTCOM's Challenges

Lt. Gen. Lance L. Smith went back to his alma mater in May, as guest speaker for the **Roanoke Chapter's** awards banquet, held at Virginia Polytechnic Institute and State University in Blacksburg, Va.

Smith graduated from Virginia Tech in 1969. He has been deputy commander of US Central Command at MacDill AFB, Fla., since October 2003.

At the AFA banquet, Smith gave a presentation on the challenges within CENTCOM's area of responsibility, stretching from the Horn of Africa to Central Asia and encompassing Iraq and Afghanistan.

Smith had "an upbeat, optimistic message about the great job US troops are doing," commented Chapter President Scott P. Van Cleef. But Smith also described the ethnic and religious tensions of the region, its struggling economies, and long history of conflicts.

The awards banquet honored A. Robert Keck and Sandra A. Sampson as Chapter Teachers of the Year. The two are eighth-grade teachers at the Gereau Center for Applied Technology and Career Exploration in Rocky Mount, Va. (They were later named State Teachers of the Year.) The chapter's Member of the Year award went to Paul Willard. SSgt. Thomas Phillips, of the 317th Recruiting Squadron, received the chapter's Air Force Recruiter of the Year award.

More AFA/AEF News

■ This month, 50 students selected by the Aerospace Education Foundation as winners of its essay contest went to camp—US Space Camp in Huntsville, Ala. More than 850 students had entered the AEF essay competition, writing about a planet they wanted to visit. Space Camp is run by the US Space and Rocket Center. It teaches children about aviation, space, or robotics and gives them a sample of astronaut, pilot, or mission specialist training. AEF's essay contest winners received round-trip airfare, tuition, and room and board for a Space Camp session designated as AEF Week. (See p. 65.)

■ Six of the AEF Space Camp essay winners came from Millennium Middle School in Sanford, Fla., and **Central Florida Chapter's** John Timothy Brock and Richard A. Ortega went to the school to present the students with awards. Brock, the chapter president, and Ortega, aerospace education VP, took part in Millennium's space-oriented activities on May 5, celebrated as Space Day around the nation. Brock spoke to a student assembly about the importance of studying math and science and the need for scientists and engineers.

■ "A great night of merry-making"—That's how the **Sal Capriglione Chapter** described its awards dinner and dance in April at Roselle Park, N.J. More than 100 guests attended the event, where John Fabbriatore received the chapter's highest achievement award in recognition for 25 years of service. He is presently the chapter's membership vice president. Chapter President Joseph Capriglione presented the award, with State Chairman of the Board Robert Nunamann of the **Highpoint Chapter (N.J.)**. Other awardees that evening were chapter members Paul Metro, Frank M. Martins, Ralph A. DeVino, and Alan M. Duva, who received Certificates of Appreciation.

■ The **Swamp Fox Chapter** hosted the South Carolina State Convention in April at Shaw AFB, S.C. More than 160 guests attended the awards banquet. The keynote speaker was Lt. Gen. Donald J. Wetekam, USAF deputy chief of staff for installations and logistics. The two-day convention kicked off with a golf tournament and a barbeque where state-level AFA awards were presented. Other convention events included briefings conducted by representatives from Shaw, Charleston Air Force Base, and McEntire Air National Guard Base.

■ Since AFAers from Minnesota, North Dakota, South Dakota, and Wisconsin were in town anyway for the North

Central Region Workshop, the host **Richard I. Bong Chapter** invited them to its quarterly meeting, held the day before. The chapter meeting took place at the University of Minnesota, Duluth. The 148th Fighter Wing (ANG) hosted the North Central Region Workshop, the next day, attended by two dozen AFA delegates. Region President Coleman Rader and Bong Chapter President Edwin C. Culbert led the workshop. It included an information session on AEF's scholarships, grants, and fellowships; its awards and recognition programs; and Visions of Exploration, the AEF-USA Today program that encourages schoolchildren to study math, science, and technology.

■ A grant from the **Danville Chapter (Va.)** and AEF helped physics students from Tunstall High School in Dry Fork, Va., put together "Fizzicks Road Show 2005" and take the program to four area elementary schools. Nearly 60 fifth-grade students at each school watched—and participated—in the hands-on program that demonstrated science concepts. Gerald Hovatter, chapter president, noted that the 22 Tunstall physics students presented the entire road show themselves.

■ Michigan's **PE-TO-SE-GA Chapter**—whose leadership nicknamed it "The Chapter That Won't Die" because it nearly did—sought out the Coast

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Guard in May. Not for resuscitation but for its annual visit to USCG Air Station Traverse City. Coast Guard Cmdr. Paul S. Ratte gave the AFAers a briefing on the service's missions and the station's HH-65 Dolphin helicopters. Air Station Traverse City handles homeland security tasks, as well as winter and springtime ice patrols, law enforcement, and environmental missions such as oil spill prevention.

■ The **Harry S. Truman Chapter (Mo.)** held a reception for its Teacher of the Year, Susan Rippe, in June. Rippe is the aerospace and engineering coordinator for Olathe Northwest High School. Chapter President James Snyder said Rippe helps her students secure internships and college scholarships. Midwest Region President Judy K. Church joined Snyder in congratulating Rippe and presenting her with an AEF Certificate of Achievement and \$250.

■ In April, Maj. Joseph Baniak, VP for the **Gen. Charles L. Donnelly Jr. Chapter (Tex.)**, presented an AFA Citation to AFJROTC cadet Jeremy Goreczny of Burkburnett High School. The award recognized Goreczny's leadership abilities. "Jeremy embodies our current generation that is proud to serve and wear the uniform," Baniak told the students at the ceremony.

■ In a similar ceremony in May, Richard A. Ortega, aerospace education VP from the **Central Florida Chapter**, presented an AFA Bronze Medal to a local Civil Air Patrol unit's Cadet of the Year, Timothy Spielman.

■ A marine veteran of two deployments to Iraq took time out from preparing for his third to speak to the May meeting of the **Pasadena Area Chapter (Calif.)**. CWO5 Thomas G. Tomka served in Vietnam during the Tet Offensive. He first went to Iraq as a Marine reservist in Desert Storm. In Iraqi Freedom in 2003, his unit fought its way into Baghdad with the 1st Marines. Now executive officer for a Marine MP unit, Tomka spoke to the AFA chapter about his wartime experiences and the civil affairs actions of US troops in Iraq. ■

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. E-mail: afa-aef@afa.org. Digital images submitted for consideration should have a minimum pixel count of 900 by 1,500 pixels.

AFA In Action

The Air Force Association works closely with lawmakers on Capitol Hill, bringing to their attention issues of importance to the Air Force and its people.

AFA Spotlights Battlefield Airmen

As part of its 11-briefing series designed to educate lawmakers and their staffs on Air Force operations and issues, AFA recently sponsored a session about battlefield airmen. While many people think about Air Force combat operations as taking place high over the battlefield, SMSgts. Donald **Cantwell** and Jonathan G. **Rosa** briefed staffers about a unique mission some airmen perform on the ground. (See "The Air Commandos," March, p. 32, and "Battlefield Airmen," April 2004, p. 26.)

Cantwell and Rosa, who are experienced combat controllers, told attendees about the increasing requirements the Air Force has for battlefield airmen, detailing some of their own experiences from humanitarian and combat operations.

Cantwell, who has served as a combat controller since 1982, participated in numerous humanitarian missions as well as combat operations, including helping rescue the F-117 stealth fighter pilot who was shot down over hostile territory during Operation Allied Force in Kosovo. He is currently USAF's combat control career field manager.

Rosa, who was a USAF Outstanding Airman in 2004 and now is president of the Kentucky state AFA, began his Air Force service as an air traffic controller in 1981, cross-training in 1994 to become a combat controller with the Air National Guard. He has served in Operations Enduring Freedom and Iraqi Freedom. (See "The Outstanding Airmen," November 2004, p. 87.)

One goal of the AFA briefing series is to provide lawmakers and their staff with opportunities to meet Air Force personnel who conduct day-to-day operations in the field.

AFA Co-sponsors Congressional Flag Day Concert

For a sixth year, AFA helped sponsor the VA-National Medical Musical Group's Congressional Flag Day Concert. The 2005 concert was June 28 and will be broadcast later this summer on the Armed Forces Radio and Television Network, the ABC Family Network, and on educational television affiliates nationwide.

This year, tapes of the program also are being sent to those serving on the front lines in Iraq and Afghanistan.

The concert featured patriotic music and readings and included an emotional plea to Congress by Artie Muller, president of Rolling Thunder, to fully fund veterans health care programs.

The VA-National Medical Musical Group includes more than 100 physicians, surgeons, and medical professionals from Department of Veterans Affairs medical facilities nationwide and has performed at the White House, the United Nations, and other venues.

Sen. Larry **Craig** (R-Idaho), chairman of the Senate Veterans' Affairs Committee, opened the Flag Day Concert. Narrators for patriotic readings were Reps. Jo Ann **Emerson** (R-Mo.), Bob **Filner** (D-Calif.), Bob **Goodlatte** (R-Va.), Gil **Gutknecht** (R-Minn.), Tom **Lantos** (D-Calif.), Steve **Pearce** (R-N.M.), Bobby **Scott** (D-Va.), Tom **Tancredo** (R-Colo.), and Stephanie **Tubbs-Jones** (D-Ohio).

AFA Conventions

Aug. 9	Michigan State Convention , Mount Pleasant, Mich.
Aug. 12-13	Midwest Region Convention , Omaha, Neb.
Aug. 13	North Carolina State Convention , Raleigh, N.C.
Aug. 19-20	Colorado State Convention , Colorado Springs, Colo.
Aug. 20	Georgia State Convention , Warner Robins, Ga.
Sept. 11-14	Air and Space Conference , Washington, D.C.
Sept. 18	New Hampshire State Convention , Manchester, N.H.

1st Tactical Depot Sq, including 1st TSS and 9th AFDS. Oct. 5-9 in Montreal. **Contact:** John Rossner, IIIHS Townhouse Center, 1924 Maisonnueve West, Montreal, PQ, Canada H3H 1K5 (514-935-3287) (jrossner@iiihs.org).

27th Air Transport Gp, including 310th, 311th, 312th, and 325th Ferrying Sqs; 86th, 87th, 320th, and 321st Transport Sqs; and 519th and 520th Service Sqs. Sept. 29-Oct. 2. **Contact:** Fred Garcia, 6533 W. Altadena Ave., Glendale, AZ 85304 (623-878-7007).

31st Fighter Officer Assn. Oct. 6-9 at the Woodward Hotel and Conference Center in Austin, TX. **Contact:** Rocky Eubank (512-282-1077) (rockyeub@aol.com).

40th BG Assn, Twentieth AF. Sept. 15-19 at the Hilton Garden Inn in Fairfax, VA. **Contact:** Jean Suitt, 10336 Brangus Dr., Crowley, TX 76036 (800-959-2582) (jsuitt@crescent.com).

49th FS Assn. Oct. 13-16 at Moody AFB, GA. **Contacts:** Maj. C.J. Will, 8223 Knights Way, Moody AFB, GA 31699 (229-257-7771) (christopher.will@moody.af.mil) or Lee Briner (mtdutchman@comcast.net).

52nd FG, including the 2nd, 4th, and 5th Sqs. Sept. 14-18 at the Quality Courthouse Plaza in Arlington, VA. **Contact:** Milton Kramer, 734 Almont Rd., Far Rockaway, NY 11691 (phone: 718-471-3122 or fax: 718-868-2527) (nltkrm@aol.com).

64th Troop Carrier Gp. October in Fort Worth, TX. **Contact:** James Kent, 1816 Dakar Rd. E., Fort Worth, TX 76116-2037 (817-732-0890).

306th BW (McCoy AFB, FL). Oct. 18-24 in Melbourne Beach, FL. **Contact:** Joe Demes (321-452-4417) (www.306thbw.org).

308th SMW. Oct. 6-9 in Jacksonville, AR. **Contact:** William Leslie, 7097 Bellefontaine Rd., Huber Heights, OH 45424 (937-255-2783) (william.leslie2@wpafb.af.mil).

315th BW Assn, Northwest Field, Guam. Oct. 12-16 in Orlando, FL. **Contact:** Bev Green (217-893-3197).

339th FG Assn. Oct. 13-17 in Tampa, FL. **Contact:** Stephen Ananian, 4 North Orchard Farms Ave., Simpsonville, SC 29681-4866 (864-430-4273) (stephen.ananian@mindspring.com).

352nd FG/1st Service Gp, Eighth AF. Sept. 22-26 at the Marriott Hotel in Wichita, KS. **Contact:** Bob Powell, 1545 Rainier Falls Dr., Atlanta, GA 30329 (phone: 404-636-3747 or fax: 404-636-1229) (bluenoserbob2@juno.com).

362nd FG, Ninth AF (WWII). Oct. 27-30 in Tampa, FL. **Contacts:** Kathy Saunders, 1298 Lake Deeson Pt., Lakeland, FL 33805 (863-686-6879) or Fern Mann, 135 Riverwalk Pl., Memphis, TN 38103 (901-578-5333) (cmann1525@aol.com).

368th FG, Ninth AF (WWII). Oct. 7-10 at the Marriott Crystal Gateway Hotel in Arlington, VA. **Contact:** Randolph Goulding, 3412 Paces Ferry Cir., Smyrna, GA 30080 (phone: 678-333-0241 or fax: 770-455-7391).

474th FG (WWII). Sept. 14-18 at the Little America Hotel in Salt Lake City. **Contact:** Lloyd Wenzel (561-747-2380) (p38lloyd@bellsouth.net).

483rd BG Assn. Oct. 10-15 in Galveston, TX. **Contact:** Claude Jackson, 1758 Pasadena Blvd., Pasadena, TX 77502-2420 (713-472-1572) (claude483@sbcglobal.net).

526th FS, including Meridian, MS, and Landstuhl

and Ramstein ABs, Germany. Oct. 2-6 in Branson, MO. **Contact:** Wayne Rebischke, 5780 Canterbury Ave. N.E., Buffalo, MN 55313 (763-682-2685) (wkreb@att.net).

906th ARS. Oct. 20-23 in Indianapolis. **Contact:** Eual Austin, 8753 Ski Ct., Elk Grove, CA 95624-1822.

966th/79th AEW&C Sqs and EC-121/WV-2 personnel. Oct. 21-23 in Kissimmee, FL. **Contacts:** Phil Szymkowicz (503-645-3917) (philszy@europa.com) or Jim Skelton (903-723-5008) (trustme5@juno.com).

B-57 Canberra Assn. Sept. 9-12 at the Adams Mark Hotel in Dallas. **Contact:** Bert Littlejohn (972-359-6099) (wblittlejohn@comcast.net).

Burtonwood, UK. Oct. 11-15 in Shreveport, LA. **Contact:** Richard Iwanowski, 4515 W. 55th St., Chicago, IL 60632 (773-767-1810) (ikeiwan@aol.com).

Pilot Class 49-A. Nov. 10-14 in Fort Walton Beach, FL. **Contact:** Tom Whitlock, 209 Natures Trail, Fort Walton Beach, FL 32548 (850-864-2088) (bonnell@cox.net)(http://49apilotsassn.nwfl.net).

Pilot Class 57-R and Navigator Class 57-10. Oct. 12-16 in San Antonio at the Menger Hotel. **Contacts:** Mike Daciek (303-470-0341) (mikedaciek@earthlink.net) or Bob Cinalli (732-244-1348) (bjcinalli@earthlink.net) (www.pilotclass57r.com/reunion.asp).

Pilot Training Class 55-P. Sept. 14-18 at the Hilton Garden Inn in Colorado Springs, CO. **Contact:** Tracy Scanlan (719-488-8835) (tracyscanlan@adelphia.net).

Raven FACs, Laos. Oct. 20-23 at Randolph AFB, TX. **Contact:** Ed Gunter, 132 Trelawney, McQueeney, TX 78123 (830-560-2522) (edgunter@aol.com).

REDHORSE, all units. Oct. 16-19 in Fort Walton Beach, FL. **Contact:** Tom Gallagher (tgallag1@tampabay.rr.com) (www.redhorseassociation.org).

Troop carrier veterans (WWII to Vietnam). Nov. 9-13 in Galveston, TX. **Contact:** Sam McGowan, 3727 Hill Family Ln., Missouri City, TX 77459 (semcgowanjr@aol.com).

Vietnam Security Police Assn, including augmentees. Oct. 6-9 in Valdosta, GA. **Contact:** Don Graham, 2911 Westminster Rd., Bethlehem, PA 18017 (610-691-6960) (tuyhoa68@att.net).

Seeking members or instructors of **Class 66-H**, Vance AFB, OK, for a reunion in 2006. **Contact:** Skip Foster, 8500 Carmel Ridge Ct., Las Vegas, NV 89113 (702-257-7455) (flyerskip@cs.com).

Seeking members of **Pilot Class 57-E** for a reunion. **Contact:** Dewey Fitch, 1127 Pembroke Dr., Peoria, IL 61614 (309-693-8378) (deweyair@aol.com).

Mail unit reunion notices four months ahead 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. We reserve the right to condense notices.

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Pieces of History

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Headgear With History



Air Force and Army/Air Forces airmen have worn a wide range of headgear over the years, depending on the era and their missions. A variety of Air Force-related hats and caps are on display at the National Museum of the United States Air Force at Wright-Patterson AFB, Ohio. Top row (l-r) are hats that once belonged to: **Gen. Henry H. "Hap" Arnold**, commanding general of the AAF in World War II, service

cap; **Lt. Col. Robert S. Johnson**, World War II ace with 27 kills over Europe, service cap; **Charlene Creger**, Women's Airforce Service Pilot VIASP beret from World War II; and **Brig. Gen. Kenneth N. Walker**, Medal of Honor recipient, sun helmet from World War II. Bottom row (l-r) are hats that belonged to: **Lt. Col. Joseph H. Turner**, whose Korean War-era baseball cap has insignia representing 101

F-84 bombing missions; **Lt. Col. Laura Jean Smith**, one of the firsts to wear the women's dress blues, hat from 1951; **Col. Michael N.W. McCoy**, killed in a 1957 B-47 crash while commander of the 321st Bomber Wing, service cap; and **Lt. Gen. William E. Kepner**, commander of Alaskan Air Command 1950-53, winter field cap.



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