June 2005/$4

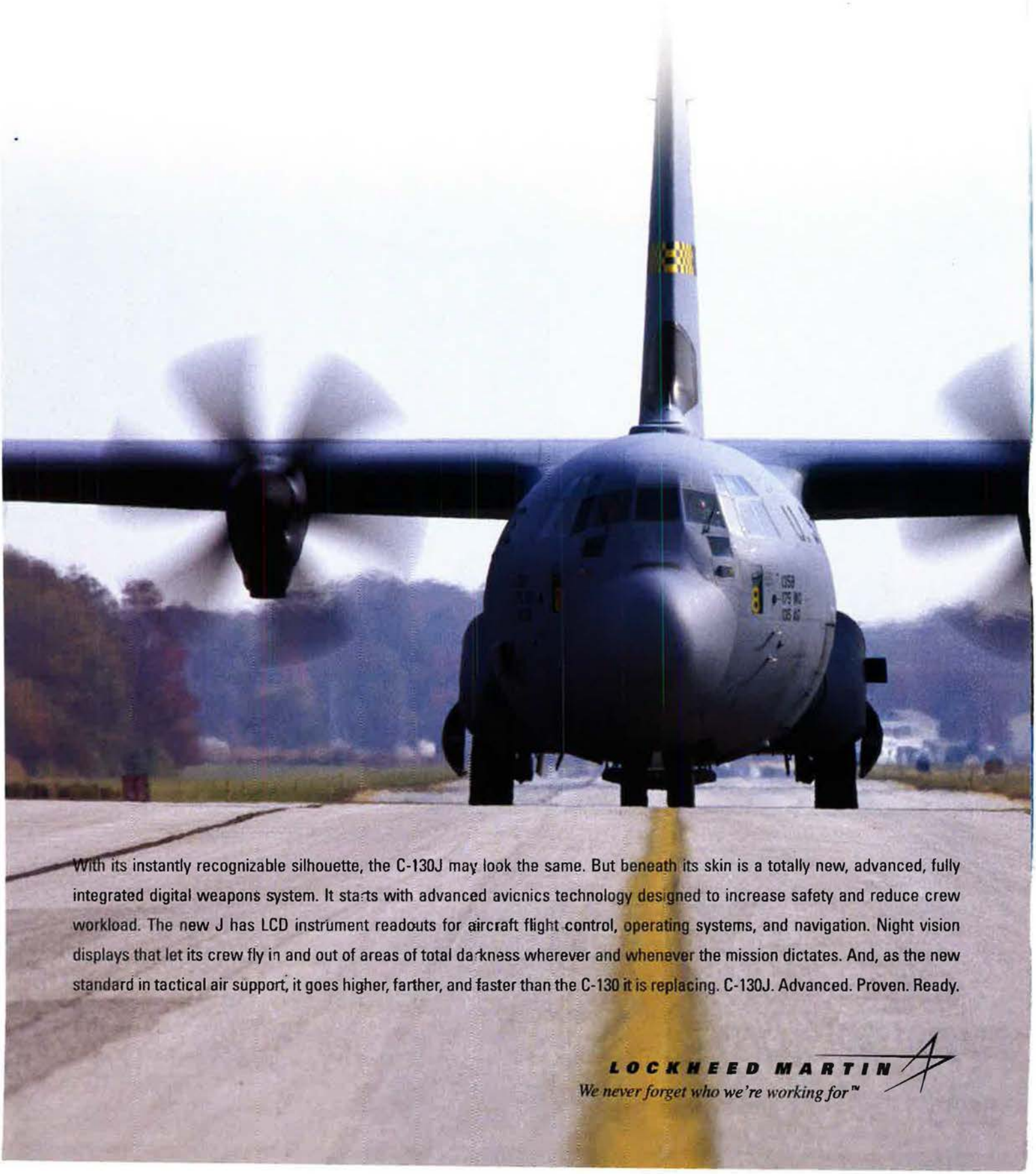
AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION

The F-35 Fighter
Ready for Prime Time?

Toward an Unmanned Bomber
21st Century Warthogs
Lord of the Skunk Works

THE RESULT OF ADDING BRAINS TO BRUTE STRENGTH.



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Editorial

By Robert S. Dudney, Editor in Chief

China Rising

"THE Middle East is just a blip. The American military contest with China in the Pacific will define the 21st century. And China will be a more formidable adversary than Russia ever was."

So begins "How We Would Fight China," a provocative treatise from noted foreign affairs expert Robert D. Kaplan in the June *Atlantic Monthly.*

In Kaplan's view, China's modernized Navy is now poised to push outward into the Pacific. There it will encounter the US Navy and US Air Force, which will refuse to make way for the newcomer. The result is predictable: "A replay of the decades-long Cold War," leading to, "if not a big war with China, then a series of Cold War-style standoffs ... over years and decades."

It seems that "traditional" conflict may not be as obsolete as the Pentagon claims.

Pushed by Defense Secretary Donald H. Rumsfeld, DOD has embarked on a reshaping of US forces and strategy, de-emphasizing conventional or "traditional" war in favor of preparing for insurgencies, terrorism, and other "nontraditional" threats.

This approach has been encoded into this year's Quadrennial Defense Review, which is to determine US military strategy and forces. Its premise is that the US has "excessive overmatch" in tactical airpower and seapower, so funds can be diverted from fighters and warships to less-traditional areas.

This premise is weak. As Kaplan and others point out, China's soaring $1.4 trillion economy is fueling a huge conventional buildup. The Chinese military budget is set to grow by 12.6 percent in 2005, marking 15 straight years of double-digit increases.

China now has some 700 accurate missiles targeting Taiwan, cyber-war systems to attack communications, a growing fleet of advanced Russian-designed fighters, and antiship cruise missiles. It is building nuclear-powered and stealthy diesel submarines.

Chinese military writings emphasize war with the United States.

This is hardly a military secret. CIA Director Porter J. Goss recently told Congress China's buildup "could tilt the balance of power in the Taiwan Strait" and "threaten US forces" in Asia.

Because of geography, Washington's dominance in the Far East hinges on superior naval and air power. The US Navy knows no peer in the Pacific. However, China's deployment of newer submarines and missiles has begun to complicate US naval operations.

If anything, therefore, the need for land-based airpower has increased,

"Traditional" conflict may not be as obsolete as the Pentagon claims.

and Chinese modernization gives officers "pause," said Gen. Paul V. Hester, head of USAF's Pacific Air Forces.

Hester pointed specifically to China's acquisition of Russian-designed fighters and defensive surface-to-air missiles.

Even at a time of global US retrenchment, PACAF has no intention of reducing its 47,000-airman force. According to Hester, it will maintain its bases in Japan, South Korea, Alaska, and Hawaii.

Moreover, PACAF has embarked on a major buildup on the US island of Guam, which is only four hours' flying time from China. Guam has become a vast storehouse of bombs, missiles, and fuel. Plans call for permanent stationing there of ISR and refueling airplanes.

To provide long-range strike capability, USAF will rotate heavy bombers through Guam. In a recent meeting with reporters, Hester pointed out that B-52s and B-2s deployed to Guam in recent months and B-1Bs will do so next year.

The looming contest with China seems to be fueling, at least to some extent, airpower innovations in the Pacific. A major case in point: Operation Resultant Fury, held last November in waters off Hawaii. Long-range bombers and fighters, working with specially equipped E-8 radar aircraft, demonstrated a capability to target and sink multiple moving ships, day or night, in poor weather.

Maj. Gen. David A. Deptula, PACAF director of air and space operations, said USAF was preparing not only to strike pirates or terrorists at sea but also for "larger-scale situations, where one major power might threaten an amphibious assault or other major action."

As the China case shows, the danger of big, regional clashes of modern conventional forces will be around for a while, and the US needs first-class weapon systems to compete effectively.

"This nation needs to be capable of engaging across the spectrum of conflict," said one Pacific airman. "Right now, we're engaged in counterinsurgency operations [in Iraq]. However, we can't forget that we need to prepare for engagements at the high end of the spectrum. We can't mortgage the future to pay for the present."

That, say airmen, is exactly what's happening in the case of the F/A-22 fighter. The Air Force wanted 381 F/A-22s, but Rumsfeld has reduced the approved number to about 180 to free up funds to pay for other priorities.

The Raptor's speed, range, stealthiness, and powerful radar and avionics make the fighter ideal for combat in the Pacific, where USAF forces would have to cover enormous distances and fight against numerically superior adversaries.

The Raptor is the only aircraft that would be able to defeat advanced "anti-access" defensive systems around the clock and in all weather. This vital capability is underappreciated in the Pentagon and Congress, but it would be critical in any face-off with China.

Major war with China certainly is not inevitable, and maybe not even likely. However, it would be a serious mistake to give short shrift to the possibility of a very rough ride in years ahead.

As Kaplan noted, "Whenever great powers have emerged or re-emerged on the scene (Germany and Japan in the early decades of the 20th century, to cite two recent examples), they have tended to be particularly assertive—and therefore have thrown international affairs into violent turmoil. China will be no exception." ■

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Letters

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Air Dominance Debate

I can't speak for the infantry associations to which I belong, but, in response to your editorial, I can speak for myself. *[See "Airpower Fiction and Fact," April, p. 2.]* I am a former "ground pounder," and my views are these: It would be a terrible mistake to ramp up one branch of service at the expense of another. In the past decade, that is why the Army wasn't fully prepared to satisfactorily handle all of its commitments.

Like Ralph Peters, I would like to see an endless supply of Predators, Army-friendly transports, etc., but as your editorial aptly points out, it would be a major mistake to degrade our air superiority. Didn't the pendulum swingers read about the ability of the Indian Air Force to defeat our current aircraft? Don't they understand its implications? Don't they understand what the loss of air superiority would mean to our tankers and infantrymen?

You can't win without having a capable Army, Navy, and Air Force. Let's hope the service self-interest groups and the pendulum swingers never control our nation's destiny.

Richard Loney
Fort Wayne, Ind.

Having flown F-86Fs and Hs, F-100s, F-101s, F-102s, F-104s, F-105s, F-106s, and F-4s, among others, I was intensely impressed by the quantum progression in air superiority represented by the F-15. But, some 30 years later with the progressive introduction of modern day fighters by many potential adversaries, some with well-trained aircrews, the F-15's days of dominance are fading.

The fundamental premise in the application of any aerial asset is the absolute necessity of first achieving air dominance over the battlefield. The A-10s, AC-130 Spectre gunships, AH-64 Apaches, etc., can only be deployed under the umbrella of air dominance. Were we to cede air dominance to an advanced foreign air-to-air fighter, the A-10s, etc., would be confined to ramp duty at their home base, since to venture into hostile airspace would simply provide the opposition with target practice. Can you ever imagine an Army commander advocating the sending of ground forces into a combat zone where control of the skies belonged to the opponent!

We can take a critical lesson learned from the recent Cope India exercise which so convincingly validated the necessity to modernize our 30-year-old premier air-to-air assets. The lesson learned from the Cope India engagements is simply what USAF has been proclaiming for several years now, i.e., confronted with the introduction of an array of modern tactical fighters in today's potential zones of engagement—when such equipment is employed by a well-trained, professional cadre of fighter pilots—the 30-year-old F-15 can no longer anticipate previously achieved lopsided exchange ratios.

The F/A-22 is designed for significantly more than combat against an adversarial fighter force, but rather for the penetration of a highly integrated air defense in order to engage those enemy assets in the depths of hostile airspace.

It's a fallacy to ever evaluate a combat weapon system solely on the basis of unit cost. Rather, combat systems should be evaluated in terms of probability of kill (Pk) per unit procurement cost. For example, if it takes nine $30,000 missiles to achieve the Pk of a single $60,000 missile (neglecting the fact that it's highly unlikely you would ever have the opportunity to take the nine shots in a single engagement), the $60,000 missile is by far the cheapest alternative in actual operational employment. The above facts, among others, were the specific reasons for selecting the AIM-9L over the AIM-9J in a previously contested procurement decision process.

In brief: Employing the logic of similar operational factors, the F/A-22 is by far the cheapest USAF alternative for the sustenance of air-to-air superiority over anticipated combat regions—a fact which Pentagon procurement specialists will hopefully factor into their coming weapons programs decision process.

Greg Neubeck
Lynn Haven, Fla.

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

After reading "Airpower Fiction and Fact," I want to commend you on your article. Obviously, there are shortfalls in what the real story should be. There are few who understand the full spectrum of impacts that relate to force structure acquisition decision-making.

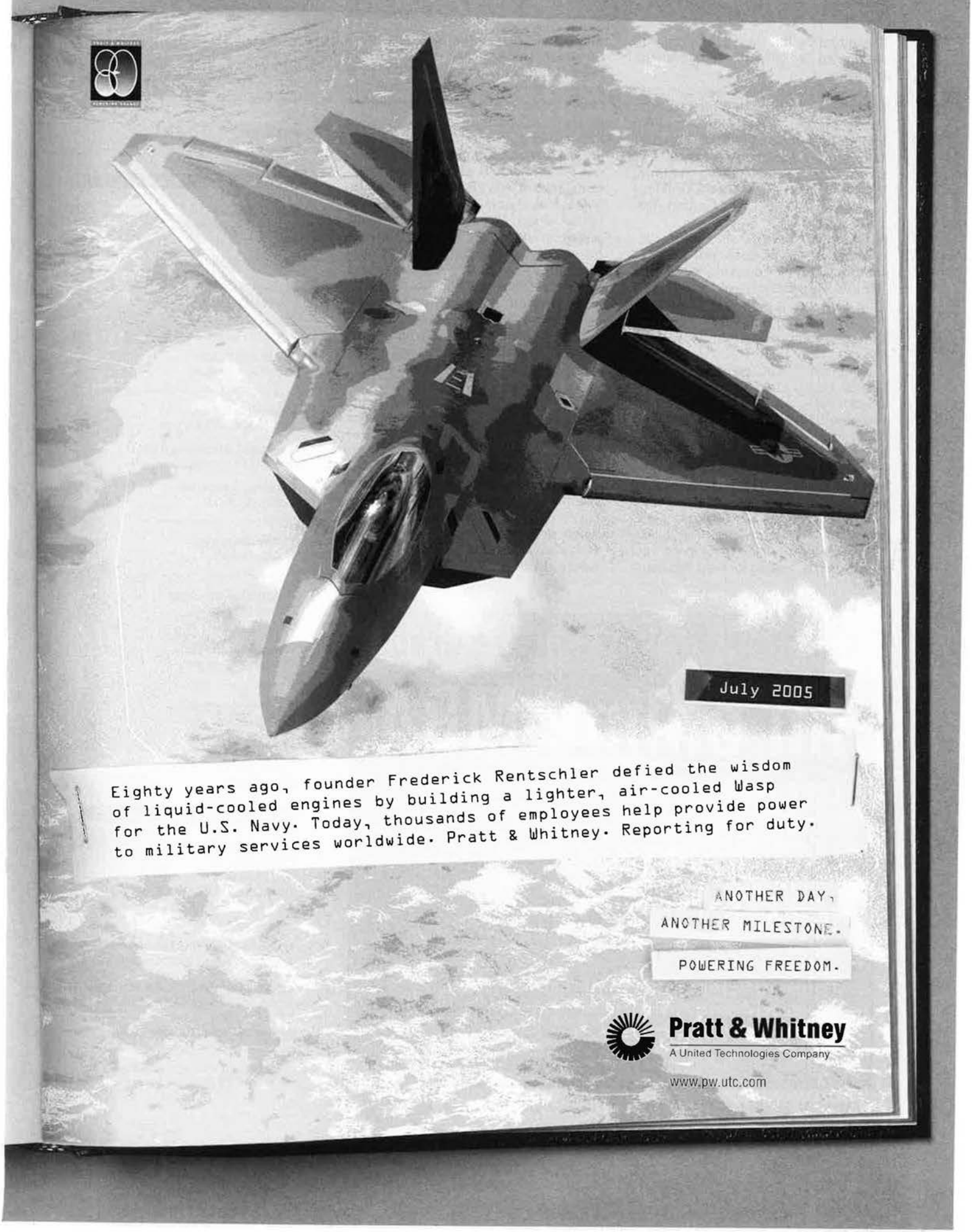
One important facet is to understand the "calculus" required to develop a roadmap into future decision-making. Unfortunately, in today's world, I've watched the established tools for making future decisions kicked to the curb, in favor of what has now become an emotional attachment to "gold plated technology."

The calculus, if properly formulated, derives the "proper numbers" of weapon systems in the correct combination. None of this has currently been done, and 1998 was the last time Air Combat Command looked at its archived analysis for fighters. As Congress deliberates and changes the ultimate number of new technology units purchased, so must the other relevant numbers in the calculus change.

Even though our country faces asymmetric threats today, drastic changes in force structure today formulated from improper analysis will derive the wrong combination of force structure in the future and then it's too late.

Randall King
Naples, Fla.

[Quotes from] the useless *New York Times* and *New York Post* should have been left out. I have served with USAF for years, now retired, served on the Berlin Airlift and in Korea and Vietnam. I flew wonderful fighters and spent five years as aide to two general officers.


July 2005
Eighty years ago, founder Frederick Rentschler defied the wisdom of liquid-cooled engines by building a lighter, air-cooled Wasp for the U.S. Navy. Today, thousands of employees help provide power to military services worldwide. Pratt & Whitney. Reporting for duty.
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ANOTHER MILESTONE.
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This quote by this *New York Post* nut, wanting to fire all four-star generals, is crazy.

All services are doing their part, and it is people like this Ralph Peters who should be fired. Listen to Gen. John Jumper [USAF Chief of Staff] and give thanks for an excellent Air Force.

Maj. Ray Roberts,
USAF (Ret.)
Denton, Tex.

What Wasn't Said

Rebecca Grant does not address some of the key concerns that Major General Hagenbeck expressed. *[See "The Echoes of Anaconda," April, p. 46.]* While I don't disagree with what she said, I am concerned about what she didn't say.

Hagenbeck was concerned about aircraft being stacked up, about the lengthy delay while DMPIs were being computed. He stated that Marine/Navy pilots routinely flew low in support of land forces (apparently meaning the Air Force did not). Grant avoids these key issues and relies on other less relevant statistics and anecdotal information.

I'm sensitive to this because I was both a "shooter" and a "controller" in AC-47s in Vietnam. Army units in contact would call us, asking for help. We could not expend [munitions] without DASC authority. The best we could do was move from our holding location until we were over the fort and actively ask DASC for authority, so we could employ when (if) authorized. It required initiative to help the guys on the ground.

Similarly, as controllers, we knew how our fighters would work with us. Redbirds/Yellowbirds (B-57s) and Spads (A-1s) would work under our flares and hit the target. Condoles (Marine F-4s) and other Navy/Marine Corps fast movers would work through our altitude and often be pretty close, even on target. Air Force F-4s would release above our working altitude and sometimes not even be in the same grid square.

I hope Grant's study did not ignore these organizational and cultural issues. They are often key to success.

Lt. Col. George Crowl,
USAF (Ret.)
Jersey Village, Tex.

■ *Based on the way things are done in Afghanistan and Iraq now, Operation Anaconda is ancient history. But as the comments confirm, Operation Anaconda remains a valuable case study of what can go wrong when joint warfare isn't joint. Surveillance and reconnaissance, airlift requirements, air control*

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systems (as pointed out in the letters), and close air support procedures are all essential to success. Let's hope future commanders from all services take Operation Anaconda as a warning and heed its lessons, for achieving a standard of excellence in joint warfare means learning to go beyond the mindset of any one service. The commanders and planners of tomorrow must understand how the air component makes it possible for the others to be all they can be.—REBECCA GRANT

I was the chief of Master Air Attack Planning (MAAP) at the CENTCOM Combined Air Operations Center (CAOC) during preparation for Operation Anaconda. Ms. Grant's article gives an accurate accounting of the air component commander's knowledge of Task Force Mountain's air support requirements.

No specific requirements were ever delineated, despite repeated attempts to get information. This fact, combined with the planned down period of one of the US Navy carriers, caused concern among the MAAP and command staff. General Moseley directed us to make a concerted effort to coordinate with the senior CFLCC planners. Despite our best efforts, no one could give the CAOC staff any specific support request, leaving my planning staff to come up with a best crystal-ball game plan.

Further, during my entire 90-day tour working for him, General Moseley never failed to prioritize air support to the "boots on the ground." In fact, his clear and unambiguous direction was to give the CFLCC [staff] everything they needed.

One correction I must make to the article concerns the Battlefield Coordination Detachment (BCD). The chief of the BCD was an aggressive and knowledgeable US Army officer who did his best to keep the MAAP planners informed concerning all operational CFLCC air support requirements. There was no failure on the part of the BCD to elevate Anaconda requirements; rather there was a failure on the part of the CFLCC planners to give him proper information or, more likely, to properly coordinate the airpower requirements into the Anaconda planning.

One other point: General Hagenbeck's assertion that the "Air Force had to work through airspace management" is flawed. Every non-CFLCC aircraft operating in the Operation Enduring Freedom (OEF) airspace had to use the complicated airspace control system, not just USAF aircraft. This was necessitated by the vast amount of air traffic in the area. During OEF, we had airlift, collection and control aircraft, civilian traffic, armed bombers and fighters performing close air support, and numerous other assets simultaneously flying over the battle area. This unprecedented fact made airspace deconfliction a must in order to prevent midair collisions and to prevent bombs falling on top of noncombat aircraft. It also made coordination prior to weapons employment imperative.

Since the Apache helicopters operated independently of this system, it is easy to see how he could interpret them as more available than Air Force assets. During Anaconda, the deconfliction between the CFLCC and CFACC air assets used the "Big Sky" theory. When the battle got hot, the individual aircrew did their own deconfliction. Since there were no problems, their skill must be commended.

Col. Jeffrey R. Johnson,
D.C. Air National Guard
Andrews AFB, Md.

Levitow's Legacy

I thoroughly enjoy reading about happenings from the past. I enjoyed no less reading of the exploits of Sergeant

Levitow. *[See "20 Seconds Over Long Binh," April, p. 68.]* But when the story arrived at the fiasco surrounding his paperwork for upgrading to five level and the "instructions to promote" him that were not followed, I felt like a big chunk of the story was omitted.

Let me assure you that I am not on a "witch-hunt" but rather, having been a squadron commander, I am aware of steps that can be taken to overcome the hazards normally encountered. I am only interested in bringing to light those that were missed so the omissions are not repeated.

As a squadron commander on two occasions, I recall a vehicle at base level for upgrading to the five skill level those personnel who were demonstrably competent but for some other reason (example, couldn't take a test) were unable to make the grade. I used this vehicle to insure the Air Force did not lose both a valued asset and someone who wanted to be there.

I have a difficult time comprehending how it is that an individual who was awarded the Medal of Honor could have been allowed to exit the service because of administrative snafus. Sergeant Levitow obviously had a very warm spot in his heart for the Air Force, so I can only believe that the "system" let him down. You would do well to tell "the rest of the story." Such a travesty should not repeat itself.

Lt.Col. Pete Doe,
USAF (Ret.)
York, Maine

■ *The account of how the personnel system failed was from Levitow himself, who talked about it at some length in oral history interviews. Levitow died in November 2000, before we began research for this article. We don't know the "rest of the story."—THE EDITORS*

Thanks for the story and the reminder of why we serve.

Carl Woodard
Eltville, Germany

New Math

[In response to] Mr. Bill Thayer *["Letters: Do the Math," April, p. 4]:* I am in the vehicle operations career field and have 19 years in the Air Force. We were tasked in 2002 to augment the Army in combat convoy operations. [Many airmen] were trained by Army instructors; it was grueling and demanding and brought out the best in [the airmen.] We worked through our "differences" with our sister service, and we have made great strides since 2002 to create lasting bonds with each of the other branches. We have been side by side with our Army, Navy, and Marine Corps brothers and sisters on the ground in Iraq.

I agree with Mr. Thayer that we have the best technology in the Air Force, but we are fighting a ground war in Iraq today, and technology can only go so far.

Until 2005, my career field has never been recognized for any high level awards, and I want to extend a heartfelt "thank you" to the Air Force Association for naming the vehicle operations career field as its Team of the Year for 2005. It will be an honor for me to see our hardworking airmen get the recognition they so truly deserve. We will defeat terrorism, and we will come home with our heads held high soon.

MSgt. David S. Parris,
USAF
McConnell AFB, Kan.

Verbatim

By John T. Correll, Contributing Editor

Fonda Over Yonda

"The image of Jane Fonda, Barbarella, Henry Fonda's daughter, ... sitting on an enemy aircraft gun was a betrayal, ...the largest lapse of judgment that I can even imagine," [but] "I felt I had to do anything that I could to expose the lies and help end the war."***—Jane Fonda, on her 1972 trip to North Vietnam that earned her the epithet "Hanoi Jane," promoting her new book on CBS "60 Minutes," April 3.***

Take That

"You don't believe everything you read in the newspaper do you?"***—Secretary of Defense Donald H. Rumsfeld to reporter at press conference in Brazil, March 23.***

Not Too Blue I

"People have to look twice to read 'US Air Force' on our uniforms, and that's a compliment. Airmen are demonstrating a lot of innovation. They don't think in terms of just their home base mission. Instead they think of ways to better fight for their commander, who may be a Navy skipper or an Army colonel."***—USAF Brig. Gen. Douglas L. Raaberg, US Central Command deputy director of operations,*** **Air Force Print News,** ***March 28.***

Not Too Blue II

"The Army gets only 23 percent of the regular military budget, and the top 10 items in the Pentagon procurement budget are five airplanes, four ships, and the missile defense system. ... We essentially have two services at war, the Army and the Marines, and two services at peace, the Air Force and the Navy. You can't dispute that."***—Retired Maj. Gen. Robert H. Scales Jr., former head of the Army War College, interviewed for article "Army, Marines Need Priority in Rumsfeld's New Defense Review," in Capitol Hill newspaper*** **Roll Call,** ***March 17.***

And, As for Space ...

"When you're kicking in a door in the middle of the night, having a satellite overhead is interesting but little more. The lesson for the American military is we're now at the age where success or failure is determined ... by the success or failure of small units."***—Scales, described as "a prominent military historian,"*** **USA Today,** ***March 20.***

Carter Names the Culprit

"The United States is the major culprit in this erosion of the NPT [Nonproliferation Treaty]. While claiming to be protecting the world from proliferation threats in Iraq, Libya, Iran, and North Korea, American leaders not only have abandoned existing treaty restraints but also have asserted plans to test and develop new weapons. ... They also have abandoned past pledges and now threaten first use of nuclear weapons against non-nuclear states."***—Former President Jimmy Carter, op-ed column,*** **Washington Post,** ***March 28.***

Feeling a Draft

"The all-volunteer force is close to breaking right now. When it does break, that's when you'll see the draft come back."***—Retired Maj. Gen. Edward B. Atkeson, senior fellow, Institute of Land Warfare, Association of the US Army,*** **Stars and Stripes,** ***March 19.***

Long-Distance Flying

"I can watch the rear of a building for a bad guy escaping when troops go in the front and flash an infrared beam on the guy that our troops can see with their night vision goggles."***—Maj. John Erickson, Air Force pilot, operating Predator reconnaissance drones in Iraq and Afghanistan by remote control from thousands of miles away in Nevada,*** **New York Times,** ***April 5.***

Chemical-Biological Security Fails

"If you were to ask me for scores out of 10 on how we are doing to secure chemical and biological material materials, I would say about three out of 10 for destruction of chemical weapons and only one out of 10 for biological."***—Former US Sen. Sam Nunn, column in London*** **Sunday Times,** ***March 20.***

Stand By for Trouble

"I personally think that Spain is making a mistake. ... I guess time will tell. The problem is that, if one waits till time tells, it can be an unhappy story."***—Rumsfeld, criticizing Spain's decision to sell military aircraft and boats to leftist regime in Venezuela,*** **Miami Herald,** ***April 6.***

No Need for Foreign Approval

"The President has the obligation to protect the country, and I don't think there's anything in our Constitution that says the President should not protect the country unless he gets some non-Americans' participation or approval of that."***—Douglas J. Feith, outgoing undersecretary of defense for policy, Pentagon news briefing, March 18.***

New Day Dawns

"We are going to turn the Defense Department into a different type of department. The mandate is on the wall. We are going to have to be prepared as an armed force to do much more on the humanitarian side, transition to and from war. I've got some strong feelings on this. I think we are going the right way."***—Thomas W. O'Connell, assistant secretary of defense for special operations and low-intensity conflict,*** **Fayetteville (N.C.) Observer,** ***April 7.***

Challenge in Space

"For us to assume that the environment that we're operating in is going to be benign, and someone is not going to attempt to fool with us in some way, shape, or form, is naive strategy."***—Gen. Lance W. Lord, commander of Air Force Space Command, on security in space,*** **Denver Post,** ***April 8.***

Problem at the Dance

"Taiwan wants the international community to know that it is willing to coexist peacefully with China. But it takes two to tango."***—Jaushieh Joseph Wu, chairman of Taiwan's Mainland Affairs Council,*** **Wall Street Journal,** ***March 24.***

Iran's Peaceful Nukes

"We urge the Europeans as well as the Americans to support us ... in being able to cover our electricity [needs] with the atom."***—Iranian President Mohammad Khatami,*** **Baltimore Sun,** ***April 5.***

Washington Watch

By John A. Tirpak, Executive Editor

F/A-22 Passes Major Hurdle; Who Will Control UAVs?; In Search of Chips ....

F/A-22 Cleared for Full-Rate Takeoff

The F/A-22 passed one of its biggest program milestones in April when the Defense Acquisition Board authorized USAF to produce the aircraft at the planned full rate of 32 fighters per year, beginning in Fiscal 2006.

The decision essentially gave the Raptor a clean bill of programmatic health. It means that, when the F/A-22 is considered in the Quadrennial Defense Review, performance and programmatic issues should not be a factor.

The favorable full-rate production decision was contingent on several factors, including Air Force certification that the aircraft and manufacturer were ready to begin full production. Michael W. Wynne, then acting undersecretary of defense for acquisition, technology, and logistics as well as DAB chairman, had to approve the test and evaluation master plan, and USAF had to deliver a report to Congress stating how procurement would proceed.

The formal DAB decision certifies that the F/A-22 has resolved the outstanding questions regarding design, manufacturing, and field maintainability as noted by the DAB in a previous review. It also takes into account the fact that the F/A-22 passed with flying colors its initial operational test and evaluation (IOT&E) last year. The aircraft was rated as being far superior to and far more effective than the F-15, which it is supposed to replace.

Some testers complained that several maintainability issues still existed. However, Wynne, before the DAB, told Bloomberg news service that he didn't see any "showstoppers" for the program. He added that maintainers would like the F/A-22 to be easier to fix, but "as time goes on, things will get better" in this area.

The Raptor program is still reeling from a Pentagon budgetary decision, taken in late December 2004, to limit production to about 180 aircraft and stop production in Fiscal 2008. The Air Force has noted that the action was purely a DOD budgetary move. USAF leaders said that no new analyses controverted the service's stated need for 381 F/A-22s.

USAF photo

F/A-22 gets green light for full-rate production.

The UAV Skirmishes

The Air Force would like to be the Defense Department's executive agent for unmanned aerial vehicles, but it's an idea that doesn't seem to fly with the other services.

In early spring, the Air Force began petitioning Pentagon leadership to consider letting the service become the UAV executive agent as part of a broader initiative for USAF to be a leader in providing intelligence-surveillance-reconnaissance assets.

Lt. Gen. Ronald E. Keys, USAF deputy chief of staff for air and space operations, said at a March 9 Capitol Hill hearing that "there are discussions" under way regarding the proposal by USAF to take on UAV leadership. Keys was testifying before the tactical air and land forces panel of the House Armed Services Committee.

Supporters of the idea see the Air Force as already providing the bulk of ISR resources in the form of satellites and aircraft such as the U-2, E-8 Joint STARS, E-3 AWACS, RC-135 Rivet Joint, as well as Predator and Global Hawk UAVs. The Air Force is already the executive agent for space and in that capacity exerts considerable influence over space priorities and how space funds are allocated and spent. And Gen. T. Michael Moseley, USAF vice chief of staff, is co-chairing a Quadrennial Defense Review task force on enablers, including UAVs, with Stephen A. Cambone, undersecretary of defense for intelligence.

In late December, the Pentagon placed the Air Force in charge of the Joint Unmanned Combat Air System (J-UCAS), a program expected to see the development of at least two types of unmanned combat aircraft. (See "Toward an Unmanned Bomber," p. 44.) This spring, USAF established the Air Force UAV Center of Excellence at Indian Springs AFAF, Nev., home of the Predator. The Air Force said it hopes the center will host participants from the other branches.

There are more than 750 UAVs from the various services operating in the Iraq theater, according to USAF Chief of Staff Gen. John P. Jumper. The Air Force, as the air component of US Central Command, has the responsibility for managing what's flying in theater and deconflicting all the aircraft in it, both manned and unmanned. Senior Air Force leaders view making USAF the UAV executive agent as a logical next step.

The other services, however, are not thrilled with the USAF proposition. They see UAVs as yielding potentially huge benefits for their operations—and in a way that is specifically tailored and rapidly responsive to their own needs for tactical reconnaissance, target spotting, and so forth.

The Army, Navy, and Marine Corps are worried that leaving executive agency to USAF would mean their own priorities for UAVs—as well as funding and rapid fielding of new technologies—would get bogged down. They don't believe that USAF would fully understand the requirements of a ground forces squad leader or a ship captain.

DOD leaders also remain unconvinced by Air Force arguments. Dyke Weatherington, the deputy director of the Pentagon's UAV Planning Task Force, told *Inside the Pentagon* in March that assigning such a responsibility to any

individual service now would be premature. A higher priority, he told ITP, is nailing down the tasking and sharing of UAV data within CENTCOM. Even then, he said, UAVs vary so greatly in size—ranging from a palm's width to the Global Hawk's 116-foot wingspan—that it would be awkward to put one service in charge of all of them.

Small UAVs might get their own executive agent "because they ... operate differently [and] have different capabilities" compared to their larger cousins. Putting a single authority in charge of all UAVs, Weatherington said, would be like "setting up an [executive agent] for all manned aircraft," an extremely broad range of technology and capability.

The Army reportedly is preparing a counterproposal that would make that service the executive agent for small UAVs. Moreover, the Army is contemplating forays into tactical fixed-wing aircraft—for the delivery and supply of small numbers of troops—as well as combat UAVs that would employ rotors and either escort or replace today's generation of attack helicopters.

The Chips Are Down

The flight of microchip designers and manufacturers to cheaper overseas venues is a crisis in the making for the Defense Department, and steps must be taken at once to stem the exodus, according to the Defense Science Board.

In a report—"High Performance Microchip Supply"—released in the spring, the DSB found reason to worry already about whether there is a trustworthy supply of microchips for the US military, which uses such devices in nearly all weapons.

"Because of the US military dependence on advanced technologies whose fabrication is progressively moving offshore, opportunities for adversaries to clandestinely manipulate technology used in US critical microelectronics applications are enormous and increasing," the DSB stated.

Potential adversaries can "gain enormous asymmetric advantages that could possibly put US force projection at risk," because they can get close to and possibly alter microchips bound for US weapon systems at nearly every stage of production, from design through delivery.

An enemy could tamper with a microchip, making it perform incorrectly, switch off at a crucial point, or actually act as a "Trojan horse," either destroying weapon system processors or infecting connected systems with faults.

"Neither extensive electrical testing nor reverse engineering is capable of reliably detecting compromised microelectronics components," the DSB asserted.

Tampering is merely one of the problems affecting the microchip supply, the DSB said. Because chip and wafer production is heavily dependent on economies of scale to be profitable, production facilities—called "foundries"—are increasingly only making microchips for which there is a huge commercial market. The Defense Department, though, often needs specialized chips of a particular design, and in relatively small quantities, particularly elements that have been radiation-hardened for use in nuclear environments. It may not find a supplier for such needs in the future if the "irresistible pressures" toward mass production continue.

Moreover, foundries are often concentrated in certain areas, usually in the Far East. The DSB noted that a 1999 earthquake in Taiwan—one of the biggest chip makers in the world—led to a stoppage in production there for a few weeks. A bigger earthquake "would have started a worldwide run on commercial wafer capacity that would have taken years to rectify. During such a time, DOD and its contractors would have little leverage to obtain needed fabrication services."

Yet another concern is the fact that design talent tends to follow production. Design and fabrication tend to be co-located, the DSB found, and so an exodus of chip manufacturing also signals a chip-design brain drain. The US share of worldwide chip manufacturing by volume, which stood at about 42 percent four years ago, is down to about 33 percent today and is still falling. By the end of this year, the US will have only 16 of the world's 59 chip foundries.

Collectively, all these problems represent "a major integrated circuit supply dilemma" which "threatens the security and integrity of classified and sensitive circuit design information, the superiority and correct functioning of electronic systems, system reliability, [and] continued supply of long-system-life and special technology components," said DSB.

Accompanying the report was a raft of recommendations, calling on the Pentagon to take the lead, in concert with industry, to ensure the US maintains a long-term and assured supply of chips.

First, DSB said Washington must do everything it can to make the US an attractive design and production location. It said the US must get the World Trade Organization to vigorously enforce trade rules and "insure that intellectual property laws are fully enforced." The government should increase investment in university research to make sure the US remains "an attractive and competitive location for the most talented students and faculty" in microelectronics.

The DSB chided the Pentagon for having "no overall vision of its future microelectronics components needs and how to deal with them."

Costs To Replace War Equipment Mounting

It will cost the military services as much as $18 billion to replace equipment used up over the last few years in the war on terrorism, the Congressional Budget Office reported in April.

CBO Director Douglas Holtz-Eakin told lawmakers that the Army accounts for about 60 percent of the defensewide war attrition bill because Army vehicles and gear are most directly involved in day-to-day operations and suffer the most hard usage and combat losses.

CBO estimates the total bill to repair or replace equipment worn out in the war to be $8 billion per year.

For the Air Force, increased flying hours stemming from Operation Noble Eagle homeland defense missions, as well as sorties in the Iraq or Afghanistan theaters, account for up to $3.9 billion in unfunded costs.

CBO derives its estimate from the reduced years of service life each aircraft would experience due to increased operating tempo in the war. However, Holtz-Eakin explained that this approach "yields insight into the costs of replacing or rebuilding equipment but not into the costs of maintaining it," which will also rise with the accelerated "aging" of the aircraft.

The B-1 bomber has seen the greatest spike in usage, with flying hours across the fleet up 47 percent on average. Gunships, transports, and aerial tankers all saw usage jump by more than 23 percent. By contrast, within the fighter fleet, only the F-16 and A-10 increased their normal operating tempo and that was by only about three percent.

Taken as a whole, the tanker and airlift fleets are paying the biggest price in reduced life expectancy, said Holtz-Eakin, adding that they "constitute about three-quarters of the estimate for wear on equipment."

CBO calculated the depreciation based on a 30- to 40-year life expectancy for the various aircraft it considered. It also included some cost for substantial repair or overhaul of aircraft not replaced but still heavily used.

Rep. Joel Hefley (R-Colo.), who chairs the House Armed Services Committee readiness panel, said reset—the term for repair or replacement of wartime losses—is "a priority and a must-pay bill." ■

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Aerospace World

By Adam J. Hebert, Senior Editor

Bush Picks Pace For Chairman

President Bush on April 22 nominated Marine Corps Gen. Peter Pace to be the next Chairman of the Joint Chiefs of Staff.

Pace, currently the vice chairman, would succeed Air Force Gen. Richard B. Myers, who is expected to retire this fall after four years as the President's top military advisor.

If confirmed by the Senate, Pace would become the first Marine Corps officer to serve as JCS chairman. He is already the first vice chairman to come from the Marine Corps.

Pace began his career as a platoon leader during the Vietnam War and commanded US Southern Command before joining the Joint Staff.

At a White House ceremony, Bush also nominated Adm. Edmund P. Giambastiani Jr. to replace Pace as vice chairman. Giambastiani is currently serving as head of US Joint Forces Command, where he has played a leading role promoting DOD's transformation efforts.

USAF photo by TSgt. Demetrius Lester

SrA. Dan Solon fires at opposing forces during recent training at Nellis AFB, Nev. USAF units have started preparing airmen for deployment to Southwest Asia by training them in combat skills they need when they augment soldiers and marines on convoy duty in Iraq.

Senate Confirms Hayden for Intel

The Senate in April confirmed Air Force Gen. Michael V. Hayden as principal deputy director of national intelligence. Hayden will support the newly created post of national intelligence director.

Hayden has spent much of his career as an intelligence officer, most recently serving six years as director of the National Security Agency at Ft. Meade, Md. Hayden's previous assignments included stints as commander of the Air Intelligence Agency and director of intelligence for US European Command.

Hayden will help intelligence director John D. Negroponte oversee and coordinate the nation's Intelligence Community, including the Defense Department's numerous intel shops, as was suggested by the 9/11 Commission.

BRAC Cuts Less Than 20 Percent

Defense Secretary Donald H. Rumsfeld recently said that this year's Base Realignment and Closure actions will probably result in less than 20 percent of DOD's basing capacity being shuttered. Defense officials announced their proposed BRAC actions May 13. The details will be covered in *Air Force* Magazine's July issue.

DOD basing studies from the 1990s estimated that the department had 20 to 25 percent excess capacity. It now appears the oft-cited estimate that BRAC 2005 would reduce the domestic basing infrastructure by 25 percent was probably overzealous.

"It looks now like the actual [reduction] will be less than the lower end of that range," Rumsfeld said at a Pentagon briefing before the list was released. "How much less remains to be seen."

The Defense Secretary added that he never necessarily believed the 2005 round would reach the 20- to 25-percent figure.

"The fact that we're bringing so many forces home from overseas" reduces the amount of infrastructure in the United States that will be deemed excess, Rumsfeld said.

The BRAC commission will review the list before sending a final list of closure and realignment recommendations to the President by Sept. 8.

The President will then review those proposals, either approving or disapproving the entire list, by Sept. 23. If approved, the list goes to Congress. After 45 days, if Congress has not enacted a joint resolution of disapproval, the list becomes binding.

If the President disapproves the list, the commission must submit revised recommendations to him within a month. The President must approve the revised list or the process ends.

USAF Should Meet Force Goal

The Air Force is on track to meet its Congressionally mandated end strength by the end of the year, the service's top uniformed personnel official recently told lawmakers. USAF will "continue to bring balance to the force through right-sizing and shaping specific career specialties," Lt. Gen. Roger A. Brady, deputy chief of staff for personnel, told the House Armed Services Committee.

According to an Air Force spokeswoman, the service needs to shed roughly 3,000 uniformed personnel by

the end of 2005 to meet its end strength target of 359,700 airmen.

The Air Force is using "all tools available to help bring down the numbers," officials wrote in an April news release.

These tools include the Palace Chase program, which allows airmen to separate early if they agree to join the Air National Guard or Air Force Reserve Command, and the "Blue to Green" program, which allows separating airmen to retrain and transition to the Army without losing rank.

Controls Caused F/A-22 Mishap

The Air Force has determined that a "deficiency" in the F/A-22's flight-control system (FLCS) resulted in last September's mishap in which a Raptor exceeded its G limits, causing $3.6 million in damage to the aircraft.

"The primary cause of this accident, supported by clear and convincing evidence, was a deficiency in the mishap aircraft's FLCS," stated the official accident investigation report.

The mishap occurred during a Sept. 28, 2004, test flight described as a "high-risk test mission" designed to stress the aircraft. During the sortie, the Raptor encountered the jet wash of its accompanying F-16, and the F/A-22's nose began to pitch up and down. After three seconds of increasing pitches, the flight-control system engaged, disregarded the pilot's inputs, and brought the aircraft back to level flight in approximately eight additional seconds.

"During these events, the [mishap aircraft] exceeded both positive and negative G limits for the structure," the investigation found. A news release noted that this test aircraft's G limit was 7.33, but it was strained by forces as much as 11.7 Gs.

There were no injuries in the mishap, and the F/A-22 safely returned to its base at Edwards AFB, Calif., after the event.

An Air Force spokeswoman said in a statement that the flight-control problem "has been identified and those jets in production will have the fix; those on the ramp either are or will be fixed."

Air, Space Warfare Centers To Merge

The Air Force announced April 26 it will merge its Space Warfare Center at Schriever AFB, Colo., with the Air Warfare Center at Nellis AFB, Nev. The new center will be located at Nellis and will be renamed the Air Force Warfare Center.

Air Force Space Command controls the SWC, while Air Combat Command runs the AWC. The new warfare center will be assigned to ACC, officials wrote in a release.

Focus on the Warfighter

The Air Force is in the midst of a major reorganization of command responsibilities that should, by autumn, carve a series of new warfighting headquarters out of USAF's numbered air forces.

The new warfighting headquarters (WFHQs) will typically be led by three-star generals and will support a specific unified command. The goal is to create an off-the-shelf structure ready to go to war on a moment's notice.

One of the lessons from previous air wars was that USAF tended to supply command and control (C2) functions to commanders on an ad hoc basis. The C2 architectures "tended to be developed from scratch each time," said Brig. Gen. Eric J. Rosborg, who is leading the WFHQ effort for the Air Staff.

Standardization was needed, Rosborg told *Air Force* Magazine. Officials have hinted at these moves for months, and the implementation plan should be complete by Oct. 1, he said.

Gen. John P. Jumper, USAF Chief of Staff, wants wartime commanders focused on war planning, mission support, and beddown preparations, Rosborg explained. Jumper does not want them dealing with base golf courses, child care centers, and housing. Responsibility for administrative functions will therefore be shifted to the Air Force major command staffs.

By early May, the Air Force had announced only one WFHQ location. Pacific Air Forces' 13th Air Force moved from Guam to Hawaii, where it set up shop at Hickam Air Force Base and will evolve into Air Forces Pacific, or AFPAC.

The Combined Air Operations Center at Hickam will serve as the "execution arm" of the warfighting headquarters, said Rosborg. The WFHQ staff will be organized along the lines of the Joint Staff's command structure, to ease the integration of joint personnel if the headquarters needs to run an air war.

Notionally, the other WFHQs will be AFNEA (Northeast Asia) for US Forces Korea, AFEUR for US European Command, AFSOUTH for US Southern Command, AFTRANS for US Transportation Command, AFSTRAT for US Strategic Command, AFNORTH for US Northern Command, and AFSOF for US Special Operations Command.

The WFHQs will be standardized where possible but tailored for their individual missions. Some will center on Falconer Air Operations Centers, while AFTRANS, for example, will utilize the Tanker and Airlift Control Center.

Rosborg said the locations for the WFHQs have not been decided, and the names are subject to change. Air Force leaders are still planning the details. Still to be resolved is the future of the numbered air forces (NAFs). What becomes of 9th Air Force once AFCENT is up and running? What becomes of the NAFs that do not evolve into WFHQs? And for regions such as Europe—which has NAFs in England and Italy and a major command based in Germany—where will the warfighting headquarters be located?

Exactly what responsibilities belong within the WFHQ is also being finalized, as is the size of each headquarters. Rosborg said a series of announcements likely will be made up until Oct. 1, detailing which WFHQ will stand up at what location.

Junior ROTC To Expand

The Air Force Junior ROTC program will be adding 199 detachments, at high schools nationwide, by the beginning of the 2007 school year. Officials say 48 of the new units, in 21 states, will be ready for cadets this fall.

Congress voted more than five years ago to increase the number of Air Force JROTC detachments from 609 to 945. However, USAF officials realized that the growth would not be easy, given the shortage of qualified instructors. (See "The Surge in Junior ROTC," April 2000, p. 75.)

Today, AFJROTC has 746 detachments, and qualified instructors are in high demand, said Col. H.B. McCarraher III, AFJROTC director at Maxwell AFB, Ala. To meet the expansion goal, 398 retired officers and noncommissioned officers are needed as instructors.

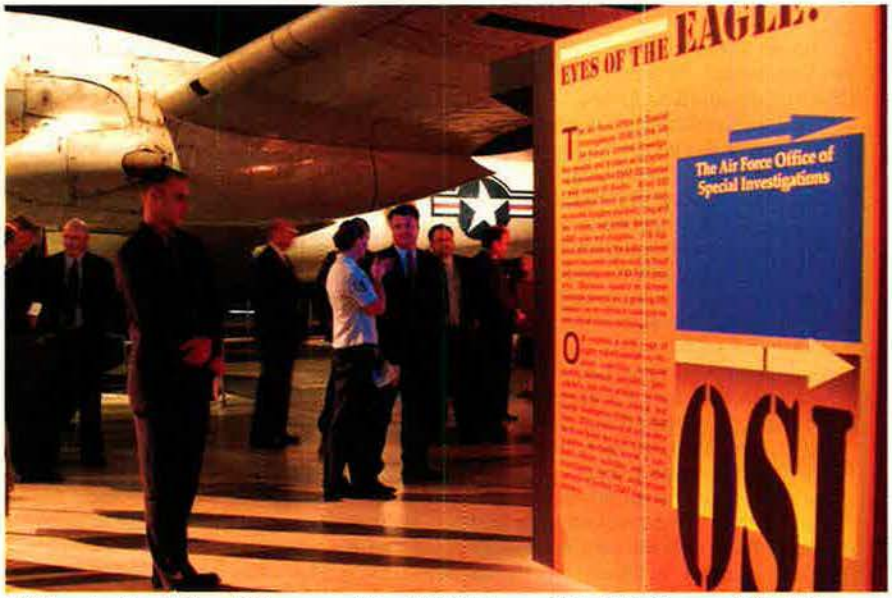
"Airmen interested in becoming JROTC instructors must have retired from active duty within the last five years," service officials said. "Airmen on active duty may apply for positions when they are within six months of their retirement date."

AFJROTC cadets are under no obligation to join the armed forces, and officials note that the goal of the program is to foster citizenship, community service, responsibility, character, discipline—and an appreciation of air and space fundamentals.

Instructors are paid at least enough to raise their retirement pay up to their active duty pay and allowances. Service officials note that some school districts pay more.

Potential instructors can find more information online at http://www.afoats.af.mil/AFJROTC/juniorinstructors/default.htm.

USAF photo by Jeff Fisher



Visitors to the National Museum of the US Air Force, Wright-Patterson AFB, Ohio, view a new exhibit, "Eyes of the Eagle: The Air Force Office of Special Investigations." The exhibit, which opened April 20, highlights OSI efforts during the Cold War, utilizing items such as a disguise kit, surveillance cameras, and a radio-transmitter wristwatch.

The consolidation makes sense, said Maj. Gen. Stephen M. Goldfein, Air Warfare Center commander. Integrating air and space operations can "create synergy," he told *Air Force* Magazine.

The single center will eliminate an artificial distinction between airpower and space power that Goldfein deemed "not helpful." The addition of space capabilities and personnel into USAF's combined air operations centers has shown what the benefits can be, he said.

Gen. Lance W. Lord, AFSPC commander, agrees. In the release, Lord said the move will "create a warfighting synergy that increases combat effectiveness and peacetime efficiencies."

The Air Force is additionally "looking at what information warfare capabilities might also fit into the integration," officials wrote. The goal is to complete the merger by Oct. 1.

New AMC Wings Take Off

About a month after its formal stand up, one of Air Mobility Command's two new contingency response wings sent a team to Afghanistan to establish a new bare base airfield for Italian troops at Herat. The 47-member team, primarily from the 621st Contingency Response Wing, McGuire AFB, N.J., was expected to complete the operation in less than 45 days.

The McGuire unit was the first of two CRWs created by AMC to provide USAF with rapid air base set-up units, primarily comprising aerial port, command and control, maintenance, and security force personnel. (See "Aerospace World: News Notes," May, p. 26.)

AMC on April 11 formally activated the second unit—the 615th CRW—at Travis AFB, Calif.

Creation of these wings "clearly signals our resolve to posture our mobility forces for rapid base-opening operations anywhere in the world," said Lt. Gen. William Welser III, commander of AMC's 18th Air Force.

Depending on the mission, these wings also can deploy intelligence, special investigations, medical, finance, weather, and contracting personnel, according to USAF officials. For instance, to fill out the contingency response element working on the Herat base, the 621st CRW drew a finance NCO from Travis and a four-person medical team from MacDill AFB, Fla.

Nuke Arsenal Needs Modernization

The Office of the Secretary of Defense has asked the Defense Science Board to study the US strategic nuclear arsenal and evaluate progress toward the goals of the Nuclear Posture Review.

US nuclear qualities "continue to be largely an extension of the Cold War capabilities," states a memo, obtained by InsideDefense.com, that established a DSB task force on nuclear capabilities. The task force chairmen are retired Air Force Gen. Larry D. Welch and John Foster, former Los Alamos National Laboratory director.

Welch said there are a number of

Sharing Exchange Operations?

Despite resistance from the military services, DOD officials have told Congress the Pentagon intends to consolidate "back store" operations of the three military exchange systems to save 15 to 40 percent in operating costs.

Two years ago Deputy Defense Secretary Paul D. Wolfowitz ordered full consolidation of the Army and Air Force Exchange Service with the Navy and the Marine Corps exchange services. The department abandoned that effort in July 2004 in the face of stiff opposition from the services and Congress.

The goal now is to establish a system of "shared services" across five functional areas of exchange operations: human resources, finance and accounting, information technology, logistics, and non-resale procurement such as store equipment and fixtures.

Charles S. Abell, principal deputy undersecretary of defense for personnel and readiness, told the House subcommittee on military personnel in early April that "staff resistance" blocked exchange consolidation. He called shared services a "viable alternative" and said the changes would be transparent to customers.

But exchange officials, who testified at the same hearing, still didn't sound excited about the move. They criticized the task force set up to execute consolidation and, in response to committee questions, grumbled that a combined $2.7 million in store profits had been spent so far in the quest to combine exchange operations.

Abell said consolidating back store operations is critical if the exchanges are to survive trends in retailing and force structure changes that will reposition tens of thousands of troops from Europe and Asia back to Stateside bases.

"Over half of all exchange profits are generated overseas," Abell noted. "As more and more troops and family members are transitioned back to the United States, this profit profile will shift. Increased support of expeditionary forces may also reduce overseas profits," he said.

Combining back store operations is expected to take from three to five years to complete. Critics such as Mike Henties with the American Logistics Association, which represents manufacturers of products sold in military stores, contend that a solid business case even to combine some exchange operations hasn't been made yet.

—Tom Philpott

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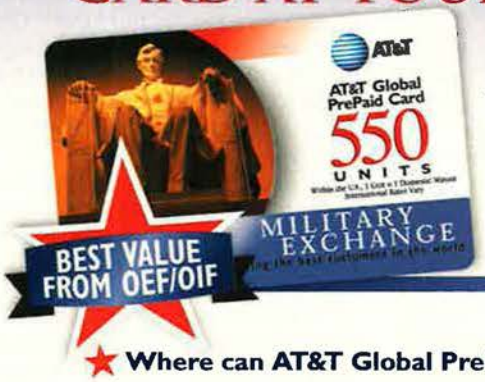

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USAF photo by SrA. Karah Manning

SSgt. Shawn Nunnally, deployed from RAF Lakenheath, UK, checks an F-15E's wiring during a main landing gear inspection in Southwest Asia. His unit, the 379th Expeditionary Aircraft Maintenance Squadron Strike Eagle phase shop, compiled a 94 percent pass rate for inspections over a 66-day period.

A Legacy of the F-15

Much of the Air Force's future uniformed leadership was assembled 23 years ago, at Kadena AB, Japan—but nobody knew it at the time.

Gen. Gregory S. Martin, then a major was flying F-15s at Kadena, surrounded by a remarkable number of young officers who have since become senior Air Force leaders.

"These are great officers who have a tremendous dedication, good people skills, and of course professional credentials that are superb, and the whole boat floats," said Martin, now commander of Air Force Materiel Command.

Pilots flying F-15s from Kadena in 1982 and 1983 included:

- Maj. Gen. Jack J. Catton Jr., Joint Staff plans and force development director.
- Lt. Gen. Carrol H. Chandler, chief of Alaskan Command and 11th Air Force.
- Maj. Gen. Kevin P. Chilton, nominated to be commander of 8th Air Force.
- Maj. Gen. (sel.) Daniel J. Darnell, commander of the Space Warfare Center.
- Maj. Gen. David A. Deptula, director of air and space operations for Pacific Air Forces.
- Lt. Gen. Michael M. Dunn, president of the National Defense University.
- Brig. Gen. Irving L. Halter Jr., Joint Staff and National Reconnaissance Office space systems coordinator.
- Maj. Gen. William F. Hodgkins, director of plans for NORAD.
- Lt. Gen. Daniel P. Leaf, vice commander of Air Force Space Command.
- Gen. Gregory S. Martin.
- Gen. T. Michael Moseley, Air Force vice chief of staff.

This particular group of officers gathered through happenstance, said retired Gen. Richard E. Hawley, who was the Kadena wing's vice commander at the time. There are quality officers throughout the Air Force, he said, and USAF's assignment system is "egalitarian in the extreme."

But it was not a complete surprise, because the F-15 was "the new darling," Hawley said in an interview. In 1982, the F-15 was still a relatively new weapons system and the competition for a coveted spot as an Eagle pilot was intense.

The rivalry among the pilots and squadrons on Okinawa also bred quality. As evidence, Hawley pointed to the fact that Kadena's three fighter squadrons each won the Hughes Trophy—now called the Raytheon Hughes Achievement Award—as the Air Force's top air defense/air superiority squadron, in order, from 1981 to 1983.

"Let's not kid ourselves," said Martin. "When you've got guys like [these] working with or for you, you are also lifted significantly."

He continued, "So I wouldn't take credit for anything other than being a good wingman with this group of people who have continued to succeed in the Air Force as a result of all our relationships."

problems with maintaining just the existing stockpile. During the Cold War "yield to weight was the goal," Welch said in an April speech sponsored by the National Defense University Foundation. Ten warheads needed to fit aboard an ICBM, and 14 warheads on an SLBM.

This resulted in "exquisite designs" with "all kinds of esoteric, hard to handle materials in them," he noted.

Today, Welch said, technology exists to replicate the capabilities of the existing nuclear arsenal with safer, more reliable designs—if the nation chooses to do so.

The US can begin to evolve "to a stockpile of weapons that are robust, that have high margins, that have intrinsic safety and security at much higher levels," said the former USAF Chief of Staff and commander of Strategic Air Command. "Not only can we do that, we must do that," said Welch. There is no infrastructure for maintaining weapons long-term.

To avoid unpleasant surprises with the health of the existing stockpile, the US should begin work on new designs as soon as possible. Waiting 15 years is "pretty risky," he said.

"Current plans do not lead to qualitative changes in the sustainability of a reliable, safe, and secure weapons stockpile," reads the OSD memo. "Instead, the plan is to extend the life of Cold War weapons that were introduced during or before the 1980s."

The DSB was instructed to assess the current nuclear sustainment plan and to evaluate progress towards the goal of creating a new triad of strike capabilities featuring nuclear, advanced conventional, and non-kinetic systems. In regards to strategic strike, Welch noted that "the only thing that exists today with any capability is the nuclear triad."

The DSB was further tasked to examine ways to modernize the stockpile with "weapons that are simpler to manufacture" and which can be sustained with a less complex nuclear support infrastructure.

USAF Integrating Sensor Efforts

The Air Force wants to synchronize its battlespace awareness efforts, creating around-the-clock situational awareness through a variety of linked sensor platforms. Currently, USAF's various sensor platforms are not well-integrated, said Gen. Gregory S. Martin, head of Air Force Materiel Command.

There is potential to create "the effect of one system staring 24/7" if near-space capabilities are properly added to the mix, Martin told the Defense Writers Group in April. Air-breathing

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News Notes

By Tamar A. Mehuron, Associate Editor

■ President Bush on April 4 nominated Kenneth J. Krieg to be undersecretary of defense for acquisition, technology, and logistics, according to a White House news release. Krieg is currently DOD's director for program analysis and evaluation. Michael W. Wynne has been serving as acting undersecretary for acquisition since the May 23, 2003, resignation of Edward C. Aldridge Jr.

■ Heidi Shyu will be the new chair for the Air Force Scientific Advisory Board beginning Oct. 1. An electrical engineer from Raytheon, she has served as the vice chair of the SAB since 2003. She succeeds Daniel E. Hastings.

■ USAF and DOD gained some 230 newly minted scientists and engineers on their March 21 graduation from the Air Force Institute of Technology, Wright-Patterson AFB, Ohio. Among those Air Force personnel earning advanced degrees were more than 200 company grade officers, eight enlisted members, and five civilians. An additional 15 graduates included Army and Marine Corps officers and international students from Australia, Bahrain, and South Korea.

■ NATO will hold the first exercise for its Rapid Response Force in 2006 in the Cape Verde islands off the west coast of Africa, according to April 13 news reports.

■ A ring of laser lights surrounding Washington, D.C., was activated in May to warn commercial pilots who stray into the national capital's restricted airspace, according to NORAD and FAA officials. The lasers cast a narrow beam, enabling system controllers to focus on a sole aircraft. The beams cause no damage to the eye. FAA officials sent a special notice to pilots and briefed those who fly in the capital area about the new system.

■ A team of Russian military officers and nuclear security specialists visited F.E. Warren AFB, Wyo., April 8 on a Department of Energy-sponsored visit to share nuclear security procedures, following a US-Russia agreement reached in February.

■ Boeing received a $609 million contract for 30,072 Joint Direct Attack Munitions. Work is scheduled to be completed by February 2007.

■ A C-130 destined for the scrap heap has found new life as an aeromedical evacuation trainer for medics bound for Iraq and Afghanistan. It was acquired April 2 by the 381st Training Squadron's medical training flight at Sheppard AFB, Tex. The aircraft was modified to resemble field aircraft operating in combat conditions.

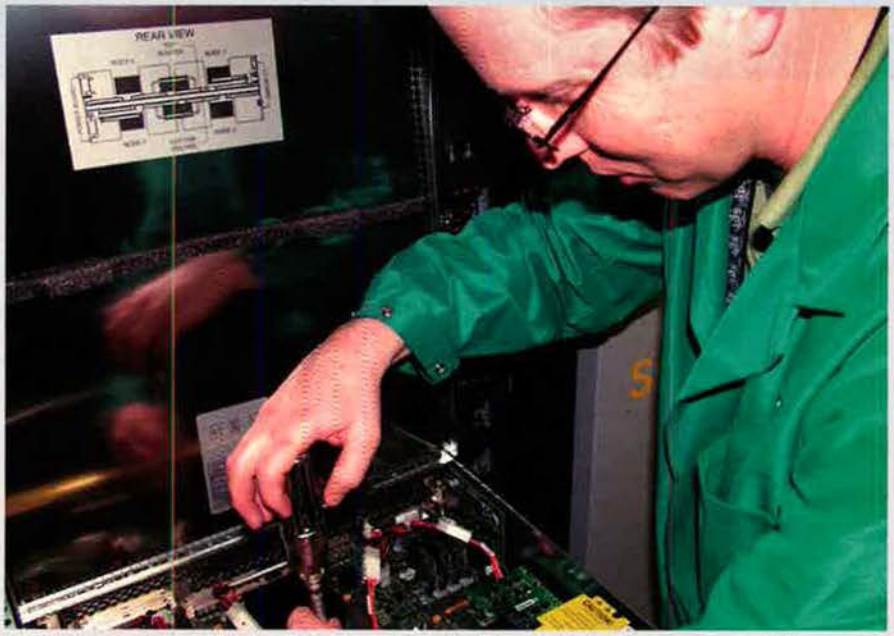
■ USAF awarded a $216 million contract to Boeing for communications work on B-52 aircraft. Work is scheduled to be completed by January 2010.

■ Federal agencies can now immediately accept veterans' letters of disability, along with their application for employment, to expedite hiring veterans. Officials at the Office of Personnel Management have changed the application on OPM's Web site to accept the letters. The change enables officials to evaluate claims for veterans' preference on government job applications online. The revisions to the online form align it with the Department of Veterans Affairs policy, which regards disability letters issued since 1991 as proof of a permanent disability. More information on veterans' preference can be found at www.opm.gov/veterans/html.

■ General Atomics-Aeronautical Systems, San Diego, received a contract worth $68 million for system development and demonstration of the MQ-9 unmanned aerial vehicle, the next generation armed version of the Predator UAV.

■ Air Force accident investigation officials have concluded that crew error was the chief cause of the crash of an MQ-1 Predator remotely piloted aircraft Sept. 22, 2004, at Indian Springs AFAF, Nev. The investigation report said that the pilot failed to correct the overly high angle of the Predator's nose during landing, in time to prevent a hard landing. Other key contributing factors were: wind shear, which caused the aircraft to lose airspeed late in the landing maneuver; pilot failure to correct an unstable final approach; pilot failure to decrease power to keep the aircraft on the runway; and sensor operator's failure to provide corrective calls for too much airspeed and vertical speed deviations. The UAV sustained more than $2.8 million in structural damage.

■ Two Predators being used for Operation Iraqi Freedom were involved in separate accidents just days apart. On March 26, an MQ-1 Predator crashed in the vicinity of Balad, Iraq, 40 miles north of Baghdad. Four days later, an MQ-1 Predator crashed in Rawah, Iraq, about 60 miles east of the Syrian border. The accidents are under investigation. There was no indication of a deliberate shootdown.



USAF photo by 1st Lt. David Cromwell

Contract employee Kevin Maloney installs DOD's newest and most powerful supercomputer at Aeronautical Systems Center's Major Shared Resource Center, Wright-Patterson AFB, Ohio. The SGI Altix 3700 Bx2 supercomputer increases the MSRC's computing capability to more than 4,100 processors spread across five shared memory systems, enabling the center to "simulate entire aircraft, entire weapon systems, and entire battlefield engagements with a fidelity not possible before now," noted Benn Stratton, with SGI Federal, in an April 25 ASC news release.

systems, such as the U-2 and Global Hawk reconnaissance aircraft, offer high resolution, but may be denied access. Space systems guarantee access, but are expensive and provide intelligence that is less detailed. Near-space systems will combine the benefits of both air and space systems, but are still not operational.

The Air Force must move now to ensure "tribal" tendencies are overcome, Martin said. Officials need to "work much harder on developing systems that are working on the same technical architecture."

Various air, space, and near-space systems must use the same "communications and data link spectrum so that they can not only share information" but actively communicate with one another, he said, and added, "That is not the case today."

To fix that, Martin said AFMC's Electronic Systems Center and Air Force Space Command's Space and Missile Systems Center have reached an agreement. ESC will be the "lead dog working on a national space situational awareness," while SMC develops the near-space systems themselves.

ESC and SMC will ensure that the battlespace awareness assets "exist in a synergistic relationship," as a new generation of sensors and communications platforms are developed, said Martin.

Photo courtesy of Rosana Weaver, The Leesville Daily Leader

An airman from the 3rd Air Support Operations Squadron, Eielson AFB, Alaska, stands inside a Stryker armored vehicle added to the Air Force inventory during a May 5 ceremony at Ft. Polk, La. The 3rd ASOS will use the Stryker to train the unit's Tactical Air Control Party airmen, alongside the soldiers they support at Ft. Polk.

Bonuses To Decline

Lt. Gen. Roger A. Brady, deputy chief of staff for personnel, recently told House lawmakers that the Air Force is cutting the number of career fields eligible for re-enlistment bonuses.

The service needs to make certain that bonuses do not "become an entitlements program," Brady said. If airmen have come to think of re-enlistment bonuses as an entitlement, he said, "they have been steadily disabused of that notion recently."

The War on Terrorism

Operation Iraqi Freedom—Iraq

Casualties

By May 3, a total of 1,587 Americans had died in Operation Iraqi Freedom. The total includes 1,583 troops and four Defense Department civilians. Of those fatalities, 1,211 were killed in action by enemy attack, and 376 died in noncombat incidents.

There have been 12,243 troops wounded in action during OIF. This includes 6,115 who returned to duty within 72 hours and 6,128 who were unable to quickly return to action.

Fighters Serve as Intelligence Platforms

Fighter aircraft operating in Iraq are performing new missions by serving as intelligence-gathering platforms, said Air Force Lt. Gen. Lance L. Smith, deputy commander of US Central Command.

"We have very good sensors on the airplanes," Smith said, according to an Air Force news release. "They are using those sensors to try and provide situational awareness to people on the ground."

Smith said this capability is being used to protect electrical lines and oil pipelines, in addition to more traditional missions such as providing overhead intelligence and air support to troops on the ground.

Fighter aircraft are flown by a "thinking, capable individual with a situational awareness" that can be relayed to ground forces, Smith noted. The fighters can also take action, because they are "armed and capable of going after whatever target happens to be down there."

Jammers Thwart IEDs

Ground forces in Iraq have reduced their casualties from improvised explosive devices (IEDs) by roughly 40 percent thanks to the extensive use of jamming devices, said Army Gen. Richard A. Cody, service vice chief of staff.

The Army initiated a multiphase strategy to defeat IEDs more than a year ago. There are "a combination of things we're doing" to stop the enemy explosives, Cody said. "We are buying millions of dollars' worth of jammers."

As many as 8,000 more jammers are on the way, according to press reports.

An Army spokesman said troops are encountering about 30 IEDs a day, but that roughly 40 percent—a dozen a day—are rendered inoperable by the jamming devices.

Operation Enduring Freedom—Afghanistan

Casualties

By May 3, a total of 184 US troops had died supporting Operation Enduring Freedom, primarily in and around Afghanistan. The total includes 72 troops killed in action and 112 who died in nonhostile incidents such as accidents.

A total of 591 troops have been wounded in Enduring Freecom. They include 144 who were able to return to duty within three days and 447 who were not.

Explosion Destroys Five Tanker Trucks

An accidental explosion at a refueling station about a mile from Kandahar airfield, in southern Afghanistan, destroyed five tanker trucks. At least three truck drivers (not Americans) were injured in the early morning blasts.

US Central Command officials quickly determined that the explosions were not terrorist acts. A spokeswoman said the April 17 blasts were caused by "faulty fuel tanks."

CH-47 Crash Kills 18

Eighteen Americans died April 6 when the CH-47 Chinook helicopter they were riding in crashed near Ghazni, Afghanistan. Fourteen soldiers, one marine, and three civilian contractors who worked for a Halliburton subsidiary died in the accident.

The CH-47 was flying a transport and supply mission. The Chinook was roughly 80 miles southwest of Kabul when it went down, in severe weather, while returning to Bagram Air Base.

Over the past two years, the number of career fields eligible for bonuses has been slashed from 44 to 12. Meanwhile, the number of Air Force specialty codes receiving selective re-enlistment bonuses has been cut from 62 to 32. These moves have saved taxpayers $132 million, Brady said.

The Air Force still has shortages in some critical career fields, so to remain competitive with lucrative private sector jobs, Brady said, the Air Force needs "flexibility to respond rapidly so that we don't pay bonuses we don't need, and we do pay those we do need."

USAF To Build IA Cadre

The days when the Air Force could rely on a group of self-trained individuals to serve as foreign area officers, providing cultural and linguistic skills for expeditionary operations, are over, according to Gen. John P. Jumper, Chief of Staff. The service now plans to "deliberately develop" a cadre of airmen with "international insight, foreign language proficiency, and cultural understanding," he said in a widely distributed policy memo.

These new experts will become a cadre of international affairs specialists (IASs).

The Air Force plans to identify mid-career line officers "with potential to excel as IASs," said Jumper.

The new specialists will go into one of two tracks. Regional affairs strategists will spend three years earning a graduate degree with language training, then alternate between their primary Air Force specialty code and regional affairs assignments.

Political-military affairs strategists will spend a year earning an international affairs degree. They will develop broader skills and go into career broadening assignments. This should develop officers with an "advanced awareness of the international context in which we will apply air and space power," Jumper wrote.

Officials said in a release that the first IAS selections will be made by this summer, and those officers—about 100—will enter training in summer 2006. The next year, the service plans to select around 150 for training and 210 each year thereafter until it builds a force of 2,500 to 3,000 specialists.

"The goal is clear," said Jumper—develop professional airmen with international insight, as "a crucial force multiplier."

Old Fighters Are Problematic

Among the fighters facing aging aircraft problems, the Air Force's fleet of F-15 Eagles "is in probably the most serious trouble," said Gen. Gregory S. Martin, chief of Air Force Materiel Command. The A through D model Eagles are beginning their third round of engine overhauls—something they were never designed for—and the exterior surfaces are becoming weak, he said.

"The constant water intrusion, freezing, ... contraction, and expansion have caused delaminations," Martin told the Defense Writers Group April 13. "Those aircraft now are under airspeed restric-

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tions, as a fleet, because they are 23 years old."

USAF's aging A-10s and F-16s face their own unique sets of challenges and require constant attention to stay effective.

"The A-10 has a pretty good airframe life left, but it's underpowered and [the Air Force is] working on an engine derivative to upgrade its engine," Martin explained. The Warthog's precision engagement upgrade, enabling the A-10 to use advanced targeting pods and fire digital weapons, is also important, he said.

The F-16, meanwhile, was designed to never need programmed depot maintenance (PDM), Martin said. But the intense use of the aircraft has forced a series of structural upgrade programs. It has come to the point that the F-16 is "almost into a PDM-type of mode ... because you're finding, about every five years," that a major service life extension is necessary.

Overall, Martin said, the F-16 fleet is in "pretty good shape, but we have to stay on top of it."

USAF, ANG Sign Historic MOUs

Air Force and Air National Guard officials recently signed memoranda of understanding for two of USAF's Future Total Force integration test cases. The Air Force plans to test six new proposals to reshape the way the service trains, equips, and employs its active and reserve forces. (See "Editorial: The Unified Air Force," January, p. 2.)

One MOU, signed in early April, lays out the details for the ANG's new "associate wing" at Langley AFB, Va. The Virginia Guard's 192nd Fighter Wing, Richmond Arpt., Va., will team with Langley's 1st Fighter Wing to fly and maintain the F/A-22 Raptor, making the Guard unit a partner in the operational establishment of this new weapons system.

The second MOU, signed in late April, provides for some new active duty pilots to serve two-year tours in Vermont, where they will integrate into the community and hopefully benefit from a close relationship with the highly experienced Guardsmen of Vermont's 158th Fighter Wing, Burlington Arpt., Vt.

Agreements on the remaining FTF proposals had not yet been signed by early May. The other cases involve active and reserve component units in Arizona, Nevada, New York, Texas, and Utah.

Vandenberg Launches Microsat

An experimental 220-pound microsatellite was launched April 11 from

Senior Staff Changes

NOMINATIONS: To be **Lieutenant General:** Kevin P. **Chilton.** To be **Major General:** Melissa A. **Rank.** To be **Brigadier General:** Salvatore A. **Angelella,** Andrew E. **Busch,** Arthur B. **Cameron III,** Susan Y. **Desjardins,** Richard T. **Devereaux,** Judith A. **Fedder,** Eric E. **Fiel,** Jonathan D. **George,** Mark W. **Graper,** Bradley A. **Heithold,** Susan J. **Helms,** Peter F. **Hoene,** Darrell D. **Jones,** Duane A. **Jones,** Noel T. **Jones,** Robert C. **Kane,** Stanley T. **Kresge,** Michael A. **Longoria,** Charles W. **Lyon,** Otis G. **Mannon,** Susan K. **Mashiko,** Darren W. **McDew,** Clyde D. **Moore II,** Douglas H. **Owens,** John I. **Pray Jr.,** David E. **Price,** Philip M. **Ruhlman,** David J. **Scott,** Dana A. **Simmons,** Paula G. **Thornhill,** Suzanne M. **Vautrinot,** David B. **Warner,** Lawrence L. **Wells,** Janet C. **Wolfenbarger,** Daniel P. **Woodward,** Scott E. **Wuesthoff.**

PROMOTIONS: Tc **General:** Michael V. **Hayden.** To **Lieutenant General:** Robert D. **Bishop Jr.,** Michael A. **Hamel,** Christopher A. **Kelly.** To **ANG Brigadier General:** John C. **Inglis.**

RETIREMENTS: Lt. Gen. Thomas B. **Goslin Jr.,** , Maj. Gen. William W. **Hodges,** Brig. Gen. Neal T. **Robinson,** Brig. Gen. Gregory L. **Trebon,** Maj. Gen. Craig P. **Weston,** Brig. Gen. Ronald D. **Yaggi.**

CHANGES: Brig. Gen. Chris T. **Anzalone,** from Vice Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga., to Dep., Test & Assessment, MDA, USD, AT&L, Arlington, Va. ... Brig. Gen. Ted F. **Bowlds,** from Dep. for Acq., ASC, AFMC, Wright-Patterson AFB, Ohio, to Vice Cmdr., SMC, AFSPC, Los Angeles AFB, Calif. ... Brig. Gen. Philip M. **Breedlove,** from Cmdr., 31st FW, USAFE, Aviano AB, Italy, to Cmdr., Air Forces Europe, Ramstein AB, Germany ... Brig. Gen. Bruce E. **Burda,** from Dir., Ops., AFSOC, Hurlburt Field, Fla., to Cmdr., 455th AEW, ACC, Bagram AB, Afghanistan ... Maj. Gen. Charles E. **Croom Jr.,** from Dir. C4ISR Infostructure, DCS, Warfighting Integration, USAF, Pentagon, to Dir., DISA, Arlington, Va. ... Brig. Gen. David M. **Edgington,** from Vice Cmdr., Air Armament Center, AFMC, Eglin AFB, Fla., to MAD, Global Power, Asst. SECAF (Acq.), Rosslyn, Va. ... Brig. Gen. Burton M. **Field,** from Dep. Dir., Politico-Military Affairs (Western Hemisphere), Jt. Staff, Pentagon, to Cmdr., 1st FW, ACC, Langley AFB, Va. ... Brig. Gen. (sel.) Frank **Gorenc,** from Cmdr., 1st FW, ACC, Langley AFB, Va., to Cmdr., 332nd AEW, ACC, Balad, Iraq ... Brig. Gen. David S. **Gray,** from Cmdr., 89th AW, AMC, Andrews AFB, Md., to Cmdr., Air Mobility Warfare Center, AMC, Ft. Dix, N.J. ... Lt. Gen. Michael A. **Hamel,** from Cmdr., 14th AF, AFSPC, Vandenberg AFB, Calif., to Cmdr., SMC, AFSPC, Los Angeles AFB, Calif. ... Brig. Gen. (sel.) Blair E. **Hansen,** from Cmdr., 332nd AEW, ACC, Balad, Iraq, to Vice Cmdr., 9th AF, ACC, Shaw AFB, S.C. ... Gen. Michael V. **Hayden,** from Dir., NSA, Ft. Meade, Md., to Principal Dep. Dir., Natl. Intel., Washington, D.C. ... Brig. Gen. (sel.) Bradley A. **Heithold,** from Cmdr., 347th Rescue Wing, AFSOC, Moody AFB, Ga., to Vice Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga. ... Brig. Gen. James P. **Hunt,** from Cmdr., 455th AEW, ACC, Bagram AB, Afghanistan, to Dep. Dir., Jt. Warfighting Capability Assessments, Jt. Staff, Pentagon ... Brig. Gen. Larry D. **James,** from Vice Cmdr., SMC, AFSPC, Los Angeles AFB, Calif., to Dir., Signals Intel. Sys. Acq. & Ops., NRO, Asst. SECAF (Space), Chantilly, Va. ... Lt. Gen. Christopher A. **Kelly,** from Cmdr., Air Mobility Warfare Center, AMC, Ft. Dix, N.J., to Vice Cmdr., AMC, Scott AFB, Ill. ... Brig. Gen. (sel.) Donald **Lustig,** from Asst. Dep. Dir., Intl. Negotiations, Multilateral Affairs, Jt. Staff, Pentagon, to Vice Cmdr., Tanker Airlift Control Center, AMC, Scott AFB, Ill. ... Brig. Gen. Allen G. **Peck,** from Vice Cmdr., 9th AF, ACC, Shaw AFB, S.C., to Dep. CFACC, CENTCOM, Al Udeid AB, Qatar ... Brig. Gen. (sel.) John I. **Pray Jr.,** from Cmdr., 436th AW, AMC, Dover AFB, Del., to Cmdr., 89th AW, AMC, Andews AFB, Md. ... Maj. Gen. (sel.) Winfield W. **Scott III,** from Dep. Dir., Prgms., DCS, P&P, USAF, Pentagon, to Cmdr., Tanker Airlift Control Center, AMC, Scott AFB, Ill. ... Maj. Gen. Norman R. **Seip,** from Dep. CFACC, CENTCOM, Al Udeid AB, Qatar, to Spec. Asst. to DCS, Air & Space Ops., USAF, Pentagon ... Brig. Gen. Mark D. **Shackelford,** from Dep., Test & Assessment, MDA, USD, AT&L, Arlington, Va., to Dir., Rqmts., AFSPC, Peterson AFB, Colo. ... Maj. Gen. William L. **Shelton,** from Dir., Policy Resource & Rqmts., STRATCOM, Offutt AFB, Neb., to Cmdr., 14th AF, AFSPC, Vandenberg AFB, Calif. ... Maj. Gen. Mark A. **Welsh III,** from MAD, Global Power, Asst. SECAF (Acq.), Rosslyn, Va., to Dep. Cmdr., Jt. Functional Component Command for ISR, STRATCOM, Bolling AFB, D.C. ... Brig. Gen. (sel.) Robert **Yates,** from Asst. Dir., Air & Space Ops., ACC, Langley AFB, Va., to Cmdr., 31st FW, USAFE, Aviano AB, Italy.

COMMAND CHIEF MASTER SERGEANT RETIREMENTS: CMSgt. Donald W. **Hatcher,** CMSgt. Karl W. **Meyers.**

CCMS CHANGE: CMSgt. David K. **Andrews,** to CCMS, 11th AF, Elmendorf AFB, Alaska.

SENIOR EXECUTIVE SERVICE RETIREMENT: Clifford E. **Rhoades Jr.**

SES CHANGES: Kenneth S. **Callicutt,** to Dir., Capability & Resource Integration, STRATCOM, Offutt AFB, Neb. ... Lorna B. **Estep,** to Spec. Asst. to Dir., Supply Mgmt., AFMC, Wright-Patterson AFB, Ohio ... Terry J. **Jaggers,** to Dep. Asst. Secy. (Science, Tech., & Engineering), Asst. Secy. (Acq.), Pentagon. ▪

Vandenberg AFB, Calif. It was boosted into polar orbit aboard a Minotaur I, which pairs components of decommissioned Minuteman II ICBMs with the commercial Pegasus rocket.

The self-maneuvering Experimental Satellite System 11 (XSS-11) spacecraft is an Air Force Research Laboratory project.

"Both the launch vehicle and the spacecraft represent state-of-the-art responsive space systems," said Lt. Col. Gary Henry, commander of the 1st Air and Space Test Squadron at Vandenberg.

The Air Force has high hopes for microsats. "XSS-11 is only a harbinger of even greater things to come with very small, highly capable spacecraft," Henry said.

The XSS-11 is designed to rendezvous with a resident space object, which it will then circumnavigate and inspect in a series of "extended proximity operations," stated a USAF news release. The microsat also is to demonstrate technologies NASA may use to collect samples of rocks and soil from Mars and return them to Earth.

C-17s Make Polar Drop

The C-17 on April 12 was used for a polar airdrop for the first time. The mission from McChord AFB, Wash., "air-dropped life-sustaining cargo to National Science Foundation scientists at the North Pole," an Air Force news release stated. The last polar airdrop was flown in 2001 by a C-141.

For the mission, a pair of C-17s flew a nonstop 12-hour mission to deliver roughly 10,000 gallons of fuel to the scientists. Pilots visually identified the drop zone, and loadmasters jettisoned the pallets from an altitude of 1,000 feet.

Polar missions can be unpredictable. Flying to "extreme latitudes" and near magnetic north can wreak havoc on an aircraft's instruments. Three months of planning went into this mission, said Maj. Travis England, mission director, so that crews could prepare for abnormalities. "As the aircraft flies near magnetic north, the compass needle may actually point in the wrong direction, leading [aircraft] off the proper flight path," the release explained. ■

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Vets Disability Commission

The Veterans' Disability Benefits Commission, controversial since it was conceived in fall 2003, held its first meeting in May. Formation of the commission was brokered by the Administration when it agreed to the House Republican plan to relax the century-old ban on concurrent receipt of military retirement and disability compensation.

Advocates for disabled veterans look upon the 13-member bipartisan panel with suspicion, viewing it as linked to the proposal in 2003 to limit the eligibility for disability pay of future veterans to those whose injuries or illnesses result from performance of duty. Current disabilities are deemed service-connected, and therefore compensable, if the injury or illness occurred while the member is on active duty.

Veterans associations were so outraged by the proposal that it was quickly withdrawn. Instead, Congress and the White House agreed to a limited lift of the ban—for those most seriously disabled only—and to create a commission, whose stated purpose is to review current disability programs and, if needed, recommend reforms.

The Senate majority and minority leaders appointed two commissioners apiece, as did the Speaker of the House and House minority leader. The President named five. The law directs that a majority of the commissioners must have earned combat decorations of Silver Star or higher. Retired Army Lt. Gen. James Terry Scott, 62, the President's choice to chair the commission is a highly decorated infantry officer who served combat tours in Vietnam and Operation Desert Storm and commanded US Army Special Operations Command at Ft. Bragg, N.C.

The law directs Scott and fellow commissioners to provide recommendations on the "appropriateness" of current benefits and standards for determining whether a disability or death should be compensated. The commission's final report is due to Congress and the White House by Sept. 9, 2006.

—Tom Philpott

Action in Congress

By Tom Philpott, Contributing Editor

More on Reserve Tricare; Compensation for Traumatic Injury; Recruit Incentives for Guard and Reserve ....

Expanding Tricare for Reserves

Sen. Lindsey Graham (R-S.C.), new chairman of the Senate military personnel subcommittee, says he is confident Congress this year will vote to open Tricare Standard to drilling Guard and Reserve members to recognize their increased role in fighting the war on terrorism.

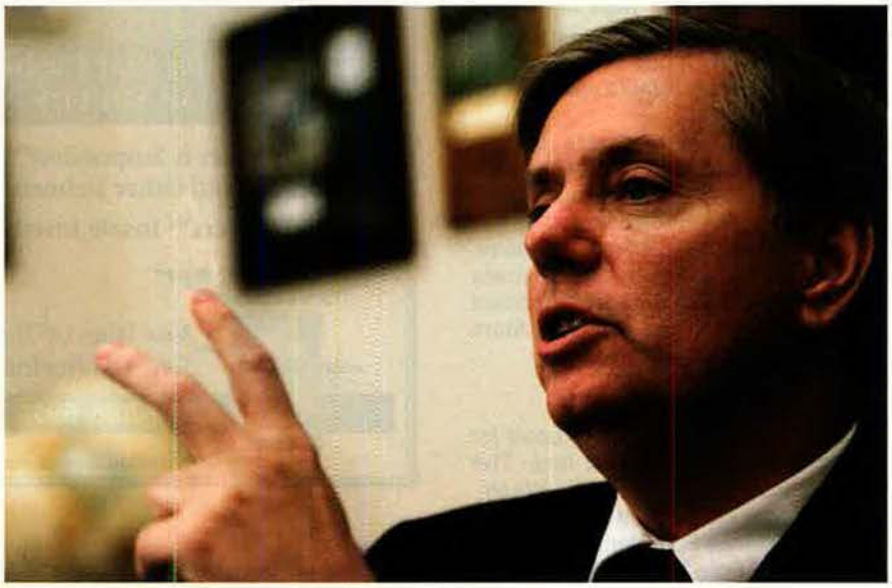
Graham and a bipartisan group of lawmakers introduced the Guard and Reserve Readiness and Retention Act of 2005 (S 337 and HR 558), which would allow any drilling reserve member to use Tricare Standard, the military's fee-for-service health care option. It also would lower the retirement age for reservists, based on years served. Current reserve retirement begins at 60. (See "Action in Congress: New Legislation," April, p. 27.)

In early April, when Graham chaired his first subcommittee hearing, he described prospects for opening Tricare Standard to drilling reservists as "excellent."

However, David S.C. Chu, undersecretary of Defense, suggested at the hearing that an improved Tricare plan for reservists is unnecessary.

Only last year, Congress approved Tricare Reserve Select (TRS), a scaled-down version of Tricare Standard. Enrollment began April 26. TRS is only available to reserve component members who deactivate from post-9/11 deployments. They must have served at least 90 continuous days of active service. For every 90 days activated, they are allowed a year of TRS coverage. Enrollees also must sign a binding agreement to remain in drill status for the duration of TRS coverage. They pay monthly premiums of $75 for member-only TRS or $233 for family coverage. They also pay the usual Tricare Standard fees, co-payments, and deductibles.

Given operational demands on Guard and Reserve forces, Graham said, TRS just isn't enough. He wants Tricare Standard open to all drilling reservists and their families with no monthly premiums, extended service commitments, or other TRS strings attached.



AP photo by Gerald Herbert

Graham says Tricare Reserve Select isn't enough.

S 337 had 17 co-sponsors by mid-May. Graham said he expected at least 70 Senators to back the plan when he offers it later this year as a floor amendment to the 2006 defense authorization bill. Seventy is the number of Senators who supported a more ambitious reserve health care plan from Graham last year.

Graham also noted that more than 300 House members had endorsed a motion to instruct House conferees who worked on the Fiscal 2005 defense bill to agree to the Senate's reserve health plan. Again, Graham said, that gesture left him confident that Congress will vote again for better health care benefits for drilling reservists.

The projected cost of the health care portion of S 337 is $3.8 billion over five years. That, said Graham, is half of last year's estimate. He lowered the cost by limiting the reserve benefit to Tricare Standard only, excluding an option for Tricare Prime, the military managed care package. He also dropped a provision that would have required the government to cover the cost of premiums paid by reservists who elect to keep private health insurance during mobilization.

Traumatic Injury Insurance

A service member severely injured in war would receive swift lump-sum compensation of $25,000 to $100,000 under a rider clause to Servicemembers' Group Life Insurance (SGLI). The Senate approved the change in mid-April as part of the wartime emergency supplemental bill.

Enactment virtually was assured since defense officials endorsed what is called traumatic injury insurance. The cost would be paid by a $1 increase in all monthly SGLI premiums. Payments would be retroactive to Oct. 7, 2001, for severely injured service members who fought in Afghanistan and Iraq.

Three soldiers severely wounded in Iraq—SSgt. Heath Calhoun, Sgt. Jeremy W. Feldbusch, and SSgt. Ryan Kelly—proposed the traumatic injury legislation to Sen. Larry Craig (R-Idaho), chairman of the Senate Veterans' Affairs Committee. Craig then introduced it as an amendment to the wartime supplemental moving through Congress.

Families of the three soldiers, two of whom lost limbs and a third his eyesight in Iraq, had suffered financial hardship as the soldiers struggled through long rehabilitations. The soldiers brain-

stormed the traumatic injury rider to SGLI as a way to prevent other families from suffering similar hardships.

Injuries covered will include loss of limbs, blindness, loss of speech or hearing, paralysis, severe burns, and traumatic brain injuries. Payments would vary by the severity of injuries.

"The difference it will make on the family unit during convalescence is tremendous," Kelly told a Capitol Hill press conference. He had lost his right leg to a roadside bomb. But the financial stress during rehabilitation, he said, far outweighed his physical stress.

Preventing G&R Manning Crisis

Congress is now considering 10 ambitious recruiting and retention incentives from Lt. Gen. H. Steven Blum, chief of the National Guard Bureau. He believes they will be needed to help avert a manning crisis over the next several years.

The Army National Guard currently is short some 15,000 soldiers. The Air National Guard is only about 400 shy of its target, but ANG leaders still believe Congress should expand monetary options to aid future recruiting and retention efforts.

Lawmakers are studying measures that would:

- Raise the enlistment bonus ceiling to $40,000 for the Army and Air National Guard.
- Change the bonus dollars offered to prior-service members who still have service obligations from the current $50 per month to a lump-sum bonus of $10,000.
- Increase reserve Montgomery GI Bill education benefits to equal 50 percent of active duty MGIB benefits. Reserve benefits for a full-time student would climb from $288 to $502 per month.
- Allow reserve members to transfer unused education benefits to immediate family members.
- Change tax laws to make all reserve enlistment and retention bonuses and incentives tax free.
- Provide $400 million in "quick ship" bonuses to entice recruits to enter service in off-season months to keep training pipelines full. These amounts would be paid on top of enlistment bonuses.
- Double to $4,000 the current $2,000 bonus offered for converting a reservist's military specialty to a skill in greater demand. This would be separate from, and could be paid concurrently with, other bonuses.
- Offer a new $2,500 bonus to current National Guard members who refer a qualified prospect to enlist. Payment would be tied to the prospect of qualifying for an occupational specialty. The Army Guard would spend $25 million a year on this program, in 2005 and 2006, and the Air National Guard half that amount.
- Offer term of enlistment options from two years up to six years, providing those opting for shorter terms with reduced bonuses.
- Remove a legal limitation that sets a maximum of one six-year and two three-year re-enlistment bonuses. The proposed change would permit bonuses of one to six years until the reservist reaches 18 years of service.

Death Benefits

The Senate approved, as the House had earlier, a combined increase in military death benefits of $238,000 as part of the Fiscal 2005 Emergency Supplemental Appropriations Act (HR 1268). However, their separate versions of the bill took different paths in applying the increases to active duty deaths. (See "Action in Congress: Death Benefits To Rise," May, p. 34.)

A House-Senate conference committee will meet to reconcile disparities between the two bills before final passage.

The House bill would apply the added $88,000 death gratuity to deaths resulting from injuries or illnesses incurred during Operation Enduring Freedom in Afghanistan or Operation Iraqi Freedom in Iraq and Kuwait as determined by regulation to be written by the Secretary of Defense. The additional $150,000 in SGLI would be paid in cases of death resulting from injuries or illnesses incurred "in the performance of duty," a broader definition than that used for the death gratuity.

The Senate approved an amendment from Sen. John F. Kerry (D-Mass.) to have the death gratuity gains applied to all active duty deaths back to Oct. 7, 2001. The Senate increase to SGLI, however, would apply retroactively only to deaths tied to combat.

Reserve Pay Replacement

In its version of the wartime supplemental, the Senate approved an amendment from Sen. Richard Durbin (D-Ill.) that would require the government to make up for any overall pay cut felt by federal civilian employees who have been mobilized as reservists for the war on terrorism.

Durbin argues that the Administration should do for federal civilians who serve as reservists what the Defense Department encourages private sector employers to do.

An estimated 26,000 federal employees are serving on active duty in Iraq, Afghanistan, and other locations. Their military pay, on average, is $3,000 less than their federal civilian salaries, according to the Congressional Budget Office. Durbin's amendment would ensure that they receive the difference, matching the practice of some private companies.

The Senate agreed to an identical amendment from Durbin last year; however it was stripped out of last year's wartime supplemental when a House-Senate conference committee met to iron out differences in their bills.

GI Bill of Rights

House Democrats in April reintroduced the GI Bill of Rights for the 21st Century, which includes a host of proposed military personnel and veterans benefit gains. (See "AFA in Action," p. 85.)

The provisions include:

- Eliminating the offset that occurs in Survivor Benefit Plan annuities when widows draw Dependent and Indemnity Compensation from the Department of Veterans Affairs.
- Adding $3.2 billion to the Bush Administration's budget request to provide full funding to the VA.
- Ending what remains of the ban on concurrent receipt of military retirement and VA disability compensation, to include veterans with disability ratings of less than 50 percent.
- Increasing Montgomery GI Bill benefits.

Unemployable Update

The Senate attached to its 2005 wartime supplemental appropriations bill a "sense of the Senate" provision urging defense officials to allow 28,000 military retirees rated unemployable by the VA to be paid full military retirement in addition to their VA disability compensation. Sens. Harry Reid (D-Nev.) and Carl Levin (D-Mich.) proposed the amendment.

The measure would correct what many lawmakers consider a misinterpretation of the accelerated concurrent receipt initiative Congress passed last year. At present, DOD applies the initiative only to 23,000 retirees rated 100 percent disabled by the VA. It does not apply it to retirees who the VA has deemed unemployable but who have ratings less than 100 percent.

A "sense of the Senate" notation is a nonbinding request that DOD does not have to follow. Analysts believe the department will not agree to restore full retired pay to the unemployable population without formal clarification of the law by Congress.

Reid vowed that if, as expected, defense officials ignore the sense of the Senate provision, he would try to include binding language in the 2006 defense authorization bill, directing restoration of full retired pay back to Jan. 1 of this year. ■

Lockheed Martin photo

The F-35, Ready

The services have slashed the fighter's weight and changed its milestones to get the program back on track.

for Prime Time?

By Adam J. Hebert, Senior Editor

THE past year has been a turbulent one for the huge Joint Strike Fighter project. Manufacturers began assembling the first flying F-35, making the transition from abstract design to well-defined aircraft. Then, however, program officials concluded that they needed to slow things down. Weight problems had cropped up. The design was seen to be immature.

A year ago, JSF officials were just beginning to come to terms with program shortcomings. (See "The F-35 Gets Real," March 2004, p. 44.) It was during preparations for the critical design review (CDR) that "we really saw the performance [problems] ... manifesting themselves," said Rear Adm. Steven L. Enewold, JSF program director.

Indeed, Enewold and others concluded the aircraft was not ready for CDR.

An end of 2004 assessment by the contractor, Lockheed Martin, noted that the F-35 program is "the most complex fighter program ever undertaken." As a result, it warned, "serious" problems can erupt "with remarkably short notice."

The F-35 was overweight, with the worst offender being the short takeoff and vertical landing (STOVL) variant. It had surpassed its limit by a whopping 3,000 pounds.

Recognizing that complex fixes were required, the program office slammed on the brakes. Major events—critical design review, first flight, initial operational capability—all were delayed by one to two years.

Ruthless Weight Cuts

The contractors and program office assembled a weight reduction team and attacked the problem from several directions. Roughly 2,700 pounds was cut from the STOVL aircraft, and the "equivalent" of 600 additional pounds was eliminated by improving the propulsion system and increasing thrust. The STOVL weight savings trickled down to the other variants.

The end result, according to program officials, is that the three F-35 variants are again projected to meet all key performance parameters. Critical warfighting capabilities are still being met, and a realistic schedule is in place.

The Air Force will buy both the F-35A conventional takeoff and landing (CTOL) variant to replace its huge fleet of F-16s and the F-35B STOVL jump jet as a follow-on to the A-10 attack aircraft.

The Marine Corps is buying the F-35B to replace its fleet of old F/A-18 Hornets and AV-8 Harriers. The Navy will use the carrier-capable F-35C as the replacement for its older F/A-18.

Enewold said he is cautiously optimistic that the F-35 will arrive on time to meet DOD's urgent need for new combat aircraft.

"We laid out a schedule for ourselves last June," Enewold noted in an interview with *Air Force* Magazine. Since the program was restructured, F-35 development has stayed on schedule.

It had better. Three US armed services—not to mention foreign customers—are depending on the arrival of this airplane, and there is no more flexibility to accommodate delays.

Projected IOC for Marine Corps aircraft is 2012. For USAF and Navy fighters, the IOC year is 2013. These new dates mark a two-year postponement for the Marine Corps and Air Force and one year for the Navy. Enewold said his program office considers the new dates inviolable.

For the Marine Corps, timing is critical. The service long ago passed up the opportunity to acquire the new F/A-18E/F Super Hornet fighter and chose to wait for the more advanced JSF. It can't afford a holdup. According to Enewold, the Corps wants to avoid having to pay for major structural rework to its F/A-18s or postpone planned retirement of its old Harriers.

The Air Force has not yet decided how many of each JSF type it will order. The service has "made no commitment" about how many of its 1,763 F-35s will be STOVL and how many conventional, said Enewold. As for the possible STOVL procurement, he said, "I've heard anything from 100 to ... 500."

To the Air Force, even the total quantity is in play. Gen. John P. Jumper, the Air Force Chief of Staff, said, "I think that we will see an overall decrease" in the planned procurement of F-35s. Because of JSF's greater capabilities and expected reliability, he pointed out, it is probably not necessary to trade F-16s and A-10s on a "one-for-one" basis.

"Clearly the JSF will be vastly superior to the aircraft it replaces," noted Maj. Gen. Donald J. Hoffman, Air Combat Command requirements director. ACC is currently evaluating the number of STOVL and CTOL F-35s needed for future operational requirements.

The most specific public estimate of Air Force needs came from the Government Accountability Office. In a March report, GAO wrote that ACC officials told them last December, "The Air Force is considering buying about 250 [STOVL] JSFs and about 1,300 [CTOL] JSFs. This would reduce the total number of [F-35s] to be acquired by 213."

The Needs of Foreign Partners

One of the F-35's unique aspects is the massive amount of foreign participation in the program. The United Kingdom has a special role in the fighter's development and has committed to buying 150 short takeoff and vertical landing variants for the Royal Air Force and Navy. Other international partners include Australia, Canada, Denmark, Italy, the Netherlands, Norway, and Turkey, and they are contributing various levels of manpower, money, and expertise to the program. In 2004, Singapore and Israel joined the program as "security cooperation participants."

Rear Adm. Steven L. Enewold, Joint Strike Fighter program director, observed that recent program delays leave very little room for error for a couple of partner nations.

The British and Australians "are very dependent upon our success because they've already started planning ... the actual retirement of some of their systems," he said. "They're counting desperately on us to fill their force structure," so that geriatric British Harriers and Australian F-111s can be retired as planned.

The British are "in more critical shape than we are, frankly," said Enewold. That nation has already committed to drawing down its Harrier force and retiring three aircraft carriers. Two new British carriers—designed with the F-35 in mind—are being built, but now the first of those will likely be completed before its aircraft are ready.

Australia, meanwhile, will start phasing out its F-111s around 2012. That nation is also looking for new fighters at the very beginning of the JSF production run.

This spring, the program began formal negotiations with the international partners to create international production and sustainment plans. "When you get into sustainment, every one of the international countries [has] aspirations of doing things in their own country," Enewold noted. The program office will determine "what we think is the most economical, cost-effective plan."

For example, three major F-35 repair facilities might be desirable—one each in the US, Europe, and the Pacific. This would ensure that F-35s do not have to return to the United States for engine overhauls and other maintenance that can be performed in-theater.

"Every country thinks that their country's the right place to do that," Enewold said. There is already a term for the nationalistic outcome that is the likely result: "pay to be different."

If national aspirations get in the way of overall program efficiency, "we'll have that discussion" later, Enewold said. The plan is to have a signed memorandum of understanding about international participation ready by the end of 2006.

Lockheed Martin photo

The Air Force's primary Joint Strike Fighter purchase will be the F-35A. This conventional takeoff and landing variant will replace the F-16 and is the simplest and least expensive of the three designs. The concept demonstrator is pictured.

USAF Rebuffed

An Air Force move to trim F-35 purchases was rebuffed by senior Pentagon leaders last December. In the Fiscal 2006 budget drills, DOD left the JSF budget untouched even as it slashed funding for F/A-22 and C-130J aircraft.

Getting the F-35 is important for the Air Force but, as the IOC dates show, slightly less urgent than it is for the Marine Corps. All things considered, officials say that USAF's legacy strike

Lockheed Martin photo

Lockheed Martin is assembling the first flying F-35 in Fort Worth, Tex. Above is the Northrop Grumman-built center fuselage, which arrived in Texas on May 3. It will be joined to a Lockheed-built forward fuselage and a BAE Systems aft fuselage.

fighters are still in decent shape, buying the Air Force some time while the F-35 develops.

A-10s have been heavily tasked in Afghanistan and Iraq for more than two years. Thanks to attentive maintenance, and "with serious input from [the] users," the health of the 22-year-old Warthog is good, said Maj. Gen. Elizabeth Ann Harrell, ACC director of maintenance and logistics.

F-16s have "different challenges," Harrell noted. They fly more stressful profiles. ACC could "beef up the airframe," she explained, but no one can calculate the long-term prospects for KC-135-type corrosion or similar problems.

USAF recently decided to upgrade every one of its 356 Warthogs to an A-10C configuration. This adds precision weapons capability, updated cockpits, and, in conjunction with A-10 structural upgrades, allows the service to buy STOVL F-35s later in the production run than it first thought would be required. The Air Force has structural and performance improvements planned for the F-16 as well.

Thus, the Air Force still has several years to sort out exactly how many F-35Bs it wants. Air Force-specific changes to the F-35 are considered "post-system design and development" changes, which will be made later in the program. This activity will lead to a STOVL in-service date of approximately 2014, a program official said.

The F-35 is expected to be vastly superior to both of the aircraft that it is replacing. Hoffman noted that this creates a delicate balancing act in planning future inventories.

On official charts of the Air Force fighter force, lines corresponding to yearly aircraft inventories make a steep decline for several years, bottom out and stay low for a while, and then turn back upward. This graphical depiction—a line high at either end, with a major depression in between—is referred to as the "fighter bathtub," in that it resembles the curve of a bathtub. The Air Force is "trying to minimize the bathtub"—meaning, the shortage of fighters the service will suffer later this decade as F-16s begin to age out and before the F-35 is ready to replace them in bulk. With 10 rotating Air and Space Expeditionary Forces to equip, small fleets don't "divide well," said Hoffman.

No "Capabilities Gap"?

Yet, people rarely talk about a fighter "capabilities gap," because there probably isn't one, Hoffman said. If analysts were to count the number of precision weapons USAF's fighter fleet can deliver rather than the number of fighter "tails" on the ramps, the tally would not show the same sort of bathtub, he noted.

Enewold said it is no accident the F-35 earned DOD's support once again late last year. The program had just shown the ability to work through its weight and design problems. Heading into the planned design review in the spring of 2004, the program was "very technically unstable," Enewold said.

Since that time, progress has been made in overall design, engine testing, and assembly of flying aircraft. There are a "whole lot of things that seem to be coalescing now," Enewold said. Without progress over the past year, "we would not have done very well" in the recent budget deliberations, he said.

The F-35 program has been helped politically by its sheer scope and magnitude. It is the largest acquisition program the Pentagon has ever known, with huge numbers of industrial connections. JSF will be a family of highly versatile aircraft. "We're going to be darn good" at

Lockheed Martin photo

The first short takeoff and vertical landing F-35Bs—one is pictured here—will go to the Marine Corps and Britain. The Air Force will later buy more than 200 of the design to replace the A-10 attack aircraft.

almost every fighter mission, Enewold said, "and the best overall."

Because several different programs would be needed to replace JSF, the massive program is actually "probably the most cost-effective" way to meet a wide range of future warfighting needs, he said.

For the US Air Force, US Marine Corps, Royal Air Force, Royal Navy, and others that may buy the STOVL version of the F-35, there may be no realistic alternative.

The Air Force recently discovered that its A-10s were the only fighters that could operate from many of the short and rough airfields in and around Afghanistan, said USAF Brig. Gen. (sel.) Charles R. Davis, JSF deputy director. That helped drive the requirement for the F-35 STOVL to replace the A-10.

"When you start talking about expeditionary ops, especially forward deployed people, I don't see any alternative to the STOVL version," said Enewold. Nothing else in development will "get up close to the battlefield" like a short takeoff fighter.

Plans call for equipping the Marine Corps, RAF, and Royal Navy with essentially the same type of STOVL F-35, but the Air Force has unique needs. For example, the service does not need to take off within 550 feet, from the deck of a warship, as is the case with the Marine Corps. For the Air Force, a short takeoff distance is 3,000 feet. The difference provides the flexibility to add additional fuel or weapons for combat.

And Air Force discussions with the Army have produced some specific F-35 preferences. Col. Dave Watt, director of ACC's JSF management office, has noted there is great interest in smaller weapons and longer loiter time.

With STOVL, the Air Force will be able to offer those capabilities even from short runways. The Marine Corps already emphasized close air support (CAS) capabilities while designing the aircraft, he said, and that pays benefits for the Air Force F-35B.

The A-10 has a "very specific mission," Watt noted, and the F-16 is typically highly "missionized" to perform a specific job such as ground attack or suppression of enemy air defenses. The F-35, whether CTOL or STOVL, "will be able to do a lot more" than either of those aircraft, he said.

Gas and Gun Issues

USAF was originally interested in equipping its F-35s with a boom-style refueling receptacle, the kind of system used by all other Air Force fighters. However, Navy and Marine Corps fighters use a probe-and-drogue (basket-style) refueling system, and the F-35B is designed in this configuration.

Meanwhile, ACC officials have sought an internal gun for the aircraft, instead of the removable, less-stealthy, missionized gun specified by the Marine Corps.

"In a highly complex, dense urban

The STOVL Diet

The Joint Strike Fighter program office and prime contractor Lockheed Martin had to slash roughly 3,000 pounds from the short takeoff and vertical landing (STOVL) F-35 last year to meet performance requirements. The changes also benefited the conventional and carrier F-35 variants, as they, too, had gotten fat.

Some of the major changes included propulsion system improvements for more thrust, a new assembly joint that weighs 160 pounds less, and a series of electrical system changes netting 222 pounds of weight savings.

Perhaps most significantly, the weapons bay was redesigned. The F-35B STOVL weapons bay has a "long and sordid story," said Rear Adm. Steven L. Enewold, program director. The operational requirements document dictates that the carrier and conventional takeoff and landing variants have internal bays large enough for two 2,000-pound weapons; STOVL would only have to carry a pair of 1,000 pounders.

"About a year into the program, we said it would really improve our commonality and reduce our flight testing ... if we could get that same weapon bay into STOVL," said Enewold. So it was made to fit. But "when we got into the weight discussion," officials determined the larger weapons bay had to go, so the 1,000-pound bay is back.

Opening up that internal space "allowed us to do a great many things," Enewold said, and was "the linchpin of getting the STOVL design weight down." The aircraft can still carry 2,000-pound weapons on wing hardpoints, and there is even an external 5,000-pound station. In an era of increasing concern about collateral damage, smaller weapons are in vogue, and this was deemed an acceptable trade. "It made STOVL viable around the ship," Enewold said.

There are still about 300 pounds of additional weight-saving "ideas" the program office is looking into. They may not be worth implementing.

"We're struggling a little bit," Enewold said, because if it costs the government $50 million to cut 300 pounds, "I'm just not sure if that's a great trade or not. The operational guys would say, 'Great trade.' The money people may not."

Brig Gen. (sel.) Charles R. Davis, JSF deputy director, added that the remaining possible weight savings make for tough decisions. "Lots of items weigh five, seven, [or] 12 pounds," he said—all the big cuts have been made.

Lockheed Martin photo

The Marine Corps and Britain will buy almost identical F-35Bs, but the Air Force has unique requirements. Air Force F-35Bs will add an internal gun and will be able to carry more ordnance because they will be permitted to have a longer takeoff roll.

environment" such as that in Iraq, the Air Force finds itself using fighter guns quite a bit, Davis said. Strafing is valuable because it is precise and causes limited collateral damage. An internal weapon maintains the airframe's stealthy characteristics and reduces drag.

Davis said the program office informed the Air Force that STOVL F-35s could be modified to add either the boom receptacle or an internal gun, but there is not room in the airframe for both. The Air Force has chosen to go with the gun of its choice.

The cornerstone of the JSF program is low cost. Program officials acknowledge that the F-35 program faces "unprecedented affordability challenges," and the bar has been set high. At present, the Pentagon estimates the unit cost of the vanilla Air Force variant to be $45 million, with the Navy and STOVL variants to be $60 million (as calculated in 2002 dollars).

As befits the F-35's joint and cost-conscious nature, plans call for consolidated training. Specifics have yet to be worked out, but it is possible that all pilot and maintenance training could occur at a single location.

"We're waiting to see what the BRAC [base realignment and closure] commission has to say," Enewold said. Most participants "want to have some joint and combined training," and the BRAC commission has been tasked with recommending the initial training location. Enewold added, "Then we can make a better assessment of the most cost-effective way to get the training system put in the field."

With the weight problem evidently resolved, software development is now deemed the biggest risk area as the program office works its way toward next year's first flight and critical design review. The F-35 will use lots of commercial-off-the-shelf software packages, Enewold said. Getting the software assembled, integrated, tested, and certified "just takes time," he said.

The first flying fighter, dubbed A-1, is being assembled with what Enewold called "representative tooling," but it does not have "a representative airframe." A-1 is based on an older design and does not incorporate the weight-saving engineering changes. A-1 will fly with a production-representative engine. First flight is scheduled for late 2006.

Under the Skin

One would notice few external differences between A-1 and the current-design aircraft, Enewold noted, because "almost all the changes are inside the skin."

Lockheed Martin photo

The Navy's F-35C features a beefed-up airframe and larger wings required for rough carrier operations. Officials say the weight-saving changes to the STOVL JSF design have also lightened up the other variants.

Enewold said that Lockheed Martin's Fort Worth, Tex., assembly plant may benefit from help when full-rate production begins. "When we start getting into production rates of 20 a month or so, it's not clear to us that that kind of rate is most efficiently done at a single site," Enewold said. The program may need two assembly sites for efficiency or surge capacity to meet foreign purchase requirements.

It is not a given that future expansion will stay in the United States: Major F-35 subsections are already being produced in Britain by BAE Systems. Northrop Grumman executive Steve Briggs told the London *Sunday Times* last year that, "at the peak, we're talking about making one new JSF every day. That's a monster to feed." Briggs added that he doubted there are "enough high-tech milling machines in the entire US to keep pace with making the components for this production line."

To effectively meet immediate combat requirements with minimum risk, the F-35 will be fielded through a spiral, "block" approach. The first operational aircraft, Block 1, will have modest capabilities. It will be followed in rapid succession by two more-powerful blocks.

For the initial warfighting capability, "you need to have a radar, you need to have missile warning," an electronic warfare system, and be able to drop bombs and shoot missiles, said Enewold. Block 1 will offer stealth, air-to-air missiles, a data link, and Joint Direct Attack Munitions, he said, describing it as "pretty rudimentary warfighting."

Block 2 will add "some close air support," counterair, and interdiction missions, as well as an expanded weapons portfolio. The program office is trying to define exactly which Block 2 weapons "have the biggest bang for the warfighter," Enewold said. The specifics should be locked in this October, with Block 2 operational testing complete in 2012.

Block 3 will be the full-up F-35 with solid capabilities across the entire mission spectrum, including offensive and defensive air superiority missions, suppression and destruction of enemy air defenses, and CAS. This is "the whole gamut of strike warfare," Enewold said. Plans call for Block 3 capabilities to be frozen in 2006 with testing completed in 2013.

The program also continues to refine the mission profiles. Weight is not a key performance parameter, but range is (measured as combat radius). The STOVL is required to have a combat radius of 518 miles, the CTOL variant 678 miles, and the carrier version 690 miles. All three variants are expected to meet these standards, but the program office would like to eliminate any uncertainty. ■

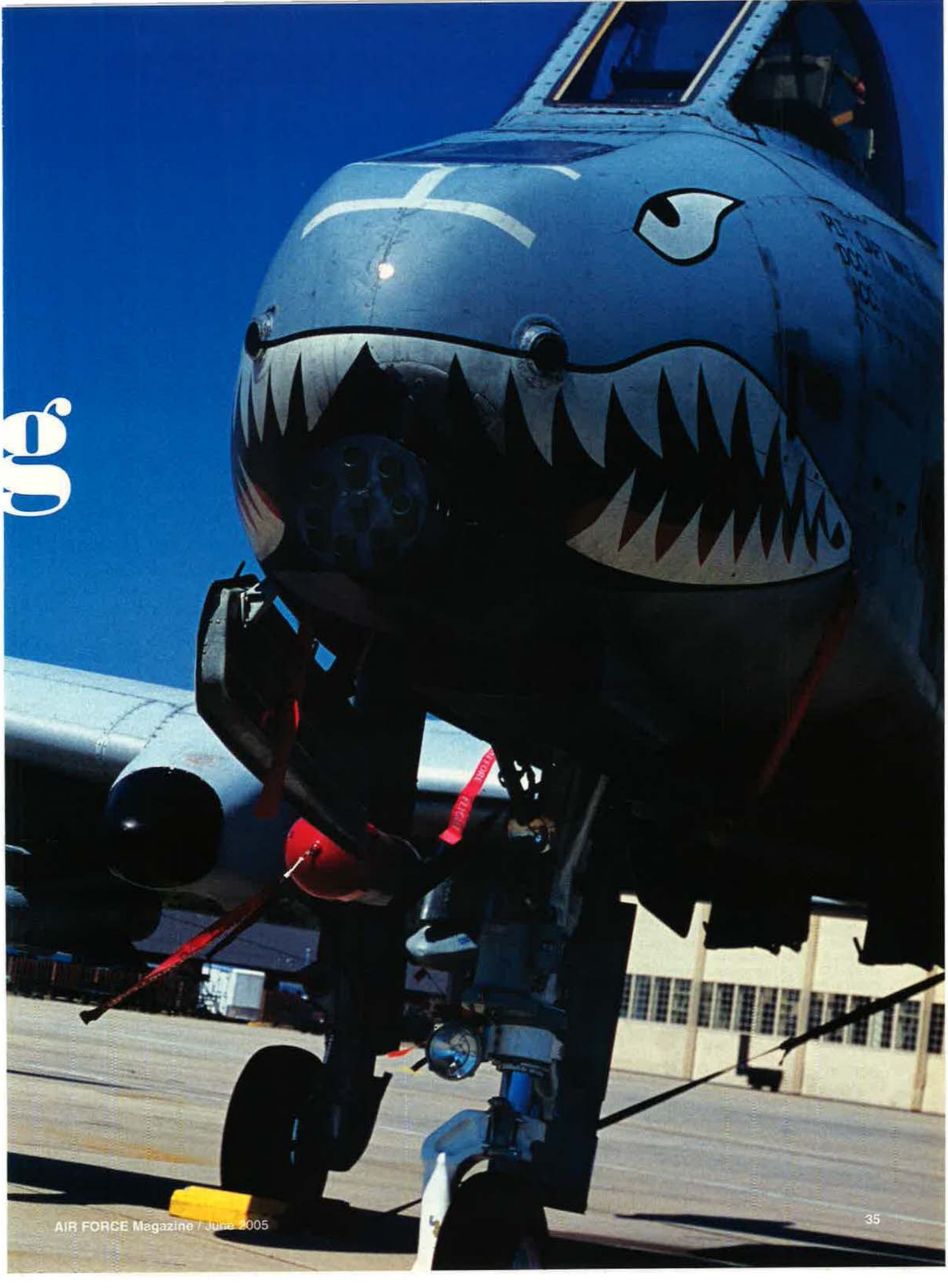
Photo by Guy Aceto

Thirty years on, USAF's A-10 units are going strong, moving out with new weapons, targeting pods, avionics, and training.

21st Century Wartho

Photography by Guy Aceto and Paul Kennedy

On the flight line at Pope AFB, N.C., a brace of A-10 Warthog attack aircraft are readied for a training mission. The A-10 is famed for a nose-mounted 30 mm Gatling gun and great ruggedness. Also notable is a new feature—the Litening-II laser targeting pod—seen on these aircraft.



The A-10A Thunderbolt II, known to all as the Warthog, began as a down-and-dirty killer of Soviet tanks. Today it employs a wide variety of munitions and is no longer just a flying gun platform. New generation weapons make it more accurate and deadly. Enhanced navigation capabilities, the Low-Altitude Safety and Targeting Enhancement (LASTE) system, a night vision goggle-compatible cockpit, and other improvements have made the A-10 effective for combat in the 21st century.

Photo by Paul Kennedy

Photo by Guy Aceto

The first production A-10 arrived at Davis-Monthan AFB, Ariz., in October 1975, nearly three decades ago. Today, the 23rd Fighter Group at Pope AFB, N.C., and the 355th Wing at Davis-Monthan fly operational A-10s and train active duty, Guard, and Reserve pilots. Above, a Davis-Monthan pilot saddles up for a training sortie in Arizona airspace as the crew chief stands by.

At Davis-Monthan, the 355th Wing operates three training squadrons and an operational squadron. The 355th Training Squadron provides formal academic instruction to more than 400 students a year—more than one-quarter of them in A-10 operations—while the 357th and 358th Fighter Squadrons train the A-10 pilots in the air. The wing also has an operational A-10 combat unit, the 354th Fighter Squadron.

At left, airmen at Davis-Monthan go through the preflight checklist.

Warthog units are expert in close air support. They work closely with Army ground forces and USAF battlefield airmen. The A-10's "slow and low" flight, long loiter time, and accurate CAS fire make it a welcome sight to ground forces. The A-10's seven-barrel, 30 mm Gatling gun can fire 3,900 armor-piercing rounds per minute. The Warthog made its combat debut in the 1991 Gulf War, where it won rave reviews.

At right, a Davis-Monthan crew chief signals for the pilot to start his engines.

Of the 713 A-10s produced, 357 remain in service in active, Guard, and Reserve units. Of these, 236 have received forward air control capability. Their OA-10 designation refers more to the ordnance carried and the forward air control qualifications of the pilot than to any difference in the aircraft. For FAC missions, OA-10s bring along 2.75-inch target marking rockets.

Photo by Guy Aceto

Photos by Guy Aceto

In the top photo, SrA. Rodney Groom of the 357th Fighter Squadron at Davis-Monthan brings an AGM-65 Maverick missile out of its container for a weapons-load demonstration. Photo above shows a TV-guided Maverick installed on a wing pylon.

While the A-10 is upgrading its armament, it has lost none of its legendary ruggedness. Recent events have shown that the aircraft can survive direct hits from armor-piercing and high-explosive projectiles. The Warthogs have self-sealing fuel cells, protected with foam both inside and out. Should a direct hit knock out the A-10's hydraulic flight controls, a pilot can switch to manual systems and still control the airplane.

In the photo above, SrA. David Hink (left), SSgt. David Hinds (middle), and Groom, all of the 357th FS, work a 2,000-pound GBU-10 laser guided bomb into position. At left, Groom attaches the laser-seeker head to the body of the precision weapon.

After 400-flight-hour intervals, each A-10 is inspected for flaws and damage. This "phase inspection" comes as close to depot-level maintenance as is possible without the aircraft actually leaving their home base. During phase maintenance, every panel on the fighter is opened and systems inside inspected. It is important that the maintainers have a keen eye for detail.

At right, Davis-Monthan maintainers work around fighters from the 355th Wing as they go through their phase inspection.

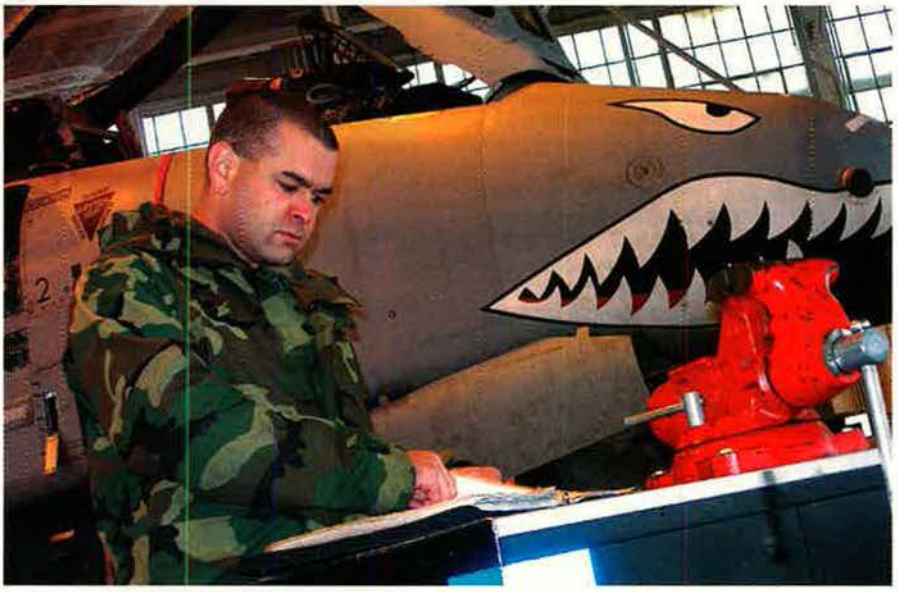
Photo by Guy Aceto

Photo by Paul Kennedy

At left, SSgt. Julie Jewett, with the 355th Component Maintenance Squadron at Davis-Monthan, replaces an auxiliary power unit filter. The vise holds the APU casing.

Below, SSgt. James Kutlik, dock chief in charge of maintenance for the 23rd Fighter Group at Pope, reviews his technical manual as the A-10 behind him goes through extensive phase work.

Above, the nose section of a Pope A-10 goes through phase inspection. The Warthog's Gatling gun is massive; its huge ammunition drum holds 1,174 rounds of 30 mm projectiles.



Photos by Guy Aceto

Photos by Guy Aceto

Airmen of the 23rd FG at Pope install a Litening II pod. Above, SrA. Mark Fesperman drives a "Jammer," while SrA. Daniel Galloway (kneeling) and A1C Robert Perry work the pod into position. At right, Fesperman and Galloway raise the pod onto the wing's hardpoint.

The Litening II targeting and navigation pod has been valuable. It offers imagery much sharper than that provided by earlier systems and allows an A-10 to "buddy lase" targets for other aircraft. Previously, Warthog drivers could light up only their own targets.

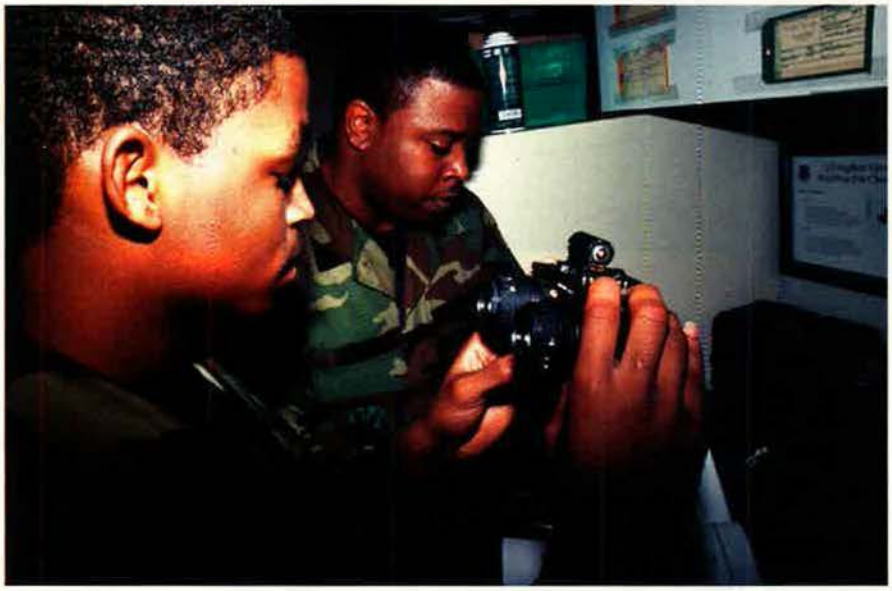
Litening II enhances the pilot's ability to perform missions other than CAS. In recent years, A-10s have conducted missions such as combat search and rescue support, interdiction, and armed reconnaissance. The A-10 also escorted transport aircraft into air bases in Afghanistan.

At left, airmen complete the installation of the pod while, at right, the A-10 taxis onto the apron. USAF plans to further upgrade its Warthog fleet to the precision engagement A-10C configuration. These "Hogs," now under development, will have digital cockpits and a wider weapons selection.

At right, Capt. Cameron Curry, assigned to the 23rd FG's 74th Fighter Squadron, "flies" the A-10 simulator at Pope. After arriving at Pope, a pilot such as Curry must complete a specified number of training sorties before being deemed combat ready. Some of these missions are performed in the simulator.

Flight simulation makes clear to the trainee the sequence of events needed to effectively use the information from the Litening II pod. In effect, it becomes second nature. Imagery from the pod appears in the multifunction display (MFD), seen glowing in the upper right of the instrument panel. The same MFD can also display images imported through the TV window of a Maverick missile.

Photos by Guy Aceto



At left, life support technicians of the 74th FS ready a pair of night vision goggles for use. A1C David Leftdwrige inspects the goggles as his supervisor, SSgt. Alfred Shells, goes through the checklist.

A recent upgrade adapted the A-10 cockpit so that a pilot could fly it while wearing NVGs in a "lights out" operation. NVGs are attached to flight helmets. Pilots use handheld lights or laser pointers to illumine the cockpit.

Above and at right, airmen at Pope are kept busy with a full slate of training sorties.

Photoss by Guy Acelo

Above, Capt. Jason Erb, a 23rd FG pilot, finishes off his training sortie with a handshake for his crew chief, A1C Michael Bell. Earlier this year, the 74th FS was preparing to deploy to Afghanistan.

The 23rd Fighter Group carries on the traditions of the famed World War II "Flying Tigers," in part by using the Tigers' distinctive shark-mouth nose art. Today's Warthogs are effective, rugged fighters operating in remote parts of the world, as were the P-40-equipped Flying Tigers in China some 60 years ago.

USAF's A-10s are simple, deadly, and tough. Given the scope of planned structural and performance improvements, the A-10 will be an indispensable supporter of ground troops for decades to come. ■

New Birth of Airpower

The 1980s were a time of strategic ferment, caused by the deflation of Soviet power. Even before the Berlin Wall came down in 1989, USAF was planning for a post-Cold War world. The result was a 15-page white paper, "Global Reach-Global Power," which came out in June 1990.

The paper posited a future without the Soviet threat (and with smaller US forces). It focused on regional conflicts and put surprisingly heavy emphasis on the value of long-range conventional bombers and expeditionary fighter forces. The new Air Force vision wasn't popular with other services, but it was the basis of an airpower renaissance. As Air Force Secretary Donald B. Rice said, "It lifted people's sights to the broader aspects of airpower."

"The Air Force and US National Security: Global Reach-Global Power"

Department of the Air Force
A White Paper
Washington, D.C.
June 1990

Find the full text on the Air Force Association Web site www.afa.org *Air Force* Magazine "The Keeper File"

Understanding the inherent attributes of the Air Force and aerospace power and how both contribute to achieving national objectives is critical. Over the last 40 years, our attention has focused most intensely on the potential requirements of a major conflict in Europe. Because of this focus, the characteristics and capabilities of the Air Force to meet the demands at other levels of security interest may be less well-understood. Air Force characteristics, capabilities, and forces contribute across the spectrum of conflict. ...

The ability to concentrate force in a responsive manner over great distances—to change the military and/or political conditions necessitating the response—is a key attribute of the Air Force. The Air Force's speed, range, and flexibility enable us to rapidly apply combat power against vital elements of an enemy's structure. Speed limits exposure to threats and significantly reduces the time needed to accomplish a mission. Range provides the ability to operate in any direction over great distances, unimpeded by surface features such as mountains and oceans. Flexibility provides the ability to perform a variety of actions, produce a wide range of effects and influences, and to adapt to changing circumstances and environments. This ability to rapidly project power, as well as readily adapt to changing circumstances and environments, will be increasingly important in the future. ...

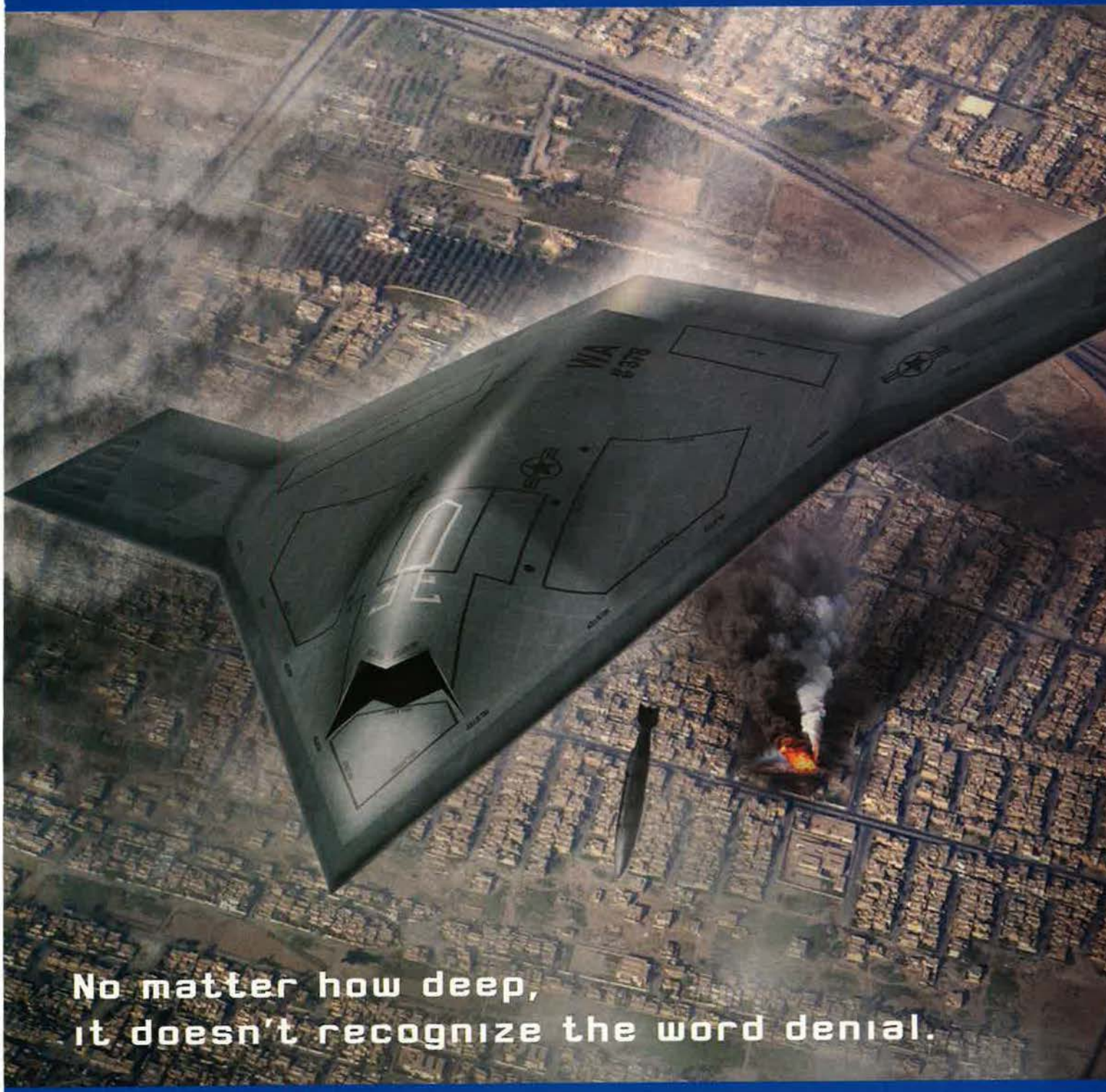
Because of the flexibility and striking power of air forces, the tasks they perform have a profound influence on the outcome of theater operations. Airpower's speed, range, and lethality allows rapid shifting of effects, concentrating firepower wherever the joint force commander needs it—from the close battle, across the length and breadth of theater, to its deepest reaches. As clearly demonstrated by American forces in multiple engagements over many years, and by the Israelis in more recent experience, tactical airpower can prove decisive and have strategic impact. ...

While complementary forces of all the services will be essential, the Air Force offers, in most cases, the quickest, longest-range, leading-edge force available to the President. Conventional airpower offers exceptional flexibility across the spectrum of conflict as an instrument of national resolve. The Air Force can deter, deliver a tailored response, or punch hard when required—over great distances—with quick response. We can provide a presence or put ordnance on a target worldwide in a matter of hours. These power projection capabilities of the Air Force will become even more vital for protecting US national security interests in the future.

Long-range bombers armed with conventional weapons can rapidly reach any location on the globe. ... In 1983's Bright Star exercise, B-52s launching from bases in the US precisely delivered conventional ordnance to a target range in Egypt, then returned nonstop to their bases. Bombers can automatically deliver massive ordnance payloads with high precision and low risk of loss. Six B-2s, operating from the United States with the support of six tankers, could conduct an operation like the 1986 Libya raid—which utilized two carrier battle groups, an Air Force F-111 squadron, and numerous supporting assets. Only a few highly survivable aircraft would be placed at risk. The 1986 operation involved 119 aircraft and 20 ships. And long-range bombers could execute such operations without reliance on forward bases or overflight rights.

The bomber's long range means that the United States can project power and enhance presence in a very short time—and often at lower cost relative to other options—regardless of conflict location. In the Persian Gulf area or deep in other theaters, long-range bombers can threaten or hit targets in the crucial first hours or early days of a conflict. They may be the only assets capable of doing so.

Our ready and flexible tactical air forces can also be tailored to provide a quick and appropriate response to support US national policy. On a day-to-day basis, our forward-based forces provide a presence lending stability to regions of vital interest. These modern fighter forces can respond anywhere in the world on short notice. With an emphasis on lean and deployable forces, tactical air forces can move forward with very little baggage compared with the massive, persistent firepower they deliver. ... The quality of our fighter aircraft, weapons, and aircrews, as well as the staying power of these forces, will be key in filling power projection needs in the future. ■



As the face of warfare changes in the 21st century, UAVs are playing an ever more critical role. Northrop Grumman, a leader in UAVs for more than 30 years — with deployed systems like Hunter and Global Hawk — is now developing the X-47B J-UCAS (Joint Unmanned Combat Air Systems). It will give the Air Force an unprecedented tool for ISR, global persistent attack and suppression of enemy air defenses inside enemy territory. Combining global, multimission capability with high levels of autonomy, J-UCAS will ensure deep penetration and persistence on station. In environments unsafe for manned aircraft, it will not be denied access.

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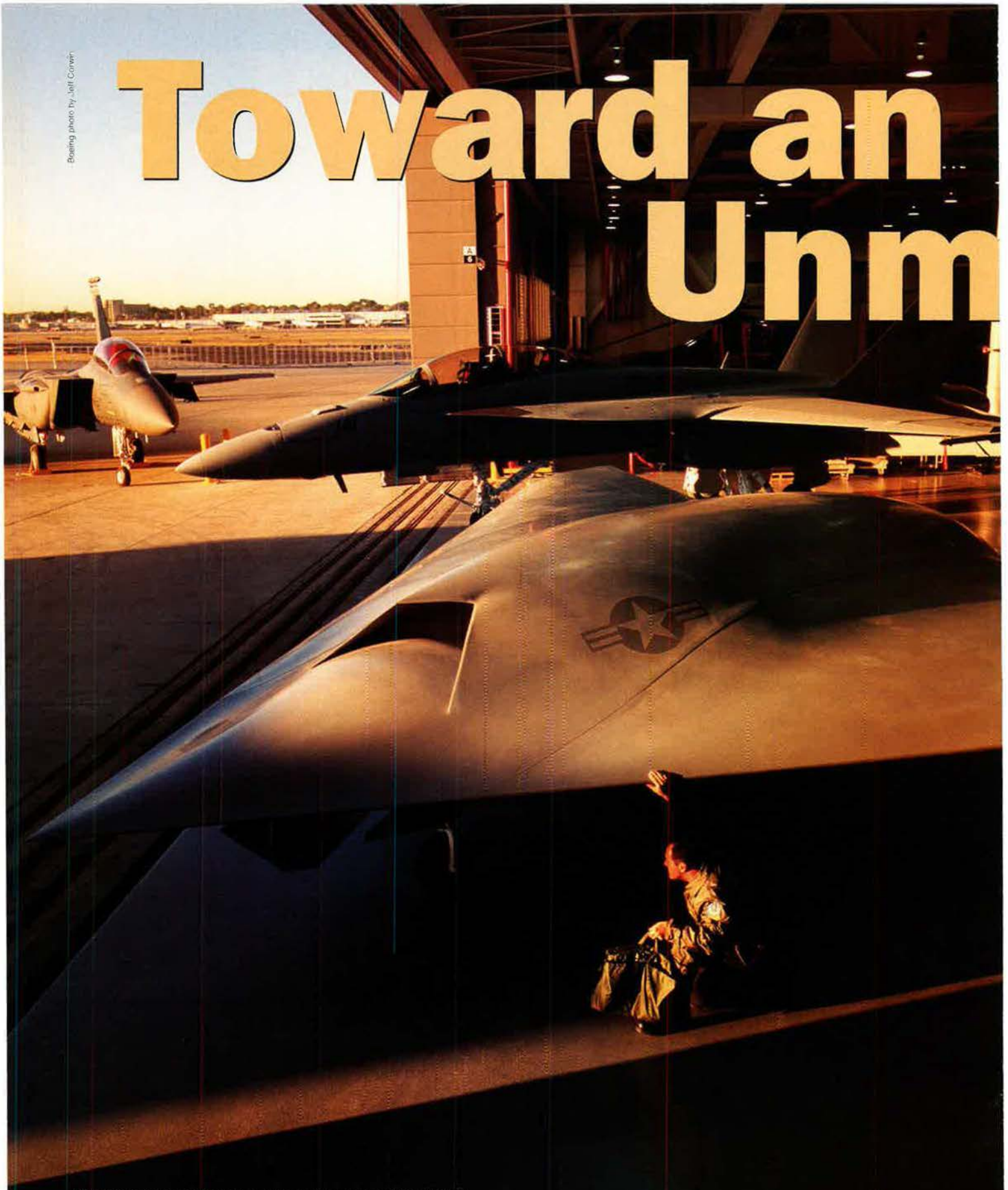


Boeing photo by Jeff Corwin

The Air Force's concept for an unmanned combat aircraft is trending larger and larger. This full-size mock-up of Boeing's X-45C is shown alongside the company's F-15E (on ramp outside) and F/A-18F.

For USAF, the Joint Unmanned Combat Air System could prove to be a large, loitering attack craft.

anned Bomber

By John A. Tirpak, Executive Editor

THE future of unmanned combat air vehicles is getting intense scrutiny this summer as the Air Force and Navy negotiate the merger of separate UCAV efforts into a joint program led by the Air Force. The plan, set for completion by August, will shape UCAV development for years—perhaps in startling ways.

The two services need to make sure they get what they want from these systems. The Navy has a long-standing requirement for a pilotless reconnaissance vehicle that can take off from and land on a carrier deck and hover for long periods over an area of interest. Ideally, it would be able to strike targets, too.

Air Force needs, however, continue to evolve. The service's original vision of a light, semidisposable craft used to suppress enemy air defenses has given way to a more ambitious concept. Now, USAF seeks an airplane that can loiter deep inside enemy airspace and strike targets, either autonomously or in conjunction with manned and unmanned strike aircraft. Other possible missions include electronic attack and close air support.

Such an aircraft would have to be large and expensive. As such, it could turn out to be in direct competition with some manned aircraft on which USAF today places a higher priority.

Leadership of this Joint Unmanned Combat Air System (J-UCAS) effort fell to the Air Force as a result of Program Budget Decision 753, the late-2004 DOD document that signaled profound changes in many programs. (See "Washington Watch: QDR 2005 and Tactical Airlift," February, p. 8.) PBD 753 directed the Air Force to take over the program from the Defense Advanced Research Projects Agency, which ran J-UCAS for two years. Presumably, the move indicated Pentagon approval of USAF's evolving approach to unmanned aircraft.

The PBD ordered that the Air Force and Navy realign the program "with emphasis on the development of air vehicles that will contribute to ... future joint warfighting concepts of operations" approved by the Joint Requirements Oversight Council. It also ordered a $1.1 billion program cut through 2011.

Serving to complicate the task is the fact that the Quadrennial Defense Review—which is to take a comprehensive look at systems needed for air dominance—is to wrap up at the same time the new J-UCAS program plan is to be completed. Decisions on many other projects—including the F/A-22 and F-35 fighters, airborne electronic attack aircraft, and even aerial tankers—will directly affect the mission and numbers of UCAVs.

DARPA's Demos

DARPA had aimed at a series of demonstrations. These ranged from basic autonomous flying to a series of experiments showing how UCAVs could, with stealth, new sensors, and a certain degree of artificial intelligence, search for, identify, track, and strike targets with minimum human involvement. It's not clear yet whether the restructured program will continue to focus on demonstrations or shift to a more deliberate effort to produce an operational system.

The Air Force initially wanted a relatively small 8,000-pound machine equipped with light weapons. It was to have enough "persistence" to be able to loiter in a given area. When enemy radars were turned on, the UCAV was to attack with onboard weapons ranging from electronic devices to bombs.

In the intervening years, changing circumstances have produced a different UCAV concept. Plans call for a much larger machine—36,000 pounds or more—that can penetrate deep into enemy airspace, survive, and loiter in the vicinity of deeply inserted friendly ground troops. It would allow

these ground forces to call down a variety of airborne weapons, as the situation dictated.

As a result, the Air Force's UCAV is gaining in weight, range, and payload. It may, in fact, be growing into the world's first unmanned bomber.

Gen. John P. Jumper, Air Force Chief of Staff, described the current thinking about the UCAV in an interview with *Air Force* Magazine earlier this year. He called it a "very stealthy thing that is able to go and loiter over maneuver units on the ground, in direct contact with battlefield airmen, [who] can directly order up a weapon that can be delivered within seconds."

The mission needs will define the shape and size of the machine, Jumper said.

"If you make it with long endurance, it's going to be fairly big," he noted. Once over enemy territory, it would be able to persist by simply going back and forth to an aerial tanker "as long as it's got weapons."

The Air Force would benefit from such a machine because it "gives us great leverage to be able to do [the attack mission] with fewer airplanes [and with] fewer people to take care of the airplanes."

Power Overhead

More importantly, though, the airplane would be directly or nearly above ground forces, so that, if a need arose, they would not have to summon close air support from aircraft flying orbits perhaps hundreds of miles away. A weapon would be just "time of flight" away from the target on the ground, Jumper said.

What the UCAV should not be, he added, is an aircraft that is loaded up with enough processors, agility, sensors, and other necessary gear to make it into a dogfighter that could defend itself against enemy airplanes. Such a machine would be too expensive. Someday, "there may be some breakthrough that gives us that combination, but I don't see that right now," he said. Protecting the UCAVs, as well as offering other kinds of support to deeply inserted ground forces and suppressing enemy defenses, is a mission better left to the F/A-22.

Jumper added, "I want to get on with this" and create an asset that "gets beyond being a novelty and gets to what is truly ... responsive to real requirements." He pointed out that the Air Force is asking whether the UCAV could become a tool for long-range strike. "I think it is," he said, "but there's more work to be done."

DARPA's Michael S. Francis, who has directed the J-UCAS program, said that substantial effort has been applied to keeping the system affordable and ensuring that it doesn't duplicate or replace anything else.

He is frequently asked if the J-UCAS competes with the F/A-22 and the Joint Strike Fighter, and his answer is, "Only for money."

"The mission niche is unique enough," said Francis, "but, fundamentally, there's only so much money out there, and people will evaluate you for your ability to do your piece of the mission space affordably, in comparison to those other things doing their job, and that's how decisions get made. So, we're very cognizant of the need to be competitive at what we do."

Moreover, the F/A-22 program is likely to be concluded before the first operational J-UCAS flies, and even the F-35 will be well into production when a possible J-UCAS production line starts ramping up.

The focus has stayed on conducting demonstrations, and not trying to anticipate the exact needs of the services, which tend to fluctuate. DARPA has also worked with the services to steer them toward the possible.

"In some cases, what are high-priority [capabilities] may not be obtainable with technology," Francis went on. "They may be too expensive. So, we've tried to blend things in a way that makes an 'executable' program."

He noted that the existing effort has been structured so that if the services decided at some point to pursue a formal weapon program, they can do so with confidence.

DARPA set up the program to allow a continuing series of demonstrations from Fiscal 2007 through 2012. Francis said, "At any point during that time, a service could say, 'Now I know enough to do something' and spin off an acquisition program. We've left the opportunity for multiple 'off-ramps.'"

The services would not have to pursue an identical solution. One could conduct demonstrations while the other could go directly to a development project. "The intent was to put [the UCAV] in the hands of the warfighting community, to figure out what its real potential is, and let them decide what the real system was going to be," Francis said.

Two Platforms

The demonstrations feature two basic types of UCAVs. Both are being redesigned with advanced applications in mind.

The Air Force had selected Boeing to build conceptual airplanes for the defense-suppression mission. It built two X-45A aircraft to demonstrate some UCAV capabilities. It has flown two X-45As—including both at the same time, under the guidance of one human operator. It has explored much of the

DARPA artist's concept

The Navy wants a persistent, long-range surveillance J-UCAS capable of safely operating from a carrier. The Navy also wants a strike capability. The J-UCAS demonstrators are about the size of a modern fighter.

flight envelope and released ordnance from the X-45A's weapons bays.

Northrop Grumman was picked by the Navy to build and fly the X-47. This craft has flown and has also "recovered" on a simulated carrier flight deck (on land), touching down on the spot where it would catch an arresting wire.

Both companies have modified their designs to keep up with the services' evolving requirements. Boeing has canceled a planned X-45B; it has gone directly to an X-45C, which will be much larger and feature a flying wing shape. Northrop Grumman's new X-47B will be vaguely similar, with larger wings to carry greater payload and provide longer range and loiter time.

When DARPA was directed to run the two UCAV efforts as a joint program, it decided to realign the development effort in the most logical way possible so the maximum amount of effort on the project could support whatever the Air Force and Navy eventually decided to do.

To that end, the J-UCAS program has focused not on the airframes themselves but on the system, Francis said. The airframe is simply one aspect—and a fungible one at that, he said.

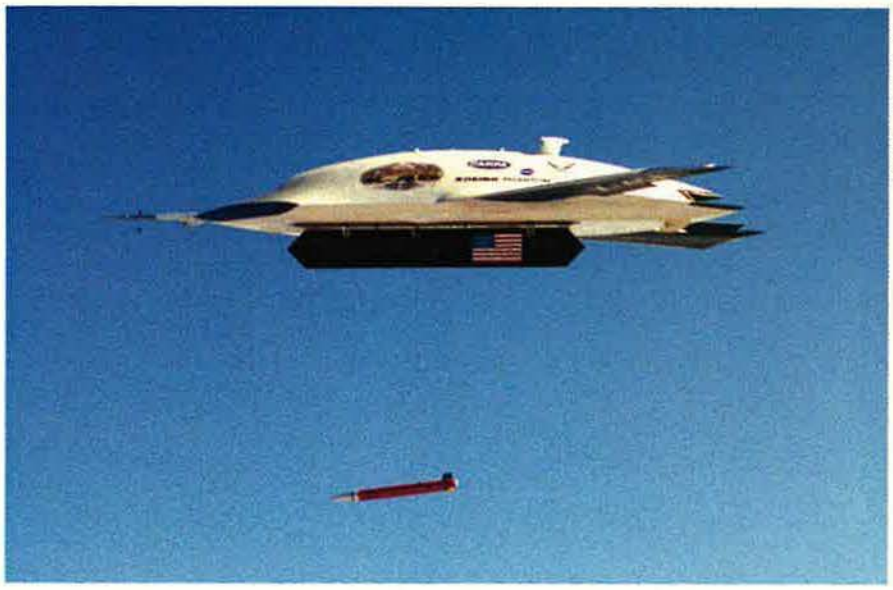
The J-UCAS will be run by an "operating system," which Francis likened to the one that allows a computer to function. The airframe, communication system, weapons, data links, electronic attack functions, ground stations, sensors, etc., will all be like applications or peripherals running off the common operating system.

There is a great advantage in doing it that way, Francis explained. If new requirements force a change in one component—the size and shape of the airframe, for instance—a service can simply exchange that element for another, without the need to go back and complete a new labor-intensive software effort.

"When you decide you don't like the platform you have, you can swap it out for something bigger or smaller—or just simply different," explained Francis.

That will come in handy, he believes, because J-UCAS will not be a single, one-size-fits-all airplane for all missions. Some will be designed with heavy emphasis on stealth, while others may emphasize range or payload or persistence.

"You can leave off some of the bells and whistles," he said. While "first day of the war" aircraft will need stealth and other survivability measures, those expensive attributes aren't needed after an enemy's air defenses have been beaten down.



AP NASA photo by Jim Ross

Boeing's X-45A releases a Small Diameter Bomb. J-UCAS demonstrations are aimed at proving that pilotless vehicles can autonomously find, track, and choose targets. Human consent will be needed for weapons release.

Cadillacs and Chevys

This approach will save money because, Francis predicted, "we're going to build a few of those Cadillacs, but we're going to use the same chassis to build a whole lot of Chevys."

The approach being pursued would also allow the interchangeability of a "navalized" UCAV and one that meets the Air Force's desires for differing missions within the operating system, without the need to develop different support systems.

Boeing and Northrop Grumman are working together on a common operating system. To make sure optimum solutions are selected, the program has hired Johns Hopkins University to act as "integrator/broker" between the two companies.

Rick Ludwig, Northrop Grumman's X-47 business development manager, said, "If we [Boeing and Northrop Grumman] don't get along, Johns Hopkins' position grows, and they will subsume more of the budget. If we get along very well with Boeing, then [Johns Hopkins'] position and their footprint doesn't grow."

Ludwig said this approach is unprecedented.

The X-45 program has been marching toward a series of demonstrations, beginning around 2007, that will involve three X-45 machines flying long distances and seeking out targets, according to Darryl W. Davis of Boeing, who until April was general manager of the company's X-45 program.

He said that two of the machines in these operational demonstrations would be "fully representative of a weapon system configuration," from a survivability and communications suite perspective, including electronic warfare systems. The aircraft, before a combat demonstration, would exercise capabilities such as use of a sensor suite to map areas of interest and locate targets.

Beginning in 2009, the X-45 program would demonstrate advanced tactical targeting technology. In this demonstration, three UCAVs, working together, would locate and target a fixed surface-to-air missile system, using synthetic aperture radar and possibly electro-optical systems. Then the airplanes, "talking" among themselves, would together "decide" which is best suited to carry out the attack.

"That is the network-centric approach and capability that we are maturing for the Air Force and the ... Navy," Davis said.

The three aircraft would triangulate the position of the radar emitter and, after receiving consent and possibly specific aim points from a human operator, release weapons. By cooperating, the three could also improve their survivability.

"The key to all this is the ability to integrate multiple platforms ... to

DARPA artist's concept

The new idea in J-UCAS is to develop airframes as just one element of an overall operating system. If the airframe changes—or if there are multiple versions—it won't be necessary to start the program over. Above is an X-47B.

communicate with each other," Davis added.

The Achilles' Heel

Francis said much work is going into development of this communication capability. It could be the Achilles' heel of the entire UCAV concept, so developers are assuming that communications will be intermittent and occasionally broken.

Nevertheless, plans say that release of weapons will always require human consent, even though "it's the intelligent system software" that finds and picks out the target, Davis noted.

Boeing's idea throughout the program has been to build aircraft with which military operators can experiment and use aggressively without concern for fragility.

An earlier concept, in which the X-45 would spend most of its time in a climate-controlled container and be brought out and used only at need, has not been discarded but merely "tabled," Davis said. It's become apparent that the UCAV can "self-deploy" around the world, meaning it wouldn't be necessary to tie up airlift hauling the crated aircraft around.

The company has also worked with the Air Force to define an aircraft whose stealthy surfaces need not be protected in a climate-controlled facility, Davis said.

"They want to park it on the ramp overnight, be in the rain, be in the sun, and not have to do lots of restoration to the survivability attributes."

These self-deployment and loitering concepts will gain further credibility when the Air Force demonstrates the aerial refueling of a UCAV. The demonstration is not part of the UCAV program per se, but is being undertaken with the X-45 under contract to the Air Force Research Laboratory. Boeing is developing the aerial refueling capability using differential Global Positioning System signals. Northrop Grumman is working on a complementary capability.

With air refueling, UCAV airborne time will be limited only by the failure of subsystems. A key requirement will simply be to keep an adequate supply of oil in the engine.

Under the AFRL contract, an aerial refueling demo is scheduled to take place in the period 2008-09.

Another challenge in the program has little to do with technology and everything to do with politics, Francis said. The world is still uncomfortable with the idea of an armed machine flying around without a human controller on board.

"It's a cultural issue," he said. For example, despite its proven track record, "filing a flight plan for Global Hawk is not a simple administrative act; it's a negotiation." And Global Hawks aren't even armed.

There is high confidence that the public eventually will accept unmanned aircraft. Francis cites the Boeing 777 and the Lockheed Martin F-117 as two examples of aircraft so automated that they could be said to have "optional pilots." Another confidence builder will be commercial use of unmanned aircraft technology. Francis sees long-duration cargo flights as one area where the technology could be a big cost-saver, "flying UPS from Memphis to downtown Beijing ... [with] a single safety pilot on board, just in case something goes awry."

In fact, Francis believes there will have to be commercial applications for unmanned aerial vehicles to become truly competitive and therefore affordable.

For the time being, Boeing and Northrop Grumman are technically collaborating on the J-UCAS project, but each has its own system and its own approach. It's not clear yet if there will be a competition down the road, with one contractor selected to build UCAVs for both the Navy and the Air Force.

Francis said the hardest part of UCAV development is not aerial refueling, sensor integration, low observability, or flight autonomy. It is, he said, the operating system, which will require intensive amounts of software. However, once the initial code is written, "updates come fairly rapidly," he noted.

Ludwig said contractors are aware of the Air Force's changing requirements and are happy to try to meet them. However, given the competition between programs, there is concern that J-UCAS might dry up.

"We do know that both services are supportive of the program and want it to move forward, and that's one of the biggest concerns for us," Ludwig noted, "that it does move forward, and it does stay a joint program. All indications are, that's going to happen."

Francis said, "We've tried not to get too big, and there are a variety of reasons for that. We want representative X-planes ... which are capable of demonstrating all the functionality that the real thing would have, whether it be bigger or smaller."

Davis voiced a common concern about UCAV growth.

"If you want to drive these things larger and larger in size, they tend to cost you more and more," he said. If the Air Force wants a bigger airplane, "we're all for it, we want to help them do it, but we're also sensitive to affordability, so ... we've been trying to help them understand, it's a trade that they will make."

He concluded, "I fear someday, someone will say, 'For this much money, why don't I build an airplane with a man in it?'" ■

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BOEING
Forever New Frontiers

The Pentagon chief didn't ask the services for advice; he set his own agenda for the big defense review.

On Rumsfeld's "Terms"

By Jason Sherman

LOCKED in safes throughout the Pentagon are copies of a classified 40-page memorandum—signed by Defense Secretary Donald H. Rumsfeld—which contain instructions on how to draft a new blueprint for the nation's armed forces.

The document is known as the "Terms of Reference." It provides primary guidance for the Quadrennial Defense Review that is now unfolding in Washington, D.C. That review could sharply reorient the armed services toward the demands of the global war on terrorism. As such, it promises to bring major changes to Pentagon weapons and forces.

According to those who have seen it, the TOR instructs Pentagon officials to come up with a plan that will shift defense investment away from mission areas in which the United States enjoys comfortable "overmatch"—that is, in major conventional warfare capabilities—and redirect it toward skills and weapons needed to deal with insurgencies and unconventional dangers.

The idea is that, in a post-Sept. 11 world, those kinds of challenges have become increasingly likely to occur.

Rumsfeld came into office in 2001 with a mandate to transform the armed forces, and his QDR deputies see this review as an opportunity to make significant changes.

The TOR document reflects a view held by senior Pentagon civilian leaders that the US military is at a critical juncture, a moment of notable strategic change that could require consequential alterations to the armed forces. High-level discussions that helped influence the document liken today's situation to three periods in the 20th century when the US embraced new thinking, organizations, strategies, and equipment.

They are referring to the 1930s, which saw the development of amphibious warfare and aircraft carrier operations; the 1950s, when the nuclear weapon and long-range delivery vehicles came to dominate US military and foreign policy; and the 1980s, a

decade in which Washington mounted a broad challenge to Soviet power, exploiting Moscow's grave economic and political weaknesses.

"We believe we have a historic opportunity" to reshape America's defense, said Christopher Ryan Henry, principal deputy undersecretary of defense for policy, one of the principal authors of the Terms of Reference.

USAF photo by SSgt. Samuel Rogers

The Air Force's F/A-22 Raptor is nearing operational status. The QDR may determine how many USAF is allowed to buy; the Pentagon is trying to determine whether too much force is aligned against "conventional" threats.

Core Problems

Now under way, the review is expected to generate by fall recommendations for altering Pentagon weapons investment. A final QDR report is due to Congress in February 2006. Issues that are not ripe for decision this year will likely be spun off into follow-on reviews that may continue for another year.

For this QDR, Rumsfeld jettisoned the previous practice of consulting the armed services for a list of issues to be studied. Instead, he set the agenda. The TOR document calls for the review to examine four "core" problems:

- Islamist extremism (and the need for "ensuring the demise of terrorist networks").
- Proliferation of weapons of mass destruction, whether they be nuclear, chemical, biological, or radiological.
- Homeland security demands on the military forces.
- Conventional and disruptive threats posed by an emerging major power.

Emphasis on these problems, insist Pentagon officials, does not lessen the importance of preparing to conduct the three other kinds of operations emphasized by today's military—conventional wars with China, North Korea, and Iran. However, it does suggest that the four services need skills, equipment, and organizational structures that go well beyond those developed for big battles against "traditional" military forces.

Said Christine E. Wormuth, a participant in the 1997 QDR and now analyst at the Center for Strategic and International Studies (CSIS) in Washington: "There is a very serious belief in the Office of the Secretary of Defense that the department is not sufficiently shaped to do the types of operations that you need [in order to deal with] the four problems the QDR is looking at."

Accordingly, Rumsfeld over the last year has pressed his staff to develop a wider range of defense planning scenarios for full-fledged consideration.

"What we're looking for is greater variability within the scenarios," said one high-ranking Pentagon civilian official who took part in their development. The goal, he added, is to "make sure we are cross-preparing our force so that it remains highly adaptable as things pop up."

He further explained, "We want to make sure we're not just [assessing] risk against the things that are familiar, but also considering things less familiar and increasingly likely."

Some of these scenarios have raised eyebrows in the defense and foreign policy community. One example: The possible political collapse of a nation armed with nuclear weapons. This would be a catastrophe, one that could feature a staunch US ally (Pakistan), a pathological American foe (North Korea), or something in between.

Hitting Nerves

Though the Pentagon's consideration of such a scenario has caused agitation abroad, DOD officials remain serene. Said one Pentagon planner: "The greater the controversy, the more it hits a nerve, ... the more I'm getting to a scenario set" for which Washington needs to prepare.

Others in the Pentagon warn that concentration on these particular four core problems is too narrow. "When you focus so explicitly—and almost exclusively—on core problems, some of us are more concerned that they're missing a lot of other stuff that goes on and needs to be available in terms of full-spectrum operations and availability of forces," said one military official involved in the review.

Though the TOR was a Rumsfeld production, it evidently has support in the services. According to one four-star officer, all of the unified combatant commanders and all of the service chiefs got to review the document and participate in its formulation.

At a Jan. 27 combatant commanders conference in Washington, Rumsfeld asked for feedback on a draft version of the Terms of Reference. One response: Broaden the review to look at how American forces might work in closer partnership with allies and civilian US agencies to get at big problems. That counsel was accepted; the final version was modified to widen the scope of the review.

"One of the things that we're going to be looking at in the QDR is this whole question of how do we structure ourselves to be more effective working with other agencies of the US government and internationally," said Douglas J. Feith, the outgoing undersecretary of defense for policy. "We are expanding the set of problems the Defense Department recognizes we're going to need to play a role in dealing with. We're also very conscious of the fact that many of these problems are not narrowly DOD problems; they are broadly US government problems."

AP photo by Khalil Hamra

Members of Hamas march in the Gaza Strip. Dealing with Islamist extremism is rated as one of four "core" problems.

Clark A. Murdock, a senior advisor at CSIS, said, "I think it is an indication of the extent to which the Department of Defense recognizes that almost all of—if not all—21st century missions are really US government missions, interagency missions, not just military missions."

Six Panels

To carry out QDR work, Rumsfeld established six panels—dubbed "integrated product teams." Each panel will examine a set of issues related to the four core problems and will be co-led by a senior civilian and senior military officer.

Of these groups, the most important is the so-called "capabilities mix" panel which is examining the mix of equipment and types of organizations needed to deal with new security threats. Tapped to lead this panel was Paul D. Wolfowitz, the deputy secretary of defense, and Marine Corps Gen. Peter Pace, the vice chairman of the Joint Chiefs of Staff. (Pace has since been nominated to be Chairman of the Joint Chiefs of Staff, and Wolfowitz has since left the Pentagon to head the World Bank.)

The capabilities mix panel began its work in April with a series of high-level Saturday meetings to examine each of the four core challenges. Plans called for this panel to begin to report its recommendations in July.

The Defense Secretary served notice to the services last fall that "everything is on the table in this review." And it is in the work of this panel and a second panel, the "joint enablers" team, that so much is at stake for the services.

The joint enablers panel is examining how the core problems can be attacked through capabilities such as airlift, sea lift, and logistics, as well as intelligence-surveillance-reconnaissance (ISR) assets and command, control, communications, and computers (C4). This panel is led by Stephen A. Cambone, undersecretary of defense for intelligence, and Gen. T. Michael Moseley, Air Force vice chief of staff.

"The fundamental issue—the most important issue—is to what extent the US military is going to reprioritize investments toward the low end of the spectrum," said John Gordon, a RAND analyst and former Army officer.

That is being debated as part of a wide range of specific issues:

- Air dominance, covering integrated joint capabilities, contributions of different types of tactical aircraft in warfare of the future, and the combined capabilities of space, airborne, and terrestrial communications and intelligence sensors.
- Ground forces capability, covering the mix of active and reserve forces, force structure, and modernization.

Henry said the review will not, however, focus on particular weapons systems. Instead, the Pentagon will concentrate on "capabilities" that convey a military effect.

"It is the effect that we want," said Henry. "It's not the platform that we're interested in. ... We have to think through what the capabilities are and how we use them and not immediately jump to the solution of a piece of hardware."

Nevertheless, an underlying goal is to recommend changes to procurement plans this fall, in time to make adjustments to the Pentagon spending plan for the period 2007-11.

The billowing costs of operations in Iraq and Afghanistan and pressure to reduce federal spending are putting a big squeeze on military procurement accounts. The QDR will recommend higher investment in some preferred

USAF photo by MSgt. Jim Varhegyi

Gen. T. Michael Moseley, USAF vice chief of staff, is the senior uniformed official on the "joint enablers" panel, looking at lift, battlespace awareness, and command and control issues.

areas, but it must be offset by "divestment" in other areas—essentially, existing programs.

"There is a need to have a resource-neutral QDR," Henry said, meaning the shake-up and realignment exercise must add no new net cost to the defense program. This budget pressure will bring new scrutiny to existing programs that could be cut in favor of new priorities, he said.

Many defense analysts believe that the big-ticket modernization programs the Air Force and the Navy are advancing will be tempting targets, as defense officials look for ways to pay for new capabilities.

The other four panels cover (1) manning and balancing, (2) roles and missions, (3) "authorities," meaning aspects of US code that might have to be changed to implement desired changes, and (4) business practices and processes.

New Strategy

The new Terms of Reference does not require an examination of basic defense strategy. Rumsfeld has already done that. He issued his National Defense Strategy on March 1.

This new strategy, Pentagon officials say, is essential for interpreting the Terms of Reference. It reiterates many strategic goals Rumsfeld has advanced since 2001, including the objective to "assure" allies and friends; "deter" aggression against the United States and its allies; "dissuade" potential adversaries from challenging US interests; and—if necessary—"defeat" foes in combat.

It also sets forth new requirements for US armed services to prepare for a wider range of threats—including "irregular," "catastrophic," and "disruptive" threats.

The US military is well-positioned to deal with "traditional" threats—enemies that attack with conventional air, sea, and land forces, according to the strategy. However, the chances of an attack against the US military anytime soon by a conventional military are considered by some to be slim. More likely, they say, are "irregular" attacks designed to erode US power in unconventional ways; "catastrophic" threats aimed at paralyzing the United States with surprise hits on major targets; and "disruptive" challenges that could end-run US military technical superiority.

The strategy upholds, if only temporarily, the existing "1-4-2-1" concept for determining force needs. This formula called for forces able to mount *one* defense of the American homeland; deter aggression in *four* critical areas (Europe, Northeast Asia, Southwest Asia, and the Greater Middle East); carry out simultaneous military operations in *two* of these areas; and "win decisively"—that is, eliminate a regime—in *one* of these areas.

The NDS state s directly that this strategy is now under review and could change.

USAF photo by TSgt. Mike Buylas

The Terms of Reference ask the armed forces how to best prepare for irregular, catastrophic, disruptive, and traditional threats. The QDR will evaluate the payoff of more spending on special operations forces, such as these Army commandos.

At Stake for USAF

The new TOR document, though of recent date, reflects the thinking that senior Pentagon civilian officials have been moving toward—and directing the services to consider—for more than a year. Indeed, the seriousness of that effort was first manifest late last year, when DOD slashed $55 billion from existing programs and pumped about $25 billion into others.

The lion's share of cuts came from Air Force and, to some extent, Navy programs and missile defense. Critics of the cuts argued that they were made without analysis. However, said Henry, formulation of the Terms of Reference over the past 18 months paved the way for those cuts.

"So," he said, "in some ways, the preparatory work ... has already started to impact decision-making."

The Air Force will have to present a compelling case for its major programs in this review, and, problems notwithstanding, Air Force officials believe they have a good story to tell.

"We think that we've built a pretty good program out in the future to address all the strategic challenges," said Brig. Gen. S. Taco Gilbert III, deputy director of strategic planning on the Air Staff.

The question for the Air Force is whether recent plans to trim its fighter force by 25 percent and overall aircraft fleet by 10 percent while organizing into smaller, more agile organizations will inoculate it from further cuts to the F/A-22 fighter, its cornerstone weapon program.

"I don't think there's ever been a time when the Air Force was in a worse position," said a former senior USAF official. "You don't have any senior leadership at a time when you're doing this very important review and a review that everyone anticipates will lead to some substantial change. So you don't have a way of injecting your priorities or positions as effectively as you did if you had an effective civilian leader. What's at stake if the Air Force can't hold its position? Future modernization is in jeopardy." ■

Jason Sherman is senior correspondent for InsideDefense.com, part of the Inside the Pentagon *family of newsletters, based in Arlington, Va. This is his first article for* Air Force *Magazine.*

Full Day

Over the Red River delta, Leo Thorsness "took on most of North Vietnam all by himself."

By John T. Correll

Photo via Leo Thorsness

THE strike force that headed into the Red River delta of North Vietnam on the afternoon of April 19, 1967, consisted of three kinds of airplanes.

Leading the way was a flight of F-105 Wild Weasels from Takhli Air Base in Thailand. They would be first into the target area to clear a path through the surface-to-air missiles. They would also be the last ones out, after the rest of the strike force had departed.

Following the Weasels came a flight of F-4 Phantoms to provide defense against MiG interceptors. With the Phantoms came four flights of F-105Ds, heavily loaded with bombs.

The target for the day was the Xuan Mai army barracks and storage supply area. It was 37 miles southwest of Hanoi and about 500 miles from Takhli.

The Weasels' mission was dangerous. They "trolled" for SAMs, using themselves as bait. If the SAM operators fired a missile or turned on their tracking radar, the Weasels could home in on the signal. They could destroy the radar with a Shrike missile that locked on the radar beam, or they could guide a strike onto the SAM site. However, the SAMs had the option of the first shot.

The call sign for the Weasels that day was Kingfish. The leader was Maj. Leo K. Thorsness in Kingfish 01, a two-seat F-105F configured for finding and fighting SAMs. Kingfish 02 and Kingfish 03 were full-up Weasel aircraft, too, but Kingfish 04 was an F-105D.

Thorsness, 35, was the "chief Weasel" at Takhli. Unlike the custom in other wings, the Weasels at Takhli were assigned to individual squadrons. Thorsness, however, was recognized as the Weasel leader by both the crews and the wing.

He had joined the Air Force in 1951 at Walnut Grove, Minn., and earned his wings and commission in the aviation cadets. He had flown a number of fighters, including the F-100, before coming to Takhli and Wild Weasel duty in October 1996.

Thorsness and his regular electronic warfare officer, Capt. Harold E. "Harry" Johnson, had almost 90 missions over North Vietnam, just 10 short of the number that counted for a full combat tour and a ticket home. So far, they had eluded 53 SAMs that had been fired at them.

They were bucking the odds. One hundred missions was a difficult mark to reach. The saying among F-105 pilots was, "By your 66th mission, you'll have been shot down twice and picked up once." In 1967 alone, a total of 26 Wild Weasel aircraft would be shot down.

The strike force refueled from KC-135 tankers over southern Laos and set course for the Red River delta, which was strongly defended by SAMs and anti-aircraft artillery.

Thorsness carried two Shrike missiles, CBU-24 cluster bombs, and 6,000 rounds of ammunition. "I carried two Shrikes whenever possible," he said. "Toward the end of our era there, I was given the option of carrying one Shrike and one ECM pod. I had confidence in the evasion tactics we developed and not a lot of confidence in the ECM pod, so always went with two Shrikes for more killing power."

Weasels

The SA-2 surface-to-air missile was one of the weapons supplied to the North Vietnamese by their Soviet allies. This was the SAM that had brought down Francis Gary Powers, flying a CIA U-2, over the Soviet Union in 1960.

As employed against fighters in Vietnam, it had a range of 17 miles. "Our Shrike was good for about seven miles," Thorsness said. "We were consistently outgunned by 10 miles until Harry and I came up with the Shrike toss: Climb to 35,000 feet, plug in burner, pull nose up to 45 degrees—nearly stalled out. We could hit SAMs about 35 miles away with this maneuver, a celebration day the first time we pulled it off."

The SA-2 was lethal at high altitudes, but fighters could outmaneuver it or shake it off by diving to low altitude. ("Take it down!" was a frequent call on Weasel missions.) Unfortunately, "taking it down" put the diving airplane within range of the anti-aircraft artillery, which accounted for even more US fighter losses in Vietnam than the SAMs did.

SA-2s were first detected in North Vietnam in April 1965 and shot down their first US aircraft, an F-4C, in July 1965. The SAMs were particularly thick around Hanoi, but the Weasels expected to encounter them anywhere they went. All of the Weasel missions were into high threat areas. If there

Air Force Maj. Leo Thorsness (left), pictured just after a mission, and his regular backseater, Capt. Harold Johnson (right), flew 93 Wild Weasel missions over North Vietnam. For his actions on April 19, 1967, Thorsness was awarded the Medal of Honor. Johnson received the Air Force Cross.

Photo via Leo Thorsness

Wild Weasels at Takhli RTAB, Thailand, were assigned to individual combat squadrons. Thorsness and Johnson, pictured at left in this 1967 photo, flew with the 357th Tactical Fighter Squadron and expected to battle SAMs on every mission.

weren't any SAMs, there was no reason to send the Weasels.

The first Weasels had been F-100Fs, but they weren't fast enough to keep up with the F-105Ds in the strike force. They were replaced by F-105F two-seat combat training models, enhanced with sophisticated electronic equipment. The F-105Fs flew their first operational missions in Vietnam in June 1966. They had a radar homing and warning system and a launch warning receiver. They were armed with Shrike missiles, bombs, and a 20 mm Gatling gun. Some of the Weasels were upgraded to an F-105G configuration beginning in late 1967.

An SA-2 site in Vietnam had five or six SAMs situated around a 40-foot ring in a six-pointed star pattern. The missiles were guided by a Fan Song radar in a van in the center of the ring.

Whenever a Weasel aircraft was painted by the beam from a Fan Song radar, the crew got a distinctive crackle in their headphones. They called it the "rattlesnake."

"The 'rattlesnake' crackle was in both cockpits, as were the small scopes," Thorsness said. "Harry had additional visual and electronic inputs in his cockpit. The scope in my cockpit was mounted in the upper left corner of the instrument panel and about three inches across. A weak signal would originate in the center of the scope and grow.

"There were three ever larger rings on the scope. We commonly referred to the SAM radar signals as one-ringer, two-ringer, or three-ringer. Once the SAM signal approached three rings, it was dead serious, no pun intended. When the signals became very strong, more than a three ringer, they went all the way to the edge of the scope and sort of spilled over sideways. When you had multiple signals that strong, we said the scope was 'growing hair.'"

SAMs

As Thorsness and the Weasels crossed the mountains that separated North Vietnam from Laos, the radars from the SAM and AAA sites began tracking them. Johnson was first to hear the rattlesnake crackle.

Employing a tactic that he had used with success before, Thorsness split his flight into two elements. He sent Kingfish 03 and Kingfish 04 around to the north while he went south with Kingfish 02—Maj. Thomas M. Madison and Maj. Thomas J. Sterling, EWO—on his wing.

Thorsness believed that "with good wingmen flying No. 2 and No. 4 and our experience learning how to evade SAMs, we could provide twice the coverage by splitting our flight of four into two elements of two aircraft. When we split, each element would take one side of the strike target."

As the Weasels approached, the blip on their radar screens got bigger. The SAM site was southeast of Xuan Mai. Thorsness turned toward it and launched a Shrike from seven miles away. The site itself was not visible because of distance and haze, but the signal disappeared from the scopes almost instantly, indicating that the missile had taken out the radar.

Almost immediately, they picked up another SAM warning. The signal was very strong. The scope was "growing hair," Thorsness said.

He turned north, and through the broken clouds saw the SAM site and radar, the missiles in firing position, with a ring of anti-aircraft defenses around the perimeter. Thorsness attacked through a barrage of fire from the 37 mm and 57 mm guns and scored a direct hit with his CBU-24 cluster bombs.

Two SAMs were out of business, but the rattlesnake crackle came yet again.

Photo by Lew Chesley via Theo van Geffen

This F-105F is the one flown by Thorsness on his memorable mission. It was specially configured to defeat enemy missiles with radar and missile-launch warning systems and radar-seeking Shrike missiles.

Photo via Leo Thorsness

Thorsness was a flight lead and seasoned F-105 Wild Weasel pilot. Shown here in 1962 at Spangdahlem AB, Germany, Thorsness nearly reached the 100 mission milestone that would have been his ticket home from Vietnam.

Thorsness launched his second Shrike and called for the Weasels to "take it down." They did not know whether the Shrike found its target or not.

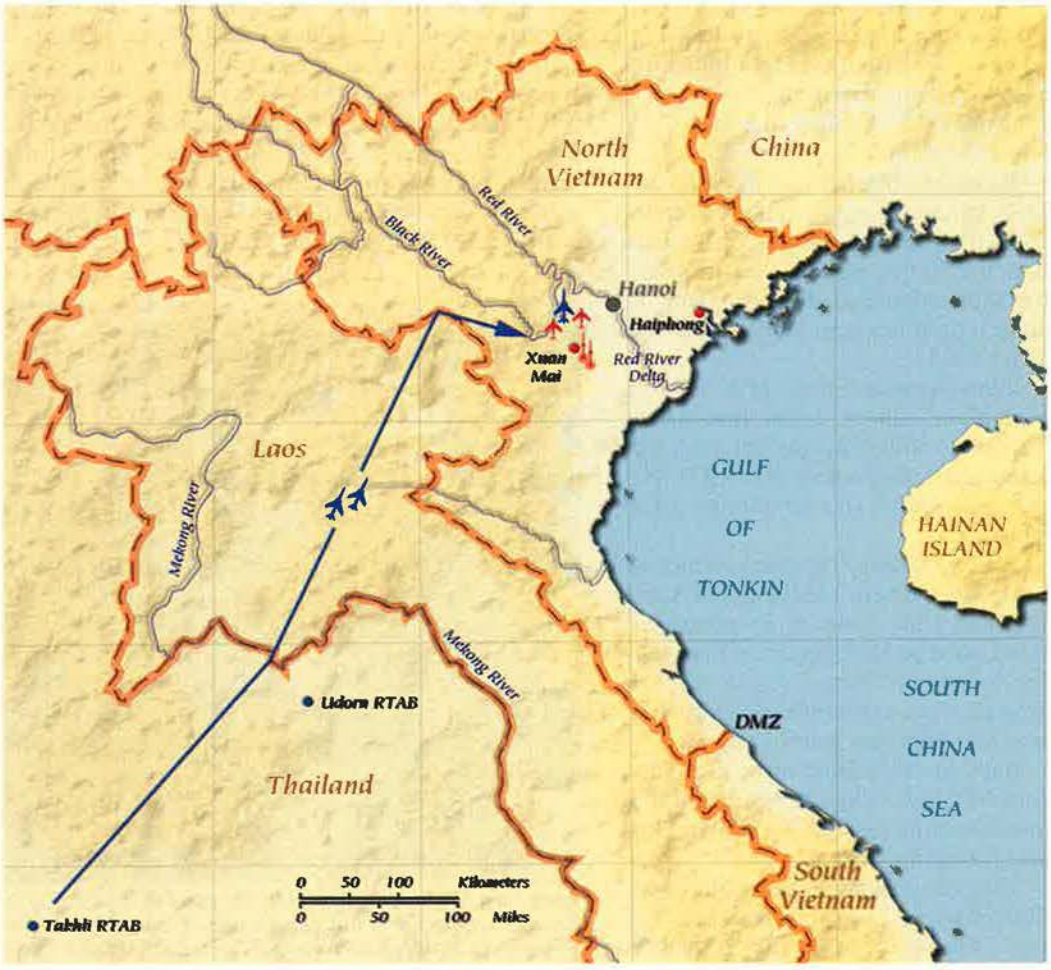
"We are now totally immersed in combat," Thorsness recalled many years later. "By this time, every cell in one's body is focused. Just the radio chatter by itself was enough to consume you. There are multiple radio calls from strike pilots: calling out MiGs, flak, 'where's Ford Two?', etc., MiG alerts broadcast on Guard channel, listening to Harry, Harry listening to me, listening for my wingmen, listening for the tail end of the strike flights so we know when we can 'get out of Dodge.' While staying on top of all that going on, we are looking for more SAM sites, keeping our six [the six o'clock stern position] clear of MiGs, jinking to avoid flak, monitoring the aircraft, setting bomb/Shrike/gun switches for the next run, and nursing our fuel so as to cover the last strike flight."

MiGs

The battle had now shifted away from the Red River delta. Kingfish 02 was hit by anti-aircraft fire, and Madison and Sterling bailed out over the foothills near the Black River.

Meanwhile, Kingfish 03 and Kingfish 04 were having their own troubles off to the north. They were fighting MiGs, and Kingfish 04's afterburner

The target of the day was North Vietnam's Xuan Mai army barracks, 37 miles southwest of Hanoi. The target zone was heavily defended by enemy SAMs and was a thousand-mile round-trip from Takhli.



Map by Zaur Eylanbekov

Photo via Leo Thorsness

Thorsness (left) and Johnson destroyed at least two SAM sites and a MiG-17 on April 19, 1967. Another SAM site and MiG were listed as probable kills. Thorsness, out of ammo, had to outrun pursuing MiGs.

wouldn't light. Kingfish 03 had to outmaneuver two MiGs as he escorted Kingfish 04 out. Thorsness and Johnson in Kingfish 01 were the only fighter crew left in the area.

They saw Madison's and Sterling's chutes and began flying around them.

"As we circled the descending crew, we were on a southeasterly heading when I spotted a MiG-17 heading east, low at our nine o'clock position," Johnson said. "I called him to the attention of Major Thorsness."

Thorsness dropped down behind the MiG, in tail chase position at 632 mph and 3,000 feet altitude, and opened up with the 20 mm gun. The left wing of the MiG splintered. Thorsness saw it enter a tight left spin and go down in a rice field.

Johnson spotted more MiG-17s behind them, about 2,000 feet back. Thorsness pulled sharply left, selected afterburner, and outran the MiGs. He was low on fuel and went looking for a tanker.

After refueling, Thorsness returned to the area where Madison and Sterling had gone down to fly cover for them. Rescue helicopters and propeller-driven A-1 "Sandy" rescue support aircraft were also orbiting. Darkness was less than two hours away.

Back in the bailout area, they saw four MiG-17s. Thorsness pressed the attack, pitting the lone F-105F against several enemy aircraft.

The only armament he had left was 500 rounds of 20 mm cannon ammunition. "One of the MiGs flew right into my gunsight at about 2,000 feet and pieces started falling off the [enemy] aircraft," Thorsness told Bob Ruhl of *Airman* Magazine in 1974. "They hadn't seen us, but they did now."

Two more of the MiGs turned to attack. Thorsness, out of ammunition, dropped to 50 feet and increased speed. He soon outdistanced the MiGs and they discontinued the chase after a few miles.

Kingfish 01 had accounted for two SAM sites and a MiG-17 for certain, and another SAM site and another MiG credited as probable. The second MiG could not be confirmed. There had been lots of action before that engagement, and Thorsness' gun camera had run out of film.

The Weasel F-105 having eluded them, the MiGs turned on the Sandys. Thorsness turned back to see if he could get the MiGs to chase him instead. As it happened, that wasn't necessary because another flight of F-105s arrived to take on the MiGs. The new arrivals got four of them.

The rescue force was unable to pick up Madison and Sterling, who were captured.

Thorsness headed for Laos and the tanker. Before he got there, another F-105, one of those that had taken on the MiGs, called for help. He was separated from his flight and had only 600 pounds of fuel left.

Although he was seriously low on fuel himself, Thorsness asked the tanker to fly toward the F-105 with the emergency and turned south, hoping to make it into Udorn, inside Thailand on the other side of the Mekong.

"With 70 miles to go, I pulled the power back to idle and we just glided in," he said. "We were indicating 'empty' when the runway came up just in front of us, and we landed a little long. As we climbed out of the cockpit, Harry said something quaint like, 'That's a full day's work.'"

Col. Jack Broughton, vice commander of the 355th TFW at Takhli, called it the day that Leo Thorsness "took on most of North Vietnam all by himself."

The mission was successful. The

Photo via Leo Thorsness

After he and Thorsness glided 70 miles to Takhli and landed with no fuel remaining, Johnson called it "a full day's work." Pictured at Nellis AFB, Nev., are (l-r) Johnson, Thorsness, and fellow Weasels Capt. Larry Waller and Capt. Jim Padget.

Photo via Leo Thorsness

Eleven days after the "Full Day" mission, Thorsness and Johnson volunteered for two missions in one day. Trying to "get home by Mother's Day," they were shot down on their 93rd sortie and held as POWs for six years.

strike flight, protected by the Weasels, got through. Twenty-two buildings were destroyed at Xuan Mai, and there were 13 secondary fires. Smoke was visible from 40 miles away. Several aircraft were lost to the anti-aircraft guns, but none were shot down or damaged by the SAMs, which had been the Weasels' responsibility.

For their actions that day, Leo Thorsness would be awarded the Medal of Honor and Harry Johnson would receive the Air Force Cross—but that came much later, after a long stay in the Hanoi Hilton.

Shot Down

Eleven days later, on April 30, Thorsness and Johnson flew an early morning mission and were standing by as a spare crew at Takhli. When one of the Weasels on a later mission aborted with radio trouble, they were written in to substitute.

"[Weasel] No. 3 aborted," Thorsness said. "They could not find another replacement so Harry and I volunteered to fill in. We were trying hard to get home by Mother's Day."

It would be their second sortie of the day and their 93rd mission over North Vietnam. Normally, Thorsness flew lead in the Weasel flight, but in this instance, he and Johnson moved into the position in the formation where the aircraft that aborted was to have flown.

As leader of the second element in the Weasel flight, Thorsness' call sign was Carbine 03. His wingman was Lt. Bob Abbott in a single-seat Thud. Behind the Weasels came four flights of bomb-carrying F-105s, led by Col. Jack Broughton, flying as Waco 01, and two flights of F-4s for MiG cover.

After refueling, Carbine flight swung north to troll for SAMs. The mission followed approximately the same route as the April 19 mission had.

The Weasels did not pick up any indication of SAMs, but they were getting an air-to-air radar signal. They figured they were being painted by the radars from the F-4s a few miles farther back.

"Two MiGs popped up from behind a large mountain we used as a turning point," Thorsness said. "We had just turned east and accelerated to 600 knots for a preplanned Shrike launch. At 600 knots, those MiGs could not have kept up with us. My belief is that the MiG and a wingman were orbiting in the valley on the west side of the mountain. We were headed northeast. I think he turned out of his orbit, looked up, and there sat those big fat Thuds loaded to the gills with weapons. All they had to do was pull up their nose and hose off their air-to-air missiles—and we were toast."

The MiGs blew Carbine 03 and 04 out of the sky. They were about 30 miles west northwest of the April 19 battle.

Six Years as POW

Thorsness was injured as he bailed out. The ejection blasted him into the windstream at almost 700 mph.

Thorsness received the Medal of Honor for his actions in the April 19, 1967, Xuan Mai mission. He was unable to receive the honor from President Nixon until Oct. 15, 1973, months after his return.

Photo via Theo van Golfen

Thorsness (third from right) is shown here at the F-105's retirement ceremony at Hill AFB, Utah, in 1984. Thorsness retired from the Air Force as a lieutenant colonel on Oct. 25, 1973.

His legs flew out and his knees bent inward, causing severe damage to that joint. His flight suit zippers were blown open, his helmet was ripped away, and his pockets tore off.

Ground gunners were shooting at the parachutes on the way down. Thorsness recalls thinking as he descended that "it's hard to hide in a parachute."

Broughton led an extended and intense rescue effort, but it was not successful.

Thorsness came down in a mountainous area. He crashed into the trees and hung there by his shroud lines before working himself free. About 20 villagers, armed with rifles and machetes, found him. They "cut off my clothes, even my boots. I don't think they knew how to use zippers. I resisted walking but they insisted and they won."

They allowed him to wrap his injured legs in bamboo splints and banana leaves, tied on with vines. After 10 hours, he passed out and was carried the rest of the way to confinement in a fishnet litter.

Johnson was captured soon after Thorsness. They saw each other periodically in Hanoi but did not have an opportunity to speak again until they were repatriated in 1973.

Thorsness was held in the Hanoi Hilton and various other POW camps. He was known as a hard-core resister who did not cooperate with his captors. For that, he was denied medical attention, and he spent a year in solitary confinement. He also sustained back injuries from torture.

"I was in Hanoi six years," he told the PBS production "American Valor" in 2003. "Three years were brutal, torture was normal. Three years were boring, torture was abnormal. Three years you lived in solitary or two or three per cell, couldn't talk out loud, did a lot of beating, and so on. Last three years, I lived in big cells, you could talk out loud, you got to pour a bucket of water over you most days for a bath, and life was a little better."

He was nominated for the Medal of Honor in 1967. The recommendation was signed by the Secretary of the Air Force, but the Department of Defense decided that approval should wait until after repatriation of the POWs, so the nomination was returned to the Air Force to hold until then.

Thorsness learned via POW tap code messages that he had been nominated for the Medal of Honor. Ironically, the officer who wrote the recommendation (he joined the wing after Thorsness' capture) was himself shot down and held captive in the same prison.

Over the years, Thorsness was allowed to send a total of 13 messages to his wife, Gaylee. All were on seven-line letter forms. Supposedly, he was allowed to receive a monthly six-line letter from her. Most were returned to her unopened, some of them stamped "Deceased" on the outside of the envelope.

"What good that possibly did for their cause is hard to understand," Thorsness said.

The Medal of Honor was approved swiftly after his return from Hanoi, and it was presented to him by President Nixon on Oct. 15, 1973.

Since 1973

Ten days after receiving the Medal of Honor, Thorsness retired from the Air Force as a lieutenant colonel. He and Gaylee settled in her hometown, Sioux Falls, S.D., and Thorsness entered politics.

"With a lot of thinking time in Hanoi and living the ineptness of our war leaders, I gradually became convinced that I had the experience and common sense to help make foreign policy, rather than enforce failed foreign policy as a military man, as a US Congressman or Senator," he said. "And it happened that George McGovern was up for election in 1974, just as I was released in 1973. Bingo, give it a shot."

His run against Sen. George McGovern (D-S.D.) in 1974 was unsuccessful, as was his challenge to Rep. Tom Daschle (D-S.D.) in 1978.

From 1979 to 1985, Thorsness was director of civic affairs for Litton Industries in Beverly Hills, Calif. In 1986, he moved to Indianola, Wash. He was a Washington state senator from 1988 to 1992.

He and Gaylee lived in Alexandria, Va., for two years, and in 2000, they moved to Saddlebrooke, Ariz., where they now live.

"In a prison camp, you had to bow 90 degrees," Thorsness told the "American Valor" program. "If you didn't bow right, they'd beat you. One day I was not gonna bow, and I was hoping that my courage was strong. The guard opened the door and I looked him in the eye and I didn't bow, and the thought that went through my mind was I had won the flip of the coin. I said, you know, he could have had American parents and I could have had Vietnamese parents. How'd I luck out? And it really made an impact on me. And from that day on, I felt kind of sorry for those guys over there." ■

John T. Correll was editor in chief of Air Force *Magazine for 18 years and is now a contributing editor. His most recent article, "20 Seconds over Long Binh," appeared in the April issue.*

For years, China pushed. Japan has finally pushed back. For the US, the consequences are large.

Dragon, Eagle,

By James Kitfield

When an unidentified submarine was detected in the waters off Japan last November, P-3C maritime patrol aircraft from the Japanese self-defense forces immediately began shadowing the intruder.

The escort was hardly benign. Japan's force of 80 P-3C aircraft boasts powerful radars and antiship and antisubmarine weapons, including lethal Harpoon missiles. With a range of more than 1,000 miles and flying from air bases stretching from Hokkaido in the north to Okinawa in the south, the P-3s would allow Japan to set up a defensive perimeter out into the South China Sea, over the Spratly Islands, and even south of the Philippines.

The undersea intruder turned out to be a nuclear-powered Chinese submarine. Though the incident rapidly receded from the front pages, it affirmed the renewal of a rivalry whose impact could be felt far beyond Japan and China.

At stake: primacy in the world's most dynamic economic region and the stability of East Asia in the 21st century.

Fueled by superheated economic expansion, the mainland communist giant has launched an aggressive military modernization program and is testing the limits of its military reach. In 2004, for instance, Chinese surveillance and reconnaissance vessels conducted more than 30 illegal incursions into Japanese territorial waters.

Shaken—and Stirred

The jolt provided by Chinese actions—amplified by the emergence of a belligerent and possibly nuclear-armed regime in North Korea—has shaken Japan out of its Cold War-era strategic slumber. Tokyo has responded by modernizing its own military, upgrading its security alliance with Washington, and drastically reducing its post-World War II pacifism.

Any lingering doubts about a rekindled rivalry between China and Japan were dispelled by recent testy diplomacy between the two economic powerhouses. Japan demanded and received an apology, for instance, for the Chinese submarine's incursion. Next came a joint statement by top US and Japanese officials in February stating that both wanted to "encourage" the peaceful resolution of the Taiwan issue, marking the first time the United States and Japan had mentioned Taiwan in a formal statement.

Beijing erupted with howls of protest over what it termed Japan's meddling in internal Chinese affairs, and then responded by passing a law in March legally binding China to "nonpeaceful means" should Taiwan declare or move toward independence.

There are even reports that China, flexing its growing economic and military muscle, has begun demanding that Australia end or modify its 50-year-old alliance with the United States.

When asked about the controversial proclamation of an official interest in the future of Taiwan—which China considers a "renegade province"—Japanese officials are unapologetic.

"We're more than just concerned [about China], but we have to be careful," Ryozo Kato, the Japanese ambassador to the United States, said

and Rising Sun

AP photo by Itsuo Inouye

Pictured are Japanese troops upon arrival at Samawah, Iraq, in early 2004. Their arrival signaled a major turning point in Japan's evolution away from the pacifist policies of the last half-century.

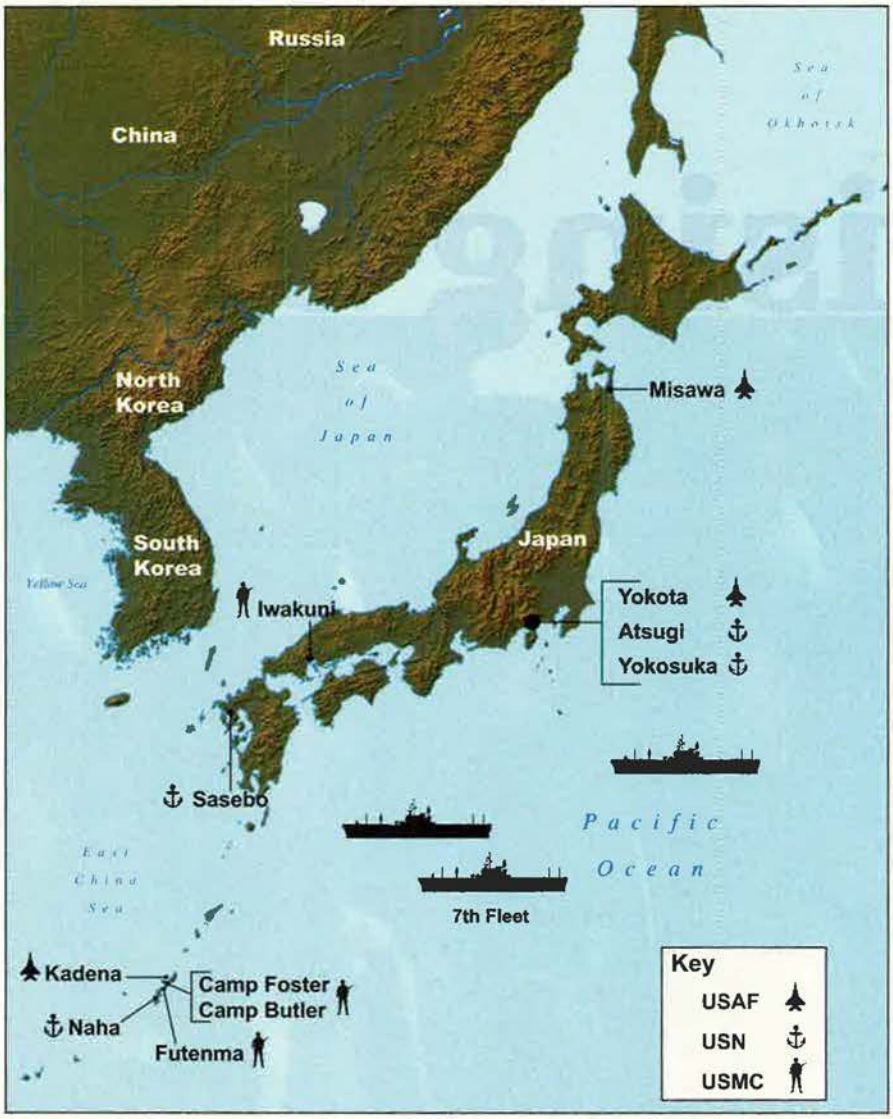
in an interview. In 1996, he noted, when China fired missiles to intimidate Taiwan on the eve of elections, they very nearly fell in Japanese territorial waters.

He went on, "Both the United States and Japan have long shared a clear recognition that the security of Taiwan is one of the most important contributors to the security of Japan. That goes back to our long sea-lanes to the Middle East, where we get nearly 90 percent of our energy. If a hostile regime were ever created on Taiwan, for instance, it would represent a potential choke point for our oil supplies that would be very troubling in terms of Japan's security."

In the recent past, Japan's general approach to foreign policy has been to grant generous aid and preferential loans to help integrate China into the global economic system and to give Beijing a vested interest in regional stability. "Our line of thinking was that there were a variety of different scenarios in terms of how China develops," said Kato. "We felt all along that the best of those scenarios was for China to consider economic development as its top priority. This will ensure that China develops international dependence, which also requires stability. So our policy remains encouraging China to give top priority to its economic development. We think that's best not only for China but also for the international community."

As a result of that common US-Japanese strategy, however, China's economy has registered nearly double-digit annual growth for decades, with no end in sight.

Now that Beijing is clearly determined to funnel huge amounts of that economic bounty into modernizing its military, expanding its power projection capabilities, and threatening Taiwan with missile deployments opposite the Taiwan Strait, Japan is clearly recalculating its strategy. In March, for instance, Tokyo informed China that it would begin cutting back its low-interest



Japan boasts a huge contingent of US forces—45,000 ashore and 13,000 in nearby waters. USAF deploys fighters, airlifters, and an SOF group. US 7th Fleet provides 17 ships and 100 aircraft. The 3rd Marine Expeditionary Force is based there. While the Army has a tiny presence in Japan, it maintains some 27,000 troops in South Korea.

loans this year, with a goal of phasing them out entirely by 2008.

Sobering Decade

Japan was first awakened to the approach of new danger during the 1990s, first by China's overt intimidation of Taiwan in 1996 and then by North Korea's launching in 1998 of a three-stage Taepo Dong 1 missile that flew over Japan's main island of Honshu. During the 1990s, Japanese officials also increasingly worried that the United States' outreach to China as a "strategic partner" represented a downgrading of the US-Japanese alliance.

Thus Tokyo began laying the groundwork for a far more assertive and muscular strategic posture that was more reflective of its vast wealth and influence as the world's second-largest economy.

To build support for such a strategic shift at home, Prime Minister Junichiro Koizumi began appealing overtly to Japanese nationalism. That was the underlying message behind the reintroduction of the "Rising Sun" flag and Koizumi's controversial annual pilgrimage to the Yasukuni Shrine, which honors 2.5 million Japanese war dead (including over a thousand convicted World War II war criminals).

Those appeals are designed to counter deep strains of pacifism inculcated into the Japanese populace and, indeed, made a formal part of the postwar Japanese constitution. The move is summarized by Koizumi's publicly expressed desire to see Japan finally become a "normal country."

That return to normality has proved controversial in the region and domestically, however, given Japan's reckless and aggressive militarism in the first half of the 20th century. As Alan Dupont points out in the spring 2005 *National Interest,* at that time, a Japanese military with a long martial tradition and steeped in samurai ethos destroyed Russia's Baltic Fleet, colonized Korea, invaded China, subjugated Southeast Asia, and attacked the United States. The end result of this international lawlessness was Japan's catastrophic defeat at the hands of the United States, punctuated by the atomic bomb attacks on the cities of Hiroshima and Nagasaki in 1945.

Koizumi's government has persistently chipped away at constitutional and administrative constraints on the active use of the Japan Self-Defense Forces (JSDF). Numerous bills passed by the Japanese Diet in recent years have relaxed restrictions on the deployment of the JSDF (albeit in noncombat roles), for instance, and focused on improved military preparedness.

Will Article 9 Go?

Many political observers in Japan think it is likely that the Article 9 renunciation of war contained in the Japanese constitution will be rewritten to recognize the existence and expanding role of the self-defense forces. Significantly, a recent poll by the authoritative *Asahi Shimbun* newspaper found that a majority of Japanese people and lawmakers now favor a revision of the constitution to abandon the prohibition on collective self-defense.

The Japanese government has moved aggressively to put the new laws and relaxed restrictions to the test. During the US-led Operation Enduring Freedom in Afghanistan in 2001, for instance, the US flotilla was supported by Japanese supply ships escorted by Japanese destroyers. The Japan Air Self-Defense Force (JASDF) also flew a number of transport missions to Diego Garcia and Guam in support of Enduring Freedom. That help came in stark contrast to 1994, when Japan refused to support US forces engaged in a tense showdown with North Korea over its nuclear weapons program.

In an even more controversial move, Koizumi in early 2004 dispatched 600 ground troops to Iraq to aid reconstruction following passage of UN Security

AP photo by Itsuo Inouye

The deployment of Japanese troops to Iraq last year stirred unwelcome memories for some and raised concerns domestically about a newly militaristic Japan. Since World War II, Ground Self-Defense Forces have been kept at minimal strength.

Council Resolution 1511, which authorized a multinational peacekeeping deployment.

"That was a difficult decision for the Japanese government, but it is in Japan's vital strategic interest to have stability in the Middle East," said Kato. "Even beyond our relations with the United States, it's important for Japan to do what is necessary to contribute to the stability of the region. So we have taken that decision on troops because it is in our interest."

The JSDF troops in Iraq are engaged in noncombat reconstruction activities. Even so, Kato concedes, the very act of sending Japanese troops so far from the homeland amounted to a crossing of the Rubicon in the Japanese psyche.

"That deployment did cross some boundary lines," he said, "which is why we were so careful in stipulating what tasks our forces would undertake in Iraq, which are mostly concerned with delivering medical supplies and water purification. And as you know, Japan is also very committed to the United Nations, so whenever we deploy troops it's important to us that such missions are authorized by the United Nations."

The cornerstone of Japan's new strategic posture, however, has been to tighten and strengthen its alliance with the United States, a move that includes closer integration of US and JSDF military forces. The Japanese government has closely linked its National Defense Program Outline and a bilateral US-Japanese Defense Policy Review Initiative with the Pentagon's own Global Posture Review. A major focus of those consultations has been the growing military reach of China.

"Pay Attention"

Japan's December 2004 National Defense Program Outline thus asserted that "China ... is attempting to expand its sphere of maritime activity while driving the modernization of its nuclear and missile forces as well as naval and air forces. Japan needs to pay attention to these trends."

One who has been observing Japan's actions is Dan Blumenthal, a resident fellow at the American Enterprise Institute in Washington, D.C. The upshot of the recent US-Japan consultations, Blumenthal maintained in a recent issue of AEI's "Asian Outlook," is that Japan "will be able to work with the United States in the future to maintain control of vital sea lines of communication, particularly in the event of a conflict involving maritime access to the Middle East."

He went on, "As China arms the Iranian regime with antiship missiles and expands its naval presence into the Indian Ocean, this is an area that will have greater importance in the future."

Indeed, Japanese officials concede that Japan's position as an island nation heavily dependent on Middle East oil is never far from their strategic calculations or consultations.

"What most stands out when you consider Japan's particular position is our dependence on Middle Eastern oil and very long sea lines between Japan and the region that must cross the Persian Gulf, the Indian Ocean, and the South China Sea," said Kato. "Because those vital sea-lanes are vulnerable to disruption at many different choke points and hot spots, it's only natural for Japan to seek the best means for securing those sea-lanes. And that can be accomplished only within its close strategic alliance with the United States. The absolutely indispensable security element for us is the strategic alliance with the United States."

As a pillar to strengthen that strategic cooperation, Japan has moved strongly

USAF photo by SSgt. Adrian Cadiz

Boasting the world's fourth most powerful air force, Japan fields more than 200 F-15s and is modernizing with F-16-derived F-2s. It has AWACS and is buying new aerial tankers. Its ground-attack capabilities remain limited, though.

DOD photo

Japan has built the world's third largest fleet to help ensure its sea lines to Middle Eastern oil supplies. Here, a USN P-3 leads a Japanese P-3 in flight over a bilateral force of US and Japanese ships during a RIMPAC maritime operations exercise.

to join the US effort to construct a defense system against ballistic missiles. In 2005, Japan will spend around $1 billion on research and development related to the American ballistic missile defense (BMD) program, for instance, and an estimated $10 billion this decade. Tokyo reportedly plans to acquire a missile defense system that is fully interoperable with the Pentagon system, which will have upper and lower tiers. Japan already has purchased four Aegis destroyers, and it plans to acquire two more. The Aegis system is an integral part in the planned Navy Theater Wide (NTW) missile defense system that will have an upgraded SM-3 interceptor missile. Japan also plans to buy the Patriot PAC 3 antimissile system for its lower tier.

In his article "The Revival of the US-Japanese Alliance," Blumenthal points out that Japan's decision to acquire the "made in America" ballistic missile defense has even greater strategic significance. "To make the BMD system effective, Japan and the United States will have to take a number of measures to harmonize plans and procedures at both the strategic and operational levels," he wrote. Because the Japanese BMD system will rely heavily on US satellites for missile detection, for instance, the United States and Japan will have to closely harmonize command and control arrangements and equipment interoperability.

"Once Japan acquires the NTW system, chances are good that the United States will call upon Japan to deploy its seaborne assets to fill information and coverage gaps to support missions not directly related to defending Japan, such as the defense of Taiwan," wrote Blumenthal.

Indeed, as US officials study ways to accommodate and, if necessary, contain China's strategic ascendance, Japan's conventional self-defense forces offer enticing capability that can greatly enhance and augment US forces in the Pacific. While Japan has minimal capability in terms of ground forces, for instance, its air and naval forces are far more capable.

Japanese Airpower

Japan has purchased more than 200 high-technology F-15J fighters and some 30 F-2 fighters (similar to US F-16 Falcons). Significantly, Japan also owns four AWACS airborne command and control aircraft and the 80 P-3 Orion patrol aircraft armed with antiship and antisubmarine weapons. The JASDF is also purchasing four Boeing 767 tanker aircraft to give the air defense forces an air refueling capability (the first tanker is slated for delivery in 2006). Already, Japanese F-15s flying from dispersed bases can project power over the Taiwan Strait, the Korean Peninsula, and regional sea-lanes a great distance from the home islands.

Because of its defensive posture, the JASDF lacks significant precision air-to-ground capability for offensive operations, but its air superiority capabilities are tops in the region. "Measured by number of modern fighter aircraft, by airborne early warning assets, and by pilot training, the Japanese Air Self-Defense Force is competitive with those of other leading military powers," wrote Jennifer M. Lind in a recent research paper sponsored by the Center for Strategic and International Studies and the Massachusetts Institute of Technology. "In fact, Japan arguably has the world's fourth most powerful air force, after the United States, Great Britain, and France. Russia fields a large but inadequately trained force averaging only 20 flying hours per pilot each year."

The Japan Maritime Self-Defense Force (JMSDF) is similarly impressive. Its four modern battle groups boast sophisticated air defense and antisubmarine warfare capability that allows them to operate far from home islands and near contested areas. In terms of major surface combatants (Japan has 54) and tonnage, Japan has the world's third largest fleet. Once again its defensive posture limits the fleet's capability to launch offensive strikes ashore, but its sea control capabilities are better than most of the world's great powers.

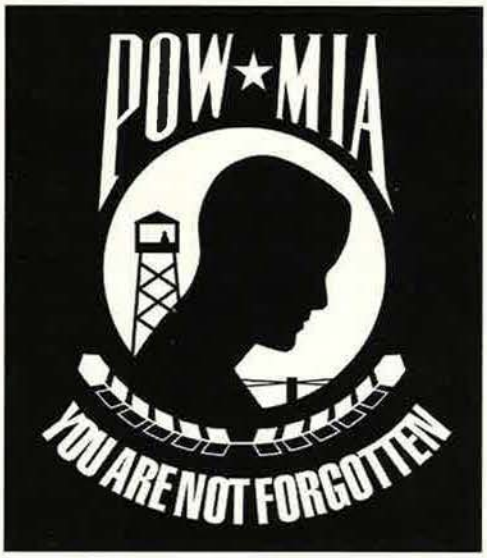
"In terms of naval capabilities, Japan ranks near Great Britain and above any other European great power," wrote Lind. "The Chinese Navy, with a slightly higher number of major surface combatants, consists primarily of light frigates and has very poor air defense capabilities relative to Japan. The JMSDF's fleet air defense capabilities are excellent, surpassed only by the United States. ... Japan's P-3s could devastate the navy of any East Asian country." So while the United States clearly has the world's most powerful navy, "Japan and Great Britain probably vie for second place."

For years, Washington has been prodding its quiet ally in the Pacific to finally step forward into the ranks of the great powers. The time has come, US officials insist, for Tokyo to assume responsibilities and duties in the region and around the world that are more commensurate with Japan's great wealth and influence. Now, the message coming back across the Pacific, while characteristically softly spoken, is nevertheless unmistakable: "We're ready." ■

James Kitfield is the defense correspondent for National Journal *in Washington, D.C. His most recent article for* Air Force *Magazine, "Guard and Reserve in a Time of War," appeared in the July 2004 issue.*

Little by little, the effort to find and identify Vietnam War dead and missing is yielding results.

The Search Goes On



By Bruce D. Callander

FIGHTING in Vietnam ended three decades ago, but, for the families of more than 600 Air Force members, the war still is not over. Their loved ones are among the more than 1,800 United States service members still listed as unaccounted for in Southeast Asia.

When the war officially ended in 1973, the United States declared exactly 2,583 airmen, soldiers, sailors, and marines to be unaccounted-for prisoners, missing, or "killed in action/body not recovered." As of February 2005, the military services had accounted for more than 700 of those troops.

Nor have the Air Force and the other services forgotten those service members who still are missing. They continue to search for lost members from the Vietnam War and other conflicts. The Air Force's point man for the effort is Jim Russell, chief of the Missing Persons Branch at the Air Force Personnel Center, Randolph AFB, Tex.

"I have a counterpart in each service," Russell said. "Our role is to deal with the families. We have a lot of unaccounted-for service members from the different wars, and the goal, obviously, is to bring our fallen heroes

The POW/MIA flag, above, has come to symbolize the ongoing search for unaccounted-for military service personnel in Vietnam.

home for proper burial honors and ceremony and to bring closure for the families. ... Our role is to help them work through all that."

Russell's office maintains contact with about 3,000 family members, a substantial number of them relatives of members lost in the Vietnam War. Attention to that issue increased in 1987 with the appointment of retired Army Gen. John W. Vessey Jr., a former Chairman of the Joint Chiefs of Staff, as special emissary to Hanoi. He has had considerable success in opening a dialogue with Vietnamese officials on this issue.

Main Players

Leading the Pentagon effort is the Defense Prisoner of War/Missing Personnel Office (DPMO). Headed by a deputy assistant secretary of defense, it coordinates the efforts of the services and oversees the operations in the field. There is also an operational agency, the Joint POW/MIA Command (JPAC) in Hawaii.

That agency, which came into being in October 2003, combines previous organizations that were in Hawaii and, before that, Southeast Asia and Thailand.

JPAC, located on the island of Oahu, was created by the merger of the 30-year-old US Army Central Identification Laboratory (CIL) in Hawaii and the 11-year-old Joint Task Force-Full Accounting. The present 425-person organization has representatives from all services and is commanded by a flag officer. A key element of the command, the Central Identification Laboratory is said to be the largest forensic anthropology lab in the world.

The five main tasks of the JPAC are to:

- Gather information on missing members and determine where each was lost.
- Negotiate through the State Department and other agencies for access to the area involved.
- Investigate the location and establish whether it is likely to have been the site of a loss.
- Send in experts to recover remains.
- Make a positive identification and notify the families.

The process is long and arduous, but JPAC says CIL identifies, on average, two Americans each week. However, the entire recovery and identification process can take years.

Before Vietnam

The cases of military aviation members who went missing or became POWs during World War II and earlier conflicts are handled by the Army because air activities were conducted under that branch until 1947.

The all-service total for World War II is about 78,000. Although most have long since been declared dead, the services still turn up new information about members lost in that conflict.

"Every so often, you see articles about somebody," said Jim Russell, chief of the Air Force's Missing Persons Branch. "A French farmer digs up the field and runs into a plane. They did some World War II recovery work in Burma just last year."

Judith A. Grojean, chief of media relations at the Air Force Personnel Center, was personally involved with just such an incident. "When I was doing protocol work for the Army in 1995," she said, "we were observing the 50th anniversary of World War II in Germany. We followed the path of an infantry unit, and when we talked to the town folk we met, it was not uncommon to hear about farmers out plowing and remains appearing. While I was there, a man came to me and said he had been up in an attic and found the backpacks of something like 15 soldiers. They had the identification numbers in them and everything, and he turned them over to us. So it is not uncommon that they continue to find remains, and when they do, they turn them over to proper authorities. There were some big battles there in the 1940s and many lost lives."

Early this year, the Joint POW/MIA Accounting Command (JPAC) in Hawaii announced that it was sending a nine-person recovery team to New Guinea to continue recovery efforts at a site associated with a 1942 B-25 crash. Another five-person JPAC investigation team was to conduct operations in up to 15 known or suspected cases, and a three-member team was to investigate reported cases in Fiji.

In the 1990s, the services took a renewed interest in the 5,866 Americans still unaccounted for in the Korean War. "It all started when then-President Clinton asked the Department of Defense to increase the accounting effort to include the Korea and Cold War era," said Russell.

"Each of the services was starting from scratch," he said. "The members were lost during the 1950 to '53 time frame, and we hadn't had any contact with these families since the time of the incidents. So when you think back to the Korean War, we were starting at ground zero with casualty cards with information on [them] that was literally 45 to 50 years old.

"We began trying to find family members and let them know about the accounting effort. We also wanted to know if the missing persons had any maternal relatives still alive, so we could get blood samples. We had a good response. We now have probably about 60 or 65 of those cases now represented with at least one family member.

"It may have been optimism to think that North Korea would allow a significant amount of access to their area, so we could go look for the unaccounted for. Unfortunately, the access hasn't materialized to the extent we would like, but, even so, we still had enough to prepare an operation and, in fact, we did. We had one Korean War identification just last year.

"The unfortunate point, however, is that a lot of those witnesses are dying. Time is our enemy, here. From the Korean War standpoint, we're talking 50 years ago. So, even if a person was 20 years old back at the time, that means he's 70 now. And, from our standpoint, ... and this is something that negotiators try to use with the foreign countries, ... the family members that we represent, they're dying off, too. The thing that we try to portray is that this is a humanitarian mission. This isn't a military operation and there isn't any secret agenda, although that sometimes is a hard point to make because there are military people involved in this process. But it is not a big intelligence scheme. It really is a humanitarian mission."

Knowing that an airplane went down, and finding the actual crash site, are two different things.

"There are casualty records and other documents that have been pieced together from the analysts in Washington, as well as from the analysts in Hawaii," said Russell, "so that is part of putting the puzzle together. For the vast majority of cases, there are grid coordinates or at least general areas. There are some officers that we just don't know anything about, any exact coordinates."

For that reason, it's still important for investigators to go "in-country" and talk to local villagers. The locals in the general area may have seen or heard something. In many cases, particularly in Southeast Asia, the villagers will lead an investigative team directly to a site.

"That's again all part of putting the pieces together before you make a commitment to do an excavation," said Russell, "because it takes a lot of time and resources to do an archeological operation. The collecting of information ahead of time is absolutely critical."

Still, the locals are a big help.

"How many times in your lifetime are you hoeing the field and see a parachute or a plane falling out of the sky?" Russell asked. "It's not going to be too often, so it's something you remember."

In some cases, the families of the missing Americans also provide information such as preservice medical or dental records.

JPAC has six investigative teams, each with four to nine members with specialized skills. They are analysts, linguists, and medics. In some cases an anthropologist, an explosive ordnance technician, or life support technician will be added.

Pick and Shovel

Finding remains of lost servicemen is a combination of science, detective work, and archeology. "The operational work is done by JPAC," said Russell. "They're the ones with boots on the ground. They're the ones that are in the jungles of Southeast Asia and the rugged terrain of North Korea working initial investigations so they can make an informed decision on making an excavation occur. Then they do what is essentially a scientific dig."

For example, an anthropologist will be the person who conducts the archeological dig in a scientific manner, so as not to disturb anything that may be in a crash site or in a burial site.

Obviously, what they are looking for is remains.

"You get the clues up front to narrow down a given area before you commit the resources to do an excavation," according to Russell. "Once they are pretty certain they have narrowed it down and gotten peripheral clues, then they will go in with their anthropology team to do an excavation. They very meticulously go through nearly every grain of dirt looking for any additional clues that could lead to human remains, personal effects, and so forth."

JPAC has 18 such recovery teams, 10 of them dedicated to looking for those missing from the war in Southeast Asia. Five teams work on the Korean War missing, and three concentrate on missing Americans from World War II, the Cold War, and the Gulf War.

Command representatives said that a typical team has 10 to 14 personnel and is headed by a leader responsible for the operation, safety, and welfare of the unit. There also is a team sergeant (typically an Army sergeant first class trained in the field of mortuary affairs) and a forensic anthropologist (the only civilian team member), who oversees the scientific aspects of the recovery.

Other team members may include a linguist, medic, life-support technician, forensic photographer, explosive ordnance disposal technician, and several mortuary affairs specialists. If the mission requires, the teams also will have mountaineering specialists, communication technicians, and mechanics. A standard recovery mission may last from 35 to 60 days, depending on the location, terrain, and recovery methods.

DNA Clues

The development of DNA as a means of identification has greatly improved the process of putting names to the remains that are recovered, Russell

STILL MISSING IN SOUTHEAST ASIA

Air Force	610
Army	585
Navy	379
Marine Corps	234
Civilians	34
Total	**1,842**

Source: Defense Department

THE "UNACCOUNTED-FOR" AMERICANS

World War I, 1917-18	1,648
World War II, 1941-45	78,794
Korean War, 1950-53	5,866
Southeast Asia War, 1961-73	1,842
Total	**88,150**

The term "unaccounted for" comprises the categories of unidentified remains, remains not recovered, missing in action, killed in action-body not recovered, and presumptive finding of death.

Source: Congressional Research Service

said. "I know that DNA has helped the identification process significantly," he said. "We've had a pretty good success rate in Southeast Asia."

While useful, DNA alone is not enough to make a positive identification, in most instances. The investigators use mitochondrial DNA, a type that is inherited maternally. It can't identify a specific individual, but it can link a bone fragment to a maternal line.

"So, if I get a blood sample from a person's mother, and they run a DNA sequence out of the bone fragments and it matches, then they can pretty much conclude that this must be the guy because he came from the same maternal link," said Russell. "Again, the whole thing is like a big jigsaw puzzle. With each investigation, the clues they find are pieces that go down on the tabletop until they put all the pieces together, and then the scientific workup comes to the conclusion that the remains they have belong to Maj. John Doe or TSgt. James Jones."

Much depends on the environment in which the teams find remains. Soil in Southeast Asia is acidic and can damage any bone fragments.

Update Meetings

The ongoing search for casualties understandably is of major concern to the families of the missing. To keep them posted on developments, the Pentagon and services schedule regular briefing sessions in various parts of the country.

"Part of our role as a liaison to the families is to work with the Department of Defense office as they schedule these meetings," said Russell. "It's called a Family Member Update. Defense schedules updates about eight months out of the year, and we have two other months where we have annual meetings that usually are held in Washington, D.C."

A typical family update attracts about 10 to 15 percent of the relevant persons living within 300 miles of the meeting site. For instance, about 300 family members live within 300 miles of San Antonio; around 30 family members can be expected to show up at a family update.

The next Southeast Asia Annual Conference will be in Washington,

Missing in the Cold War and Later

Only about 125 service members remain unaccounted for from the Cold War era, but a substantial percentage of those are Air Force personnel. Jim Russell, chief of the Air Force's Missing Persons Branch, said, "Most of the Cold War incidents were reconnaissance flights over hostile territory, meaning the former Soviet Union or China or in those general areas. There were 14 such incidents that the Department of Defense considers Cold War hostile losses in which crew members were unaccounted for. I think there are five or seven Air Force incidents that represent 57 people."

DOD figures show that 39 US military aircraft and one civilian aircraft were shot down by communist forces or crashed near communist countries while flying operational missions between 1946 and 1991. Typical of the missions involved were:

Two RB-29s lost in 1952, one over the Sea of Japan and the other over the Pacific Ocean.

Two RB-50s lost over the Sea of Japan, one in 1953 and the other in 1956.

An RB-47 downed over the Bering Sea in 1955 and another lost in 1960 over the Barents Sea.

A C-130 lost in Armenia in 1958, an RB-57 lost in the Black Sea in 1965, and an EC-121 downed over the Sea of Japan in 1969.

In March 1992, the former Cold War adversaries set up the United States-Russia Joint Commission on POW/MIAs. It meets several times each year as a forum through which the two nations can look for their missing service members.

Today, there is one American still missing from Operation Desert Storm. So far in the war in Iraq, there have been numerous casualties but relatively few POWs and MIAs. One soldier is still listed as a prisoner.

AMERICAN POWS AND THEIR DISPOSITIONS

	World War I	World War II	Korean War	Vietnam War	Gulf War	1992-2005
Captured, interned	**4,120**	**130,201**	**7,140**	**725**	**23**	**14**
Returned to US military control	3,973	116,129	4,418	661	23	13
Died while POW	147	14,072	2,701	64	0	0
Refused repatriation	0	0	21	0	0	0
Still held by enemy forces	0	0	0	0	0	1

Over six combat eras, a total of 142,233 US military members have been captured or interned in foreign countries. Of those, only one case is unresolved. This serviceman, confirmed as a POW in Iraq on April 23, 2004, is still listed as captured by US military authorities, despite unofficial reports that he died in captivity.

Source: Congressional Research Service

Five Key Definitions

- POW (Prisoner of War): Known to be, or to have been, held by the enemy as a live prisoner or last seen under enemy control.
- MIA (Missing in Action): Removed from control of US forces due to enemy action but not known to be a prisoner of war or dead.
- KIA-BNR (Killed in Action-Body Not Recovered): Known to have died in action, but remains not recovered by US forces.
- PFOD (Presumptive Finding of Death): Official determination that there is no evidence a POW or MIA could still be alive.
- Unaccounted for: All who are listed as POW, MIA, KIA-BNR, or PFOD, but about whom no further information is yet known.

Adapted from March 4, 2005, Congressional Research Service study, "POWs and MIAs: Status and Accounting Issues."

D.C. Regional updates are scheduled for Omaha, Neb., on July 30; Columbus, Ohio, on Aug. 27; San Diego on Sept. 24; Raleigh, N.C., on Oct. 22; and Spokane, Wash., on Nov. 19.

"These meetings are all-day events," said Russell, "and the first portion is given to briefings. All these different agencies that work the accounting issue—the Department of Defense, the JPAC guys from Hawaii, the Armed Forces DNA [Identification] Lab, etc.—give a series of presentations about the overall effort and what their organizations do, in a general sense. They show pictures and have graphs and slides, etc., to bring the audience up to speed on the overall effort. Then the second part of the meeting is opened up to the families to ask questions on each of the general areas they were briefed on, and then time is set aside, ... a couple of hours, ... for one-on-one discussion. This is the time when a family can sit down with my staff and say, 'OK, what's the latest with my case and where are we headed?'"

Those Still Missing

Are some live American prisoners still being held in Vietnam? In the aftermath of the war, that question became the subject of a great political controversy which has never fully died away. In a recent study for Congressional Research Service, analyst Robert L. Goldich asserted, "Few people familiar with the issue feel that any Americans are still being held against their will" in a communist country.

However, he went on to say: "Those who believe Americans are now held, or were after the war ended, feel that, even if no specific report of live Americans has thus far met rigorous proofs, the mass of information about live Americans is compelling. Those who doubt live Americans are still held, or were after the war ended, argue that, despite vast efforts, only one live American military prisoner remained in Indochina after the war (a defector who returned in 1979)."

Washington says it won't rule out the possibility that Americans are being held in Indochina. Since 1982, the official US position has been as follows: "Although we have thus far been unable to prove that Americans are still being held against their will, the information available to us precludes ruling out that possibility. Actions to investigate live-sighting reports receive and will continue to receive necessary priority and resources based on the assumption that at least some Americans are still held captive. Should any report prove true, we will take appropriate action to ensure the return of those involved."

The CRS report says that, of the 1,842 Americans still listed as unaccounted for, the Pentagon continues to search for the remains of 1,175. It has given up actively looking for any of the other 667 servicemen because it believes there is no prospect of finding them, based on the circumstances of their disappearance. Examples include 468 men lost over water, or those who died in exploding aircraft in flight, with no sign of crew ejection.

Families Organize

While the Pentagon and the services do the actual investigations, the families of the MIAs and POWs have done much to keep the country aware of the issue. Russell said, "We give credit to the family organization, the National League of POW/MIA Families. This was a Vietnam group that has kept this whole mission on the front burner from a political standpoint."

The POW/MIA flag is really their flag. At the bottom of its logo are the words "You are not forgotten."

The league originated on the West Coast in the late 1960s, when the wife of a ranking POW questioned the government's policy of keeping a low profile on the POW/MIA issue. She put together a loosely knit group to press for more action and information. The group was incorporated formally in 1970 and is open to the wives, children, parents, and other close relatives of Americans listed as POW/MIA.

The league now has about 1,000 members. It is run by a seven-member board of directors, and its national office in Arlington, Va., has one full-time employee, the executive director, who is the sister of a missing service member. The rest of the staff are volunteers.

Russell shares the league's feeling that a continued effort to account for POWs and MIAs is imperative. "If I could leave a message," he said, "it's that this whole effort of accounting is both a matter of national purpose and a very sacred mission. It gives a hard-hitting message that we are not going to forget our fallen service members, and we're certainly not going to forget their families."

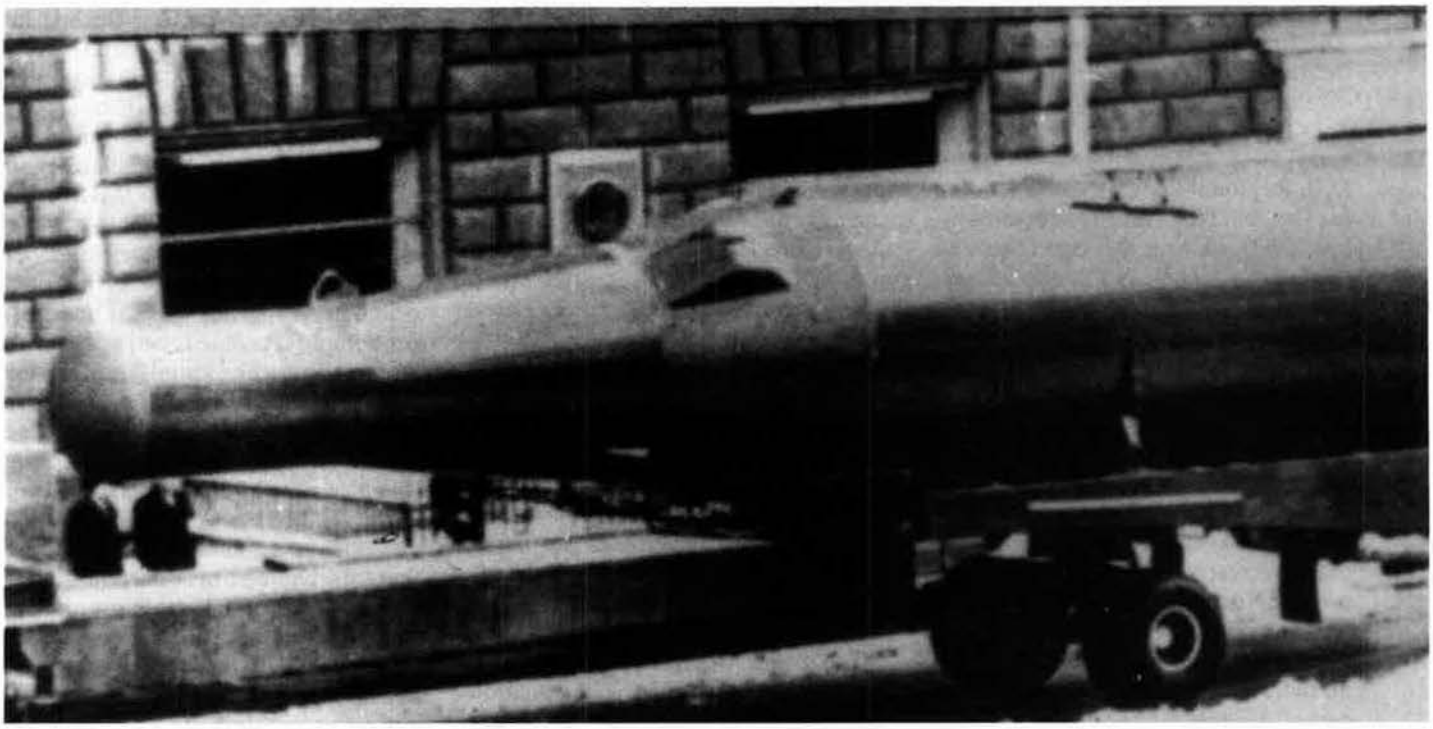
In September, the same message will be reflected in a POW/MIA Recognition Day. By custom, this commemoration usually is observed in Pentagon ceremonies on the third Friday in September. Local observances are set for other days by local planners.

National POW/MIA Recognition Day is one of six days specified by law on which the black POW/MIA flag is to be flown over federal facilities and cemeteries, post offices, and military installations. ■

Bruce D. Callander is a contributing editor of Air Force *Magazine. He served tours of active duty during World War II and the Korean War and was editor of* Air Force Times *from 1972 to 1986. His most recent article for* Air Force *Magazine, "Mr. Caron's Opus," appeared in the April issue.*

The Soviet Union wanted a nuclear weapon that could stage a "backdoor" strike on US soil.

The FOBS of War



By Braxton Eisel

In the movie "Space Cowboys," Clint Eastwood plays a test pilot/engineer who leads a group of aging astronauts on a mission to retrieve a nuclear-armed satellite, which had been put into space by a Soviet Union that then ceased to exist.

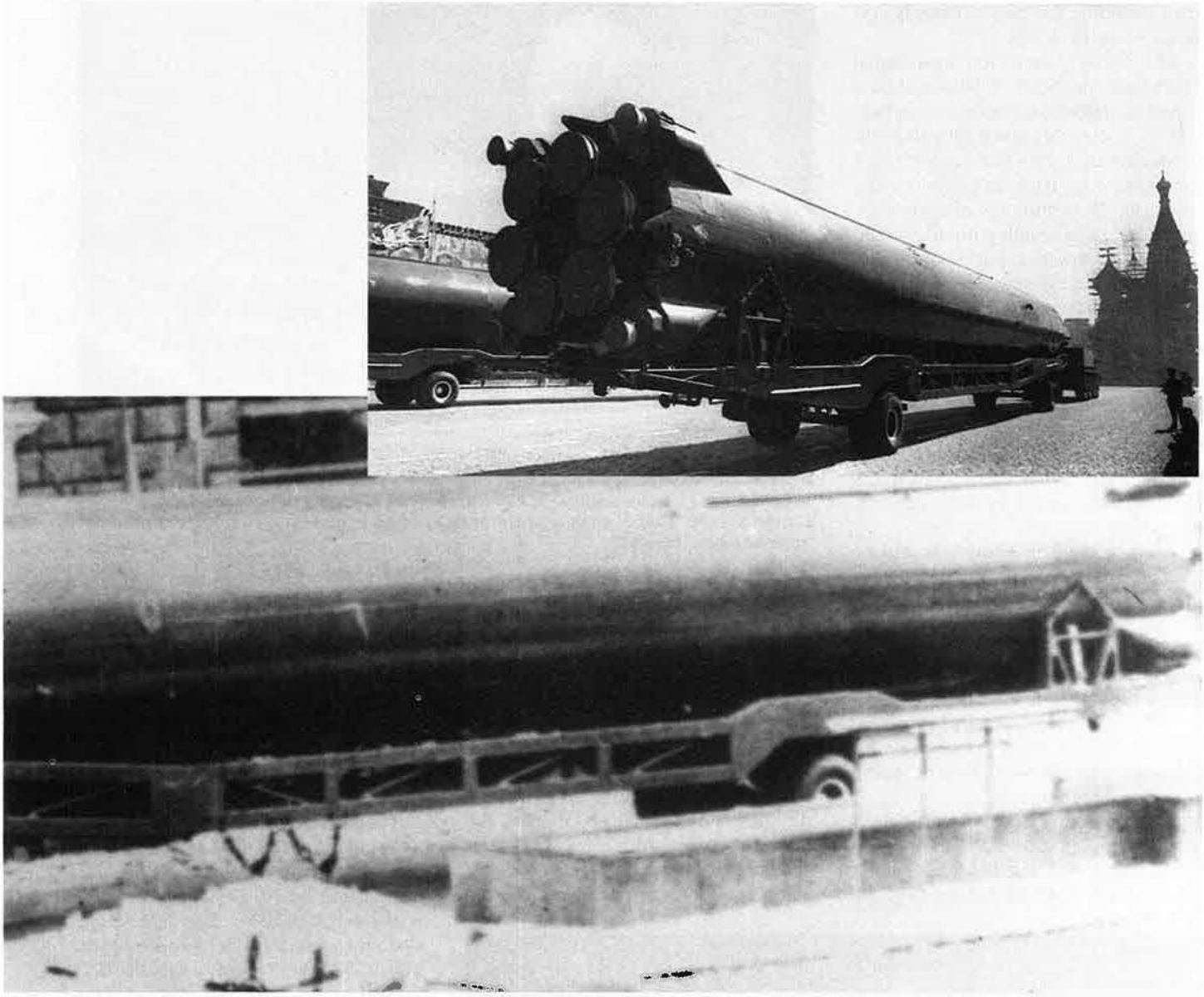
It was, at least in small part, a case of art imitating life.

During the Cold War, both superpowers contemplated the deployment of nuclear weapons in space. However, Moscow did more than contemplate. During the 1960s, the USSR had an operational system ready to go into orbit to attack the United States.

This weapon was a combined low-flying missile and nuclear warhead. It was designed to take off from the Soviet Union and de-orbit for an attack. Most importantly, it would not fly over the Arctic to reach US territory. It would, rather, traverse southern polar areas and reach the US via the "backdoor."

The superpower space competition heated up with the Soviet Union's successful Oct. 4, 1957, launch of Sputnik. In those days, the mere act of putting an object into orbit was a major achievement. It didn't take very long for both sides to start worrying about missiles equipped with doomsday payloads.

For several years afterward, Moscow



In the period 1968-83, the Soviet SS-9 was deployed and ready to strike at the United States via a hard-to-detect partial south polar orbit. FOBS was designed to fly an incomplete orbit.

had the lead. Soviet premier Nikita Khrushchev boasted of his country's superiority in space. On Aug. 9, 1961, Khrushchev bragged, "You [the Americans] do not have 50- or 100-megaton bombs; we have bombs more powerful than 100 megatons. We placed [cosmonauts] in space, and we can replace them with other loads that can be directed to any place on Earth."

No one had any doubt that the Kremlin leader was talking about nuclear weapons.

In the ensuing years, both the US and USSR spent considerable energy monitoring the nuclear capabilities of the other. To detect incoming Soviet ICBMs, the US developed both ground- and space-based early warning systems.

The Warning Line

One of the earliest detection systems was the Ballistic Missile Early Warning System, BMEWS, a network of high-powered, long-range radars placed on the northern periphery of the Western Hemisphere, facing the Arctic. An approach over the North Pole was deemed the most likely scenario for a Soviet missile or bomber strike, as that was the shortest route from the USSR to the US.

Washington hoped to achieve at least 30 minutes' advance warning of a Soviet nuclear strike. In that half-hour, Strategic Air Command would flush its bombers from bases in the Midwest, and US leaders could launch land-based and sea-based missiles in a massive retaliatory strike.

The US deterrent scheme only led Moscow to seek some way to strike that would not be detected until it was too late.

The Soviet Union calculated that a missile fired into a depressed trajectory would follow a low orbital path and be difficult for the US system to "see." The missile would pop above the horizon—and thus become visible to the searching US radar beams—much later

than would be the case with an ICBM attack over the Arctic.

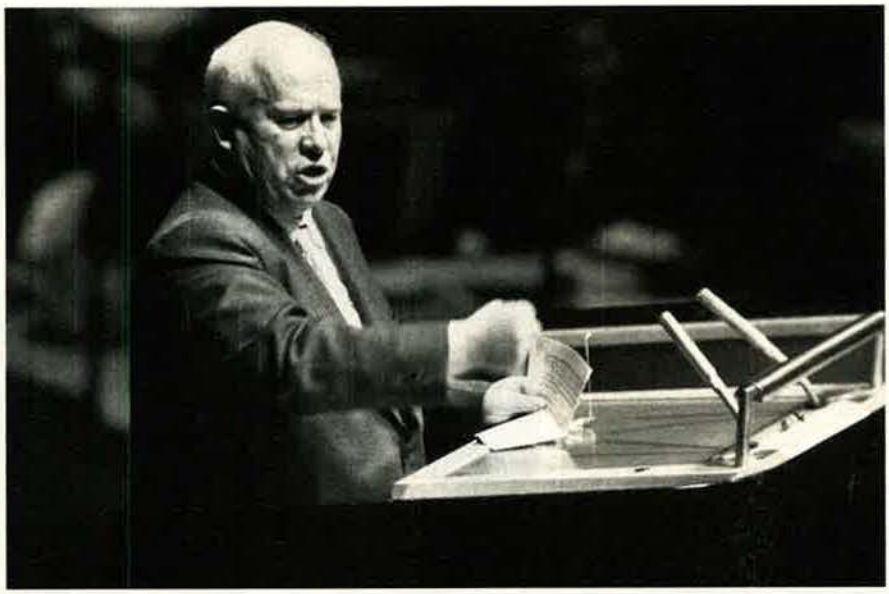
The Soviet Union's first operational ICBM was the SS-6. If launched on a conventional ballistic trajectory, it would rise on a relatively steep path and soar to an altitude 1,200 miles above Earth before turning back and plummeting to Earth. Only minutes after launch, therefore, the ascending missile would clear the radar's horizon. When it did, US early warning systems would detect it and sound the alert.

By contrast, a weapon launched into low orbital plane would ascend on a relatively flat, depressed trajectory, level off, and never rise more than 150 miles above Earth. It thus would not clear the radar horizon until it had almost reached its target. As Soviet planners saw it, US warning time would be reduced to as few as five minutes.

Even that much warning would be available only if the incoming warhead were to come in over the Arctic. The US in the early 1960s was unprepared to detect intrusion from the south. In that case, time from detection to impact could have been only a few seconds.

In March 1962, Khrushchev stated that the Soviets could launch missiles "not only over the North Pole but in the opposite direction, too."

The premier warned, "Global rockets can fly from the oceans or other directions where warning facilities cannot be installed. Given global missiles, the warning system in general has lost its importance. Global missiles cannot be spotted in time to prepare any measures against them."



AP photo

In March 1962, Soviet premier Nikita Khrushchev issued a thinly veiled threat to the United States. "Global missiles cannot be spotted in time to prepare any measures against them," he said.

Three Projects

At least three projects were under way. The first proposed near-orbital missile was a Vladimir N. Chelomei design based on the UR-100 ICBM. The Soviets began work on this two-stage system on March 16, 1961.

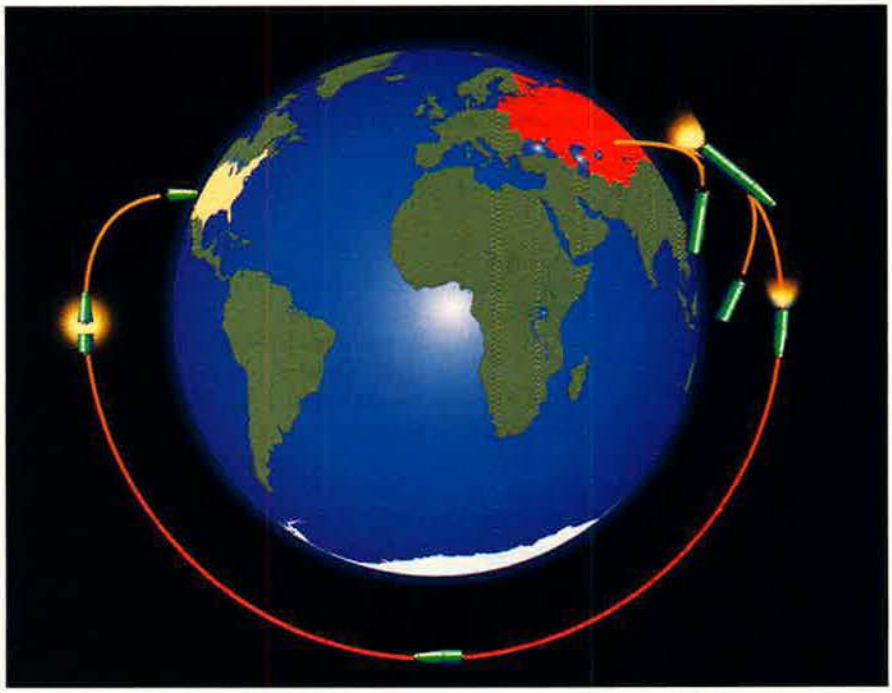
The second proposal came from the legendary designer Sergei P. Korolev. He began preliminary work on Global Rocket No. 1 (GR-1) in 1960. The GR-1 was a part of Korolev's N-1 lunar program booster. (See "The Secret at Complex J," July 2004, p. 72.) Korolev's three-stage GR-1 weighed 117 tons and carried a 2.2-megaton-yield warhead.

The third proposal came from Mikhail K. Yangel, whose R-36-O was approved for development on April 16, 1962. This design was based on the SS-9 superheavyweight ICBM. The three-stage system weighed 180 tons fully fueled. The 3,000-pound re-entry vehicle (RV) packed an explosive yield of two to three megatons of TNT.

As 1965 dawned, all three designers had produced required hardware, but none of the systems had yet flown. The Strategic Rocket Forces selected the Yangel article as the most promising system and stopped the other two programs.

Yangel was soon under pressure to produce. The system was tested at the Tyuratam missile range and from launch silos. Operationally, the missile was to be silo-based. At Tyuratam, the 2nd Testing Directorate led a series of test launches beginning in December 1965.

The SS-9 used its first and second stages to reach an orbital plane, with each stage being discarded as it used up its fuel. The flight generally followed a southerly near-polar path. The payload, after passing over the polar region, would fly northward over the Southern Hemisphere, putting the warhead on



Artist's concept by Zaur Eylanbekov

FOBS would follow a much lower trajectory than an ICBM's ballistic path. Approaching the US from the south, it would give only moments of warning. (Sketch of flight path is notional, not to scale.)

track to hit targets in the central US. A slightly higher inclination would get the warhead to West Coast targets; a little lower would hit the East Coast.

During the coasting phase, just before de-orbit, the vehicle would initiate a pitch maneuver to reorient itself for re-entry. The retro-rocket would fire for one minute, changing the plane of flight from orbital to ballistic. The warhead would then separate from the RV and continue on its trajectory until impact.

The test launches were monitored by the CIA and matched US expectations. There was a period in 1965-66 to get the system configured, followed in 1967 by a robust firing program, which prepared crews for operations. The orbital missile was first deployed in 1968.

By that time, however, the United Nations had passed Resolution 1884 and the Outer Space Treaty, which called upon the world's nations to keep nuclear weapons and other weapons of mass destruction out of Earth orbit.

Semantics

Moscow saw this mainly as a problem of semantics. It promptly dubbed its orbital weapon system the "Fractional Orbital Bombardment System" or FOBS. It claimed that the system would never complete a full orbit and thus would be in compliance with the letter of the international accords. The Kremlin continued developing FOBS to deliver thermonuclear bombs via a low-trajectory, low-visibility route.

The Soviet Union constructed 18 operational FOBS silos at a site west of Tyuratam and activated its first operational unit on Aug. 25, 1969. Two more battalions joined the first. Together, they comprised the 98th Missile Brigade.

FOBS certainly was not a precision weapon. Its circular error probable (the radius of a circle within which at least 50 percent of the warheads would be expected to hit) was more than three miles. Therefore, FOBS wouldn't be used to destroy hardened ICBM silos or other protected sites requiring a direct hit.

Instead, US strategic planners and policy-makers thought FOBS would be used as a pathfinder. The system could be used to take out numerous command and control centers around Washington, D.C.—the White House, Pentagon, and so forth.

The idea was that effective use of FOBS might well rob the US of its capacity to carry out a launch-under-attack counterstrike which would be possible if a Soviet attack were detected soon enough.

The FOBS threat didn't last long. Soon, Soviet designers were developing advanced submarine-launched ballistic missiles to equip its undersea vessels. SLBMs emerged as an even stealthier way to launch a disarming strike on the United States. By the time of the SALT II weapons limitation negotiations of the late 1970s, FOBS was nearing its end.

SALT II was signed in 1979, but the Senate never ratified it. Even so, both superpowers informally followed SALT II provisions. The treaty specifically mentioned the SS-9 FOBS as one system marked for deactivation. According to the agreement, 12 of the 18 silos had to be destroyed and the others converted to other uses.

Things moved slowly in the Soviet empire. It was not until 1982 that the USSR began dismantling the FOBS installations and retiring the missiles. By February 1983, the last missile was taken off duty. In May 1984, the Soviets began to remove missiles from the silos, ending the prospect of Soviet nuclear weapons in orbit. ■

In the 1960s, the United States also considered a system to deliver nuclear weapons through space. Plans called for the X-20 DynaSoar (full-scale mock-up pictured) to eventually have a bomb bay for nuclear weapons.

American Nuclear Weapons in Space

In the 1950s and early 1960s, the Air Force pushed to be the space force for America. As part of that drive, the service proposed building a reusable spaceplane, the X-20 DynaSoar.

The X-20 was conceived as an operational system to conduct space missions of reconnaissance, satellite inspection and repair, orbital resupply, and bombardment.

The third version was to use a Titan IIIC rocket booster and have an orbital capability. This variant would contain a bomb bay for delivering nuclear warheads requiring precise targeting and would offer the ability to approach a target from any direction.

Eventually deciding against placing nuclear weapons in space, the Defense Department canceled the first test version of the X-20—less than a year before testing was to have begun in 1964.

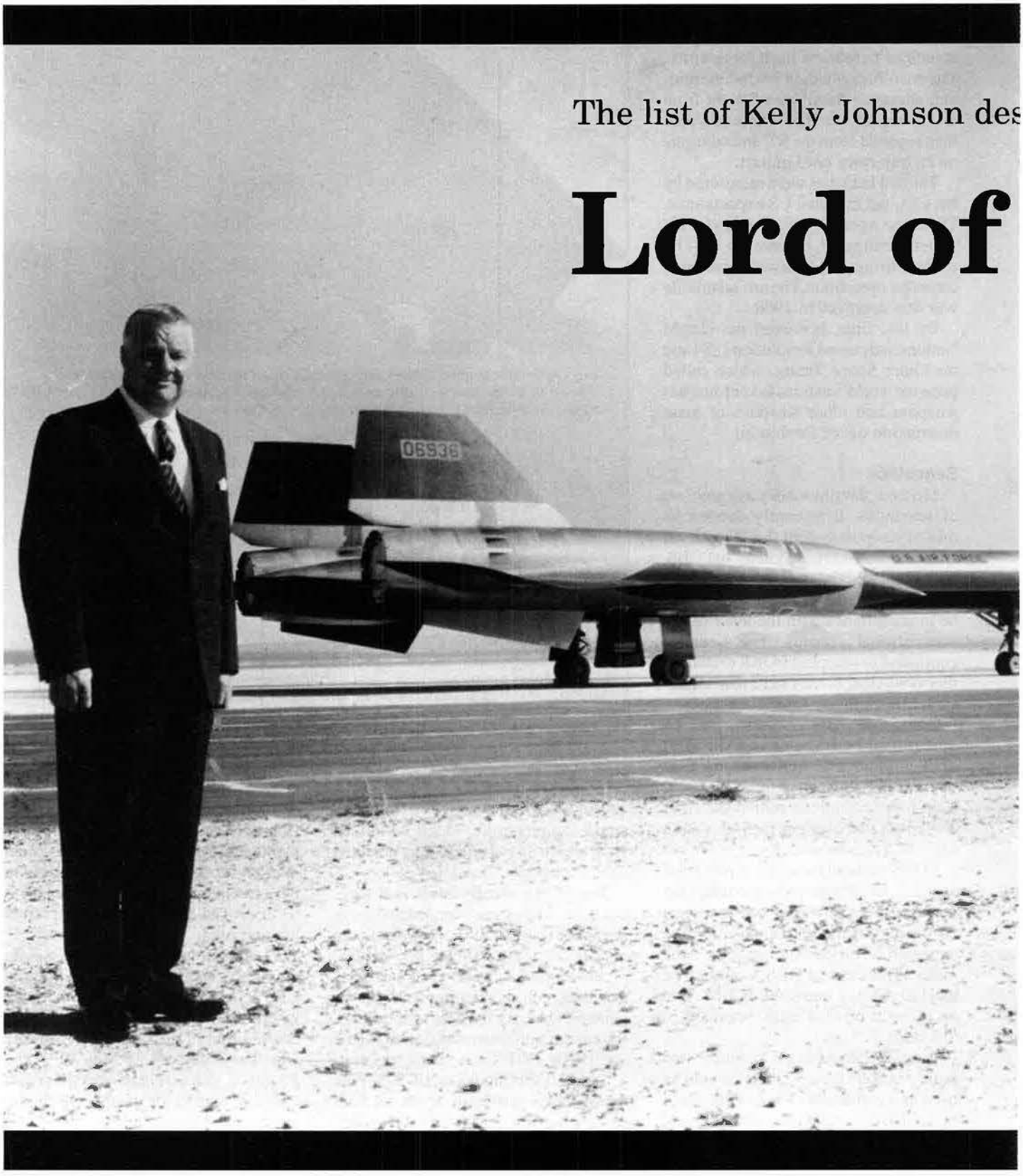
US officials preferred smaller, more accurate warheads, unlike their Soviet counterparts, who had a "bigger is better" philosophy. For US leaders, the prospect of a gigantic nuclear weapon coming down accidentally was highly worrisome.

That, plus America's ability to rely on a large, highly versatile fleet of manned bombers, kept the United States from seriously pursuing an orbital nuclear weapon.

Air Force Lt. Col. Braxton Eisel is assigned as an air defense advisor to the Federal Aviation Administration in Washington, D.C. Previous assignments have included Minuteman III ICBM launch officer, weapons controller in ground-based mobile radar systems, mission crew on E-3 AWACS and E-8 Joint STARS aircraft, and military historian. This is his first article for Air Force *Magazine.*

The list of Kelly Johnson des

Lord of



Clarence "Kelly" Johnson left an unmatched legacy to military aviation. In his 42 years with Lockheed, he designed or led the design of more operational aircraft than anyone else, and his masterpiece, the A-12/SR-71 (YF-12 interceptor variant above) retains absolute speed records more than a decade after its retirement.

igns is a roll call of legendary aircraft.

the Skunk Works

By Walter J. Boyne

Few aeronautical engineers have received the acclaim accorded to Clarence Leonard "Kelly" Johnson, a man many believe to be the finest aircraft designer of the 20th century. Johnson is revered for playing the leading role in more than 40 Lockheed designs, including such epic aircraft as the P-38 Lightning, P-80A Shooting Star, XF-104 Starfighter, U-2 spyplane, and SR-71 Blackbird.

In his 42-year career at Lockheed, Johnson became world famous for finding solutions to seemingly impossible performance demands and for motivating his workforce to achieve what seemed to be unattainable goals. Above all, Kelly Johnson excelled in providing the United States with aeronautical systems that were sometimes decades ahead of adversary aircraft.

Many believe that his most enduring contribution was the creation of a new methodology for aircraft design and manufacture in Lockheed's world-famous "Skunk Works." This legendary engineering complex grew from humble beginnings into what may have been the most sophisticated development organization ever.

Johnson radiated energy. His aggressive attitude—it came across whether he was striding around some new aircraft or merely sitting at a table—made the five-foot-11-inch, 200-pound Johnson seem much larger than he actually was. A construction worker in his youth,

he was physically powerful, and his strength was matched by a powerful personality. He could be imperious and rude and had a hair-trigger temper.

As a result, Johnson was not universally loved by his co-workers, but he was universally respected. Johnson benefited from Lockheed's strong leaders at the time. Among them were Hall Hibbard, the enormously talented chief of engineering, and Robert E. Gross, Lockheed's president and chairman. Hibbard learned how to manage Johnson, serving as an intermediary between him and the gentlemanly Gross, who might easily have been offended by Johnson's sometimes brusque manner.

Farewell to Clarence

Johnson has been called the "engineer without a peer." He racked up a long list of honors, including two Collier Trophies and the Medal of Freedom. His origins, however, were humble.

Johnson was born on Feb. 27, 1910, in Ishpeming, a tiny town on Michigan's Upper Peninsula. The seventh of nine children of Swedish immigrant parents, Clarence inherited his father's appreciation for good tools and precision craftsmanship.

The nickname "Kelly" stemmed from a fight in grade school. A bully made the mistake of taunting young Clarence, repeatedly calling him "Clara." One morning, Johnson struck back, and the ensuing tussle left the name-caller with a broken leg. Johnson's classmates, suddenly seeing him in a new light, thereupon nicknamed him "Kelly," taken from the title of a popular song. He liked it, and the name stuck.

Arrow automobile and a Studebaker racing car.

Johnson often joked that he earned more from his college wind tunnel work than he did during his first 10 years at Lockheed. He claimed that his techniques for use of titanium as a basic structural material derived from the practices he had learned working the wind tunnel at Michigan.

In 1932, in the depth of the Great Depression, Johnson had his first interview, in Burbank, Calif., with the Lockheed Aircraft Corp., which Gross had just re-established. Johnson was told that there were no job openings, but he was invited to try again later. He returned to Michigan and earned a master of science degree in aeronautical engineering.

The top photo shows an SR-71 and a U-2 (lower right), two legendary Johnson designs. In the bottom photo, a Blackbird lands and deploys its chute at the 1974 Farnborough air show in England.

Johnson led a simple life, working hard at any available job and spending lots of time in the local library, reading the great Tom Swift adventure books of the era. He became fascinated with flight, designing his first aircraft, the "Merlin I Battle Plane," in 1920. Johnson kept meticulous records throughout his life, and the drawing of the Merlin still exists.

In classic American fashion, he worked his way through school. Enrolling at the University of Michigan, he expanded his working skills by running the school's wind tunnel. Eventually he was able to do subcontracting work of his own with the wind tunnel facilities. He and a colleague did test work on both the classic Pierce Silver

Hibbard, his future mentor, re-interviewed him in 1933, hiring him as Lockheed's sixth engineering employee—a tool designer.

Johnson was assigned to do wind tunnel testing on Hibbard's brand-new design, the all-metal, twin-engine Lockheed Model 10. The new hire didn't hesitate to criticize his boss's design, saying Hibbard should replace its single-tail configuration with what would become the Lockheed trademark twin-fin-and-rudder empennage.

Hibbard implemented Johnson's ideas without resentment.

This was the start of a collaboration that would see Hibbard and Johnson work closely together on several designs, including the Model B-14

Hudson and the XP-38, before Johnson moved up in the Lockheed engineering hierarchy.

Hibbard always kept a hand in engineering, but recognized that he could do more for Lockheed by marshaling and controlling Johnson's talent than by doing his own original design work.

Hibbard, who might reasonably have been annoyed by Johnson's increasing hubris, always backed him. When pressed to define Johnson's finest characteristic, Hibbard cited his great engineering skills but went on to note that Johnson "was intensely patriotic and a magnificent American."

Chief Engineer

By 1937, Johnson completed a proposal showing how the Lockheed Model 14 Super Electra could be converted to a bomber. In 1938, he became Lockheed's chief of research engineering.

The following year, Lockheed proposed a version of the converted Model 14 airliner to the British Purchasing Commission, which was buying aircraft in anticipation of the coming war.

RAF Air Commodore Arthur T. Harris (who was later to head the Bomber Command and become a Marshal of the Royal Air Force) rejected the proposal, taking exception to some details. To Harris' amazement, Lockheed sent a car for him 24 hours later to bring him back to the facility. Johnson and Hibbard showed him a wooden mock-up of an aircraft tailored specifically to answer all of his objections.

Impressed by this rapid reaction, Harris authorized an initial order of 200 Hudsons. This established Lockheed for the first time as a major military aircraft manufacturer. Eventually the company built almost 3,000 Hudsons, a production run that also spawned a host of naval aircraft.

The contract solidified Lockheed's financial situation, enabling it to sustain itself as another project evolved: the twin-engine fighter that would gain immortality as the P-38 Lightning. Based on a radical specification created by Lt. Benjamin S. Kelsey at Wright Field, Ohio, Johnson and Hibbard put the P-38 through an assortment of configurations before settling on the twin-engine, twin-boom central gondola layout that was to make the Lightning so distinctive.

The aircraft was radical for the time, with its tricycle landing gear, heavy armament package, turbo-supercharged engines, and counter-rotating propellers. First flown on Jan. 27, 1939, the Lightning starred in the Pacific Theater, where it entered combat in April 1942. It was flown by the two leading American aces of the war, Majs. Richard I. Bong and Thomas B. McGuire Jr.

Johnson's supercharged, twin-tail P-38 Lightning was flown by the two leading Army Air Forces aces of World War II, Maj. Richard Bong and Maj. Thomas McGuire Jr. It was the first of many successful Lockheed fighters.

The Jet Beckons

As work on the Lightning progressed, however, a greater development was unfolding. Johnson became enthralled by the possibility of using the jet engine in combat aircraft. In May 1943, Lockheed was offered the opportunity to build a jet fighter designed around a single de Havilland-Halford H1.B Goblin jet engine. The next month, Lockheed submitted a successful proposal for the Model L-140, subsequently designated the XP-80. The company earned a contract calling for delivery in 150 days.

This urgency played into Johnson's hands. He had long wanted to establish an experimental group under his direct supervision. Collaborating with a band of more than 120 engineers and workers, operating out of a scrapwood and canvas temporary building, Johnson delivered the new aircraft ahead of schedule, taking only 143 days. Lockheed, Johnson, and the US Air Force were firmly embarked on a journey into the jet age.

For most of his career, Johnson was

The Skunk Works

Kelly Johnson was always fanatical about security. While Lockheed was working on the XP-80 project, access to, and even knowledge of, the design facility was rigidly controlled. Barred from identifying the facility officially, insiders referred to the workplace as the "Skonk Works"—after the fabled Kickapoo Joy Juice factory in Al Capp's "Li'l Abner" comic strip.

Objections from Capp's lawyers required the facility to be renamed "Skunk Works." That name was subsequently trademarked by Lockheed.

The XP-80, predecessor to the P-80, America's first operational jet fighter, made its first flight on Jan. 8, 1944.

P-80 production was turned over to the mainstream Lockheed organization, and some 1,742 Shooting Stars were built. The airplane did excellent work in the Korean War. Its design also led directly to the T-33 and T2V-1 trainers and the F-94 all-weather fighter series, each of which became a bread-and-butter product for Lockheed.

The transition of the P-80 from secret experiment to mass-produced aircraft resulted in fewer demands on the Skunk Works. Yet the concept of a secret, compartmentalized design studio persisted.

Johnson later reintroduced the Skunk Works concept for a new jet fighter program that ultimately became the XF-104 and the F-104 Starfighter.

Under Johnson, Lockheed took the P-80 design from drawing board to flight in 143 days, making it the first operational US jet fighter. These F-80s are using jet-assisted takeoff rockets.

not only a great engineer but also a superb salesman, able to anticipate customer needs with uncanny precision. In November 1952, he submitted an unsolicited proposal for an F-104 concept to Air Force Lt. Gen. Donald L. Putt. Such proposals are often quietly ignored, but Putt saw merit in the proposal and knew the value of dealing with Johnson. A general operational requirement was issued, and, despite competition from other firms, Lockheed in 1953 won a contract to produce two prototype XF-104s.

Johnson believed that use of ultrathin straight wings was the optimum technique for supersonic flight, an opinion confirmed by the test results of the otherwise disappointing Douglas X-3 Stiletto research airplane. He designed the XF-104 accordingly, creating a Mach 2 fighter that flew at altitudes higher than 60,000 feet, its thin unswept wings stretching only seven feet on either side of the cockpit.

First flown in March 1954, the XF-104 found its biggest following in foreign countries. Only 296 were procured for US use, but more than 2,500 were built for customers worldwide. The last model was delivered to Italy in 1980—26 years after the first XF-104 flight. Updated Italian F-104s are just being retired, 51 years after the initial flight.

Besides turning in good service in Vietnam, the F-104 had provided other benefits to the Air Force. The program institutionalized the Skunk Works as a permanent part of Lockheed, and the F-104 became the departure point for Johnson's next great achievement, the U-2.

In an age of constantly improving satellite reconnaissance systems, it must be remembered that the Soviet Union was once a fortress, almost completely secure from US intelligence-gathering efforts.

Need to Know

After the Soviet Union had demonstrated that it had bombers and missiles capable of delivering nuclear weapons against the US homeland, it became absolutely vital to gather intelligence by flying over the Soviet Union on strategic-reconnaissance missions.

Four technologies had matured to make such an airplane possible—the jet engine for high-altitude work, Edwin H. Land's high-resolution cameras, Hycon's lenses, and Eastman Kodak's Mylar-base film.

The Air Force invited three firms to bid to create the spyplane: Bell, Fairchild, and Martin. Bell's X-16 design won the contest in 1954. And for every other company without Kelly Johnson, that was the end of the story.

Since 1953, Johnson had been working on the Lockheed CL-282 for essentially the same mission. With a fuselage similar to the F-104, he added an extremely long, high-aspect-ratio wing. Construction was lightweight, and the first designs envisaged using a trolley for a takeoff and skids for landing, like the Messerschmitt Me-163 of World War II. The initial structure was too light for pressurization, so the pilot had to rely on a full pressure suit at all times.

In his usual manner, Johnson took his idea to the very top, talking to Joseph V. Charyk, then in charge of CIA research programs, and Trevor Gardner, assistant secretary of the Air Force for research and development.

In a rapid-fire series of meetings, the design of the CL-282 was changed so that it had a moderately pressurized cockpit, an unconventional semibicycle-style landing gear, and a special

The F-104, with its short, razor-thin wings, was USAF's first Mach 2 fighter, but it also went on to huge success as an "export fighter," serving in the air forces of numerous foreign countries.

high-altitude version of the Pratt & Whitney J57 engine. Johnson clinched the deal by promising to deliver the aircraft in just eight months. Further, he offered to build 20 aircraft for just $22 million.

To Bell's dismay, the X-16 program was killed. Skunk Works began work on an aircraft that was estimated to have a four-year service life, given the rate of Soviet missile improvements.

The fragile U-2 made its official first flight on Aug. 1, 1955. After extensive testing, preliminary reconnaissance flights were flown over Eastern Europe. The first operational mission over the Soviet Union was flown by Hervey Stockman on July 4, 1956. Taking off from Wiesbaden, Germany, Stockman overflew Minsk and Leningrad before returning to Wiesbaden. In the process, the U-2 gathered a huge amount of information about the USSR—more than the US had ever been able to get by any other means.

The Soviet Union hotly—but discreetly—protested repeated U-2 incursions into its airspace. The Kremlin was unwilling to embarrass itself by admitting that the U-2 could overcome Soviet air defenses at will and with impunity.

The U-2 missions revealed that while the Soviet ICBM threat was real, the much feared "missile gap" did not exist. The Soviet bomber capability was also found to be less extensive than had been feared. U-2 flights over the Soviet Union continued until May 1, 1960, when Soviet SA-2 missiles near Sverdlovsk shot down the U-2 carrying Francis Gary Powers.

The U-2 made headlines again during the Cuban Missile Crisis. Instead of being retired after just a few years, modified versions were built through the 1980s, continue to serve, and will do so for the foreseeable future.

Kelly's Masterpiece

The U-2 had scarcely begun to fly before Johnson was contemplating its successor, an aircraft that would remedy the U-2's vulnerabilities—low speed and large radar signature. A long series of design evolutions led to the Lockheed A-12. This single-seat, high-altitude Mach 3.2 reconnaissance airplane was designed for the CIA and evolved into the legendary SR-71 Blackbird.

Both the A-12 and the two-seat SR-71 were phenomenally advanced aircraft. Sustained high speeds generated searing skin-surface temperatures of up to 1,300 degrees. This obviously affected the selection of the structural materials, hydraulic fluids, lubricants, electronic gear, wiring—practically everything.

In 1975, the National Aeronautic Association bestowed its Wright Brothers Memorial Award on Johnson (center). Presenters were, at left, NAA President (and former AFA Board Chairman) John Henebry and Sen. Barry Goldwater.

Johnson worked hand in hand with Ben Rich, an equally volatile but more happy-go-lucky type who eventually succeeded Johnson as head of the Skunk Works. Johnson, Rich, and their team overcame the design difficulties to create an aircraft whose performance has never been exceeded. Further, they endowed the SR-71 with a sculptural beauty that has fostered an almost cultlike following.

The first official flight of the A-12 took place April 30, 1962. The Air Force required an aircraft with greater range, a larger payload, and room for a reconnaissance systems officer. This led in time to the SR-71, which first flew in late 1964. By December 1967, 31 of the Blackbirds had been delivered to the 9th Strategic Reconnaissance Wing at Beale AFB, Calif.

The A-12 served the CIA for 30 flights, including missions over North Vietnam and North Korea, where it was used in the aftermath of the seizure of USS *Pueblo* on Jan. 23, 1968. Domestic political considerations led to the A-12's premature retirement and replacement by the Air Force's SR-71.

The Blackbird served around the world, setting many speed and altitude records in the process. Unfortunately, SR-71s were expensive to operate. With satellite and enemy missile technology advancing, the fleet was finally retired in January 1990. The last operating model was flown to a National Air and Space Museum hangar at Dulles Arpt., Va., in 1990, setting a transcontinental speed record en route.

The Blackbird was undoubtedly Johnson's masterpiece, and though his genius as an engineer never faded, his success as a salesman did. Johnson's heavy-handed dealings with procurement officials began to negatively affect Lockheed's sales to the Air Force. Johnson retired from Lockheed in 1975, but stayed on as a consultant for many years. He left the Lockheed board in 1980, and in June 1983, the Lockheed Rye Canyon Research Facility was renamed the Kelly Johnson Research and Development Center.

Johnson died on Dec. 21, 1990, after a long illness. In his absence, the Skunk Works inevitably took on a different character, but Johnson's spirit lives on in his inspirational designs and the records they still hold. ▪

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel and author. He has written more than 400 articles about aviation topics and 29 books, the most recent of which is Today's Best Military Writing: The Finest Articles on the Past, Present, and Future of the US Military. *His most recent article for* Air Force *Magazine, "Creech," appeared in the March issue.*

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EMA

AFA/AEF National Report

afa-aef@afa.org

By Frances McKenney, Assistant Managing Editor

Texas-Size Blue-Suit Salute

At the **Alamo Chapter's** Joe Kellogg Blue-Suit Awards banquet in March, Air Force Association National President Robert E. "Bob" Largent met the San Antonio area's finest—50 military and civilian personnel honored for superb job performance and support of the Air Force and AFA mission.

Largent addressed the gathering and helped Chapter President Andy Nodine present awards during the ceremonies.

Ticket sales for this Blue-Suit Awards banquet had exceeded the chapter planners' expectations, so they put their heads together with the hotel staff to figure out how to accommodate more guests. Their solution: Some attendees were served dinner in the hotel's restaurant. During the intermission that followed, several tables in the main ballroom were cleared and chairs set up for the overflow crowd. Then the organizers opened the sliding doors and combined the AFA audience with party-goers at an Air Force retirement celebration next door. Suddenly a Texas-size crowd of 500 was on hand to toast the Blue-Suiters.

During five days in the Lone Star State, Largent spoke at the state-level AFA spring meeting. He described the association's mission and its initiatives. In addition, he met with a dozen Air Force unit commanders, as well as junior officers, command chiefs, and enlisted members in the San Antonio area. He also had lunch with USAF basic trainees at Lackland Air Force Base.

AEF Awarded for Excellence

The Aerospace Education Foundation received the Education Achievement Award from the Space Foundation in Colorado Springs, Colo., in April.

L. Boyd Anderson, AEF Chairman of the Board, accepted the award at the opening ceremony of the 21st National Space Symposium, held in Colorado Springs and hosted by the foundation. More than 6,500 registered to attend the four-day event.

The education award is presented annually to organizations that motivate young people to excel in aerospace studies. Anderson said afterward that he was awed by the number of people from the Air Force and aerospace industry who came up and congratulated him on the award.

The Space Foundation is a national nonprofit organization, founded in 1983, that promotes civil, commercial, and national security space endeavors and educational excellence.

Staff photo

Air Commodore Graham Bentley, assistant defense air attache from Australia, and AFA Board Chairman Pat Condon meet at* Air Force *Magazine's annual reception for foreign air attaches. More than 30 countries sent air attaches to the April event in Arlington, Va. Bentley spoke on behalf of the absent dean of the foreign air attache corps, Belgian Brig. Gen. Daniel Van de Ven.

Teacher's Aid and Teacher's Aide

The **Gen. Charles A. Gabriel Chapter (Va.)** recently helped AFJROTC cadets in Chantilly, Va., by providing both aid and an aide: In March, Chapter President James A. Holt presented $1,000 to the Chantilly Academy's AFJROTC unit. The chapter also brought along a highly qualified guest speaker to teach cadets about weather.

The donation combined $500 from the chapter and a matching grant from the state's AFA organization. The funds will be used for field trips, drill competitions, equipment, and a model rocket contest, according to Nancy T. Cribb, chapter secretary.

The "teacher's aide" provided by the chapter that day was David Bacon, director of the atmospheric physics center at Science Applications International Corp. He was the latest in a series of speakers that the chapter has rounded up to teach Air Force-related topics to the Chantilly cadets. Last fall, Cribb arranged for veterans from World War II, the Korean War, and Desert Storm to address the students, who are in grades 11 and 12. Those speakers were such a hit that the senior aerospace science instructor, retired Maj. Sheila Allen, asked the chapter to send in an expert who could teach the cadets about weather.

Bacon presented two classes for 65 students and covered the basics of physics, weather patterns, weather forecasting, and the impact of weather on military operations. The cadets wanted to know, of course, why weather forecasters are sometimes off the mark.

Mobility Awards at McGuire

It's a sure sign that your awards banquet has a great reputation when someone from another chapter asks for an invitation.

For the **Thomas B. McGuire Jr. Chapter,** that special guest at their

annual awards dinner at McGuire AFB, N.J., was ANG Brig. Gen. Maria Falca-Dodson, the state's deputy adjutant general. A member of the **Mercer County Chapter (N.J.),** Falca-Dodson telephoned specifically to garner an invitation to the chapter's signature event.

The banquet turned a spotlight on McGuire's 305th Air Mobility Wing, the Air Mobility Warfare Center, 621st Air Mobility Operations Group, 108th Air Refueling Wing (ANG), 514th Air Mobility Wing (AFRC), McGuire NCO Academy, and the local Civil Air Patrol. In all, nearly 30 award recipients were named AEF Scott Associates.

Guest speaker retired CMSgt. Walter J. Tafe was more than familiar with McGuire and its people: He had been the 305th AMW's command chief master sergeant before his retirement in July 2003. Chapter President Geraldine Jones said Tafe told the audience that all military personnel are heroes—especially those now deployed to Southwest Asia. Tafe's remarks were backed by personal experience with deployments: Before his assignment to McGuire, he served at Aviano AB, Italy, taking part in Operations Joint Forge, Determined Falcon, Northern Watch, Deliberate Force, Cobalt Flash, and Allied Force.

Jones said special guest Falca-Dodson—who is New Jersey's first woman ANG general—enjoyed the awards banquet so much that she asked to be included on future invitation lists.

Cleaning the Redstone

It only needed a thorough scrubbing to look good again, but the problem was it stood 70 feet tall. So when the Mercury Redstone rocket on display outside the Museum of Life and Science in Durham, N.C., needed to be cleaned of algae and dirt, the museum called in the fire department. Firefighters from Durham's Station #2 brought over a fire truck with a ladder extension and bucket attachment. They turned a fire hose on the rocket—which had already been doused with household cleaner and bleach—and scrubbed away.

When they were finished, "the old rocket was gleaming once again," noted Troy D. Cash, **Tarheel Chapter (N.C.)** chapter secretary. The chapter decided to thank three of the firefighters with a March luncheon meeting where William L. Mickey, North Carolina state treasurer, presented them with an AFA Certificate of Appreciation.

Along with thanking the firefighters for helping preserve aerospace history, other highlights of the chapter's meeting were a presentation by Margaret Everett and introduction of the chapter's Teacher of the Year, Holly C. Hanrahan. Everett is chief health administrator at Durham's VA Medical Center. She talked to the chapter members about health care services available for veterans. Hanrahan is a sixth-grade teacher at F.J. Carnage Middle School in Raleigh.

The Write Stuff

The **Gen. B.A. Schriever Los Angeles Chapter** hosted a Space Walk Awards luncheon in March for winners of its essay contest on space.

The chapter's 13th annual contest on space topics was open to students in grades seven through 12 from schools in San Pedro and El Segundo, communities near Los Angeles Air Force Base. The winners were: Ramsey Alderson, Talia Borgo, Jeramie Vecera, Amy

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 Meets With Key Democrats

Senior staff executives from the larger military and veterans service organizations—including the Air Force Association—were invited to meet with the Democratic Steering Committee, chaired by Sen. Hillary Rodham **Clinton** (N.Y.). Other committee members in attendance included Daniel K. **Akaka** (Hawaii), Edward M. **Kennedy** (Mass.), John F. **Kerry** (Mass.), Mary **Landrieu** (La.), Patty **Murray** (Wash.), Harry **Reid** (Nev.), Ken **Salazar** (Colo.), and Debbie A. **Stabenow** (Mich.).

Clinton thanked the associations for their advocacy role in supporting service members and their families.

Issues discussed included: the need to provide full funding for the Department of Veterans Affairs to care for the veterans now in the system and those who will be using the VA, based on their service in Iraq and Afghanistan; adequate funding for mental health and counseling services for those returning from a war zone; and the need to provide adequate funding for benefits, including family support services, for those on active duty.

AFA Executive Director Donald L. Peterson mentioned the Pentagon's push to "right size" the services and emphasized the need to ensure the retention of military personnel with superior technical and leadership skills. Peterson encouraged the Senators to pass legislation to update the GI Bill (see below.) He advocated providing continued support services for the families of deployed troops—active, Guard, and Reserve.

AFA Supports New GI Bill Legislation

Lawmakers invited AFA and other military organizations to join them recently when they unveiled legislation proposing a GI Bill of Rights for the 21st century. Speaking to the press and public at a forum of veterans service organizations were several legislators, including House Minority Leader Nancy **Pelosi** (D-Calif.), Lane **Evans** (D-Ill.), and Ike **Skelton** (D-Mo.).

Reflecting on the original GI Bill, passed before the end of World War II, Pelosi said that legislation allowed the "greatest generation, which had defeated tyranny abroad," to build "a new America here at home." She said, "The prosperity and quality of life that we enjoy today are due to their optimism, hard work, and sacrifice and to that visionary legislation."

Pelosi continued: "America's investment in our veterans has been repaid many times over. Today, the wars in Iraq and Afghanistan are creating a new generation of veterans, and it is time for a new GI Bill of Rights."

Among provisions in the legislation, AFA supports an increase in the GI Bill's monthly stipend to more accurately reflect education costs; providing an open enrollment period; making GI Bill benefits more readily available to members of the Guard and Reserve; ending the Disabled Veteran's Tax; expanding Tricare benefits for members of the Guard and Reserve; and providing additional funds to assist homeless veterans with employment.

Air Force Caucus Program

AFA sponsored an Air Force Caucus breakfast on Capitol Hill, offering lawmakers and their professional staffs an opportunity to learn about recapitalization and modernization from Gen. T. Michael **Moseley,** Air Force vice chief of staff.

Officiating at the breakfast were the House Air Force Caucus co-chairmen, Rep. Cliff **Stearns** (R-Fla.) and Rep. Sam **Johnson** (R-Tex.), and the Senate Air Force Caucus chairman, Michael B. **Enzi** (R-Wyo.).

Senators attending the program included Wayne **Allard** (R-Colo.), Kent **Conrad** (D-N.D.), James M. **Inhofe** (R-Okla.), and John R. **Thune** (R-S.D.). Lawmakers from the House were Duncan **Hunter** (R-Calif.), chairman of the Armed Services Committee, Todd **Akin** (R-Mo.), and Michael **Conaway** (R-Tex.). They were joined by senior professional staffs from the Senate and House.

Acting Air Force Secretary Michael L. **Dominguez** led the Air Force delegation.

AFA Chairman Continues Hill Visits

AFA Chairman of the Board Stephen P. "Pat" Condon met with several senior professional legislative staff members to get the sense on the Hill about what might be achievable during the first session of the 109th Congress.

Condon visited with John **Chapla,** professional staff member of the House Armed Services Committee. He also talked with Rebecca **Hyder,** military legislative assistant to Rep. Michael **Bilirakis** (R-Fla.). Bilirakis, who has been a staunch supporter of service quality of life issues, is currently the sponsor of Expanded Combat-Related Special Compensation (HR 1366), which is supported by AFA. (See "Action in Congress," p. 26.)

The AFA Chairman also met with a number of professional staff from the House Veterans' Affairs Committee. They included the committee minority staff director, Jim **Holley,** and subcommittee minority staff directors Susan **Edgerton** and Mary Ellen **McCarthy.**

Condon met over lunch with Rep. Cliff **Stearns** (R-Fla.) to discuss initiatives to expand the Air Force Caucus and to provide its members with additional services.

Chong, Camille Massy, Jessica Porter, Ian Buczko, Matthew Lim, Aaron Markle, Karina Arismendiz, Cosmin Barbu, and Cyrus Moshiri.

This year, the student writers chose their essay topic from among four subjects: space pioneers, space tourism, future space, or the Space and Missile Systems Center, whose commander, Lt. Gen. Brian A. Arnold, attended the luncheon.

The chapter has arranged for the award-winning students to tour the satellite assembly and test facility at Boeing Satellite Systems in El Segundo. Chapter President David J. Murphy said the facility fabricates commercial and military satellites, including those used for XM Radio, DirecTV, and the Global Positioning System.

Guest speaker for the Space Walk Awards was Todd J. Barber, an engineer from the Jet Propulsion Laboratory, Pasadena, Calif.

Recruiter's Right Hand

The **Charles Hudson Chapter (Calif.)** recently honored Joseph M. Hanvey for his work at the Air Force recruiting office in Bakersfield, Calif.

Hanvey has for the past three years screened potential recruits through prequalification checks, helped them fill out forms, advised them on books to study, and arranged for tutoring.

What's surprising is that he helps the Air Force recruit five days a week—7:30 a.m. to 3 p.m.—as a volunteer.

An 80-year-old retired chief master sergeant, Hanvey served on active duty in flight operations for nearly 25 years, from 1942 to 1967. He had put in nearly

At the Donald W. Steele Sr. Memorial Chapter's Outstanding Enlisted Breakfast in Arlington, Va., the most junior award recipient, SSgt. Derick Harris, 11th Medical Operations Squadron, stands for a photo with Lt. Col. Molly Kusik and MSgt. Malcolm Jones.

7,000 hours as a VA facility volunteer in Long Beach, Calif., moving patients from site to site—in essence, walking five to eight miles a day—when 9/11 happened. He wrote to his Congressman, asking to be recalled to active duty. He was advised to keep on with his volunteer work. Now living in Bakersfield, he has.

Chapter President Fred B. Phillips, in presenting Hanvey with an eagle statuette for his volunteer work, noted that the Bakersfield recruiting office has been shorthanded due to reassignments and retirements, but Hanvey has filled in the gap. By manning the office, he frees SSgt. Jason Terwilliger and SSgt. Eduardo Villa, of the 369th Recruiting Squadron, to visit the schools in their area.

"Joe is truly an outstanding addition to our chapter," Phillips said.

The Four Tops

An NCO, a WAC, a Diva, and a docent received Women of Distinction awards from the **Thomas W. Anthony Chapter** in Maryland in April.

The annual awards recognize the achievements of women from the Andrews AFB, Md., area. Top honors this year went to: TSgt. Patrice N. Martinez, NCOIC, civil law, in the staff judge advocate office, 89th Airlift Wing; Bonnie J. Braun, a former Women's Army Corps platoon sergeant and a Department of the Army civilian for 34 years; Donna M. Wilkinson, a running back for the D.C. Divas women's professional football team; and Jane I. Teixeira-Henry, a volunteer tour guide at the Smithsonian's National Air and Space Museum.

The guest speaker was Diann L. McCoy, the component acquisition executive at the Defense Information Systems Agency. Rebecca J. Cooper was emcee for the event. She is a reporter for a local ABC TV affiliate.

Central East Region President James T. Hannam attended the event and said later that the ceremony was "a superb community outreach event, highlighting the Air Force Association as a key part of the Andrews Air Force Base and surrounding community."

One measure of the chapter's support for Andrews is that it hosted a luncheon in February for Brig. Gen. David S. Gray, outgoing 89th Airlift Wing commander at the base. During that event, Hannam presented the Central East Region's 2004 exceptional service citation for outstanding programming to the chapter president, Charles X. Suraci Jr.

A Piece of Heritage

When the Heritage Center museum at Sheppard AFB, Tex., donated wall space to the **Gen. Charles L. Donnelly Jr. Chapter** recently, the chapter decided to use it to feature AFA supporters in the local business community. Their first step was to mount a plaque, with brass nameplates listing Community Partners, on the wall.

In March, Chapter President Michelle Lollar and Brig. Gen. James A. Whitmore, commander of the 82nd Training Wing at Sheppard, hosted a reception for the Community Partners and unveiled the large plaque. They also presented individual plaques to the CPs.

About 75 current and prospective Community Partners and chapter members attended the reception, held out-

doors, on the Heritage Center's patio. The general told the audience how much the Air Force appreciates the community's support and talked about AFA's role in supporting the service.

The Heritage Center originally housed the first municipal airport at Wichita Falls, Tex., and was a stop off for such aviation pioneers as Amelia Earhart and Charles Lindbergh. Today it is a Texas Historic Landmark.

Special Forces in Afghanistan

A second-generation Special Forces soldier was guest speaker for the **Pasadena Area Chapter (Calif.)** meeting in March.

Former Army Sgt. Mark Griffen followed his father's footsteps into the elite corps and in addition learned to speak Farsi (Persian). He served on active duty for six years, followed by seven more in the National Guard.

A firearms instructor in the Los Angeles Police Department, Griffen was deployed as a Guardsman in 2002 for Operation Enduring Freedom in Afghanistan. He served as a Special Forces weapons sergeant, conducting combat operations and training new Afghan soldiers. Griffen said he had an advantage over less experienced Special Forces soldiers because some of what the commandos did resembled his police work in LA. ■

Have AFA/AEF News?

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Reunions

reunions@afa.org

4th Emergency Rescue Sq Assn. Sept. 28-Oct. 1 in Louisville, KY. **Contact:** Chet Gunn (781-944-6616) (tightboot@msn.com).

6th BG Assn (WWII). Sept. 29-Oct. 2 at the Marriott in Wichita, KS. **Contact:** Pat Carnevale, PO Box 1230, Sonoita, AZ 85637 (phone: 800-765-8808 or fax: 520-455-5866) (carne@dakotacom.net).

15th Troop Carrier Sq (WWII). Sept. 9-12 at the Milwaukee River Hilton Hotel in Milwaukee. **Contact:** Linda Sunde, 4035 North Stowell Ave., Shorewood, WI 53211 (414-962-5707) (sundel@execpc.com).

21st/6461st TCS (Korean War). Sept. 21-25 in San Diego. **Contact:** Dana Mansur (908-782-1657) (kgypsy@patmedia.net).

39th FS Assn, including the 40th and 41st FSs of the 35th FG, Fifth AF. Sept. 28-Oct. 2 at the Hilton Washington Dulles Airport in Washington, DC. **Contact:** Roger Rehn, 3516 Manzana Ct., Camino, CA 95709-9547 (530-644-7346) (rolo7346@sbcglobal.net).

61st FIS. Sept. 22-25 in Chicago. **Contact:** Fred Tomasek, 13005 S. Brandon, Chicago, IL 60633 (773-646-0563) (ftom40110@aol.com).

86th Fighter-Bomber Group Assn (WWII). Sept. 22-24 in St. Paul, MN. **Contact:** Sidney Howard, 211 Brownstone Dr., LaHabra, CA 90631-7397 (714-992-2504) (ww2gfu@juno.com).

99th BG (WWII). Oct. 17-20 in Tunica Resorts, MS. **Contact:** David Hill, 5385 Gwynne Rd., Memphis, TN 38120 (901-680-0002) (warwings@att.net).

312th BG Assn, Southwest Pacific (WWII). Sept. 7-10 in Pittsburgh. **Contact:** J.T. Happy, 9 East Lake Dr., Haines City, FL 33844-9320 (863-439-6657) (jthappy@juno.com).

356th FG (1943-45). Sept. 15-18 at the Fairview Park Marriott in Falls Church, VA. **Contacts:** Jim Stowell (262-763-7665) (jstowell@core.com) or Joan Ziegler (714-903-5146) (jzieg@earthlink.net).

366th Fighter Assn. Aug. 31-Sept. 4 in Seattle. **Contact:** John France (817-860-2780) (luv_2_fly@sbcglobal.net).

359th FG (WWII). Sept. 15-18 in Chicago. **Contact:** Tom Mettel, 6706 Leonard Dr., Darien, IL 60561 (630-654-4528).

376th BG. Sept. 13-19 in San Antonio. **Contact:** Charlie Yates (817-292-5900) (b24prez376bg@yahoo.com).

384th BG, Eighth AF (WWII). Sept. 8-13 at the Marriott Hotel in Huntingdon, UK. **Contacts:** Lloyd Whitlow (702-433-5810) (koeppwhitlow@msn.com) or Theodore Rothschild (561-734-6140).

461st BW and 4128th Strategic Wg (SAC), Amarillo AFB, TX. Sept. 29-Oct. 2 in Omaha, NE. **Contact:** Bill Davies, 23 Queenspark Rd., Little Rock, AR 72227-4815 (501-225-2400) (wjdavies3@comcast.net).

486th BG Assn. Oct. 12-16 at the Sheraton National Hotel in Arlington, VA. **Contact:** William Phelps, 2500 E. Baseline Rd., Evansville, IN 47725-9350 (812-867-2991).

582nd Air Resupply Group, Molesworth, UK. Sept. 11-14 at the Reno Hilton Hotel in Reno, NV. **Contact:** William Rawlinson, 3119 Cherry Valley Cir., Fairfield, CA 94534 (707-426-6457) (brawlins@castles.com).

3084th Aviation Depot Group, Stony Brook AFS, MA. Sept. 15-17. **Contact:** Clarke Ketter (859-273-2259) (crketter@insightbb.com).

7330th Flying Training Wg (MAP) Furstenfeldbruck, Kaufburen, and Landsberg ABs, Germany (1953-60). Sept. 15-18 in Arlington, VA. **Contact:** Jim Baisden, 7729 Wellington Rd., Alexandria, VA 22306-2751 (703-768-7252) (blackjackt33@aol.com).

B-37 Canberra Assn. Sept. 9-12 at the Adams Mark Hotel in Dallas. **Contact:** Bert Littlejohn (972-359-6099) (wblittlejohn@comcast.net).

Bainbridge AFB, GA, all pilot classes and support personnel. Sept. 2-3 at Bainbridge AFB, GA. **Contact:** J.S. Wilkinson, 1801 Douglas Dr., Bainbridge, GA 31717 (229-246-1973) (jswilkin@mailaka.net).

Johnson AB, Japan. Sept. 15-18 at the North Hilton Garden Inn in Colorado Springs, CO. **Contact:** Keith Swinehart (303-814-0800) (hrnet@comcast.net).

K.I. Sawyer AFB, MI, personnel. June 24-26 at Sawyer Arpt., MI. **Contact:** Marquette Country Convention & Visitors Bureau, 2552 US Highway 41 West, Ste. 300, Marquette, MI 49855 (800-544-4321 or 906-228-7749) (frontdesk@marquettecountry.org).

Pilot Class 43-K, including all flying training commands and flying schools. Sept. 21-25 at The Menger Hotel in San Antonio. **Contacts:** Tom Schuler, 149 Cincinnati Cir., Monroe, OH 45050 (513-539-7185) (tschuler@siscom.net) or Hal Jacobs (jakes43k@aol.com).

Pilot Training Class 55-O. September 2005 in San Antonio. **Contacts:** Don Wallin (281-491-0647) (forepkw@aol.com) or Jerry Ohlson (623-546-9523) (jerrohlson@cox.net). ■

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.

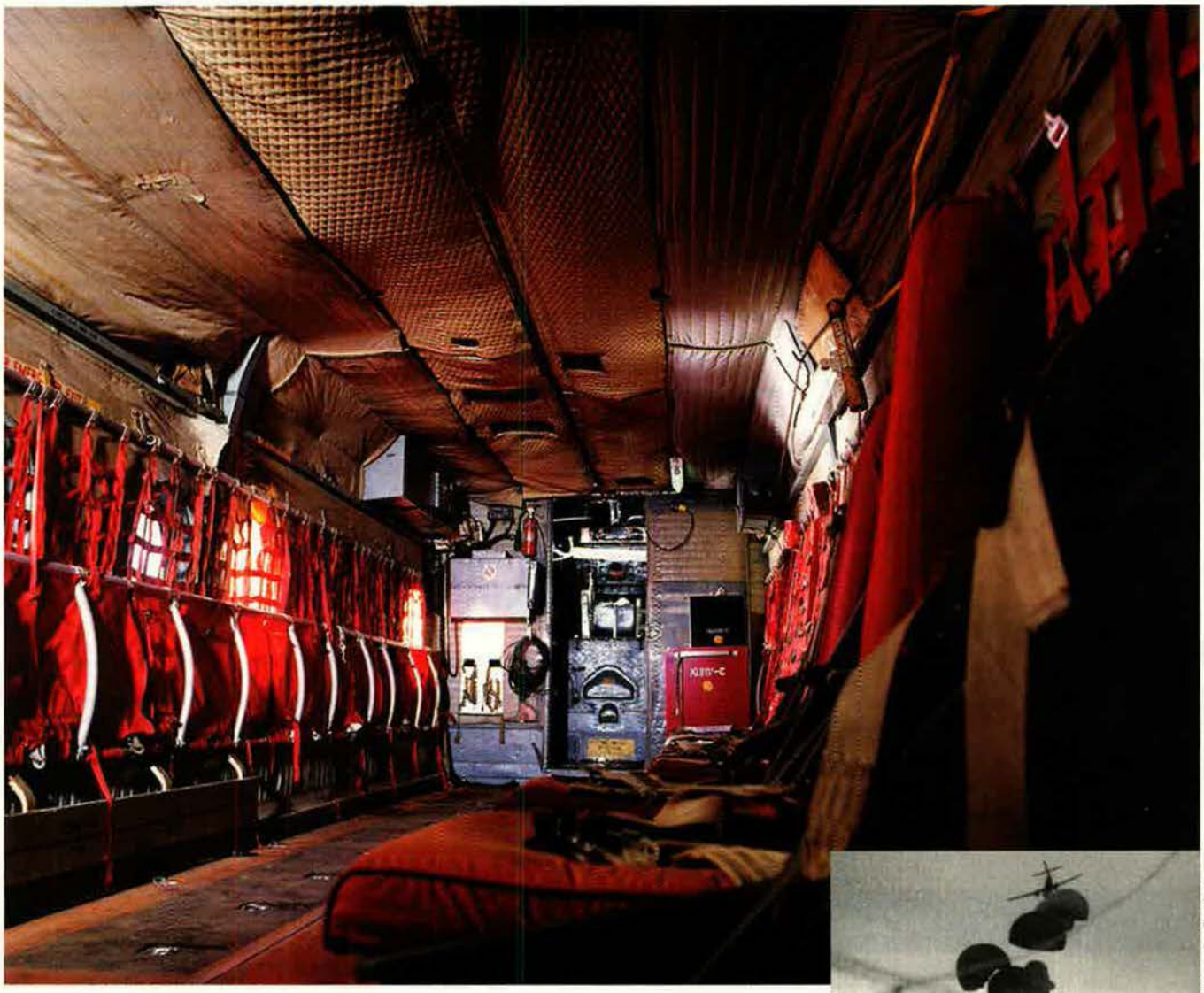
AFA Conventions

June 10-11	**California State Convention,** Beale AFB, Calif.
June 10-12	**Oklahoma State Convention,** Tulsa, Okla.
June 18	**Virginia State Convention,** Arlington, Va.
June 25	**Mississippi State Convention,** Columbus, Miss.
June 27	**Alaska State Convention,** Fairbanks, Alaska
July 15-17	**New York State Convention,** Niagara Falls, N.Y.
July 16	**Pennsylvania State Convention,** Mechanicsburg, Pa.
July 23	**Florida State Convention,** Cape Canaveral, Fla.
July 29-31	**Texas State Convention,** San Angelo, Tex.
July 30-31	**Washington State Convention,** McChord AFB, Wash.
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.

Pieces of History

Photography by Paul Kennedy

Caribou



Air Force Magazine file photo

The C-7 Caribou was used extensively in Vietnam for the resupply of special operations forces in the field. Often operating from short dirt strips in the middle of mountainous jungles, the C-7's ruggedness and low-speed handling qualities filled a niche in the Air Force's fleet. The Caribou first flew in 1958, when it was an Army program. Originally the AC-1, it was redesignated the CV-2 in 1962. In 1967, all fixed-wing transports were transferred to the Air Force, where the aircraft got the C-7A nomenclature it would carry for the rest of its operational life. At right, a C-7 drops supplies to Special Forces and civilian irregulars defending Ben Het camp in July 1969. Above is the interior of a C-7 now at the National Museum of the United States Air Force at Wright-Patterson AFB, Ohio. The C-7 could carry 26 fully equipped troops, 20 litter patients, or more than three tons of cargo. Nothing like the C-7 exists in the Air Force today, but that may change. Gen. John P. Jumper, USAF Chief of Staff, who flew C-7s in Vietnam as his first operational assignment, has called for acquiring an aircraft of similar size for the same mission—resupply of ground units operating in isolated areas.

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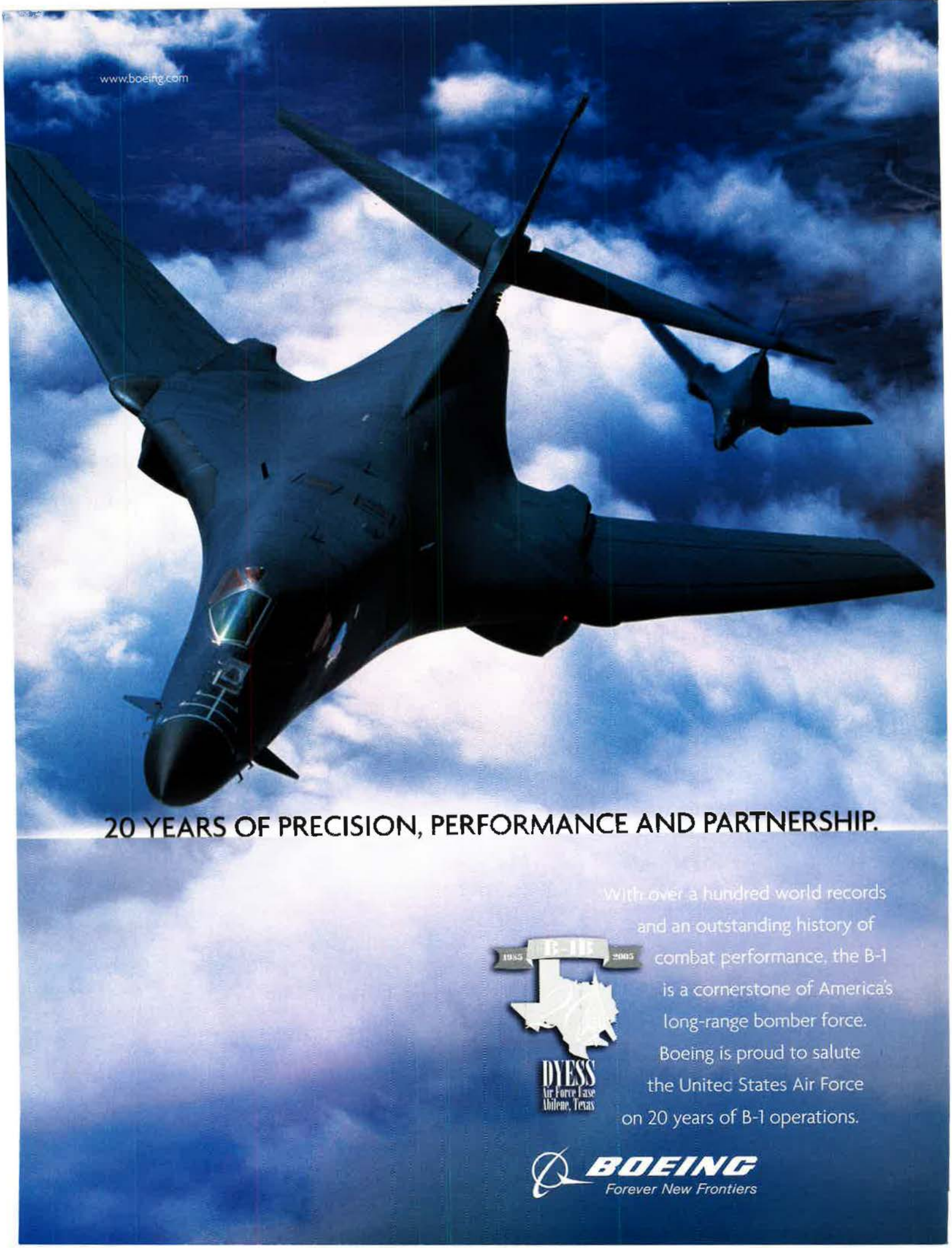
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