

March 2001/\$4

# AIR FORCE

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MAGAZINE

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**Flash Point Taiwan**

**The Dangerous World of 2015**



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**About the cover:** An F-22 flies in the skies near Edwards AFB, Calif. See "The Indispensable Fighter," p. 22. Lockheed Martin photo by Judson Brohmer.

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By John T. Correll, Editor in Chief

## Crossroads in Space

**A** Congressionally chartered commission warned in January that the United States is an "attractive candidate for a Space Pearl Harbor."

Last summer, Chinese military strategists said it would be easier to attack US satellites than our aircraft and tanks. Others have made the same observation.

Our economy and national security strategy are increasingly dependent on space. Intelligence and communications from space are at the heart of our global military advantage.

US space systems are already vulnerable to disruption and destruction, and the risk is rising.

The commission—chaired by Donald H. Rumsfeld, who has since become Secretary of Defense—said the defense of space should be "high among the nation's priorities." In the present scheme of things, it is not.

At the White House, space is an additional duty for a lieutenant colonel on the National Security Council staff. Congress scatters responsibility for national security space across six committees, each with its own agenda. At the Pentagon, space is several layers down the organizational chart.

Conflict in space is a "virtual certainty," the commission said. It is a question of when, not if, it will happen.

The technology for weapons in space is no longer remote. Retired Gen. Ronald R. Fogleman, one of the commissioners and a former Air Force Chief of Staff, predicts that by 2020, directed energy weapons will be the centerpiece of the US military arsenal.

National space policy should ensure that we have the option to deploy weapons in space to deter threats and defend against attacks on US interests, the commission said.

Contrary to popular belief, there is no international prohibition on placing or using weapons in space, although various treaties ban weapons of mass destruction. It is important, the commission said, that we do not negotiate away the current provisions of the Outer Space Treaty, which allows for self-defense, including "anticipatory self-defense," in space.

The commission said greater investment is required, especially in research and development, but its focus was on organization. The commissioners believed the organizational problems must be resolved before addressing the budgetary and programmatic issues.

They called for top-to-bottom changes, from the White House on down, including a new and closer re-

### **The defense of space needs a higher priority and better organization.**

lationship between the Department of Defense and the Intelligence Community. Space would get more visibility and priority at every level.

We are at a crossroads on national security space policy. As commissioner Fogleman said in a presentation at Capitol Hill, "Doing nothing is not an option."

The recommendations are expected to gain their best traction in the Pentagon, where chairman Rumsfeld is in a position to accept his own proposals.

At the military operational level, much of the implementing centers on the Air Force, which funds and supports about 90 percent of the military space program, even though it gets the same share of defense budget it did 40 years ago, when the space program was in its infancy.

The Rumsfeld commission was the legislative brainchild of Sen. Bob Smith (R-N.H.), who previously had called for the Air Force to shed "big chunks of today's Air Force" to pay for tomorrow's space force. Otherwise, he said, Congress might create a separate service for space.

The commissioners said the idea of an independent space service has not yet reached "critical mass," but they clearly leaned in that direction as the long-term solution.

The Air Force last year codified its

concept of "aerospace integration" in a new vision statement, which supplanted a 1996 concept of "an air and space force on an evolutionary path to a space and air force." The Air Force has argued that air and space are a continuous medium and that it will be to the detriment of both if they are treated as separate military regimes.

The Space Commission view is, at best, an awkward fit with the aerospace integration concept. Fogleman said the Air Force is "downplaying the uniqueness of the space dimension." He compared it to Army thinking that held airpower down in the 1920s and 1930s.

The commission said Congress should formally give the Air Force the mission—denied to it several times in the past—to organize, train, and equip forces for operations in space, and that the Department of Defense should designate the Air Force as its executive agent for space.

On the other hand, the commission said the Air Force has not yet fostered a space culture. The top space jobs are filled by pilots. There is a widespread belief that the Air Force regards space as a supporting capability for air operations.


To the extent the commission's recommendations become policy, the Air Force is on notice. It has a limited time—somewhere between five and 10 years, probably—to make its case that the space mission belongs in the Air Force.

The Air Force's critics have a responsibility, too. Airpower is the first weapon in the nation's lineup. "Big chunks" of it are not expendable. Will critics help the Air Force maintain airpower while it builds space power, or will the two be treated as competitive?

There is no doubt that in years to come, more of the nation's interests and defense capabilities will lie in space.

It would be best if we can meet that calling with an integrated aerospace force, incorporating the cultures of airpower and space power and taking advantage of the inherent strength that each of them gains from the other. ■





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## Talking Airpower

John T. Correll's editorial "In the Wake of the Storm" [January, p. 2] would have the reader believe the Gulf War was single-handedly won by the Air Force. Nothing could be further from the truth. There was no mention of the soldiers who crewed 1,956 M1A1 Abrams main battle tanks which killed more Soviet-built Iraqi T-72s in 100 hours in the desert than the Air Force destroyed in 38 days of bombing.

While I realize your view of the world depends on where you stand, to even suggest the Air Force won the Gulf War without strong support from the ground forces is myopic to the extreme. In my opinion, it is negligent beyond belief to write an entire article about the Gulf War and not even mention the ground forces, which participated in the largest armored forces battle since Gen. George Patton faced Field Marshal Erwin Rommel in Africa during World War II.

I don't mean to belittle the Air Force's achievements, which were awesome, but any credit for winning that decisive engagement must be shared with all the coalition forces. It is precisely this kind of single service posturing that promotes the continuing and unnecessary interservice rivalry.

Every Air Force unit and airman who participated in the Gulf War can be proud of his or her contribution to that unprecedented victory. But so can the soldiers who crewed those tanks.

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

■ *The editorial did not depict the Gulf War as won by the Air Force alone. It said, among other things, "On Feb. 24, coalition ground troops, supported by airpower, surged into Kuwait and in four days drove out the staggering Iraqis, inflicting still more damage on them in the 'Mother of All Retreats.'"*

*What the editorial did say was that airpower was the dominant and decisive element in the conflict, and that is difficult to dispute. The Iraqi force*

*sustained attrition of about 50 percent during the air campaign, and the starch had been taken out of its capability and will to fight.*

*A day into the ground campaign, the Iraqi forces were in general retreat, approaching a rout. Resistance was limited. The Iraqis had abandoned many of their tanks, and more than 40 percent of the tanks in the heavy divisions remained in place, making no move to fight or flee during the ground war. On orders from Gen. H. Norman Schwarzkopf, however, coalition forces were to inflict maximum destruction on the Iraqi forces, especially the Republican Guard, and to "destroy all warfighting equipment. Do not just pass it on the battlefield. We don't want the Iraqis coming at us again five years from now."*

*The tank battle you cite is presumably the action at Medina Ridge on Feb. 27, the day before the ceasefire. In 45 minutes, US tanks struck a dug-in Republican Guard division and destroyed 60 Iraqi T-72 tanks, nine T-55s, and 38 armored personnel carriers. It was a job well done, but at that point, the outcome of the war was already determined.—JOHN T. CORRELL*

Editor in Chief Correll should read some of the history books on World War II, especially those dealing with airpower. What a ludicrous statement to make, comparing the first day of Desert Storm to Eighth Air Force's bombing campaign of 1943. For what they had in the way of weapons and tactics, and flying against the de-

fenses of the Germans, Eighth Air Force did very well. They don't need Correll to critique their performance. Compared to World War II, Desert Storm was a drive-by shooting.

Maj. Vern Pall,  
USAF (Ret.)  
Blue Springs, Mo.

■ *The point of the comparison is the extraordinary improvement since World War II in the capabilities of airpower. Coalition aircraft in the Gulf were able to strike 150 individual targets the first day, compared to 50 target sets struck by Eighth Air Force in all of 1943. That is not a criticism of Eighth Air Force, which did a great job with the capabilities that were available at the time, but a measure of how far airpower has come.—JOHN T. CORRELL*

## Schwarzkopf of Arabia

The article was informative, but what really caught my eye was the accompanying picture, which is priceless in its detail. [See "Schwarzkopf of Arabia," January, p. 32.] The no-nonsense expression on the general's face speaks volumes.

Especially eye-catching for me are the bodyguards in the background. The [soldier] with the red beret seems quite alert and ready, but the [one with the gun] behind Schwarzkopf is fixed on the Iraqis like a cat on a mouse, obviously and totally intent that absolutely no tricks will be pulled by the defeated enemy.

Truly, a great photograph, and a USAF one to boot.

MSgt. Bill Brockman,  
Georgia ANG  
Robins AFB, Ga.

## Gulf War Chronology

In the January issue, you identified a number of Air Force Reserve and Air National Guard units which were placed on alert, called up, and then deployed. [See "The Gulf War: A Chronology," p. 42.] One unit you missed was the [Air Force Reserve] 71st Special Operations Squadron.

We were an HH-3E unit located at Davis-Monthan AFB, Ariz., and were

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the only AFRES or ANG special ops helicopter unit in the Air Force. Additionally, we had modified our Jolly Green Giants with [inertial navigation system], [forward looking radar], and electronic [infrared countermeasures] jammers and renamed our aircraft the MH-3E due to our special mission and equipage. We were activated in December 1990 and arrived at King Fahd airport in early January 1991.

Upon activation, we chopped to the 1st Special Operations Wing, and our arrival allowed six MH-60Gs of the 55th Special Operations Squadron to rotate back to the States for additional modifications and upgrades. We did not miss one assigned mission and were required to perform in both [search and rescue] and special operations roles. Although our unit was small in stature (five HH/MH-3Es), our unique ability and experience enabled us to provide a service to both the US and coalition forces arrayed against Iraq.

CMSgt. Craig B. Bergman,  
AFRC  
Davis-Monthan AFB, Ariz.

Regarding your article on the events in Operations Desert Shield and Desert Storm, please note that a key operation leading to the very successful Jan. 17, 1991, initial airstrike occurred at 2:38 a.m. when eight US AH-64 Apache helicopters completely destroyed Iraq's early warning radar sites along the selected route for the main air attack.

USAF Global Positioning System-equipped Pave Lows escorted the Apaches to within nine miles of their targets, creating an [initial point] for the Apache's inertial and Doppler radar navigation systems. Schwarzkopf later stated that in the 4.5 minutes it took to complete the task, the Apaches "plucked out the eyes" of Iraq's air defenses.

Lt. Col. Robert E. Mitchell Jr.,  
USAF (Ret.)  
Mesa, Ariz.

■ *The mission should have been noted. We did do a major article on it in October 1991, "Apache Attack," p. 54.—THE EDITORS*

I was part of the Air Force that was responsible for ensuring North Korea did not take advantage of the massive US military buildup [for] Desert Shield/Storm. Since then I have been one of the thousands of fighter pilots who has served in both Northern and Southern Watch. Your articles do a good job of explaining the situation

past, present, and a small look into the future. I did notice a mistaken ID of a destroyed aircraft on p. 48.

At first look it appears to be a MiG-23. After further investigation the burnt aircraft is a MiG-29 Fulcrum. The left vertical tail has fallen off. The remains of the missiles under the wings are AA-10 Alamos. These missiles are only used on the MiG-29 and the Su-27. The nose of the aircraft has the remains of a burnt out [infrared search and track system] at the lower right corner of the windscreen. The wing roots look like they may contain the pivot point for the swept wing of the Flogger. In fact, these are the remains of the burned-out fiberglass strakes on the Fulcrum. Finally, if you look closely at the remains of the front fuselage you can see two jet engine intakes.

Terry Fornof  
Las Vegas

The article was both interesting and informative, but I noted two errors in captions for accompanying photos. The lineup of F-117s shown on p. 45 is at Langley AFB, Va. (vice Tonopah, Nev., where the nearby green grass and trees would not be typical) when the aircraft were en route to the Gulf in December 1990.

The destroyed Iraqi aircraft on p. 48 is not a MiG-23, but rather a MiG-29 Fulcrum, as evidenced by the vortex generator strake on the nose radome pitot tube and the unique "bow tie" control fins on the damaged AA-10 Alamo missile under the left wing. Although the latest MiG-23 (Flogger K variant) had the nose vortex strake, it did not carry the AA-10.

Lt. Col. Barry A. Miller,  
USAF (Ret.)  
Poquoson, Va.

■ *We got the MiG wrong. The error in the caption for the F-117s was not identifying where the photo was taken. Tonopah was listed as the home station for the unit.—THE EDITORS*

### Speaking of Subs and Ships

"Submarine Salesmanship," [p. 60] in the January issue, was disappointing. It seemed to have a tone of "the usual pigs at the Congressional trough, vying to fund favored programs," and it was also a bit misleading because it didn't provide a broader picture of a very real and sobering situation.

Reference to Navy "entitlements" from the 1997 QDR tends to be misleading without further explanation of events in September of 1998, when the Joint Chiefs radically revised their

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**Publisher**  
John A. Shaud

**Editorial** [afmag@afa.org](mailto:afmag@afa.org)

**Editor in Chief**  
John T. Correll

**Executive Editor**  
Robert S. Dudley

**Senior Editor**  
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**Administrative Assistant & Staff Editor**  
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**Advertising Director**  
Patricia Teevan  
1501 Lee Highway  
Arlington, Va. 22209-1198  
Tel: 703/247-5800  
Telefax: 703/247-5855

**Industry Relations Manager**  
Nicola C. Whitlock • 703/247-5800

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William Farrell • 847/295-2305  
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earlier assessment of overall military readiness. The real issue at hand, here, is much broader than the Navy selling Congress submarines over something else. In reality, significant amounts of funding are reportedly required by all the military services and intelligence agencies to maintain and replenish their forces to meet the challenges of intelligence gathering, peacekeeping, drug cartels, terrorism, and rogue activities sponsored by Third World powers and global economic interests.

Intimating the Navy's needs, the chart titled "The Navy's Planned Purchases of New Ships and Aircraft Through 2020" is shown without any explanation, leaving the uniformed reader to think that perhaps the numbers reflect the Navy's plan to meet their needs. That's far from the truth. What's not said is that, according to the recent Congressional Budget Office report ("Budgeting for Naval Forces: Structuring Tomorrow's Navy at Today's Funding Level," dated October 2000) the chart reflects what's required for the period 2000-05 under the outgoing Administration's [Future Years Defense Plan] 2001 to sustain a 300-ship fleet and inventory of aircraft, as well as the infrastructure that supports them. That report then goes further to point out that about \$105 billion will be required annually to sustain a 300-ship fleet, et al. That's \$17 billion more per year than the dollars needed by the Navy to procure what's on the chart for the period 2000-05.

Secretary of the Navy [Richard J.] Danzig has pointed out that there are nine fewer ships budgeted from FY 2001-05 than in Clinton's last FYDP. Adm. [Robert J.] Natter, [commander in chief] US Atlantic Fleet, has said that "today there are 318 ships on active duty. The last time the Navy had 318 ships was in 1933, during the throes of the general depression, a time of global disengagement, and on the eve of Pearl Harbor." And Sen. Olympia J. Snowe, [former] chairwoman of the Senate Armed Services Subcommittee on Sea Power, has pointed out that Clinton's historic average of building 7.5 ships per year has placed the Navy on a course for a 263-ship fleet. Far from "business as usual," this situation reflects the sobering reality of the outgoing Administration's inability to understand what funding is required to maintain a global presence as the only remaining superpower.

Going further, the article contains a paragraph that begins: "The Navy's attack submarine force was built to shadow and, when necessary, de-

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stroy Soviet subs poised to fire nuclear-tipped missiles on United States soil" and then goes on to describe traditional mission priorities. The thought in that paragraph is somewhat antiquated. Attention is invited to *Blind Man's Bluff: The Untold Story of American Submarine Espionage*, written by Sherry Sontag and Christopher Drew with Annette Lawrence Drew. The authors describe many critically needed intelligence-gathering missions assigned to the attack submarine fleet. They also point out that shadowing a submarine in the pitch black of the ocean's depths is best done knowing what's being shadowed and its capabilities, and that knowledge is gained from earlier intelligence-gathering missions. As the "only big dog on the block," it's more than wise to "stay off the porch" to monitor activities in North Korea, China, Timor, Iran, Pakistan, India, Colombia, Libya, Egypt, et al. The attack submarine has proved to be an excellent platform for maintaining that awareness. So, regarding crucial missions and needs for funding in the 2000 era, there is one that can be stated quite simply with no intent to affront: "It's intelligence gathering, stupid." Borrowing from [Rear] Adm. [Albert] Konezni, commander, submarine force, US Pacific Fleet, "Today's peacetime attack submarine force faces twice the requirements as it did prior to the fall of the Berlin Wall with half the number of platforms."

In conclusion, the title, tone, and substance of "Submarine Salesmanship" is small. It's been said that when the American people know all of the facts they always do the right thing. It's time for the media and especially magazines like *Air Force Magazine* to get them fully informed.

Echoing Correll—Let the noise begin! On the whole, *Air Force Magazine* does an excellent job. But please en-

sure that your articles present all of the picture and, in light of our currently deplorable defense posture, refrain from provoking interservice rivalry. Today all of our warriors need much.

Jim Harding  
Mansfield, Tex.

[The] article was right on. If other service commanders wanted to see an efficient, gung ho outfit, they should hop a ride on a Navy submarine.

Secretary of Defense [Donald] Rumsfeld plans to build a ballistic missile shield to protect American interests. No better place to start than to reactivate the 17 SSBNs as mobile platforms that could move around as need be and fire their anti-missiles at will. [It would be] extremely cost effective in these coming days when all services want an increase in spending.

David K. Chigos  
San Diego

#### Why Live With It?

The article "Learning to Live With the Pilot Retention Problem" [January, p. 66] left me shaking my head. The Air Force brass still doesn't get it. At a time when pilot retention is critical, they assume that all pilots still need to learn how to become generals. I spent nine years on active duty, and four of those years were spent flying the F-15C. In November 1991 I was given an ultimatum: Spend three more years in the F-15 and then go to a staff position or get out and work for the airlines. I put in my papers and got out.

My wing commander at Kadena [AB, Japan] tried to persuade me to stay in and accept my next assignment. He asked me what it would take for me stay in the Air Force. My response was, "Let me fly the F-15 for 20 to 25 years and promote me to major." Of course that was not possible. Pilots are officers first and must follow the prescribed track to becoming good officers. This means staff



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## Letters

tours, [professional military education] in residence, tours at the Pentagon and NORAD, etc.

I have never understood why there cannot be a pilot-only track. The Canadians, British, and Australians have [such] programs, and it works for them. We are the only air force in the world that spends \$8 million to \$10 million training experienced pilots and then, after six years, yanking them out of the cockpit and putting them behind a desk. If the gentlemen upstairs would just listen, well, I would have 17 years on active duty and at least eight more to go.

Maj. Rick Womick,  
AFRC  
Rockvale, Tenn.

Why live with it? If being a rated Air Force officer is not good enough, open pilot billets to the enlisted force. End of problem!

SMSgt. Rob Lentini,  
ANG  
Tucson, Ariz.

The continuing pilot retention problem isn't new. Airline hiring has had a significant impact on pilot manning for the last 15 years. The Air Force will never compete with commercial pilot pay and family and lifestyle considerations.

One place the Air Force could take advantage of a significant amount of flying experience is at Undergraduate Pilot Training bases. Fighter pilots resist becoming Instructor Pilots unless they're guaranteed a return to their fighter cockpit at the end of their training tour. And, while first assignment IPs do a good job, it's difficult to [justify] having your most inexperienced pilots as your primary instructors.

The Air Force employed active duty "gray beards" at training bases in the past, and I'm told it worked. The Navy employs retired aviators at some of their bases.

Why doesn't the Air Force consider hiring highly experienced retired USAF pilots for UPT IP positions? Operational pilots could stay operational, staff decisions involving flying would continue to be made by rated officers, and students would benefit from being taught by pilots who "have been there." I suspect my experience in the F-16, A-10, and C-130 is still valid. Additionally, retired officers may bring along some leadership experience not yet attained by younger pilots with or without operational experience.

If it's never been considered, it should be. While you're considering

hiring pilots to teach at UPT, take a look at hiring retired navigators, weapons system officers, flight engineers, loadmasters, and other crew members into basic training roles as well.

Col. Ron Moore,  
USAF (Ret.)  
Murfreesboro, Tenn.

Your article was a fine exposition of the programmatic measures the Air Force is taking to combat the third pilot exodus in the last 22 years. Unfortunately, what was missing was an explanation of the measures the Air Force is taking to enhance the ability of its leaders at every level to deal with the problem. On that score, "We have met the enemy, and they is us!"

During my 20 years of military service and 7.5 years with a major commercial airline, it has become apparent to me that money and quality of life are indeed important aspects of a pilot's life. But most important is the conviction that the people for and with whom we work everyday respect us, that they are worthy of our respect, and that in all aspects of their conduct they truly put service above self.

The many new-hire, ex-military pilots I regularly fly with have led me to the conclusion that, just as during the prior two retention crises, the armed services are afflicted with too many leaders at all levels who place their own goals and aspirations ahead of their subordinates' and the service's welfare. This is reflected in the numerous stories I hear on long flights, of disrespect and outright mistreatment at the hands of unit, wing, and command level leaders.

The third occurrence of this cycle has convinced me that the armed services' promotion and leadership development system, as currently constituted, is incapable of consistently producing the number of quality leaders necessary to both effectively lead the services and deal with the current and future retention situation. It is due to the fact that, over time, people who put their own interests first have captured the system at all levels.

In my opinion, the only effective way to solve this problem is to remove the incentive for such behavior. Accordingly, the Defense Officer Personnel Management Act should incorporate three amendments. First, all language permitting below-the-zone promotions to any grade should be excised. This would remove a primary incentive for careerist behavior.

Second, the years-of-service ceiling for flag officers should be raised to 40 years. This would allow suffi-



cient utilization of such officers after promotion to O-7. At the same time, it would allow application of the current retired pay formula to bestow 100 percent pension on those dedicated senior flag officers who have agreed to serve the bulk of their adult lives in the armed services. Advances in health care, longevity, and vitality among older Americans over the last 30 years now make such a lengthy career feasible.

Third, the flag officer promotion system should be placed directly in the hands of the service secretaries. For each O-7 selection board, a panel of distinguished civilians should be selected by each Secretary to assess the records of all eligible O-6s. These panels could include retired flag officers, but rigorous firewalls should be erected to preclude current active duty or recently retired officers from influencing the boards. The only goal of the panel would be the selection of those officers best able to lead the services in combat.

Bitter medicine, I know. But the persistence and severity of this problem call for more stringent measures than the services have yet been willing to consider. Those officers who consistently apply and are motivated by the highest standards of leadership and ethical conduct would find the above changes an asset to their capabilities. Those who do not would fall by the wayside. The effectiveness and health of the combat force demand nothing less.

Lt. Col. Peter M. McCarthy,  
USAF (Ret.)  
San Antonio

### Clamor for Airlift

John Tirpak's article, "A Clamor for Airlift," [December 2000, p. 24] makes three telling points: 1) the demand for strategic airlift is increasing; 2) the Air Force has insufficient airlift assets to meet current, much less future, demands; and 3) many existing assets are reaching the end of their useful service life.

Life extension efforts can only mitigate the shortfall to some extent because with aging aircraft, to borrow a quote from [former] Air Force Secretary [F. Whitten] Peters used in the article, "[There are] problems which can put a whole fleet down or 200 aircraft down overnight." Given these facts, it is difficult to understand why Air Mobility Command would risk its future by not taking up Boeing on its offer of a follow-on multiyear buy of an additional 60 C-17s.

As Tirpak notes, Boeing has offered an improved aircraft at a reduced price. Acquiring more C-17s is

the only way to reduce the average age of the airlift fleet and protect against the kinds of problems noted above. It just makes sense.

Daniel Goure  
Senior Fellow, Lexington Institute  
Arlington, Va.

### Capital Flying

Your article on the 1st Helicopter Squadron [*"Capital Flying," January, p. 52*] triggered many fond memories of my tour with the unit from 1975 to 1980. That they are now approaching 200,000 hours of accident-free flying is an enduring testament to the dedication of the professional maintenance people who have taken care of these birds over the years.

I would like to highlight one incident that was not mentioned in your report. On March 28, 1979, a problem with a nuclear reactor in Pennsylvania prompted an emergency request from the Atomic Energy Commission for emergency transportation for their people to evaluate the situation at Three Mile Island. Dispatched by the [commanding officer], Lt. Col. John Wells, the helicopter crew arrived on their pad 15 minutes later and called back to the unit for instructions since there wasn't anyone to pick up. When contacted, the AEC acknowledged they were not expecting that kind of response, which is what the 1st Heli crews were trained to do. Subsequently, the unit flew numerous evaluation missions to determine the potential fallout from the incident to ensure the safety of the people in the area.

As a sidelight to the mention of the bank robber who was pursued by the unit, he made the mistake of exiting the Suitland Parkway and entering federal property which allowed us to transport police and tracking dogs without being hindered by the Posse Comitatus Act. At the same time, Queen Elizabeth of England was proceeding down the Suitland Parkway for a state visit, which made for an interesting situation.

Lt. Col. Roger J. Lueschow,  
USAF (Ret.)  
Maple Valley, Wash.

### The Osprey Issue

Many problems intersect at the V-22 program. [See *"World: Second Crash Clouds Osprey's Future," February, p. 8.*] DoD casts these as reliability, maintainability, availability, cost, and self-induced air turbulence which makes flying "a challenge."

The basic compromise design solution growing from the conflicting requirements for both vertical and horizontal flight seems flawed from the perspective of complexity, cost,

and failure modes (too many are catastrophic). This program has been held aloft by a strong political wind at the expense of a growing body count and tight restraints on more promising technology programs.

In a combat situation, the last thing you need is an aircraft that is difficult to fly. You need to be able to fly the aircraft while at the same time being able to focus most of your attention on what is happening combatwise. The V-22 fails that simple easy-to-fly test. No amount of rework has the promise of overcoming the basic design problems. The more complex the mission is, the more important simplicity and easy-to-fly become. Simple is better. Our nation never has a shortage of better ideas.

Col. Bill Evans,  
USAF (Ret.)  
Monument, Colo.

### Mission Capable?

Many of us are concerned about the low level of combat ready aircraft. [See *"World: For Worried Air Force, the Down Streak Hits Nine Years," January, p. 20.*] Our wings complain that the lack of serviceable parts is the problem. Our mechanics are at the mercy of the depots. [Mechanics] are no longer allowed to repair items at the wing level.

Many items can be repaired locally with less man-hours than it takes to prepare the item for shipment. For instance, a leaking booster pump can be repaired in about one hour by replacing the O ring seals. A brake assembly that needs new pucks installed can be repaired in about two hours.

We can fill the shelves with serviceable parts, and under the present system, those parts will soon need repairing and will be gathering in repairable warehouses both at wing level and at a depot. We in maintenance live off our repairables and the system must expedite their repair.

We must remember that keeping our aircraft combat ready is much more important than protecting the depot work backlog. I don't care how short parts become. If the mechanics are allowed to repair when capable, many more aircraft will be on the ready line. At least 95 percent of our aircraft should be ready at all times. This is possible if Air Force assets are properly managed.

Lt. Col. Linn E. Mann,  
USAF (Ret.)  
Kerrville, Tex.

The term "Total Not Mission Capable Supply" is confusing. I believe it refers to any aircraft maintenance action awaiting a part, not aircraft

awaiting a part for an extended time. When defining a supply problem, what is the value of X in "the part isn't available for X days"? While a supply problem is easy to recognize (you can't "poof" a part into existence), it's more difficult to identify an accurate [Not Mission Capable Maintenance] rate because it varies with the number of person-hours worked.

MSgt. Rick Brumble,  
USAF (Ret.)  
Portland, Ore.

### The Anthrax Issue

It is true the anthrax vaccine has been approved by the FDA for a number of decades; however, it is equally as true that the anthrax vaccine has never before been administered on this scale. [See "The Anthrax Issue," December 2000, p. 46.]

Given DoD's [Anthrax Vaccine Immunization Program] has not been long in existence, I am amazed at Col. [Gaston Randolph's] comment that there has been "no long-term chronic or life-threatening illness." This program has been in existence for what, two or three years now? This hardly qualifies as long-term, and it is this very type of subtle propaganda and disinformation campaign being waged by DoD officials that has me skeptical of the entire program.

In another example, Col. [Deneice] Van Hook adds, "There have been several studies that seem to indicate that females are more apt to have reactions than males, but we really don't know what's causing that." In other words, the vaccine has not been fully tested against a wide population, further confirmed by the article's comment that the reports of few reactions to the anthrax immunization were a welcome surprise.

I love the Air Force, I believe officials are doing their best to protect me, and I accept my duty to receive the anthrax vaccine; however, AVIP is the sole reason I elected to retire at my soonest opportunity: 20 years and 16 days. In each instance that I received this vaccination I had a large knot in my arm that lasted for one to two weeks. The first nights after receiving the immunization were essentially sleepless, waking from the pain as I rolled onto the shoulder that had received the immunization. This two-week duration side effect is quite well-known.

To liken anthrax's side effects to those of the tetanus shot is yet another example of DoD's misinformation campaign about this vaccine. I have had both immunizations. The tetanus vaccination is nothing like the anthrax vac-

ination. Van Hook concludes that she would give the vaccination to her child. I would not. I have too much respect for my children to do such a thing to them.

MSgt. John J. Warns II,  
Kadena AB, Japan

### About That MiG, Again

The MiG-15 was disassembled in Korea and shipped to Kadena AB where it was my flight commander Capt. Walter B. Dillard's responsibility to reassemble [it]. [See "Letters: About That MiG," February, p. 4.]

The 4th [Fighter Interceptor Squadron] hosted the test operations with the famous MiG parked in front of our alert shack, which gave us a front row seat to some historic tests. Three famous test pilots took turns flying the MiG-15 and the F-86 in simulated combat. The highlight for us was a briefing on their initial findings. They stated that the MiG-15 was indeed a hotter aircraft than the Sabre but with the shortcomings of restricted visibility and a poorly laid-out cockpit which resulted in the pilot spending an inordinate amount of attention to just fly the aircraft.

Lt. Col. Ronald C. Rule,  
USAF (Ret.)  
Jackson Hole, Wyo.

### Another Pit

Those pictures of the X-1 pit ["Flashback: The Pit," January p. 39] got my flashback gears engaged. My mind snapped back to another time, another pit. This pit had a common denominator with the X-1 pit. It allowed another special, modified B-29 to back over it and swallow another special cargo.

It was the afternoon of Aug. 5, 1945. I was a B-29 flight engineer, 483rd Squadron, 505th Bomb Group, North Field, Tinian. I [saw] an intruder from the 509th BG, trundling down the crushed coral taxi strip. The -29 approaching our revetment turned his nose away from the ramp next to us, and powering up, he backed up into the revetment next to us. When the props stopped spinning, I realized that he had Curtiss electrics instead of the Ham Standards that [we] used. We couldn't back up.

After the -29 was positioned over a pit, they placed an orange colored tarp around the bomb bay doors. This way, the space between the lower edge of the doors and the ground was blocked. You couldn't see what was loaded from the pit into its belly. The -29 then left our area and trundled back to its area. The next day was history. The plane was the *Enola Gay*.

George Glawe  
Las Vegas

### Two More Notes on Korea

In his letter regarding the 1st Provisional Group, [retired] Col. [Paul C.] Fritz says he didn't remember any C-46 aircraft at Yonpo airstrip. [See "Letters: Air War Korea, 1950-53," December 2000, p. 7.] I don't know if he was there on the last day before the field was overrun. If he had been, he would have seen the wrecked C-46 in the middle of the airstrip and the dozen or so C-46s waiting to get out of there. They belonged to the 1st Pro and 437th Wing. The wrecked C-46 was dragged away from the strip by an obliging Sherman tank borrowed from the perimeter of the airfield, and the evacuation continued.

Our C-46 was loaded with 10,000 pounds of 20 mm ammo, which we carried to K-9 (Pusan). Prior to that night we had been carrying wounded out of Yonpo to Itazuke [AB, Japan]. We did not have nurses or corpsmen; we just made the people as comfortable as we could. In January of 1951 the 1st Pro was assimilated into the 437th Wing. Before this merger took place they had evacuated over 7,000 casualties. God bless them.

As for going into tight places, in early 1951 C-46s flew the gas required by the Army for Operation Killer into Chungju airstrip. This was a 2,000-foot-plus gravel and mud strip with obstacles at each end. Although the price was high—six wrecked C-46s and four dead aircrew—the gas enabled the Army to reverse its retreat and start driving back north.

All of the people in the airlift—1st Pro, Gypsies, Greeks, and the 314th—did the very best they could with what they had. I think it's rather petty to harp about who did what after 50 years. The only heroes in Korea were frost-bitten wounded we carried out of there and the ones that were left behind.

Lt. Col. Hal Richter,  
USAF (Ret.)  
Barrington Hills, Ill.

As one of the grateful Marine casualties evacuated from Hagaru-ri, North Korea, on Dec. 5, 1950, I was pleased to read Fritz's letter telling me where we landed (Yonpo). My recollection was landing [and] being treated and transferred to a C-54. The lieutenant colonel who helped me from the C-47 seemed quite excited to find I had a pocketful of grenades, as was the custom where we had been. I hope those pilots and flight crews are now honored members of The Chosin Few.

Lt. Col. Patrick R. Stingley,  
USMC (Ret.)  
Victorville, Calif.



# Aerospace World

By Peter Grier

## Bush Defers Major Budget Decision

In February, President Bush proposed an across-the-board military pay raise but said that a request for a broader defense increase would await the outcome of a review of missions and spending priorities.

Declaring that "the highest honor and the greatest duty of this office is to serve as Commander in Chief," Bush took time during his fourth week in office to visit a number of East Coast military bases.

On Feb. 6, the White House ruled out any immediate request for a supplemental defense appropriation for the current fiscal year. Moreover, Secretary of Defense Donald H. Rumsfeld told the service chiefs that, for Fiscal 2002, Bush planned to present the final Clinton defense proposal of \$310 billion.

The DoD chief reportedly told military leaders to "stick to their knitting" until the impending review was done.

That position caused a commotion on Capitol Hill, where some senior Republicans expressed concern that Bush was backtracking on his campaign promises to increase military spending.

Sen. John Warner (R-Va.), the chairman of the Senate Armed Services Committee, said, "There was [Vice President Dick] Cheney's famous statement to the military during the campaign, 'Help is on the way.' That could be conceived as a bit of a disconnect with what they're doing now."

Within days, however, the White House had re-opened the door to some financial relief for the Pentagon during this fiscal year. An administration official told the *National Journal News Service* that "it went from no defense supplemental this year to none right now."

## Analysts Puzzled About Rumsfeld Testimony

The White House's defense budget decisions came as a major surprise to many defense analysts, largely because of Rumsfeld's own testimony to the contrary on the subject.

In his Jan. 11 confirmation hearing



USAF photo by SSgt. Stan Parker

*Personnel with the 633rd Air Mobility Support Squadron, Kadena AB, Japan, unload earthquake relief supplies from a C-17 from McChord AFB, Wash., after its arrival at the airport in Ahmedabad, India, on Feb. 3. The earthquake, which struck Jan. 26, measured 7.9 on the Richter scale.*

before the Senate Armed Services Committee, he emphatically endorsed the principle of raising the budget to close a huge gap between spending and actual defense needs.

"I've read a great deal about it," said Rumsfeld. "The [Congressional Budget Office] was using one number. I think it was something like a \$40 or \$50 billion [per year] add-on. I read an article by [former Defense Secretaries] Jim Schlesinger and Harold Brown, who came up with a number that was somewhat higher than that—\$60 or \$75 billion, as I recall. And I read a report from [the Center for Strategic and International Studies] that was something in the neighborhood of \$100 [billion]. ...

"What the number is, I don't know. Is it clear that there needs to be an increase in the budget? There is no doubt in my mind."

He noted that Bush had not determined exactly how much to boost defense spending, but he remarked that it would likely be more than the 10-year \$45 billion increase promised during the election campaign. Rumsfeld said, "I do not believe that

he suggested that that was the totality of what he had in mind."

## Rumsfeld Pushes Major Reforms

New Secretary of Defense Rumsfeld put the Pentagon on notice that he plans to move quickly to make sweeping changes in everything from the way the US military buys weapons to the number of bases it oversees.

At his Jan. 11 Senate confirmation hearings, Rumsfeld said his comprehensive review of policies and procedures would be the most thorough the Department of Defense has experienced in at least a decade.

"The legacy of obsolete institutional structures and processes and organizations does not merely create unnecessary cost ... [but] also imposes an unacceptable burden on national defense," Rumsfeld said. "It could be said that we are in a sense disarming or underarming by our failure to reform the acquisition process and to shed unneeded organization and facilities."

Rumsfeld—who was confirmed by the Senate on the afternoon of Inau-



guration Day, Jan. 20—declined to specifically support or oppose specific weapons systems.

### **NMD a Top Priority, Says Pentagon Chief**

Deployment of a National Missile Defense will be one of the new national security team's top priorities, Rumsfeld vowed.

The Defense Secretary referred to the 1972 Anti-Ballistic Missile Treaty, which as currently constituted would prohibit a robust defensive system, as "ancient history."

The fact that the Bush Administration is more serious about NMD than was its predecessor will inevitably cause other nations that now oppose missile defense to begin to change their minds, Rumsfeld told Senators. He made specific mention of Russia.

On some security questions, Rumsfeld's views constituted a sharp departure from those of the Clinton Administration. China, he said, is not a strategic partner. He characterized North Korea as a dictatorship more interested in weapons of mass destruction than in feeding its own people. He opposed a treaty to prohibit underground nuclear testing.

The new DoD chief concluded that the United States today faces a "dangerous and untidy world" where bio-

## **Bush Throws Cold Water on War Crimes Tribunal**

The Bush Administration has no intention of submitting to the Senate a treaty intended to establish an international war crimes tribunal.

So said Bush spokesman Ari Fleischer on Jan. 2.

Among the new President's concerns is the danger that US military personnel could be dragged before an international court on trumped-up charges for political or ideological reasons.

Now ex-President Bill Clinton signed the treaty on Dec. 31, 2000. He recommended, however, that the pact not be submitted for ratification until some US concerns have been alleviated.

"We will review it," said Fleischer. "We are concerned about a flawed treaty."

The Clinton Administration said signing the treaty would offer the US leverage in continuing debates about the tribunal's authority.

Clinton officials were worried about indications that the tribunal might claim sweeping jurisdiction, covering citizens from nations that are not parties to the tribunal treaty.

Conservatives have expressed hard opposition. It is not something that can be fixed, they say. They find abhorrent the very idea of surrendering a portion of national sovereignty to such an international court.

"This decision will not stand," declared Sen. Jesse Helms, the North Carolina Republican who chairs the Senate Foreign Relations Committee, in the Jan. 1 *Washington Post*.

Some 139 nations have signed the treaty. Its language states that it will take effect when 60 signatories have ratified their participation. Currently the ratification count stands at 27.

terrorism and cyber attacks must be dealt with along with more traditional threats.

### **Airborne Laser \$98 Million Short** Air Force officials on Jan. 5 an-

nounced that the Airborne Laser program needs an additional infusion of \$98 million this year to stay on schedule for a live-fire demonstration in 2003.

ABL contractors Boeing, Lockheed Martin, and TRW have pledged to loan the Air Force a total of \$60 million, interest-free, to be paid back from the 2002 ABL budget. The Air Force hopes to obtain the remaining \$38 million by winning Pentagon and Congressional authority to shift money from other accounts.

"This program is too important, and we intend to keep the program on track for its 2003 missile shootdown," said Gen. Michael E. Ryan, Air Force Chief of Staff.

The sudden need for money stems from two factors, said ABL officials.

First, some \$64 million is necessary to complete certain tasks that program engineers once thought could be handled in the out-years but which they now believe must be dealt with now.

Second, the program has experienced \$34 million in cost growth due to greater technical challenges than anticipated.

The ABL program will slip 15 to 20 months behind schedule if it doesn't get the extra cash, says Col. Ellen M. Pawlikowski, ABL program director.

### **UK Kicks in \$2 Billion for JSF**

Britain on Jan. 17 agreed to contribute \$2 billion toward Joint Strike

## **Cohen Finds No One, Everyone to Blame in *Cole* Disaster**

In one of his last acts as Secretary of Defense, William S. Cohen on Jan. 19 said that a series of reports shows no single US officer or official is to blame for the Oct. 12 bombing of USS *Cole*.

At the same time, said Cohen, the suicide attack shows that every level of the US military chain of command could do a better job at preparing for counterterrorism in today's dangerous world.

"All of us in the leadership positions, including myself, the Chairman of the Joint Chiefs of Staff, the Secretary of the Navy, ... and others needed to engage more vigorously in examination of the range of potential threats," said Cohen in a briefing for reporters. "Clever, committed terrorists are predators who will always search and look for weaknesses."

Cohen's words echoed the findings of a Pentagon commission, which found that shortfalls in intelligence resources, training, and administration helped make *Cole* vulnerable.

While the Navy has focused on high-tech threats such as missiles, and done a good job at laying plans to protect ships tied up at a pier, US forces are less prepared to defend against a small craft that approaches them in mid-harbor, said the commission. *Cole* was attacked while moored at a refueling barge in Aden harbor.

"We must constantly search for and find the so-called 'seams' in our force protection plans before our enemies do," said Cohen.

A separate Navy investigation determined that the *Cole's* captain, Cmdr. Kirk S. Lippold, should not be punished in the attack's aftermath. Any security steps that Lippold did not take either would not have stopped the attack or were more than the Navy could have expected under the circumstances, concluded Adm. Vernon E. Clark, Chief of Naval Operations.

(See "From Khobar to *Cole*," p. 48.)



Fighter engineering and development costs. In doing so, London fulfilled a long-standing financial commitment that will buy them a say in whether Lockheed Martin or Boeing wins the JSF production contract.

The money will create or sustain 5,000 jobs at 70 companies in the United Kingdom and represents a welcome infusion of cash to a program certain to face intense scrutiny from a new Administration looking for ways to change defense priorities and save money.

"Obviously ... the incoming Administration is going to have to consider its own position on JSF," said Liz Symons, Britain's weapons procurement minister, at a Pentagon ceremony.

Plans call for selection of the winning contractor in September. The programs of both contractors are proceeding on track.

### F-22 Flies With Mission Avionics

On Jan. 5, the F-22 program passed



USAF photo by SrA. Della Castillo

**SSgt. Albert Garcia, air traffic controller supervisor, 31st Fighter Wing, Aviano AB, Italy, and Sgt. Jebara Mohamed, air traffic controller, Royal Moroccan air force, Sidi Slimane AB, Morocco, manage airfield operations during African Eagle in Morocco. During the biannual exercise USAF and Moroccan aircrews practice dissimilar air-to-air training.**

## Navy Changes Status of Gulf War Casualty

The Navy on Jan. 11 announced something highly unusual: It changed the status of Lt. Cmdr. Michael Scott Speicher from Killed In Action/Body Not Recovered to Missing In Action.

Speicher was shot down over Iraq on Jan. 17, 1991—the first casualty of the Persian Gulf War. The Navy and the Pentagon had long insisted he was dead. Now officials say they do not really know what became of him.

"The Navy and the US government have consistently sought new information and continued to analyze all available information to resolve Speicher's fate," said the official notice of the status change. "This additional information and analysis ... underscored the need for a new review."

This strange saga began in the opening hours of the conflict with Iraq, when Speicher and 32 other pilots took off from USS *Saratoga* in the Red Sea and streaked toward the outskirts of Baghdad. Their mission was to suppress enemy air defenses and clear the way for strike aircraft.

Minutes from the target, some other pilots saw a bright flash in the general vicinity of Speicher's F/A-18. When the rest of the force returned to the carrier, Speicher did not.

Based on this evidence, then-Secretary of Defense Dick Cheney publicly announced Speicher was dead during a press conference hours later in Washington.

Adm. Mike Boorda, the Chief of Naval Operations, approved the official KIA declaration in May 1991. The crash site had not been found.

According to a 1999 letter to the Navy from Sen. Bob Smith (R-N.H.) and then-Sen. Rod Grams (R-Minn.), when the war ended Iraq provided some hair and soft tissue that Iraqi officials said were from Speicher. This move was unremarkable, except for one detail. "DNA tests determined the remains were not those of Lt. Cmdr. Speicher," claimed the letter.

Nearly three years after war's end, members of a hunting expedition in Iraq stumbled on the wreckage of an F/A-18 in a remote desert region. One of the hunters, an official of Qatar, forwarded to US officials pictures of the airplane's canopy and a shard of metal that bore serial numbers. He also mentioned that he'd seen an ejection seat resting some

distance from the airplane. The wreckage was Speicher's.

US intelligence spy satellite images showed something more: a man-made symbol. It was, reportedly, an escape and evasion symbol. Had Speicher ejected and lived?

Some military officials wanted to launch a covert operation to study the wreck further. The Chairman of the Joint Chiefs, Army Gen. John Shalikashvili, nixed the idea.

US experts did not get access to the crash site until late 1995, after requesting permission from Iraqi authorities.

When they arrived, the US experts found a site they believed had been tampered with. But they found spent flares and portions of a survival kit and no remains. They also found a flight suit lying on the desert floor.

According to an internal Pentagon memo obtained by APBNews.com, the suit was not weathered and appeared to have been planted.

Smith and Grams, among others, began agitating to change Speicher's status from KIA to MIA. Labeling the aviator missing, they wrote, "more accurately reflects the available evidence and provides a presumptive 'benefit of the doubt' to Lt. Cmdr. Speicher."

Outgoing Secretary of the Navy Richard J. Danzig finally notified Speicher's relatives in early January that such a change was imminent. The Navy had no evidence their loved one was alive, he said, but they had no evidence he was dead, either, and an MIA tag would give them more leverage with which to press the Iraqis for information.

The soon-to-be-ex-President Clinton said Jan. 11 that Speicher may still be alive. In New Hampshire on a farewell trip, Clinton said he did not want to raise false hopes but that "we've already begun working to try to determine whether, in fact, he's alive; if he is, where he is; and how we can get him out."

Iraq, for its part, insists that Speicher died without ejecting from his cockpit, despite the fact that his remains were never found.

"All the indications were that he was killed while he was still in the cockpit," said Deputy Prime Minister Tariq Aziz on Jan. 15. "But there were no remnants of his body after several years in a remote desert environment."



## Former CIA Director Deutch Cops Plea, Then Gets Pardon

The saga of former CIA director John M. Deutch and his mishandling of classified information came to a surprise end Jan. 20 when President Clinton pardoned him—only two hours before Clinton himself left office.

According to news reports, Deutch had on the day before agreed to plead guilty to a misdemeanor charge in return for the government dropping more serious charges against him.

The pardon means that Deutch will avoid prosecution for putting classified information on unsecure computers.

Deutch, who ran the CIA from May 1995 until December 1996, was accused by security officials of storing hundreds of pages of secret files on home computers which were unsecured and which family members used to access the Internet.

The Pentagon, where Deutch served as deputy secretary of defense, accused Deutch of similar offenses.

Deutch's pardon was one of 104 issued by President Clinton as his time in power ran out. The former CIA chief is now free to seek reinstatement of his security clearances, although his current job—chemistry professor at Massachusetts Institute of Technology—does not require handling of classified material.

an important test milestone with the first flight of a Raptor equipped with Block 3.0 combat-capable avionics software. The flight of Raptor 4005 occurred at Lockheed Martin's Marietta, Ga., facility. Preparing the software represented the most technically demanding challenge facing the F-22 team, said USAF officials.

Block 3.0 software will permit the F-22 to launch and simultaneously guide multiple weapons, such as the AIM-120 and AIM-9 air-to-air missiles. The software package also allows the F-22 to avoid incoming missiles by automatically initiating the aircraft's countermeasure systems.

"Block 3.0 is the software that provides and controls the 'first look, first shot, first kill' warfighting capability," said Tom McDermott, Lockheed Martin's F-22 avionics product manager. "Block 3.0 provides the multisensor fusion Raptor pilots will need to accurately acquire, track, identify, and engage multiple targets."

Per Congressional mandate, the F-22 program had to successfully flight test Block 3.0 before it could receive \$2.1 billion set aside to fund low-rate initial production.

### Allies In Stew Over DU Shells

Some US allies in Europe have decided to become concerned about the use of Depleted Uranium ammunition—the Pentagon's tank-busting ordnance of choice. They fret that DU might turn out to be a health hazard.

Those fears have been fed by reports of cancer and other health problems among peacekeepers in the Balkans. NATO used DU ammunition

in the 1999 air war over Kosovo, when US A-10s fired about 31,000 DU rounds at Serbian tank columns. US forces also fired DU in Bosnia in 1994 and 1995.

NATO has already rejected German and Italian requests to place a moratorium on the use of DU. On Jan. 17, the European Parliament voted to ask NATO to suspend use of DU ammunition, pending further inquiry into its possible health risks.

Depleted Uranium is a nuclear by-

product, a heavy metal that contains extremely small trace measures of radioactivity. Its military virtue is its penetrating power, which is up to 20 percent greater than alternatives such as tungsten.

DU burns on impact, creating powder that can be hazardous if ingested in significant quantities, but the health risks are no greater than those associated with such other potentially damaging substances as old lead paint.

"It is uranium that is less radioactive by some 40 percent than naturally occurring uranium," said Pentagon spokesman Ken Bacon at a Jan. 4 press briefing.

### No Cancer Link, DoD Declares

Years of study have found no link between Depleted Uranium and increased risk for cancer or other serious illness, said Bernard Rostker, undersecretary of defense for personnel and readiness, at a briefing for reporters Jan. 12.

Specifically, Rostker cited a 1999 report from RAND that reviewed scientific literature on the subject, as well as subsequent reports from the Department of Health and Human Services and the Institutes of Medicine.

"Cancers do not develop, even leukemia, in the periods of time we are talking about here," he said. "And there is no indication from 50 years of research and monitoring of people

## Rumsfeld's Really Relevant Rules

During a long career in government and business, Defense Secretary Donald Rumsfeld jotted down thoughts, reflections, and aphorisms concerning leadership and management of organizations. He compiled these into what is now known as "Rumsfeld's Rules," a few of which seem particularly relevant.

- Beware when any idea is promoted primarily because it is "bold, exciting, innovative, and new." There are many ideas that are "bold, exciting, innovative, and new," but also foolish.

- Reserve the right to get into anything, and exercise it. Make your deputies and staff realize that, although many responsibilities are delegated, no one should be surprised when the Secretary engages an important issue.

- Manage the interaction between the Pentagon and the White House. Unless you establish a narrow channel for the flow of information and "tasking" back and forth, the process can quickly become chaotic.

- Normal management techniques may not work in the department. When pushing responsibility downward, be sure not to contribute to a weakening of the cohesion of the services; what cohesion exists has been painfully achieved over the decades.

- Develop a personal relationship with the Chairman and each of the Joint Chiefs of Staff. They are almost always outstanding public servants. In time of crisis, those relationships can be vital.

- Find ways to decentralize. Move decision-making authority down and out. Encourage a more entrepreneurial approach.

- Beware of the argument that, "this is a period for investment; improvements will come in the out-years." The tension between the short term and long term can be constructive, but there is no long term without a short term.

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working with natural uranium ... that would associate it with leukemia."

Veterans Affairs has been monitoring the health status of 33 Gulf War veterans who were exposed to DU, said Rostker. Of those, 16 still have small Depleted Uranium fragments in their bodies. "They continue to have elevated levels of uranium in their urine, and they've experienced no renal failure [evidence of kidney disease] or lung cancers," he asserted.

**Nuclear Jobs Opened to Reservists**

The Pentagon on Jan. 11 announced that National Guard and Reserve troops may now serve in nuclear-related jobs, such as missile silo staffing, that previously were closed to them.

The move could particularly ease a staffing crunch in the Air Force, which controls many of the nuclear jobs in the military.

"The number of Reserve and National Guard forces to be used in nuclear-related missions will be up to commanders to determine, as they work through this process," said Charles L. Cragin, principal deputy assistant secretary of defense for reserve affairs. "However, a major structural barrier to full integration of the force has been shattered with this determination."

Previously military officials felt that the typical commitment levels expected of Guardsmen and Reservists—one weekend per month and two weeks of active duty per year—simply weren't enough to ensure proper training. In recent years, however, the military has relied more heavily on reservists—and many reservists are serving more.

Reservists who now wish to serve in nuclear-related posts will still face intense medical and security evaluations, noted Pentagon officials. Only those who serve in the military at least 12 days a month, with no more than 14 days in between stints, will be eligible.

"This was determined to be the minimum level of direct observation required to meet the spirit and intent of the program for the Total Force," said Cragin.

**USAF Consolidates RC-135 Linguist Training**

In a change of policy, all Air Force linguists assigned to RC-135 Rivet Joint duty will soon get their initial qualification training at Offutt AFB, Neb.

The Rivet Joint provides real-time intelligence and electronic warfare

**High Hopes for New ACP Program**

The Air Force is hoping revisions to the Aviation Continuation Pay program put in place for Fiscal Year 2001 will provide enough financial incentive to keep additional experienced pilots in service cockpits and away from the lure of airline jobs.

The revised ACP program increases the lump-sum, up-front payment a pilot can receive for a long-term Air Force commitment from \$100,000 to \$150,000. According to Col. Jim Brooks, chief of Air Force operational training at the Pentagon, ACP helps the service "keep more pilots longer," although the program is just one part of the "tool kit" being used to help stem the loss of pilots.

Most continuing pilots take the largest possible lump-sum payment when signing on for an additional term, so the \$50,000 increase is a significant boost. Overall, however, independent analysis has shown Air Force pilots effectively lose some of their lifetime income every year they stay in uniform instead of leaving to join the airlines—even when bonuses such as ACP are factored in.

For that reason, Brooks noted that ACP is but one part of a broader effort the Air Force is using to improve retention of experienced pilots. Officials say compensation continues to be a major factor cited by separating pilots as a reason for wanting to leave the Air Force, along with quality-of-life issues such as frequent, unpredictable deployments.

The Air Force is addressing deployment rates with its Aerospace Expeditionary Force structure, now more than a year old, which helps pilots predict when they will be away from home, and officials predict the ACP reform will pay retention dividends as well.

For Fiscal 2001, pilots can take 50 percent of their total ACP bonus up front, up to the new limit. Aviators signing on for more than three additional years at once will earn a \$25,000 ACP bonus per year. Amounts not taken in the lump sum are distributed in annual payments.

Signing on for three years or fewer of additional service will net pilots \$15,000 per year.

Brooks said the minimum active duty commitment, currently 10 years, will remain in place because analysis has shown "that's the right term to shape our force."

Despite a pilot shortage that is not expected to dissipate until after 2010, the service still needs some pilots to leave at the end of their initial commitment. Fewer officers are needed the more senior they become—for example, the service has a need for more captains than lieutenant colonels.

—Adam J. Hebert

**Senior Staff Changes**

**CHANGES:** Maj. Gen. Robert F. **Behler**, from Dep. Cmdr., Jt. Subregional Cmd. North, NATO, Stavanger, Norway, to Spec. Asst. to Cmdr., ACC, Langley AFB, Va. ... Brig. Gen. Kenneth M. **Decuir**, from Cmdr., 354th FW, PACAF, Eielson AFB, Alaska, to Dep. Cmdr., Canadian NORAD Region, Winnipeg, Canada ... Brig. Gen. Bob D. **Dulaney**, from Commanding Gen., CTF, Operation Northern Watch, EUCOM, Incirlik AB, Turkey, to Cmdr., 354th FW, PACAF, Eielson AFB, Alaska ... Brig. Gen. Gary R. **Dylewski**, from Dir., Ops., AFSPC, Peterson AFB, Colo., to Cmdr., Jt. Task Force, Southwest Asia, CENTCOM, Riyadh, Saudi Arabia ... Brig. Gen. Edward R. **Ellis**, from Dep. Cmdr., CAOC 7, Air South, NATO, Larissa, Greece, to Commanding Gen., CTF, ONW, EUCOM, Incirlik AB, Turkey ... Brig. Gen. Jeffrey B. **Kohler**, from Vice Cmdr., 7th AF, PACAF, Osan AB, South Korea, to Spec. Asst., DCS, Air & Space Ops., USAF, Pentagon ... Brig. Gen. Dennis R. **Larsen**, from Cmdr., AEF Ctr., ACC, Langley AFB, Va., to Vice Cmdr., 7th AF, PACAF, Osan AB, South Korea ... Brig. Gen. Maurice L. **McFann Jr.**, from Dir., Plans, NORAD, Peterson AFB, Colo., to Dep. Cmdr., Jt. Subregional Cmd. North, NATO, Stavanger, Norway ... Brig. Gen. Craig R. **McKinley**, from Dep. Dir., ANG, Arlington, Va., to Dep. IG, OSAF, Pentagon ... Maj. Gen. Howard J. **Mitchell**, from Spec. Asst. to ASD, C<sup>4</sup>I, Pentagon, to Dir., Ops., AFSPC, Peterson AFB, Colo.

**SENIOR EXECUTIVE SERVICE RETIREMENTS:** Joseph F. **Janni**, Robert E. **Mulcahy Jr.**

**SES CHANGES:** Horst R. **Kelly**, to Dir., Personnel, AFMC, Wright-Patterson AFB, Ohio ... Richard J. **Millies**, to Dir., Policy, Intl. Affairs, OSAF, Pentagon ... Phillip W. **Steely**, to Dep. Dir., DLA, Pentagon ... Theodore J. **Williams**, to Asst. Auditor General, Field Activities, AFAA, Arlington, Va.



support to theater commanders. Currently, linguists assigned to the aircraft get initial qualification at their duty stations following graduation from technical training. Kadena AB, Japan, RAF Mildenhall, UK, and Offutt are the RC-135 duty stations.

Consolidation at Offutt ensures that all students receive comparable training, and it is expected to reduce training time and costs. Students will make use of the 97th Intelligence Squadron's Airborne Training Center and two of its simulators, the Rivet Joint Mission Trainer and the Ground Data Processing System.

"The [Airborne Training Center] training complements the time students spend training in the air, and that allows us to get more training done without having to use more valuable flying hours," said Capt. Lori Calabrese, the squadron's future-requirements coordinator.

### New System Eases Bad-Weather Landings

A new mobile Ground Control Approach system, the GCA-2000, should make it much easier for Air Force crews to make bad-weather landings in areas with little infrastructure.

Air Mobility Command recently received the GCA-2000 system, which could help prevent such accidents as the 1996 crash of an Air Force CT-43A into a Croatian mountainside that killed Commerce Secretary Ron Brown and 34 others.

"This mobile radar system provides our Air Force and our allies the ability to operate wherever we need to deploy and in virtually any weather," said Col. Bud Vazquez, global air traffic operations and mobility command and control systems program office director, Electronic Systems Center, Hanscom AFB, Mass.

The unique system actually includes three radars in one:

- A mobile airport surveillance radar, which provides bearing and range data to air controllers.

- A secondary surveillance radar, which provides flight code and altitude data.

- A precision-approach radar.

The system even generates its own power. "It can be shipped on a single C-130, and it can be set up by a small crew in less than three hours," said CMSgt. Scott Caldwell, the ESC program manager for the system.

### USAF Expands Commissioning Program

The Air Force is increasing the number of positions in the program enlisted airmen can use to earn an officer's commission. The Airman

Education and Commissioning Program manpower authorization will go from 90 to 180 positions each year through Fiscal 2004, officials announced Dec. 26, 2000.

Currently the program each year produces about 30 graduates and selects another 30 to begin the program. Starting with the April 2001 AECF board, that number will double.

The Air Force also has increased the number of academic majors in the program. Until now, candidates had been limited to electrical engineering, computer engineering, meteorology, nursing, foreign languages, and foreign area studies. Now, AECF will accept additional technical degrees, including math, physics, and computer science.

### Air Force Targets New Contracting Law

The Air Force Law wants to soften a provision of the 2001 defense bill that was intended to increase the professionalism of the contracting career field within the military. The provision requires military contracting members to have a college degree and 24 semester hours of college business courses. USAF said the law has unintended negative consequences.

"Previously, the law required con-

tracting members to possess either a college degree or 24 semester hours of college business courses, but not both," said Lt. Col. Robert Winiecki, chief of the Air Force's Contract Support Division.

The law has had a sharp impact on the Air Force's enlisted workforce, which is the most critical element of contracting support for Air Force expeditionary forces and other deployments. Enlisted personnel, in fact, account for 90 percent of the service's deployable contracting capability.

"The new law restricts our ability to recruit and hire enlisted people who do not possess a college degree and 24 semester hours of college business courses," said Winiecki. "Enlisted attrition rates for contracting are about 14 percent each year. Air Force operations will quickly be impacted if we cannot continue to access new enlisted contracting personnel."

Enlisted contracting personnel deployed 303 times in 2000 and executed 11,957 contract actions valued at \$44.3 million.

For now, the Air Force is working on implementation guidance that includes some waiver approval of personnel who do not meet the new guidelines. For the long term, the service is working with DoD leadership to de-

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## For the Clintons, a Polite Military Farewell

US armed forces on Jan. 5 gave President Clinton and First Lady Hillary Clinton a polite but not effusive farewell. The low-key and correct Full Honors Review was staged at Ft. Myer, Va.

The now ex-First Couple was feted by honor guards from military installations. A jazz version of "America the Beautiful" was played on saxophone by Marine SSgt. Greg Ridlington.

Outgoing Secretary of Defense William S. Cohen lauded Clinton's military interventions in the Balkans. Army Gen. Henry H. Shelton, Chairman of the Joint Chiefs of Staff, cited the largest military pay raise in two decades and improvements in the military health care and retirement systems.

"Mr. President, on quality-of-life issues for the members of our armed forces and their families, you stood tall," said Shelton.

Clinton's evasion of the draft during the Vietnam War and his Presidential record on such hot-button issues as gays in the military did not overly endear him to those in uniform. Still, Clinton paid homage to the men and women wearing the country's uniform. "You are America's finest, and America must always be prepared to give you what you need to do your job," he said.

velop legislative proposals that reverse what Air Force officials see as the harmful side effects of the law.

### DoD Grants Higher Arduous Duty Pay

Troops serving in remote or dangerous posts will be paid a new hardship allowance, beginning this year. Hardship Duty Pay—Location officially replaced the old Certain Places Pay, also known as Foreign Duty Pay, on Jan. 1. Unlike CPP, HDP—L is payable to officers as well as enlisted personnel. It is also more generous than its predecessor program, with increments of \$50, \$100, or \$150 a month, as opposed to the old \$8 to \$22.50 scale.

Locations covered are not necessarily the same. Some 70 factors were considered in the HDP—L assessment, including degree of remoteness, prevalence of disease or pollution, and crime rate. Areas assigned the highest \$150 increment include Diego Garcia, Johnston Atoll, Korea's demilitarized zone, and the polar ice cap regions.

Enlisted members in areas not covered under HDP—L will continue to receive CPP allowances for the rest of 2001, stated Pentagon officials.

### Leadership Development Office Stands Up

The Air Force's new Developing Aerospace Leaders office is open and in business, its director told a Bolling AFB, D.C., audience Dec. 18.

DAL's charge is to review a wide spectrum of service development activities and recommend ways they can be changed to purposely develop leaders conversant in staff, joint, and operational assignments.

"Recognizing the pace of Air Force

change demands that we take a new look at our professional military education," said DAL director retired Maj. Gen. Charles Link.

Encouragement of mentoring will be one DAL thrust. The office also intends to work with personnel officials to ensure that every officer has adequate opportunity for broadening professional growth.

"DAL initiatives are designed to ensure we have the appropriate leadership available to continue to fulfill America's expectations," said Link.

### News Notes

■ George J. Tenet, director of central intelligence, will stay on the job an indefinite period per request from President George W. Bush. The decision ensures continuity in a sensitive post during a changeover in Administrations, said Bush officials.

■ The Electronic Systems Center, Hanscom AFB, Mass., delivered the

ninth production E-8C Joint Surveillance Target Attack Radar System aircraft to the 93rd Air Control Wing, Robins AFB, Ga. The aircraft was delivered seven weeks ahead of schedule, the fifth consecutive E-8 to arrive early.

■ On Jan. 3, a California Air National Guard transport unit, the 146th Airlift Wing, Channel Islands ANGB, sent 30 people and two aircraft to help battle a wildfire burning east of San Diego. The unit's C-130 cargo airplanes were both equipped with modular airborne firefighting systems capable of carrying 3,000 gallons of retardant.

■ Last year the Defense Commissary Agency broke \$5 billion in sales for the first time since 1997, according to recently released figures. The final figure of \$5.03 billion represented a 1.3 percent increase over the previous year.

■ The in-the-promotion-zone selection rate for pilots in the Calendar 2000B Majors Board were slightly below board average, at 86.7 percent. Officials said they were at first surprised by the shortfall but have attributed it to an increase in the percentage of pilots who had an established date of separation at the time of the board.

■ Col. John Lauten, 51st Fighter Wing vice commander at Osan AB, South Korea, successfully ejected from his A-10 Jan. 12 while on a training mission. He suffered only minor injuries. The aircraft crashed a mile east of Osan airfield. A board will investigate the accident.

■ The Alaska Air National Guard recently passed a major milestone—more than 150,000 hours flown without a major accident. The wing's last major crash was Dec. 15, 1965, when a C-123 transport went down west of Anchorage.

■ On Dec. 21 Maj. Bobby Loher, an

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## 50 Largest Air Force Contractors

Net value of prime contracts, Fiscal 2000

1 Lockheed Martin	\$9,111,916,000	26 Engineered Support Systems	112,442,000
2 Boeing	5,938,877,000	27 IT Group	107,401,000
3 Raytheon	2,196,122,000	28 BF Goodrich	97,980,000
4 Northrop Grumman	1,539,361,000	29 General Atomic Technologies	91,519,000
5 United Technologies	1,257,471,000	30 Dell Marketing	86,754,000
6 TRW Inc.	1,169,853,000	31 L-3 Communications	83,667,000
7 General Electric	579,691,000	32 Titan Corp.	76,831,000
8 FedEx	443,620,000	33 United Industrial Corp.	72,525,000
9 SAI Corp.	434,909,000	34 Chugach Alaska Corp.	70,881,000
10 General Dynamics	385,276,000	35 GTSI	69,748,000
11 Honeywell International	363,044,000	36 CH2M Hill Companies	62,906,000
12 Mass. Institute of Technology	339,841,000	37 Motorola	58,869,000
13 The Aerospace Corp.	334,194,000	38 Harris Corp.	56,241,000
14 Hughes Arabia	308,875,000	39 URS Corp.	55,152,000
15 Rockwell International	308,059,000	40 Veridian	50,585,000
16 Jacobs Engineering Group	289,565,000	41 Booz Allen & Hamilton	48,648,000
17 Computer Sciences Corp.	283,079,000	42 Government of Canada	46,972,000
18 Litton Industries	248,292,000	43 Caci International	45,779,000
19 DynCorp	238,020,000	44 Arinc, Inc.	32,102,000
20 Marconi Corp.	216,773,000	45 Johnson Controls	30,578,000
21 Mitre Corp.	197,828,000	46 Alliant Techsystems	29,962,000
22 ITT Industries	176,736,000	47 Parsons Corp.	29,453,000
23 CNF Transportation	165,126,000	48 Philipp Holzmann	24,165,000
24 Carlyle Group	142,980,000	49 Unicom/Federal Prison Industries	23,740,000
25 Textron	122,116,000	50 AT&T	22,856,000

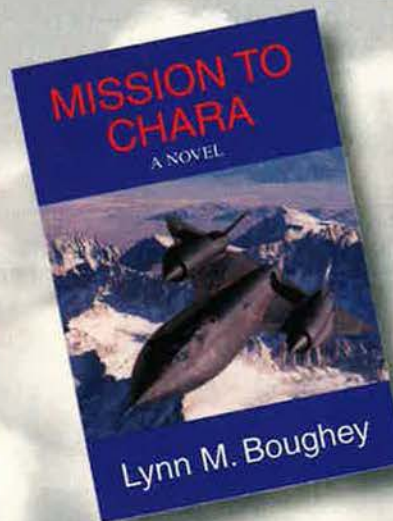
Air Force Reserve Command associate instructor pilot with the 12th Flying Training Wing, Randolph AFB, Tex., won honors for being the first military aviator to log more than 2,000 flying hours in the T-1A Jayhawk. Randolph T-1A aircrews have chalked up more than 80,000 major accident-free flying hours since the aircraft first arrived in May 1993.

■ On Dec. 21, Northrop Grumman announced that it has agreed to buy Litton Industries for \$3.8 billion. The deal would create one of the nation's largest defense contractors and is unlikely to face serious opposition from the Pentagon, said analysts.

■ India successfully flew its first indigenously produced fighter airplane Jan. 4. The domestic light combat aircraft has been in development for 17 years, and it will be at least another decade before it joins the Indian air force's largely Russian-made fleet.

■ The Air Force announced winners of the service's Lance P. Sijan leadership award on Jan. 16. They are: senior officer, Lt. Col. Joseph W. Mazzola, formerly of the 31st Support Group, Aviano AB, Italy; junior officer, Capt. Michael A. Geer, 52nd Civil Engineering Squadron, Spangdahlem AB, Germany; senior enlisted,

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former CINCSAC (Commander,  
Strategic Air Command)



SMSgt. Lee A. Gorrell, Air Intelligence Agency; and junior enlisted, TSgt. Brian O. Miller, Air Mobility Command.

- The June 16 crash of an F-16C Fighting Falcon from the 309th Fighter Squadron, Luke AFB, Ariz., was caused when student pilot 1st Lt. Doyle Pompa inadvertently shut down the engine during aggressive aircraft maneuvering and was unable to restart it before nearing minimum safe ejection altitude, according to an accident report. The student ejected safely, suffering only minor cuts and bruises, near Sells, Ariz.

- On Dec. 14, 49 years of manned high-frequency radio operations at RAF Croughton, UK, home of the 422nd Air Base Squadron, came to an end. Instead of contacting "Radio Croughton," USAF crews en route across the Atlantic will now be able to direct-dial phone numbers on the new System Capable of Planned Expansion, or SCOPE, Command. The system automatically selects the best frequency available.

- On Jan. 18, Air Force officials announced they were investigating 15 service personnel who work at Peterson AFB, Colo., and Cheyenne Mountain AFS, Colo., on suspicion of drug use. None of those involved were from either the North American Aerospace Defense Command or US Space Command.

- Boeing's X-32A Joint Strike Fighter demonstrator recently took to the air with the JSF's first UK pilot at the controls. Royal Navy aviator Lt. Cmdr. Paul Stone, a fighter pilot with nearly 2,400 total flying hours, including 1,350 hours in the short takeoff and vertical landing Harrier, praised the prototype's handling qualities.

- On Jan. 10, Chinese officials announced they had successfully launched the second flight test of a spacecraft they hope will soon carry

## Osprey Undergoing Thorough Probe

The Pentagon took charge of a major investigation into the V-22 Osprey program, following two multifatality crashes this year.

Marine officials had said they would thoroughly investigate allegations into Marine Corps falsification of the maintenance records in a V-22 Osprey squadron, but DoD was, evidently, taking no chances.

Among the key questions is whether undue pressure from higher-ups caused Lt. Col. Odin "Fred" Leberman, the squadron's commander, to exaggerate the tilt rotor aircraft's readiness record.

So far, the Marine probe has found no connection between the alleged paperwork fraud and two recent fatal Osprey crashes.

"Based on all of the information that we have, we see no relationship," said Lt. Gen. Fred McCorkle, Marine Corps deputy commandant for aviation, at a Jan. 19 press briefing.

An anonymous letter sent to Navy officials in early January charged that Leberman was ordering his subordinates to falsify Osprey data. The letter was accompanied by an audiotape on which Leberman is allegedly heard saying that maintainers in his VMT-204 training squadron had to lie to help preserve the troubled tilt rotor program.

Leberman has admitted playing a role in creating misleading data, according to Pentagon officials. He was removed as squadron commander, pending the investigation's outcome.

Specifically, the letter charges that Ospreys unable to fly due to maintenance problems were marked as fully mission capable on squadron books. The deception has been going on for several years, according to the letter, and had reached the point where it may begin to affect safety.

"It all stems from an attitude that we have to have the plane whether or not it is ready," the letter said.

However, the letter specifically states that two recent Osprey accidents weren't caused by any maintenance fraud cover-ups. Last December a V-22 crash in North Carolina killed four Marines. An April accident in Arizona killed 19.

A previous accident investigation had determined that maintenance was not a factor in the Arizona crash incident. The investigation into the December crash is "99 percent complete," said McCorkle, and all indications are that the aircraft suffered a hydraulic system failure followed by a software error in the flight control system.

In the North Carolina accident, the aircraft was first at 100 percent fixed wing mode. It began to transition to helicopter mode, but only got 10 percent of the way there before it ran into trouble. It then transitioned back to full fixed wing.

"They were 100 percent in the fixed wing mode when they did crash," McCorkle told reporters.

a Chinese astronaut into orbit. The Shenzhou II capsule and Long March 2-F booster could be ready for manned

flight in as few as 18 to 24 months, according to at least one Western analyst.

- A new Congressional report notes that the international demand for Airborne Early Warning aircraft is growing and that the US may soon have to weigh whether extensive AEW proliferation is in its national interest. China and India are among the countries interested in acquiring AEW capability, according to the Congressional Research Service study.

### Obituary

Brig. Gen. Joseph Myers, 82, died Jan. 4 in St. Petersburg, Fla. He is credited with the destruction of 7.5 enemy aircraft in aerial combat, including the first jet, an Me-262, shot down in World War II. He retired from the Air Force in 1970. ■

## Wolfowitz Tapped for High DoD Post

President Bush on Feb. 5 announced he had selected Paul Wolfowitz, a veteran of the Administrations of both Ronald Reagan and George H.W. Bush, to be deputy secretary of defense.

Wolfowitz has long been an intellectually conservative force in the fields of military power, foreign policy, and arms control.

If confirmed, he would become the No. 2 official at the Defense Department, with responsibility for day-to-day management of the vast Pentagon bureaucracy.

His most recent government service was as the undersecretary of defense for policy under the elder Bush. He has also held top posts in the State Department and the diplomatic service.

Wolfowitz is dean of Johns Hopkins University's Washington-based Nitze School of Advanced International Studies.





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**Airpower, led by the F-22, can “kick the door down” for the other forces.**

# The Indispensable Fighter

**A**IR Force leaders always have expected much from the stealthy F-22 fighter. As the Raptor stood poised to enter series production early this year, however, they were considering an even more compelling role for the aircraft. The role would use the F-22's unprecedented capabilities to solve a key problem facing the nation's forces in decades ahead.

The problem is access.

As world militaries acquire advanced technologies such as cruise missiles, theater ballistic missiles, and mass destruction weapons, it is becoming ever riskier to place large forces close to the battlespace early in a conflict. Taken together, these systems provide what planners call “anti-access” capabilities—that is, the means to deny American and allied forces a safe and orderly entry into a theater of battle.

To guarantee its access to future war zones, the United States plans to acquire defense forces of unparalleled speed, stealth, precision attack powers, and standoff capability. It will rely on these forces to disable those enemy systems with the potential to hold allied forces at bay and to guarantee control of the sky for the advanced sensor and strike aircraft on which the entire US military depends. These capabilities are the hallmarks of the F-22.

The Raptor has all-aspect stealth, meaning that, in engagements beyond visual range, it would be hard to detect from any angle, using any type of sensor. It has powerful new engines that permit it to supercruise—fly at

supersonic speed without using gas-guzzling afterburners—and large internal fuel tanks to give it unmatched range and speed for a fighter. Its onboard avionics have tremendous capability to collect information about air and ground threats, fuse those data with intelligence passed to it by Airborne Warning and Control System aircraft and other sensors, and present to the pilot a comprehensive “God's eye” view of the battlespace.

## “Global Reconnaissance Strike”

USAF leaders argue that the F-22, armed with such capabilities, is uniquely suited to the task of overcoming anti-access strategies. One true believer is Brig. Gen. David A. Deptula, a key Gulf War planner who now directs USAF's office for the Quadrennial Defense Review. In Deptula's view, “Aerospace power is America's asymmetric advantage.”

Deptula and retired Gen. Richard Hawley, who from 1996 to 1999 commanded USAF's Air Combat Command, are spearheading a drive for acceptance of a new strategy making fuller use of that aerospace advantage. Called “Global Reconnaissance Strike,” it calls for using new aerospace capabilities such as the F-22's to guarantee access.

“It's a concept of operations that we've put together ... to overcome these threats to the degree that we can, then flow in the follow-on forces that would be required to conduct a Major Theater War successfully,” Deptula said. “It relies on modern aerospace technologies and capabili-

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

*Over the California high desert, pilots are wringing out the F-22 Raptor, the Air Force's front-line fighter for the 21st century. Flight tests so far indicate the F-22 can do everything predicted by the engineers and demanded by the tacticians. The Raptor's capabilities are so formidable and unprecedented that whole new strategies are being built around it. This F-22 carries a spin chute on its tail for those tests where pilots push the airplane beyond its unrivaled flight envelope.*







ties inherent in stealth, standoff, precision, and responsiveness.”

Deptula added that the GRS concept acknowledges a need to “paralyze an adversary’s ability to lock us out of where we want to go, whether that be on the ground, on the sea, or in the air.”

Gen. John Jumper, head of Air Combat Command, said the Air Force’s job under the new concept would be to “kick the door down” into a theater of operations, enabled by its unique capabilities in stealth and, in the case of the F-22, speed.

In the new GRS concept, F-22s would be deployed to the rear of the theater of operations, either outside of or on the edge of the range of cruise and theater ballistic missiles. From these peripheral bases, the F-22, taking advantage of its long range and stealth, could quickly sweep the skies of enemy fighters and seize control of the air over the battlespace. Bombers would be based at even more-distant locations. They and the stealthy F-22s, working together, would destroy missile launchers and other anti-access weapons on enemy soil. Bombers could also strike at armored columns on the march.

At the same time, theater ballistic missile defense systems—the Airborne Laser, the Army’s Theater High Altitude Air Defense system, and the Navy’s Upper Tier system—would deploy and protect the peripheral operating bases from the few weapons that could reach them.

Clearing a path for bombers, the F-22 allows the truly critical targets to be hit right at the outset of hostilities, Jumper said.

“The F-22 enables essentially 24-hour-a-day stealth. ... You don’t have to wait until the first moonless night” as is typical when deploying the F-117 and B-2, he said. Working in concert, and using standoff weapons, the F-22 and bombers can produce an intense “shock value” against the enemy, he added.

USAF planners argue that use of peripheral bases would provide a measure of protection even from a fast-flying ballistic missile. That is because, between launch and impact, several minutes would pass, providing a degree of warning. By basing no more than a handful of F-22s at any single location, the aircraft could quickly scramble into the air ahead of an incoming missile and relocate to another base.

As the anti-access threats were disabled, the F-22s and bombers could increase sortie rates by recovering briefly at more forward locations for quick-turn refueling and rearming. As the tempo of dismantling the enemy threat quickened, greater numbers of aircraft, followed by naval and ground forces, could enter the theater and begin prosecuting the attack in other dimensions.

### Firepower, Not Forces

Hawley, the former ACC commander, suggests that the GRS idea

marks a fundamental shift in thinking. “This concept ... attempt[s] to put forth a solution—a joint solution—that would rely on importing firepower, rather than forces, early in a conflict, so that we don’t try to deploy massed theater forces into the teeth of an anti-access threat,” Hawley said. He emphasized that the concept depends not only on Air Force bombers and F-22 fighters, but on Navy Tomahawk cruise missiles and possibly the Army Tactical Missile System.

Hawley added that the future US military, because of its need to have mastery of battlespace information, will still be “dependent upon” Air Force systems such as the E-8 Joint STARS ground surveillance aircraft, E-3 AWACS, RC-135 Rivet Joint electronic reconnaissance aircraft, and the Global Hawk and Predator unmanned aerial vehicles. These, said Hawley, are “airborne systems that must operate in close proximity to the threat and therefore must be defended” by friendly aircraft.

“The key enabler for all of this,” Hawley concluded, “is that advanced air superiority system, the F-22.”

Jumper said ACC has developed a companion Air Force concept called Global Strike Task Force. This concept will “flesh out” GRS with the Air Force’s full role: the ability not only to provide a wedge into the theater but, afterwards, to keep the pressure on day and night.

“After you make available these forward airfields by taking care of the anti-access threat, then you go ahead and deploy ... forces ... that persist over the battlefield and provide those things that require constant cover, like close air support, time-critical targeting—those sorts of things that ... [support] the follow-on phases of the battle, to include putting ground forces in,” Jumper said.

As the anti-access threats are “rolled back,” he added, forward bases would allow the pace of air operations to increase and put greater numbers of enemy targets at risk.

Such forward air bases would not be “100 percent immune” to being hit, but Jumper noted that the US military practiced “for 40 years” to operate even on bases that had been attacked with chemical or biological weapons.

Of all the aircraft now planned or

Lockheed Martin photo by Judson Brohmer



**A KC-135 designed in the 1950s refuels an F-22, expected to be in service until the 2050s. The two aircraft illustrate USAF’s challenge in keeping old systems working even as revolutionary new technologies are introduced.**



actually on the books, only the F-22 will have the combination of stealth and speed to operate over the next 30 years against world-class fighters and advanced, "double-digit" surface-to-air missile systems—the SA-10 to SA-20 level of weapons.

"The F-22 is the only system ... that can accomplish all of the things that the theater enabler has to accomplish," Hawley added. Neither of the other two new fighter programs in the works—the Navy's F/A-18E/F Super Hornet or the Joint Strike Fighter—will have the ability to play a role in guaranteeing access. The F/A-18E/F is not stealthy and lacks the long range and speed of the F-22. The JSF, though stealthy, won't have supercruise powers and will not have the F-22's impressive theater-spanning range.

Deptula said the GRS concept consists of three basic elements—inverting, distilling, and protection.

"Inverting," he explained, calls for standing the current concept of operations on its head. Instead of waiting for forces to be massed before beginning the attack, the US military, under the GRS concept, "moves into [the] theater very rapidly those key elements, those key forces, that allow you to target the threats" that prevent access by the rest of the US military. These units begin operations within hours rather than waiting for days or weeks to engage.

"Distilling," Deptula went on, means packing the maximum amount of capability into each combat unit,



Lockheed Martin photo by Derk Blansett

*When the F-15 was introduced in the early 1970s, there were serious growing pains with its then-advanced engine, the F100. In contrast, the F-22's F119 engine has been remarkably reliable and problem-free during flight testing.*

which typically will be small because it must be rapidly dispatched to battle. The F-22, he noted, distills into one platform "a lot of capabilities that we used to have to bring lots of different platforms into theater to do." Like the F-15C, the F-22 can control airspace. Like the F-16CJ, it can suppress defenses by knocking out radars and missile batteries. Like the F-117 and F-15E, it can make near-precision attacks.

"Because of their ability to do multiple missions," he added, "you don't have to move as many of them into the theater." This enhances "pro-

tection" of the fighting force, because having fewer airplanes at the rear of the theater makes it easier to protect them, Deptula said. In addition, he said, by moving the F-22s around among several bases "you greatly complicate the adversary's problem in determining where they need to target."

### New Concepts Needed

The new Concept of Operations was developed, Deptula said, as a means to inject reason and new thinking into the QDR 2001 process. "We want to make sure this QDR is not just a resourcing drill for legacy CONOPS," he said. Deptula added that, when all the services are strapped for cash, and demands on the military are greater than ever, "we want different CONOPS to be part of the equation, as well as modernized forces."

The F-22's role in winning Major Theater Wars is not its only mission, as Air Force leaders have pointed out over the last few years. USAF's role in providing forward presence, enforcing no-fly zones, and responding to various no-notice, Smaller-Scale Contingencies means it must have a fighter that can do the day-to-day work of peacetime, as well.

To meet the demands of routine operations, the Air Force created 10 Aerospace Expeditionary Forces to divide up the work. There are, however, not enough F-22s in the budget plan to fully equip all of the 10 AEFs. The current approved Air Force plan



Photo by Katsuhiko Tokunaga

*Be careful out there: The Su-27/30/35 Flanker family of fighters, which exceeds the F-15's performance in some ways, is being aggressively marketed by Russia. China and India each are building Flankers under license.*



calls for procuring 339 of the new fighters.

"Perhaps it's too soon to forecast what AEFs will look like by the time we reach the full complement" of 339 F-22s, said Gen. John W. Handy, vice chief of staff of the Air Force. However, he added, "It's pretty clear [that] we're going to need more F-22s ... to flesh out [the force]."

Handy added that, without enough F-22s to fill out the AEFs, there is a real risk that it will become a Low-Density, High-Demand system—one of many that regional commanders in chief all clamor for but which are too small in number to match the demand. Such LD/HD systems typically experience excessive operating tempos, leading to retention problems among the crews that operate them and shortages when all available systems must come home for needed maintenance.

The planned procurement of 339 F-22s stems from QDR 1997, when the Air Force accepted the figure in light of intense budget pressures on all the services. The 339-fighter buy amounts to only about three wings' worth of aircraft. However, the service needs at least four wings, since the Air Force is supposed to have two wings of F-22s for each of the two Major Theater Wars that US forces are supposed to be able to handle at about the same time.

### It's the Math, Stupid

Asked if there are enough F-22s

planned to meet the needs of the AEF structure, Brig. Gen. Daniel P. Leaf, Air Staff director of operational requirements, said, "If we were to set a [level of] a squadron-and-a-half per AEF, you'd have to have 572 airplanes." He added that USAF policy right now still calls for 339 airplanes.

"I'm not raising the bar," Leaf said, "I'm answering a math question."

The 1997 QDR did leave the door open on the final buy of F-22s, acknowledging that the Air Force may have to add two wings' worth of dedicated ground-attack variants to its force structure at some future date.

Leaf said the F-22 is essential if USAF is to make good on the high standard of air dominance it has held since the 1950s. He asserted, "We've gone from where we measure our ability to establish dominance over enemy airplanes in terms of kill-to-loss ratios to where we measure it in terms of how long it takes the enemy to quit flying. That is the standard, and I would submit that none of our joint partners are ready to back down from that standard and go anywhere near parity" with competing aircraft.

Leaf added, "I don't think the nation is ready to back down from that standard, either. It's going to take the F-22."

This winter, the F-22 had completed virtually all of the benchmark requirements necessary for it to enter low-rate initial production, and

program leaders were prepared for an appraisal by the decision-making Defense Acquisition Board, which was expected to give the go-ahead for production. The timing, however, was such that the Pentagon decided to defer the low-rate initial production decision to the incoming Bush Administration, which indicated a desire to conduct an immediate review of all major aircraft programs.

Pentagon and Air Force officials were cautious about assuming the new Administration would back the F-22, but they did note that, in 1998, several former Secretaries of Defense sent a letter to the incumbent, William S. Cohen, urging him to continue the F-22 program. The list of signatories contained two names of special note: Dick Cheney, now the vice president, and Donald Rumsfeld, who again heads the Pentagon.

By the time the Pentagon DAB review was to take place, the F-22 program had met nearly all of the Pentagon's 11 specific requirements for entering production. These included firing an Advanced Medium-Range Air-to-Air Missile from the aircraft, beginning aerial tests of the F-22's stealthiness, and static load tests.

The static load test was marked "incomplete" because the aircraft was stronger than the device finding the limits of its durability. The test rig broke when it had flexed the F-22's wings to 141 percent of their design strength. The test was supposed to bend the wings to 150 percent. The aircraft still was judged to have passed the trial because it more than cleared the F-22's flight envelope, according to F-22 system program manager Brig. Gen. William J. Jabour.

"It's going to take us awhile to repair that fixture," Jabour said, but he hopes to complete the 150-percent load test eventually.

### Flying Software

To get the F-22 past the test gates and into production, the contractor, Lockheed Martin, had to fly Raptor 4005 and Raptor 4006. Both aircraft had to contain complete and fully working Block 3.0 software, which is the full-up avionics suite. The flight of 4005, which took place Jan. 5, was an event "on a par with the first flight of the F-22," Jabour said. For the first time, a fighter flew "with multisensor fusion ... and it worked,"



*F-22 performance will be unprecedented, but there's nothing exotic about its flight-line care. Maintenance, fueling, and weapons loading will be comparable to that of the F-15 but with 40 percent less equipment and personnel.*

Lockheed Martin photo by Derk Blansett



## How the F-22 Fights

The F-22 fighter's unique combination of stealth, speed, range, and sensor fusion will profoundly alter the way the Air Force conducts aerial combat.

"The history of dogfighting shows us consistently that the loser never saw his opponent until it was too late," explained a USAF tactician. "The F-22 will allow us to make this unfortunate situation routine for all our adversaries."

The shorthand description of the F-22's fighting concept is "first look, first shot, first kill." The Raptor will be able to penetrate enemy airspace at high speed, without being detected. Information from AWACS airplanes and other intelligence-gathering systems will be piped into the cockpit. There it will be processed and presented in a simple display which shows the F-22 pilot where he is, where both friendly and hostile aircraft are, their type and heading, and the location and effective range of ground threats, such as surface-to-air missile batteries, shown as red circles on a map. Waypoints on a moving map give the pilot the best route to stay stealthy and avoid known threats.

Weaving among the red threat rings, the F-22 pilot will be able to put himself in the most advantageous position to fire at his opponents, while staying out of reach of their weapons. He will reveal himself only briefly—as he illuminates his targets with radar and opens the weapons bay doors—then virtually disappear again.

The F-22 is also at ease operating above 50,000 feet—well beyond the reach of many SAMs. In some cases, the best departure route may be right over the heads of the defenders.

As the enemy aircraft try to escape his missiles, the F-22 pilot either prepares for a second shot, moves on to new targets, or heads out of the danger zone. His Advanced Medium-Range Air-to-Air Missiles need no further guidance and autonomously find and destroy intended targets. The F-22 will be able to carry six compressed-carriage AIM-120C AMRAAMs in its belly.

It is the ability to positively identify and shoot targets well out of visual range—and without being detected—that will enable the F-22 to destroy enemy aircraft at a distance, exposing itself to the least possible risk. Close-in, turning dogfights should be rare.

### No Knife Fights

"If I get into a 'knife fight' in the F-22, I've screwed up," the tactician observed. Should that happen, though, the F-22's thrust-vectoring and extreme agility will still give it the edge;



*If the F-22 gets drawn into a turning dogfight, it will have Sidewinder missiles, a 20 mm cannon, and F-16-like agility to win. As a rule of thumb, though, the F-22 will shoot unseen, from a distance.*

the airplane can fly at 60 degrees angle of attack and still point its weapons at an opponent. For the close fight, the F-22 will carry short-range AIM-9X Sidewinder missiles and a 20 mm cannon.

The F-22's capabilities will open up all sorts of new tactics. One F-22 could hang back, well out of enemy missile range, and illuminate targets with radar while another flies on ahead. His wingman, without ever turning on his own radar and revealing his presence, could shoot at them from closer range, using the other F-22's radar lock.

With supersonic cruising speed, the F-22 will also have a "running start" to outpace or outlast enemy missiles that might somehow succeed in obtaining a radar or infrared lock. The extra time will give the aircraft's all-aspect—any direction—stealthiness time to work, potentially causing the enemy missiles to lose track and fly harmlessly past. More likely, the F-22 will fly by so quickly that, even if seen, there likely won't be time to spot, track, and shoot at it before it gets out of range.

In the ground-attack mode, the F-22 will similarly streak into the target area, avoiding defenses, release its satellite guided bombs and hustle out before enemy defenses have a chance to react, its exposure time again minimized by stealth and speed. Work on new small smart bombs that achieve the same level of destruction with a lighter, smaller weapon, means the F-22 will be able to attack as many as eight targets per mission in the future.

he noted. The software "exceeded our expectations," and on the first flight with the 3.0 software, "we illuminated targets, tracked them, and verified sensor fusion."

The F-22 program had, by mid-January, racked up more than 830 hours of flight tests. Backing up these actual flight hours were thousands of preliminary tests on all

the components of the airplane as well as tens of thousands of hours of wind-tunnel tests and more than 600 hours of flight-testing of avionics on a -757 aircraft specially equipped to try out the F-22's avionics.

Because the Pentagon's review was intended not only to approve production but to clear the way to pay-

ing the contractor team of Lockheed Martin, Boeing, and Pratt & Whitney, the Air Force sought and received from Congress special "bridge funding" that would carry the contractors into the spring if the contract was not awarded as scheduled. Though it asked for \$922 million and received only \$353 million, the amount was sufficient to keep the work going,





**F-22 pilots will have unprecedented awareness of what's in the sky around their aircraft. Supercomputers on board will give a clear picture of what to shoot, and in what order, to achieve maximum effectiveness.**

according to Lockheed Martin's F-22 vice president and general manager, Robert S. Rearden Jr.

Rearden explained that the bridge funding should "preserve funding continuity and keep the program on track in terms of the negotiated price that we have established with the government for the Lot 1 aircraft." The money will chiefly go to component suppliers that must begin work well in advance of planned delivery.

There were two big hurdles for the F-22 going into the production review. The first was a wide variance between the Air Force's estimates on F-22 costs and those of Pentagon's own cost assessment group. Whereas the Air Force believed it could bring the program in under the Congressionally imposed cost cap on the F-22 of \$63.4 billion, the Pentagon group estimated the true cost would be around \$71 billion.

To guarantee the program would meet the cap, the Air Force and the contractor team are exploring initiatives in which investments would be made on the production line to reduce costs and increase efficiency. This is expected to save enough money over the life of the program that the investment would be paid back and the price target met.

Jabour reported that the Air Force was considering reducing the quantities of airplanes bought in early lots and adding them back later in the program, using the money saved

for up-front investments in producibility.

#### **Differing Methodologies**

"A small change in assumptions early on can result in wild variations between cost estimates down the road," said Brig. Gen. John Corley, USAF director of global power programs.

"We and the Pentagon ... have different methodologies for estimating cost. ... They tend to give us less credit for the payoff from these investments than we give ourselves." On some of the investments, Corley said, the Air Force predicts as much

as a 20-to-1 payback, but the Pentagon might only give credit for a 10-to-1 return.

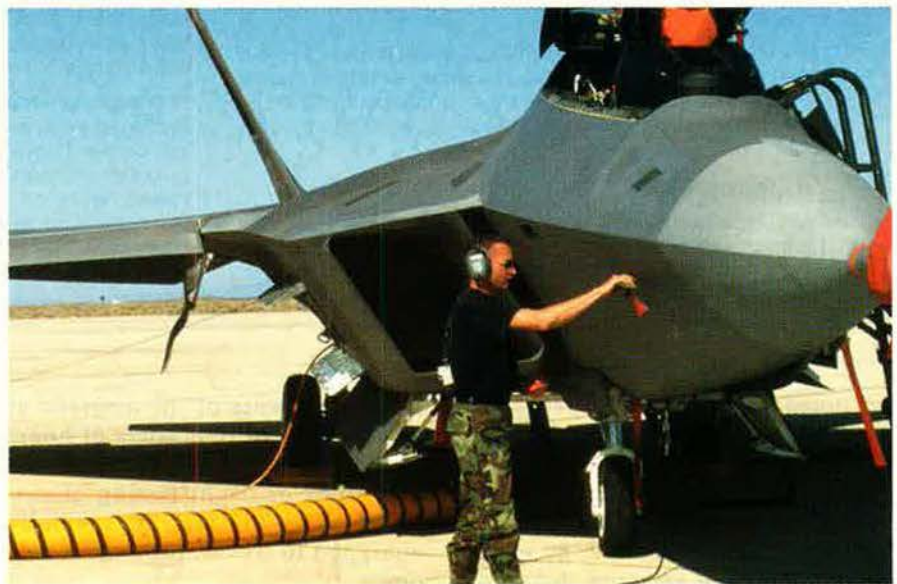
Corley said these are "auditable" predictions, which are based on previous measures that have yielded high levels of savings through production efficiencies.

Rearden acknowledged that previous cost-cutting drills probably picked off most of the ready savings from manufacturing changes but maintained that the new initiatives could easily bring in a "return multiple of 10-to-1." The initiatives tend to do with how the factory is arranged for assembly, the use of lower-cost fasteners on internal parts, and other component-related work.

Rearden also noted that Pentagon officials are worried the F-22 will require a major configuration change and that this will cause costs to skyrocket, as was the case when the Navy F/A-18 A model proved unsuitable and had to be upgraded to the C model in short order.

Explaining the Air Force position, Rearden said, "If there are changes to the baseline configuration that would cause it to migrate to a new configuration—let's say, a ground-attack variant were added—that there would be new money" provided by the Pentagon to accomplish that, he reported. He said all of the parties still had to work out the cost-variance issue before the Air Force could begin production.

In the push for production, another



Lockheed Martin photo by Derk Blansen

**Additional roles? Given its stealth, speed, and enormous onboard electricity-generating and computing power, it would be a natural for electronic warfare, with electronic countermeasures pods loaded in the weapons bays.**



sticking point was the stated opposition of the Pentagon's director of operational test and evaluation, Philip E. Coyle. Coyle, in a memo to Cohen, said the F-22's flight-test program was "slow" in accumulating hours and that tests of avionics, stealthiness, and other features would take longer than expected.

Jabour acknowledged, "We've flown fewer hours than we anticipated ... by now." However, he chalked up the delay to unforeseen problems such as a strike at Boeing, which significantly delayed work on the F-22's avionics software. Also, cost-cutting earlier in the program removed an environmental control system test laboratory, and the control system proved to have more bugs than anticipated. Also, cracks in the canopy attach points slowed the flight-testing program. "And, we had some pretty poor weather" in Georgia, where Lockheed Martin assembles the F-22. The weather delays postponed the ferry flights to Edwards AFB, Calif., for tests.

Still, the program had "caught up" to close to where it needed to be by late December, and was only two weeks late in meeting nearly all of the criteria necessary for production to begin, Jabour added.

Rearden said there has been some unofficial discussion of variants for the F-22 with the Air Force. Adapting the fighter to a "more multi-mission" role would involve only slight changes to the weapons bay, he said. These would allow the F-22 to carry bomblet dispensers like the wind-corrected munitions dispenser.

Jumper reported that USAF is making great strides in increasing the ground-attack firepower of the F-22. By intensifying the power of explosives, small bombs will soon be able to do the same extent of damage that previously required large ones.

In the Fiscal 2003 budget plan, he said, work is slated to begin on the small-diameter munition, a 250-pound bomb with wings that will sprout from inside. Eight could be carried on an F-22, with a new bomb rack.

When dropped from high altitude and high speed, "it can go out there in excess of 40 miles," Jumper asserted.

#### The EW Answer?

There has also been discussion of employing the F-22 as an Electronic



*The F-22 was the most thoroughly tested airplane in history, even before the first flight. Extensive simulation, modeling, and component testing left little to discover during flight test. The only question now is, will Congress support it?*

Warfare platform, loading jamming pods in the Sidewinder weapons bays on the sides of the aircraft. Again, the aircraft would not be radically altered; the service wants to maintain a common baseline configuration. The EW pod surfaces would replace the Sidewinder bay doors, which would have to be altered to be removable, Rearden said. The F-22 will generate enormous amounts of electrical power and has substantial onboard processing capability, making it a good candidate for the EW role.

Jabour noted that the F-22 is a significant advance in stealth over the F-117 and B-2. No special tapes or exterior materials are needed to maintain its stealth, and the radar cross section of the Raptor can be checked in the field by using a new device called the common low-observable verification system. Because much of the interior components can be reached through the weapons bays, fewer access panels are needed on the outside of the airplane, reducing the opportunities for its stealth to be compromised by stray screws or loose-fitting panels.

"The F-22 is designed to be maintained [the way] an F-15 is—out on the ramp," Jabour asserted. "Clearly, there will be some things that need to be done with a little more skill, ... but [it will require] no special techniques or tools. ... It will not be as difficult to maintain

as a B-2." An automated, portable diagnostics and maintenance aid will also help ground crews quickly assess whether "a two-inch scratch on the top of the wing at this location" will degrade the radar cross section, Jabour added.

During the Presidential campaign, President Bush and his advisors frequently commented that they would reform the military in part by "skipping a generation" of weaponry and moving on to more advanced technology, but USAF leaders believe a generation of fighters has already been skipped, and the fleet must now be recapitalized with a state-of-the-art airplane.

The F-22 replaces the F-15.

There is no service life extension program for the F-15, and USAF planners maintain it would cost billions to restart the line and give the F-15 some modest improvements in survivability. In addition, the F-15 simply could not operate past 2010 and survive against projected air-to-air and surface-to-air threats.

"I've got 2,000 hours in the F-15," noted Leaf, the head of operational requirements. "It is a fabulous airplane. It is the undefeated heavyweight champion of air superiority." Even so, he said, "it's still a 1970s-designed airplane, updated to the max. [It is] nonstealthy, nonsupercruise. And you can only make it do so much. ... You have to build a new airplane. So we are." ■



The commissioners said the nation and the Air Force need to put more emphasis on space.

# The Space Commission Reports

By John A. Tirpak, Senior Editor

**T**HE recommendations of a blue-ribbon panel on military space, if implemented, could cause the Air Force to revisit its initiative to merge air and space operations into a seamless aerospace continuum, set the stage for creation of a "Space Corps" within the Air Force in this decade, and possibly lead to the formation of an independent space service in the not-too-distant future.

Some of the findings of the Commission to Assess United States National Security Space Management and Organization, made public in early January, found immediate favor in military and intelligence communities. There was applause for the panel's highlighting of the vital economic and military importance of space activities to the nation and for its call for Presidential attention to military, civil, and intelligence space functions.

In the near term, moreover, the suggestions would give the Air Force

greater authority over space activities. Senior Air Force officials cheered the suggestion that the Air Force be made executive agent for military space, a status which would give it oversight of other services' space efforts and recognize its standing as supplier of more than 90 percent of the funds and personnel to US military space activities.

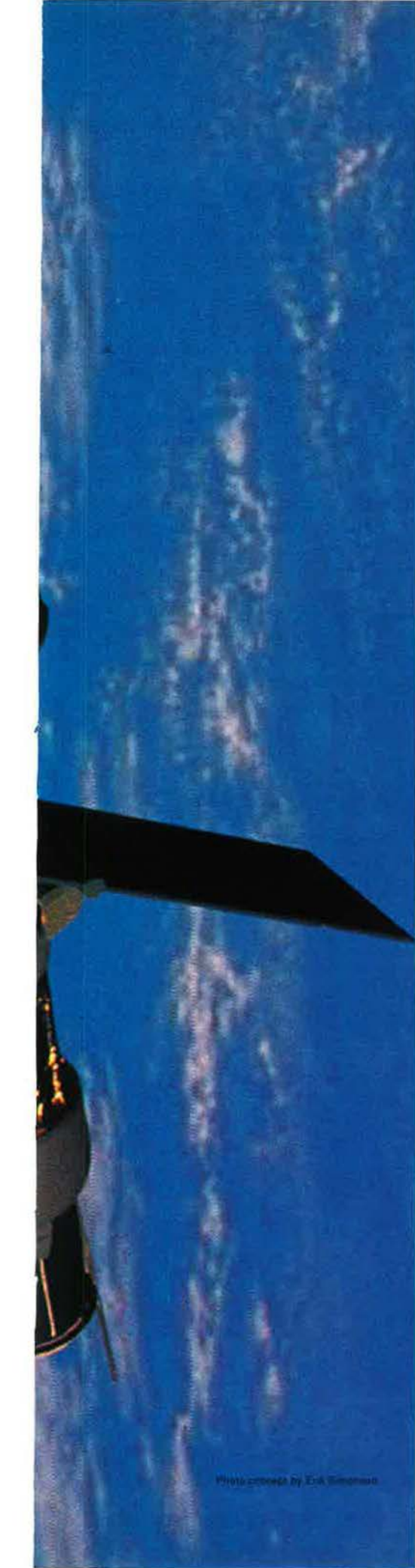
Many of the proposed organizational and structural changes, however, raised eyebrows in the space community. Some of the suggested initiatives could redistribute responsibility for space endeavors in ways such that some aspects of US military power could be degraded without the space capabilities necessarily being strengthened.

## Rumsfeld's Weight

Over the past decade, military space has generated a stream of reports from blue-ribbon panels. How-







ever, the recommendations of this one could carry considerable weight because its chairman, Donald H. Rumsfeld, has become Secretary of Defense. (For other commissioners, see box on p. 34.) Rumsfeld resigned as chairman of the panel when President Bush tapped him to head the Pentagon, a scant two weeks before the commission published its final report. However, the report is said to reflect much of Rumsfeld's thinking on space organization issues and could well serve as a blueprint for reorganization of military space.

The commission called on the National Security Council to create a focal point for space. It also recommended setting up a Presidential Space Advisory Group to keep the chief executive well informed on space and assure that the field remains a high-profile national priority. The commission suggested a number of measures designed to foster cooperation between intelligence and military agencies and NASA. It advised a more active role for government in investing in space technologies, to advance US security and economic interests.

In the area of bureaucratic structure, the commissioners called for creating a new job at the Pentagon: undersecretary of defense for space, intelligence, and information. This individual would be expected to serve as a top Pentagon advocate for space systems and organization and assure that space gets a high priority in annual funding decisions.

Today, the four-star officer who serves as commander in chief of multiservice US Space Command also serves as commander of Air Force Space Command. That practice should cease, said commissioners, who advised that both jobs require the attention of a full-time leader. Moreover, if the panelists had their way, the Pentagon would be able to select the commander of US Space Command from any of the four services (not just the Air Force) and from among any four-star officer possessing "an understanding of combat and space" (not necessarily a rated flier).

Further, said the commission, the US armed services need to dispense with the practice of assigning only combat "operators" to top space posts. "Military leaders with little or no previous experience or expertise

in space technology or operations often lead space organizations," said the report.

It noted, "A review by the commission of over 150 personnel currently serving in key operational space leadership positions showed that fewer than 20 percent of the flag officers in key space jobs come from space career backgrounds. The remaining officers, drawn from pilot, air defense artillery, and intercontinental ballistic missile career fields, on average had spent eight percent, or 2.5 years, of their careers in space or space-related positions."

Under the panel's plan, the US would restate the charter of the Air Force to give it formal responsibility to organize, train, and equip "for prompt and sustained offensive and defensive air *and space* operations." This change to Title 10 provisions would have to be approved by Congress, but such a mandate from Capitol Hill to "plan, program, and budget for space missions ... should motivate the Air Force to give space activities higher priority," the commission asserted.

Air Force field commands would be restructured to "more effectively" pursue the space mission.

Making the Air Force "executive agent" for space, would require it to assume responsibility for "developing, defending, and submitting a joint 'Space Program Plan' to the Office of the Secretary of Defense," the panel explained. The other services would continue to develop—and fund—space programs meeting their "unique requirements," but these would have to be submitted to USAF, and meet with the approval of USAF's Space Acquisition Executive.

This SAE would be the undersecretary of the Air Force, who would also absorb the role of director of the National Reconnaissance Office, the commission proposed. The undersecretary would oversee and harmonize the space-based intelligence, surveillance, and reconnaissance functions of both agencies, as well as their space system procurement efforts.

### Space "Culture"

This arrangement would "create a single chain of authority" for space within USAF, the commission argued. It would also give the service "a clear opportunity to create a space-



oriented culture" composed of "military professionals who could directly influence the development of systems and doctrine for use in space operations."

The commissioners don't think this is happening. "The Department of Defense is not yet on course to develop the space cadre the nation needs," said the panel's report. "The department must create a stronger military space culture, through focused career development, education, and training, within which the space leaders for the future can be developed. This has an impact on each of the services but is most critical within the Air Force."

The nation's vital interests depend on creating such a cadre of space professionals, the commissioners said. The pace of technological change is so great, they asserted, that there must be a core group able to make "a concentrated effort to deter and defend" against attacks on US space and information infrastructure. "Such efforts are not being pursued with the vision

and attention needed," the panelists said.

Both the Pentagon and the CIA should be working on "revolutionary" means of collecting information from orbit, the panelists found, suggesting that a joint, space-specific "research, development, and demonstration organization" be created with "competitive centers of innovation" to spur such breakthroughs.

This organization—a joint venture between the Pentagon and CIA—would be called the Strategic Reconnaissance Office. It would focus on "the unique, one- or two-of-a-kind systems needed to address an urgent national requirement," the commission said. It suggested an office "small in size," staffed by motivated people, and having the authority to swiftly move a project from the drawing board to the launchpad.

The approach suggests a reprise of the "Skunkworks" approach, which Lockheed pioneered for development of secretive, high-tech-

nology aircraft such as the U-2, SR-71, and F-117. The outfit would be free to consider nonspace alternatives to such pressing technical problems.

At the same time, the Defense Advanced Research Projects Agency should work on demonstrating military-specific "innovative space technologies."

Finally, the panel advised creating a Major Force Program for space—the Pentagon's 12th. Such a status was conferred on the program of US Special Operations Command in the late 1980s. The intent would be to highlight and lend visibility to space missions and requirements.

### Insufficient Attention?

The commission was launched by members of Congress who feel the Air Force is not paying sufficient attention to space, nor allocating enough resources to pursue a suitably strong military space presence. Some members, particularly Sen. Bob Smith (R-N.H.), consistently charged the Air Force with shortchanging

## Fogleman: Doing Nothing Is Not an Option

The Air Force needn't abandon its concept of "aerospace integration." It is a good idea to merge space capabilities into all aspects of combat. However, USAF is failing to cultivate people who focus solely on space and give it the attention it deserves.

Such is the view of retired Gen. Ronald R. Fogleman, a former Air Force Chief of Staff and member of the Space Commission.

The commission members concluded that the Air Force, in its pursuit of aerospace integration, was "downplaying the uniqueness of the space dimension," Fogleman said.

Speaking at a Capitol Hill symposium explaining the commission's thinking, findings, and recommendations, Fogleman said the service has failed to recognize that there are fundamental differences between space operations and air operations and that the US needs a dedicated, career cadre of experts to advocate space superiority and focus on technologies and infrastructure necessary to achieve it.

"In the end ... we found ... that this cadre was not being developed, not being nurtured, not being given the right kind of attention," he reported.

Fogleman said he saw striking parallels between the Army's reluctance in the 1920s to recognize the uniqueness of air operations and airpower as a facet of warfare and the actions of today's Air Force with respect to space power.

### Sufficiently Distinct

Space operations are sufficiently distinct from air operations "that we need to provide more focus," said Fogleman. He added, "That is our belief."

Fogleman went on, "I can show you testimony from Army officers who were dead set against an independent Air Force, who did not understand that flying airplanes was enough different that you had to have your own organization to develop that and go do it."

There was complete agreement among the commissioners that "we are going to see conflict in space," Fogleman noted. "Anybody who thinks we aren't has got his head in the sand." The US dependence on space is a "glaring vulnerability," he said. The nation hasn't done enough to prepare against an attack on US space assets, the commission decided.

The commission liked the idea of developing, within USAF, a Space Corps, Fogleman said. He noted that it would be modeled on the way in which the Army Air Forces was formed and eventually led to the Air Force itself.

The commission looked at several other models for splitting off a space organization—including naval carrier aviation, the nuclear navy, and the Marine Corps. However, it found the Army Air Forces example most to its liking.

The time is "not right" for a Marine Corps-style organization, with a Space Corps commandant who would sit on the Joint Chiefs of Staff, Fogleman said.

However, he rejected the notion that creating a new organization would lead to stovepipes and artificial barriers between space-generated information and people in the armed forces who need to use it.

"We don't see that as necessarily creating seams," Fogleman asserted.

The commission preferred that the Space Corps be an "evolution" of space called out as a Major Force Program, and Fogleman said he and his fellow commissioners hoped that would happen. Whether creation of Special Operations Command as such an MFP was a success "is almost immaterial," Fogleman charged.

"The existence of that MFP gave visibility to special operations programs and for the services that have been criticized for not supporting special operations, it took away that criticism. At long last, everybody could see what was happening. I think the same thing will happen with an MFP [for space]."



space to keep money flowing to aircraft programs.

The commission seemed to agree with this assessment.

"Few witnesses before the commission expressed confidence that the current Air Force organization is suited to the conduct of these [space] missions," said the report. "Nor was there confidence that the Air Force will fully address the requirement to provide space capabilities for the other services. Many believe the Air Force treats space solely as a supporting capability that enhances the primary mission of the Air Force to conduct offensive and defensive air operations. Despite official doctrine that calls for the integration of space and air capabilities, the Air Force does not treat the two equally. As with air operations, the Air Force must take steps to create a culture within the service dedicated to developing new space system concepts, doctrine, and operational capabilities."

This month, the Air Force will provide an official response to the commission's recommendations.

Setting the stage for their specific recommendations, the commission members unanimously agreed that space capabilities should be pursued peacefully and in support of both economic and security ends, but they also stipulated that the US should obtain the means to defend its considerable investments in space and to prevent enemies from using space against the United States.

"The pursuits of US national interests in space require leadership by the President" and his senior officials, the panelists asserted. They recommended that space-specific entities be created on the National Security Council and that the United States pursue cross-agency initiatives to use space to speed the transformation of US military forces.

The group also suggested the US help create a set of international regulations governing space that help the domestic aerospace industry and ensure US security. Additionally, the panelists called for greater US government investment in "leading edge technologies" applicable to space,

to ensure US leadership in the field, and finally for the government to establish and maintain a "trained cadre of military and civilian space professionals."

To ensure competitiveness and "mastery" of space operations, the panel recommended that government invest in systems such that it keeps "one generation ahead" of what any other nation possesses in space technology and encourage the civil sector to do the same.

Defense of space assets is vital because of American dependence on them for military and economic security and because that dependence has made US space assets "potentially attractive targets," the commission found. Not only foreign nations but "nonstate entities" are obtaining space capabilities ranging from intelligence and surveillance to communication, it added.

To avoid the danger of what it termed a "space Pearl Harbor"—that is, a crippling surprise attack on US space assets by an aggressor—the US must move more "seriously" to

However, the commission believed there would be a sudden move toward a Space Force if there was a "catastrophic event, ... a potential Pearl Harbor in space," observed Fogleman. There would be immediate finger-pointing and a furious public, demanding to know, "Why did we not prevent this? Where did the failure occur?.... Why were you not prepared for that? Why were weapons not developed?" Preparations should begin long before that happens, the commission warned.

"Clearly, someday in this country, we will have a Space Department, or it may be called an Aerospace Department," Fogleman said.

The argument about the militarization of space is "moot," he said, "because space has been militarized. The issue is, whether you weaponize space." He noted that there is a ban on nuclear weapons tests in space, but otherwise, there is "no prohibition against weapons in space today" under any existing treaty. Moreover, he noted that a handful of nations already have the "crude" means to do great damage to a satellite constellation.

### Fact of Life

"Militarization of space is a fact of life," Fogleman asserted. He added that weapons applicable to space are further along than most suspect and predicted that directed energy weapons will be a "centerpiece" of the US military's arsenal within 20 years.

In later discussion with reporters, he said the commission didn't intend to "challenge the aerospace integration [concept]. ... I don't think aerospace integration and a restructured space segment of the US Air Force are mutually exclusive."

The point of aerospace integration is to merge space capabilities into all facets of warfare and bring down barriers between space power and field commanders who need it, but Fogleman said that many of those barriers already "have been knocked down" and had to do with security classifica-

tion and "nothing to do with organizational structure." While the Air Force has not suffered much until now by putting nonspace experts in command of space organizations, this needs to change, Fogleman said.

"Within the space community, we think there really needs to be this career training/career progression. ... As we start to get into the wing commander level, ... increasingly, those slots are filled by space people" and not by rated officers who come from the flying business and go back to it when their tour is up.

The commission specifically avoided calling for more funding, said Fogleman, because the panel did not see money as a panacea. Commissioners opted for a restructuring as a way to deal most decisively with the pressing issues.

"Just throwing more money at a flawed organization ... or management system is not going to necessarily provide success," he asserted. Nevertheless, "it may in fact require more money," and space may get the funds "if the right type of attention comes down" from the President and his inner circle of policy-makers, Fogleman suggested.

The commission was intent on establishing high-level, single-point oversight for space because there currently is no such office, and there must be visibility over space issues in many different disciplines.

Fogleman noted that some diplomatic initiatives that seem "harmless" could "inadvertently tie our hands." A case in point: The recent US-Russian agreement in which both sides agree to give 24 hours' notice of a large missile launch.

The commission's chairman—Donald Rumsfeld—is now the Secretary of Defense, and so military space issues are fresh in his mind, said Fogleman. He added that some sort of restructuring likely will happen soon.

"If I were a betting man, I would bet you that in the [Defense Department] legislative proposal that comes to the Hill this year, this will be in there," Fogleman said.

He added, "Doing nothing is not an option."



## Who Was Who on the Space Commission

**Donald H. Rumsfeld** (chairman). Secretary of Defense, also served in that position 1975–77.

**Duane P. Andrews**, former assistant secretary of defense for command, control, communications, and intelligence.

**Robert V. Davis**, former deputy undersecretary of defense for space.

**Gen. Howell M. Estes III, USAF (Ret.)**, former commander in chief of US Space Command and NORAD and commander of Air Force Space Command.

**Gen. Ronald R. Fogleman, USAF (Ret.)**, former Air Force Chief of Staff.

**Lt. Gen. Jay M. Garner, USA (Ret.)**, former commander of Army Space and Strategic Defense Command.

**William R. Graham**, former deputy administrator of NASA.

**Gen. Charles A. Horner, USAF (Ret.)**, former commander in chief of US Space Command and NORAD and commander of AFSPC.

**Adm. David E. Jeremiah, USN (Ret.)**, former vice chairman of the Joint Chiefs of Staff.

**Gen. Thomas S. Moorman Jr., USAF (Ret.)**, former Air Force vice chief of staff and former commander of AFSPC.

**Douglas H. Necessary**, former staff member to the House Armed Services Committee.

**Gen. Glenn K. Otis, USA (Ret.)**, former commander of US Army Training and Doctrine Command.

**Malcolm Wallop**, former Republican Senator from Wyoming.

undertake defenses of its satellites, uplinks, downlinks, and launch facilities.

“The nation’s leaders must assure that the vulnerability of the United States is reduced and that the consequences of a surprise attack on US space assets are limited in their effects,” said the commission report.

The commission was specifically charged by Congress to examine the feasibility or advisability of creating a new Space Service separate from and independent of the Air Force. While it found that a new Space Department would “provide strong advocacy” for space and essentially serve as one-stop shopping for space activities, the commission concluded that now is not the proper time for such a move.

“The disadvantages ... outweigh the advantages,” the commission said. Among the negatives, it said, was the fact that “there is not yet a critical mass of qualified personnel, budget, requirements, or missions sufficient to establish a new department.” However, it also said nothing should be done that might “preclude eventual evolution toward a Space Department, if that proves desirable.”

More likely and “appropriate,” the panel said, would be the creation of a Space Corps within the Air Force, along the lines of the Army Air Forces during World War II. It could use existing Air Force space installations and infrastructure and take over the acquisition and operation of space systems.

### Continuing Competition

Commissioners said the drawback

of that approach is that the existence of a Space Corps within USAF “would not eliminate the competition for resources between air and space platforms that exists within the Air Force today. Nor would it ... alleviate the concerns of other services and agencies over Air Force space allocations.”

Retired Adm. David Jeremiah, one of the commissioners, spoke with Washington reporters about this problem. He said the panel looked at creating a new service for space and decided “it is too early in terms of the overhead associated” with such a move.

“Call it tooth-to-tail ratio,” said Jeremiah. “To create a department at this stage of the game is dysfunctional.”

The commission said a Space Corps might be a suitable development in the “mid-term.” Jeremiah explained that the panel specifically tried to avoid setting a timetable for such an organization to be created but generally felt it “could be six years ... [to] 10 years.”

He added, “What we are suggesting is that there is a continuum from executive agent through Space Department and that circumstances will draw the decision as to whether you should do that [go all the way to a new department] or not.” If the Air Force truly becomes “a space and air force, as opposed to an aerospace force,” said Jeremiah, then “why would you create a Space Department?”

Jeremiah also said the panel liked the model of the “nuclear Navy” as a template for how the Air Force might organize its space operations.

The commission also suggested Congress itself should restructure its committees overseeing space. They are numerous, each with its own agenda, leading to a bewildering array of conflicting oversight requirements.

Jeremiah was blunt about the need for Congressional streamlining. “We are moderately appalled by the fact that there are on some issues anywhere from six to 18 committees that have to vote on a matter before it can be consummated,” he said.

The panelists said they were recommending the Title 10 changes and making USAF the executive agent for space because “US interests in space may well ultimately call for the creation of a Space Corps or Space Department.” The changes “lay the foundation for such future steps.” Jeremiah reported that some members of Congress briefed on the report were surprised by the Title 10 recommendations; many were under the impression that the Air Force already possessed this authority.

### Leap of Logic

Once the USAF realignment is complete, “a logical step toward a Space Department could be to transition from the new Air Force Space Command to a Space Corps within the Air Force,” the commission said.

The commissioners said they could foresee the day when the commander of Air Force Space Command becomes head of Space Corps and would “join the deliberations of the Joint Chiefs of Staff when space-related issues are on the agenda.” They also saw a transition directly to a Space Department “if future conditions



support that step more quickly than appears likely from the commission's vantage point today."

The commission made no suggestions per se about weaponizing space, Jeremiah noted, saying that introducing weapons in space would have to be paced by the actions of other nations.

"It depends upon what you see and how aggressive people are," he said. "It's a circumstance-driven question." The commission strongly advised that the US "stay ahead of the problem to be sure we are following the technology advances around the world," Jeremiah said.

The Space Commission issued its report only a few days before F. Whitten Peters left his job as Secretary of the Air Force. Peters's name will not be on the official response to the commission's report; that will be prepared mostly by the Air Force Chief of Staff, Gen. Michael E. Ryan. However, Peters offered some insights into how the commission's proposed changes would affect the Air Force.

"We agree, first of all, that the Air Force is the proper steward for space," Peters told defense reporters in Washington. "Second, we agree that some kind of a national structure to integrate space at the National Security Council or at the Presidential level is really important."

Peters was less enthusiastic about the prospect for a Space Corps, let alone the formation of a new Space Force.

"I have spent three years with General Ryan trying to integrate space into what we do," Peters said. "We think that's where the [greatest] bang for the buck is." By fusing space and airborne sensors, he explained, the Air Force has made huge strides in tackling one of its toughest challenges—finding and targeting relocatable and mobile targets.

Space is important "because it is a critical enabler," Peters asserted, and he agreed with the commission that steps should be taken to protect US assets in space.

### Distant Battles

However, he read the commission's emphasis on a new Space Corps or Space Force as deriving from a conviction that there will be violent clashes in space. "My own view," said Peters, "is that is so far

off we should not start preparing for it today."

The Air Force is assiduously working to upgrade or recapitalize its space systems as enablers of terrestrial and air-breathing systems, and "in my own view, that's where I would put the emphasis and the money today."

Ryan, for his part, is firmly on record as saying that the creation of a separate Space Force would divert scarce financial resources from critical items to non-value-added functions, such as setting up new headquarters, personnel systems, and bureaucracy. He has campaigned to eliminate stovepipes that unnecessarily route space programs through one organization and aircraft that collect intelligence or conduct reconnaissance through another.

Peters found little to like in making the undersecretary of the Air Force the space czar for the service and the NRO.

"The real problem inside DoD today is too many places of direction and too few funding pots," he asserted. The commission "may have compounded these problems by creating—potentially—two different sources of defense acquisition executive." One of these is the new undersecretary of defense for space, intelligence, and information, the other being the existing undersecretary for acquisition, technology, and logistics.

"One for space and one for everything else," he observed. "I don't think that is an ideal structure."

Having served as undersecretary of the Air Force—the job entails supervising personnel issues such as recruiting, health care, retention, and many other areas—Peters said enlarging the job to encompass space activities would turn it into something far too big for one person. "I will tell you: That is a killing workload," he said.

Jeremiah said the commissioners—with their cumulative experience in military space issues—decided that the Air Force undersecretary is indeed the best place to focus the service's attention on space. The post once held the space portfolio, but space was later shifted to an assistant secretary-level job.

The person in the reorganized job will have "visibility over virtually all of the space program of the United States," as well as "over a large por-

tion of the air-breathing reconnaissance assets," Jeremiah said, well able to conduct "trade-offs" between the two.

Giving military space a Major Force Program "doesn't solve the budget problem," Peters said. "It just makes the dollars more visible. ... It doesn't guarantee more money." He noted that making Special Operations Command an MFP "has not produced a lot more money for SOCOM."

The commission said it found no comprehensive, overarching plan to "build up to the investments needed to modernize" space capabilities. It suggested that a level of effort similar to the 1960s push to build up strategic missiles—which "averaged some 10 percent of the Department's budget annually"—is needed in space.

Specifically, it suggested a "more robust science and technology program" that would put the spurs to "developing and deploying space-based radar, space-based laser, hyperspectral sensors, and reusable launch vehicle technology."

At the same time, funding and initiative are needed to improve situational awareness and attack warning capabilities, enhanced measures to protect US satellites, "prevention and negation systems" and quick-response, long-range power-projection systems, such as hypersonic or suborbital attack craft.

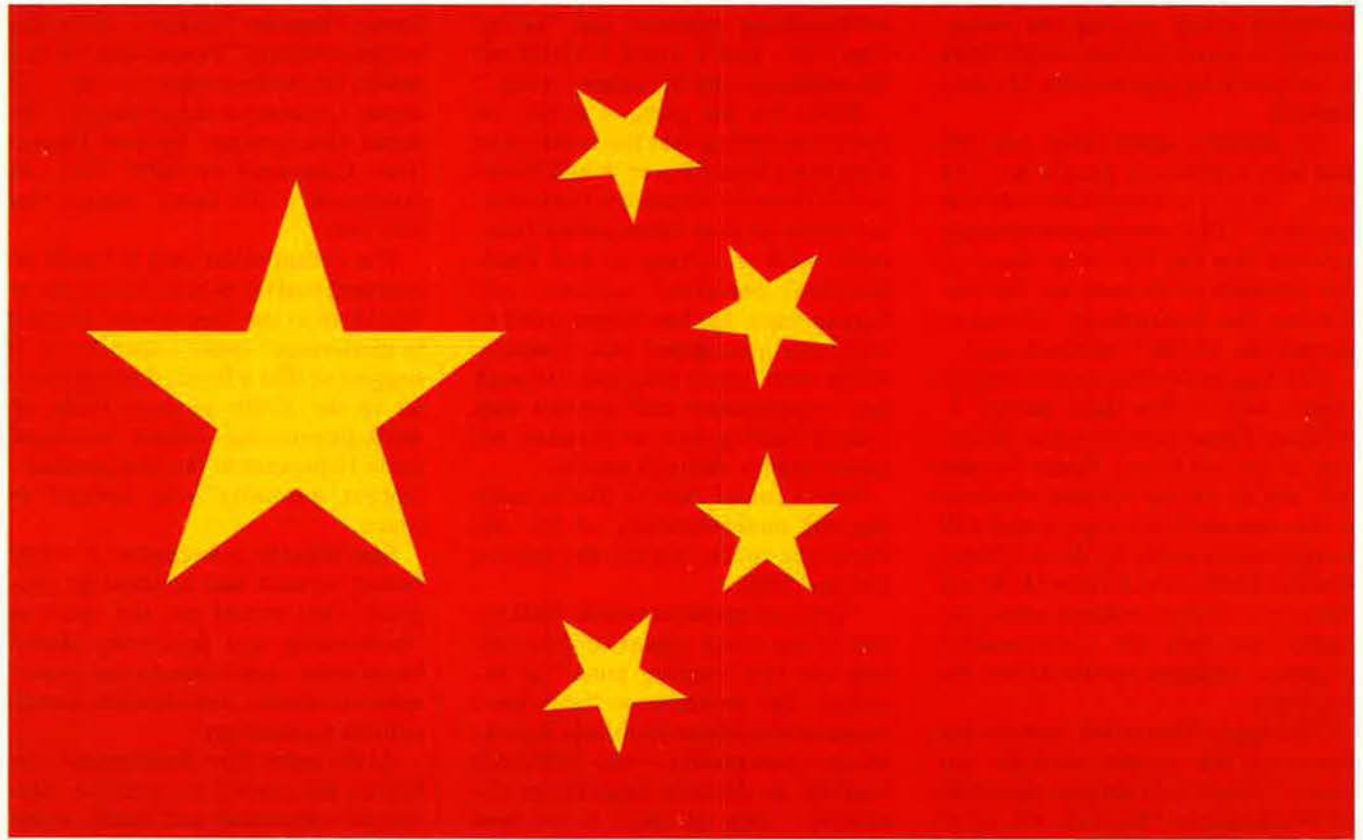
Underlying all these initiatives would be a push to modernize launch capabilities. "In space launch, we are losing ground and losing ground rapidly," Jeremiah observed.

In summing up the commission's findings, Jeremiah said, "History tells us that every media—air, land, and sea—has seen conflict over time, as we use it. Experience suggests that space will be no different. ... Other people are going to be attracted by our vulnerabilities. ... We have to develop the means to deter and defend our assets in space and on the ground against that kind of hostile action."

He added that, as the commission perceived it, "The US government and particularly the Department of Defense and the Intelligence Community are not very well arranged or focused to meet the national security space needs of the 21st century." ■



**Taiwan is the last major post-revolution territorial issue for China, and tensions are rising.**



# Flash Point Taiwan

**By Bill Gertz**

**I**F the President's words are any guide, China can expect a hard new line from Washington during the Bush years. The Clinton Administration ceaselessly boosted Beijing as a "partner," but George W. Bush, in a sharp reversal, has branded China as a "strategic competitor."

The new attitude seems certain to raise tensions—most notably in the Taiwan Strait. In fact, the first test of this new Bush policy comes in April, when Washington announces its next decision on arms sales to Taiwan. Taiwan seeks to buy submarines, Aegis ships, air-launched missiles, and more. China opposes these sales and, under Clinton, they



declined. Taiwan expects a far more favorable response from Bush.

The new President, thus, will have an opportunity to show whether he is truly prepared to buck China and offer Taiwan high-tech US military equipment. If he does, the Chinese regime can be expected to counter with a nerve-racking response, as it did during other difficult periods and what became known as the Taiwan Strait Crisis of 1996.

Few believe it will be the last test for Bush. Working out the proper US role in the defense of Taiwan shapes up as one of the toughest and most perilous tasks he faces. All signs are that the issue will flare time and time again, making Taiwan a major flash point in the Far East.

Taiwan looms larger than usual in Beijing's political calculations because China has finally reclaimed Hong Kong and Macao, two other long-sought pieces of Chinese territory. Experts say China's rulers in 1999 began to step up a campaign to reunite the island with the mainland, which have been estranged since the end of China's civil war in 1949. Simply put, Taiwan is the last major post-revolution territorial issue for China.

The Chinese campaign is essentially political, but China plainly has signaled that it is willing to use force to achieve reunification if that's what it takes. China knows such action could bring it into conflict with the United States, but Chinese leaders act as if they believe reunification will indeed require force.

In early 2000, for example, the official newspaper of the People's Liberation Army bluntly stated that China's rulers would fire its long-range nuclear missiles at America if US forces ever attempted to intervene on behalf of Taiwan.

### **Not Iraq, Not Yugoslavia**

"China is neither Iraq nor Yugoslavia, but a very special country," warned the newspaper, referring to America's two recent adversaries. "It is a country that has certain abilities of launching strategic counter-attack and the capacity of launching a long-distance strike."

Over time, the newspaper predicted, US military units will be "forced to [make] a complete withdrawal from the East Asian region"—

including Taiwan—"as they were forced to withdraw from southern Vietnam" in the 1970s.

A major Chinese defense white paper, published Oct. 16, again turned up the heat. It roundly criticized Washington for "hegemonism" and "gunboat diplomacy" and concluded that the situation in the Taiwan Strait was "grim."

Then it issued a warning: "The Chinese government will do its utmost to achieve peaceful reunification. ... However, if a grave turn of events occurs, leading to the separation of Taiwan from China, ... or if Taiwan is invaded and occupied by



foreign countries, or if the Taiwan authorities refuse ... the peaceful settlement of cross-straits reunification through negotiations, then the Chinese government will have no choice but to adopt all drastic measures possible, including the use of force."

At times, China has matched its words with deeds. Pentagon officials report that Chinese fighters have challenged USAF's RC-135 Rivet Joint reconnaissance aircraft—once flying within two miles of the American aircraft even though it was flying more than 50 miles outside of Chinese airspace.

At the Pentagon, China's recent statements and actions have had a noticeable effect.

Senior uniformed leaders, even before the transition of Administra-

tions, were shifting course on China, as was apparent in a Nov. 3 speech by Army Gen. Henry H. Shelton, the Chairman of the Joint Chiefs of Staff, to the People's Liberation Army National Defense University in Beijing.

In this setting, Shelton pointedly reminded his Chinese hosts, "The ultimate status of Taiwan is a matter for the Chinese people on both sides of the Taiwan Strait to resolve in a peaceful—I repeat, peaceful—manner."

A month later, Shelton returned to the China theme in a widely covered speech raising the specter of a new, Soviet-style Chinese superpower. "I am firmly convinced," said Shelton, "that we need to focus all elements of US power and diplomacy on ensuring that China does not become the 21st century version of the Soviet bear."

Chinese leaders, Shelton said, "are aggressively modernizing their military forces, both conventional and nuclear."

Even earlier, Pentagon officials took special notice of threats to Taiwan. In an annual report delivered to Congress last June, DoD said China's military buildup seemed to be preparation for high-tech conflict with the United States over the island.

### **The "Dominant Scenario"**

"A cross-strait conflict between China and Taiwan involving the United States has emerged as the dominant scenario guiding [the People's Liberation Army] force planning, military training, and war preparation," the report declared.

The report went on to warn that China's military thinkers were discussing ways to "offset US power," which could include "accelerating military modernization, pursuing strategic cooperation with Russia, and increasing China's proliferation activities abroad."

Referring to possible American military operations taken in defense of Taiwan, the report predicted China would employ "all means necessary" with the goal of "inflicting high casualties and weakening [American] resolve."

The most alarming Chinese military development of recent years—by far—has been its buildup of missiles clearly aimed at destroying Taiwanese targets and detaching it



from allies and friends that might try to come to its aid.

As long ago as October 1998, a Defense Intelligence Agency report outlined a major buildup of short-range ballistic missiles opposite Taiwan. The study said that, up until 1998, the missile deployment had been modest and was limited to a garrison of CSS-6 weapons based at Leping.

Then matters suddenly changed. The DIA uncovered a new Chinese plan to put into place a total of 600 missiles by 2005. The report stated that the process would entail deployment of about 50 new missiles a year, starting from a base of about 150 weapons.

At the Pentagon, this revelation had a sensational effect. It was viewed as a clear sign that China was embarked on a major campaign to acquire the means for the intimidation or actual military defeat of Taiwan.

The deployment includes two versions of the CSS-7 short-range ballistic missiles. The DIA report said the first version—Mod 1—has a range of 217 miles. The second version—Mod 2—could hit targets nearly 329 miles distant, according to DIA.

On Dec. 5, 1999, DIA issued an updated report on the Chinese buildup of short-range missiles opposite Taiwan. It was not good news for US military planners. It concluded that China already had deployed about 400 CSS-7s to Chinese military bases near Taiwan, said one official familiar with the conclusions.

In short, China had acquired a capability to target Taiwan and unleash a devastating strike with little or no warning.

In addition, the DIA report identified a CSS-7 base, at Yongan, that was co-located with tunnel storage areas, a sign that the Chinese were protecting the systems from US aircraft equipped with precision guided bombs and missiles.

Pentagon analysts viewed the missile buildup as ominous because it showed Beijing's intention was not to conduct aircraft or seaborne assaults against the island but rather to launch barrages of missiles.

### **An Unorthodox View**

In a 1999 paper, Air Force Maj. Mark A. Stokes, a former assistant

air attaché at the US Embassy in Beijing, outlined the full extent of possible missile operations. He challenged the orthodox view of those US security analysts of the PLA who dismiss it as a "junkyard" army incapable of matching US power for 15 to 20 years. Stokes said China's strategy of missile power threatens not only Taiwan but also US forces in Japan and Hawaii.

Stokes laid out a 2010 scenario for lightning missile strikes on Taiwan. The plan calls for backing up these no-warning attacks with aircraft sor-

tion of its forces arrayed along the strait, most notably by deploying short-range ballistic missiles."

Adm. Dennis Blair, the commander in chief of US Pacific Command, has said in interviews that the Chinese missile buildup is destabilizing the region and underlines a need for the US to provide more defensive arms and weapons systems to Taiwan.

Blair claims the US could justify giving Taiwan missile defenses under the Taiwan Relations Act. "We're talking about a balance here," Blair said, "and a count of 500 or 600 [missiles] to very few defenses doesn't seem like a very good balance."

Taiwanese forces would not be the only ones facing the missiles, according to Stokes. He said the PLA, in anticipation of US intervention, has "indicated a willingness" to use accurate short- and medium-range ballistic missiles and cruise missiles against US forces, including bases in Japan and aircraft carriers operating in the Western Pacific.

Stokes warned that the combination of advanced surveillance, large numbers of ballistic and cruise missiles, and surprise is a serious threat to the stability of the region. The force would provide Beijing with a "conclusive edge" over Taiwan in a conflict and could hold US forces at risk.

### **Tempted to Pre-emption**

"Confidence in a quick military victory could lower the perceived cost of conflict and thus increase Beijing's incentives to use force," the report stated. It added that such a situation "raises the danger of pre-emptive war."

In a confrontation with Washington, however, China's position would be weakened were it not prepared to escalate from tactical and theater weapons to long-range strategic nuclear arms. In the view of US officials, China recognizes this fact and is taking steps to prepare itself.

At present, China's 24 silo-based CSS-4 missiles form the backbone of Beijing's long-range strategic nuclear force. These missiles are quite old by US standards. Because they are liquid-fueled, the CSS-4s require a long time to prepare for



ties and special operations attacks to prevent a buildup of US forces. The goal of the attacks would be to knock out all communications and information systems, defeat Taiwan's air forces, and control the waters around the island.

According to Stokes, the missiles could be launched within 40 minutes of an order to do so. The report quotes PLA writings as stating that Taiwan could be paralyzed by missiles "in as little as 45 minutes."

CIA Director George J. Tenet echoed these concerns in testimony to Congress. He said tensions between China and Taiwan could lead to a regional military confrontation.

Tenet observed that China's military "still lacks the air- and sealift capability to successfully invade Taiwan," but that it had made great strides in "the size and sophistica-



firing, a fact that makes them vulnerable to pre-emption. Still, US soil is well within their reach. Each can hit a target 8,000 miles away with a huge five-megaton warhead, packing a punch equivalent of 5 million tons of TNT.

On Aug. 2, 1999, China tested its new ICBM, called Dong Feng ("East Wind") 31. DF-31 was a mobile missile, with a maximum range of about 5,000 miles. Intelligence analysts say DF-31 is the first of two new mobile missiles that will replace China's CSS-4 weapons and will be focused on India and Russia, though it could also reach limited areas in the United States. The DF-31 was tested twice in 2000, once in November, while Shelton was visiting the country, and again in December. The twin tests showed the Chinese are speeding up development of the road-mobile missile.

To confront the United States, China is developing a longer-range version. That missile, the DF-41, will have a range of some 8,600 miles and will be able to hit any point in the United States. The DF-31, by contrast, can only reach the western United States.

Chinese policy with regard to use of these weapons is contained in an internal military document—"Document 65," which is dated Aug. 1, 1999, and signed "General Political Department of the People's Liberation Army." It stated that all Chinese military units—including the ICBM forces—must be "well-prepared for the war" over Taiwan.

The document also pondered ways to make Washington "exercise some caution" about Taiwan and "be aware that it would have to pay a price" if it intervened against China.

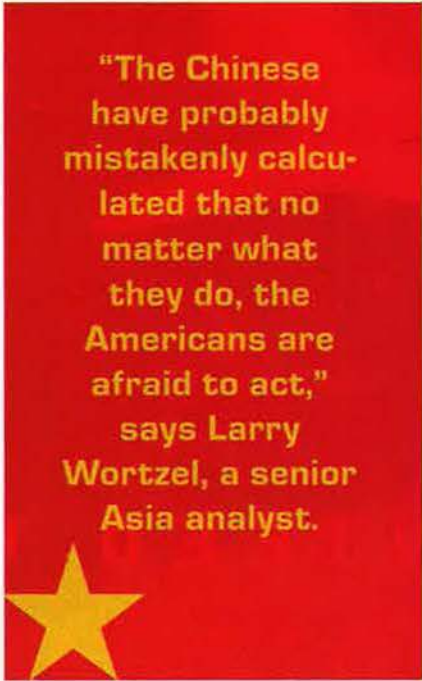
It appears that the United States and Taiwan have little option but to live with the missile problem. If China has a plan to halt or reverse the proliferation of missiles around the Taiwan Strait, it is not apparent to US officials. Appeals to cut back on the missile force, made by Blair and other US officials, have fallen on deaf ears.

### What China Knows

Most experts concede that the danger of a major armed conflict does exist, but there is wide disagreement about how likely it is. One skeptic is Ralph A. Cossa, executive director

of the Pacific Forum CSIS, a Honolulu-based research institute affiliated with the Center for Strategic and International Studies in Washington. Cossa says the Chinese regime does not want war with America, and it is aware that "no US Administration would be able to ignore an unprovoked Chinese attack" on Taiwan.

"Without an unambiguously provocative act on the part of Taipei—and there is no reason to believe that [Taiwan] President Chen Shui-Bian is suicidal—a Chinese military move



**"The Chinese have probably mistakenly calculated that no matter what they do, the Americans are afraid to act," says Larry Wortzel, a senior Asia analyst.**

against Taiwan is highly unlikely," he advises.

However, Larry Wortzel, a former military attaché once posted in Beijing, says the problem is that the Chinese could miscalculate. "The Chinese have probably mistakenly calculated that no matter what they do, the Americans are afraid to act," says Wortzel, now the senior Asia specialist at the Heritage Foundation in Washington. "And they have bought a wide array of Russian military hardware that is specifically designed to attack the United States." Wortzel notes that the Chinese are continuing to develop a nuclear force

that will hold 20 percent of the US population at risk of nuclear attack as a deterrent.

The United States is beefing up forces in Asia. An example: Last August, the Air Force transferred several dozen conventional air launched cruise missiles to Guam, the first time the precision guided weapons have been based outside the continental United States.

The forward deployment means that US bombers will require only 12 hours at most to put a superaccurate cruise missile warhead on any spot on the Asian rim. The JCS for years opposed the deployment out of concern for physical security of the missiles. Their transfer was approved after appeals from combatant commanders, specifically Blair, who has taken a leading role in developing fresh plans for US forces to defend Taiwan in a conflict with China.

Over the years, Pentagon reports to Congress generally have played down the military capabilities of the People's Republic of China and contended that China lacks the kind of amphibious assault capability needed for an invasion. However, more recent reports have presented a different picture.

In December, the Pentagon stated: "We cannot expect to predict confidently the outcome of a military conflict" across the Taiwan Strait. The report by the Office of Net Assessment identified at least three major intelligence gaps that made gauging conflict almost impossible. The opaque nature of the Communist government and the inability to discern its leaders' intentions was a key shortfall. As for whether the United States would mount a successful defense of Taiwan, the report was vague. It would say only that an attack by China would be a grave concern.

When it comes to US commitment, however, the new President does not seem ambiguous at all. "If they decide to use force, the United States must help Taiwan defend itself," Bush declared in last year's political campaign. "Now, the Chinese can figure out what that means." ■

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*Bill Gertz is a defense and national security reporter for The Washington Times and author of the book The China Threat: How the People's Republic Targets America (Regnery). His most recent article for Air Force Magazine, "The North Korean Missile Threat," appeared in the January 2000 issue.*





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# New Horizons for Air and Space





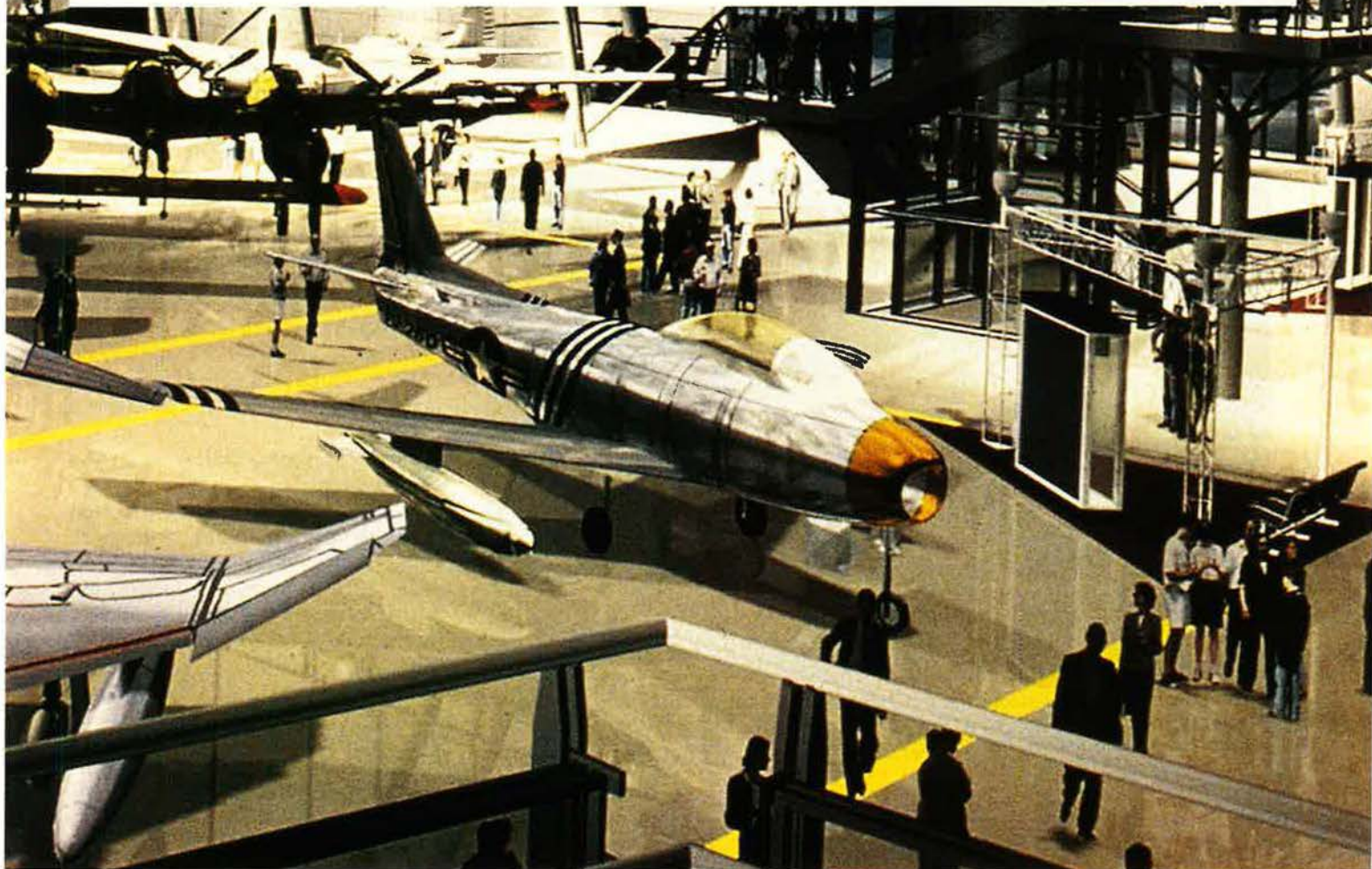


By John T. Correll, Editor in Chief

**T**HE National Air and Space Museum has the world's most extensive collection of historic aircraft and spacecraft, but visitors see only the most famous artifacts, such as the Wright brothers' 1903 Kitty Hawk Flyer and Lindbergh's *Spirit of St. Louis*.

The museum, located in downtown Washington, D.C., does not have room to show more than 10 percent of its holdings. In any case, the larger items, such as a space shuttle and a B-29 bomber, are too big to display in the main museum.

Eighty percent of the collection is in storage, most of it in no-frills metal





buildings at the Paul E. Garber Preservation, Restoration, and Storage Facility in Suitland, Md. Another 10 percent of the vintage airplanes are on loan to other museums around the country.

Some of the buildings at Garber are open for tours, but most of the museum's treasures have seldom been seen by the public.

That is about to change as a huge museum annex—the aviation display hangar will be 10 stories tall and as long as 2.5 football fields—rises out of the Virginia countryside adjacent to Dulles International Airport west of Washington.

Named the Steven F. Udvar-Hazy Center for the contributor who gave \$60 million toward its construction, the annex will put 187 aircraft and 100 space artifacts on display.

Among them will be the B-29 *Enola Gay*, which dropped the first atomic bomb on Japan, the space shuttle *Enterprise*, an SR-71 Blackbird, fastest airplane ever built, and a Curtiss JN-4D Jenny, the aeronautical equivalent of the Ford Model T.

Along with numerous aircraft from World War II and Korea, the Hazy Center will also exhibit such Vietnam stalwarts as the Republic F-105, North American F-100D, and McDonnell Douglas F-4.

In addition to the air and space exhibition hangars, the center will include a workshop where the public can watch the restoration and preservation of historic aircraft. There



**An artist's concept illustrates the exterior approach to NASM's Udvar-Hazy Center, scheduled for completion in 2003. The panels in the foreground will bear the names of contributors.**

will also be restaurants, shops, and large parking lots for cars and tour buses.

Ground was broken for the Hazy Center Oct. 25, and ensuring that it opens on schedule in December 2003, in time to celebrate the 100th anniversary of powered flight by the Wright brothers, is the all-consuming task of the museum's new director, John R. Dailey.

### Marine in Charge

Jack Dailey is a retired four-star Marine, who spent 36 years in uniform and was assistant commandant

of the Corps when he left active service in 1992. From then until he came to Air and Space in January 2000, he was the associate deputy administrator at NASA.

He is a pilot with more than 6,000 hours in a variety of aircraft. He served two tours in Vietnam, both at Da Nang. He flew 450 combat missions, most of them reconnaissance missions in RF-4s and the rest of them in EA-6A electronic warfare aircraft.

Dailey succeeded Donald D. Engen, director of the museum from 1996 until his death in a glider accident in 1999. After the disastrous *Enola Gay* controversy—in which a former director and his curators tried to use the famous bomber in a politically charged exhibit that came close to depicting Japan as the victim rather than the aggressor in World War II—Engen restored stability to the museum and took it back to its basic charter, which is to collect, preserve, and display the nation's aerospace heritage.

In that respect, Dailey is in the Engen mold.

"Eighty percent of our collection is hidden from the public," he said. "This is the largest and most complete collection in the world, but we've got to get it on display. We are putting that ahead of everything else."

In a strategic plan developed last year, Dailey temporarily cut back by half on staff research, publications, and other projects not related to the

Photo by Paul Kennedy



**Many of the museum's aircraft are currently in storage at the Paul E. Garber Preservation, Restoration, and Storage Facility. The museum's new annex will house nearly 200 aircraft and 100 space artifacts.**



Hazy Center and redirected the time and resources to getting the aircraft and spacecraft ready to go to Dulles and preparing other exhibit materials, such as signs and placards, that will be required.

Meanwhile, he and his staff had another special job on their hands. After more than 20 years of operation, the main museum was in urgent need of renovation. By July—the 25th anniversary of the museum's opening—the skylights and the massive "window walls," the large exterior panes that give the museum its distinctive look, will have been replaced. The first and second floor ceilings will also be replaced. Until then, visitors must pick their way through construction.

Last November the crown jewels of the collection, the Wright Flyer and *Spirit of St. Louis*, were moved by special dolly from their customary place just inside the main entrance to the west end of the museum. They move back in July, but for now, visitors standing on the mezzanine are treated to a close look from a different perspective at these classic aircraft.

With more than nine million people trooping through the museum each year, wear and tear is a constant problem. Every night, the cleaning crew zaps the chewing gum with nitrogen to make removing it easier.

Dailey would like to re-carpet the main museum, but that would cost \$700,000, which he doesn't have to spare just now.

"By the way," Dailey said, "we are not going to have carpet in Hazy. We are having hardened concrete that will be a very nice surface, but it is not going to be carpet."

### A Ton of Money

Dailey doesn't get to spend as much time as he would like thinking about airplanes, or even about chewing gum and carpets. His primary focus is on funding.

The Hazy Center will cost about \$238 million. "This is the first Smithsonian building to ever be built with 100 percent private funding," Dailey said.

Congress provided \$8 million for planning and design, and the Commonwealth of Virginia is paying for roadways, utilities, and clearing and grading of the site. The project took a great leap forward when Udvar-

## On Display at Udvar-Hazy

More than 180 aircraft and 100 spacecraft will be on display at the Steven F. Udvar-Hazy Center.

Here are some of them. For a complete list, see the museum's web site, [www.nasm.edu/nasm/ext/artifacts.htm](http://www.nasm.edu/nasm/ext/artifacts.htm).

**Boeing B-17D Swoose**, the oldest intact B-17 in existence. It is the sole survivor of 21 B-17s that made the first mass flight of land-based aircraft from the continental US to reinforce Hickam Field in Hawaii. It is the only known US military aircraft to have flown a combat mission on the first day of the US entry into World War II and remain in continuous military flying service until the end of the war.

**Boeing B-29 Superfortress Enola Gay**, the aircraft that dropped the first atomic bomb on Hiroshima on Aug. 6, 1945. In 1995, public and Congressional outrage stopped plans by Air and Space Museum curators to exhibit the *Enola Gay* as a prop in a political horror show. The museum director lost his job.

**Boeing P-26A Peashooter**, first monoplane fighter procured by the Army Air Corps and first all-metal production fighter. It was the last open-cockpit fighter accepted by the Air Corps and was still in limited service at the time of Pearl Harbor.

**Caudron G.IV**, one of the world's first strategic bombers and one of the first World War I Allied aircraft armed with a machine gun. The G.IV was built in three versions: reconnaissance, bomber, and trainer. The museum's G.IV is one of only two that still exist.

**Curtiss JN-4D Jenny**. The Jenny was the first aircraft many Americans in World War I ever saw, and for most pilots of that era, the first airplane they ever flew. The museum's Jenny is probably the most complete original World War I aircraft in the world.

**Curtiss P-40E Warhawk**, among the best known US fighters of World War II. Its greatest fame was achieved by the shark-mouth P-40s of the Flying Tigers.

**Lockheed P-38J Lightning**. The twin-boom, twin-engine P-38 was one of the most versatile fighters of World War II and downed more enemy aircraft in the Pacific than any other airplane.

**Lockheed SR-71 Blackbird**. It dates from the early 1960s but is still the fastest, highest-flying aircraft ever built. It can fly at more than 2,200 mph (Mach 3+, or more than three times the speed of sound) and at altitudes above 85,000 feet. On its final flight, the museum's Blackbird set a transcontinental speed record when it flew from the West Coast to the East Coast in 68 minutes, 17 seconds.

**North American F-86A Sabre**. High above the Yalu River in Korea, it joined the ranks of the great fighters. American pilots flying the Sabre established a victory ratio of more than 10-to-1, even though enemy MiG-15s could not be pursued across the Chinese border.

**Space shuttle Enterprise**. NASA used *Enterprise*, now owned by the museum, for approach, landing, and launchpad tests in the 1980s.



SR-71 #64-17972 set a transcontinental speed record March 6, 1990, when flying from the West Coast to the East Coast in 68 minutes, 17 seconds on its way to join the museum's collection. It's shown here outside its Dulles hangar.

Mark Avino/Smithsonian



Hazy, the president and CEO of International Lease Finance Corp., which owns and leases a fleet of 400 jet aircraft, contributed \$60 million toward the construction.

However, "we still need a ton of money," Dailey said.

Fund-raising professionals have told him that on a project like this, corporate gifts will be limited and that 80 percent of the funding will have to come from individual contributors.

The task has also grown a little. Previously, the size of the main exhibit hangar had been reduced by 25 percent to save money. The space, enough for four additional bays, has been restored. Dailey does not know yet where the money will come from but said that "we are going to build it right when we do it."

That means there will be room for the museum's most wanted airplane, a B-24. During World War II, 19,256 B-24s were built, more than any other kind of bomber, but they are rare now, and the Smithsonian does not have one.

Only a few of them still exist. The Collings Foundation in Massachusetts has one. So does the Air Force Museum at Wright-Patterson AFB, Ohio. Still another is at what used to be Castle AFB, Calif. The base closed, but the museum (Castle Air Museum) is still in operation, and it has a B-24.

Dailey is confident that the Hazy Center will obtain one eventually.



Photo by Paul Kennedy

**Some of the aircraft restoration and preservation activities, such as this at the Garber facility, will be done at the Hazy Center in a workshop where the public can watch the process. The museum will still use three buildings at Garber.**

"We are going to go back to the original size, and that will make room for that B-24 and the Concorde that we already have [from Air France], that has not been delivered yet. They would not fit in the plan before we extended it."

There will be an associate director for the Hazy Center, but the downtown museum and the Dulles annex will operate as two parts of a whole. "We are not going to duplicate the staff," Dailey said.

He will keep his office in the main museum but expects to spend a lot of time at Dulles. (Dailey's residence

is in Fairfax, Va., which is about halfway between the two sites.)

The Garber facility will stay open. "Everybody in the Smithsonian is waiting for us to get out of those buildings ... because that storage space is needed by another museum," Dailey said.

The Air and Space Museum itself will keep three of the 13 buildings it now occupies at Garber, where it will continue such activities as painting airplanes and building exhibits.

### Hanging From the Arches

The Udvar-Hazy Center will occupy 176.5 acres on the southeast side of Dulles Airport, near the intersection of Routes 50 and 28.

It will be an instant tourist attraction. Museum officials believe it will draw between three and four million visitors a year. They are providing enough parking for 2,000 cars and special lots for tour buses. Shuttle buses will take people back and forth to the nearest Metro rail station.

The main elements of the Hazy Center will be the aviation hangar and the smaller space hangar, which joins it at a right angle.

The museum staff has been using computer models to fit aircraft within the big hangar. The largest ones will be on the floor, with others suspended from the ceiling at two levels. A walkway approximately four stories high will run parallel to the middle tier of aircraft for close-up viewing.

Staff photo by Guy Acelio



**A B-24 Liberator—like this one flying at the Air Force Fifty celebration in Nevada in 1997—still eludes museum officials, but they are confident they will find a suitable aircraft for the new center.**



In all, 73 aircraft will be suspended from the massive arches that reach up 103 feet to support the roof and hold the cables from which aircraft will be hung. Each arch will support 20,000 pounds, spread equally between the two halves of the arch. The arches and cables are strong enough to hold single-seat World War II fighters.

There will also be a large format theater—IMAX or competing technology—where a new film, documenting the first 100 years of powered flight, will premiere in 2003.

In an observation tower named for former museum director Donald Engen, visitors will be able to watch arriving and departing air traffic at Dulles Airport.

### The Enola Gay

Positioned in the very center of the aviation hangar will be the *Enola Gay*, fully assembled for the first time in decades. The big bomber has come a long way in the museum's regard since 1994 and 1995, when curators tried to use the *Enola Gay* in a highly politicized exhibition that focused on the suffering of the Japanese at Hiroshima and Nagasaki.

Even the *Washington Post* denounced the plan as "incredibly propagandistic and intellectually shabby" and the tone as "tendentiously anti-nuclear and anti-American."

(For background on the controversy, see [www.afa.org/enolagay/](http://www.afa.org/enolagay/).)

That exhibit collapsed around the ears of the curators and was canceled, and in June 1995, the museum put the 53-foot forward fuselage of the *Enola Gay*, up on its nose wheel, on display in a straightforward historical exhibition. The wings would not fit into the gallery—the wingspan stretching 141 feet—and neither would the rest of the fuselage.

Within a year, the *Enola Gay* had drawn more than a million visitors, making it by far the most popular special exhibition in the history of the Air and Space Museum. When it

finally closed in May 1998, it had drawn almost four million visitors.

Since then, the forward fuselage has remained in the main museum, walled off from sight, while restoration of the other sections proceeded at the Garber facility. The work is now complete, although the Garber team has a notice posted on the Internet looking for several interior parts, such as three fire extinguishers of the original type, a torque amplifier, and an azimuth control box.

When the forward fuselage moved from Garber to the downtown museum in late 1994, it was in the small



Photo by Paul Kennedy

With little fanfare the plastic-wrapped forward fuselage of the *Enola Gay* is moved into the NASM in November 1994. When the aircraft moves to the Hazy Center, museum director Dailey wants people lining the streets to watch.

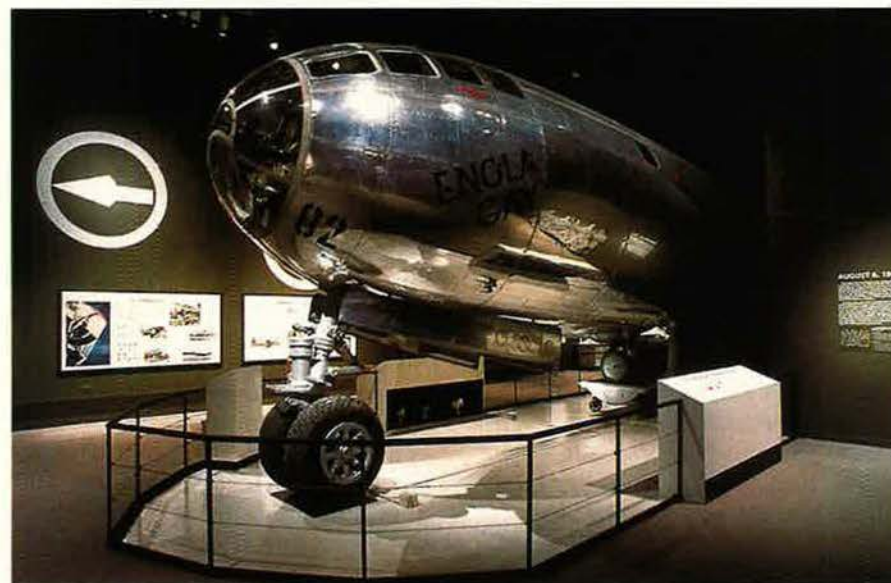


Photo Carolyn Russo/Smithsonian

NASM exhibited the forward fuselage of the *Enola Gay* from 1995 to 1998 in what was the most popular special exhibit in its history. The famous bomber—fully assembled—will be in the center of the Dulles facility's aviation hangar.

hours of the morning. Reasons included traffic considerations and security, but the Smithsonian also wanted to keep it low key.

When the *Enola Gay* goes to Dulles, it may be different.

"We are going to announce [it] and we are going to try to get people to come out and wave as we come by," Dailey said.

Another sign of the times is an announcement that the *Enola Gay* pilot, Brig. Gen. Paul W. Tibbets Jr., USAF (Ret.), will appear at the museum April 20 to sign copies of his new book, *The Return of the Enola Gay*.

The next day, he will deliver a special lecture in the museum's Langley Theater about bombing operations in the Pacific theater during World War II.

It's a new day at Air and Space. ■





**Five years later, terrorists attack again in the Middle East. This time, though, the skipper didn't walk the plank.**

# From Khobar

**T**ROOPS who receive a FedEx delivery at Prince Sultan Air Base in the Saudi Arabian desert won't be the first to open the package. Every item delivered to the main gate must be unsealed and inspected by security guards before it can enter the compound.

Such invasive procedures are a way of life at that sand-blown USAF outpost, home to 3,600 airmen. Cargo trucks and unregistered cars seeking entry can sit for close to an hour while guards slide underneath the vehicle, pry into body cavities, and even peer into the tailpipe looking for explosives. Precautions like these may bottle up commerce and make coming and going a chore, but they keep devastating terrorist bombs outside the base perimeter.

The Air Force learned to use such techniques in the hardest way imaginable. In 1996, terrorists detonated a truck bomb beside Khobar Towers, an apartment block in Dhahran, Saudi Arabia, used as a barracks. The blast killed 19 and injured 500. Overruling the Air Force, Secretary of Defense William S. Cohen held the wing commander responsible and stripped him of promotion, effectively ending his career.

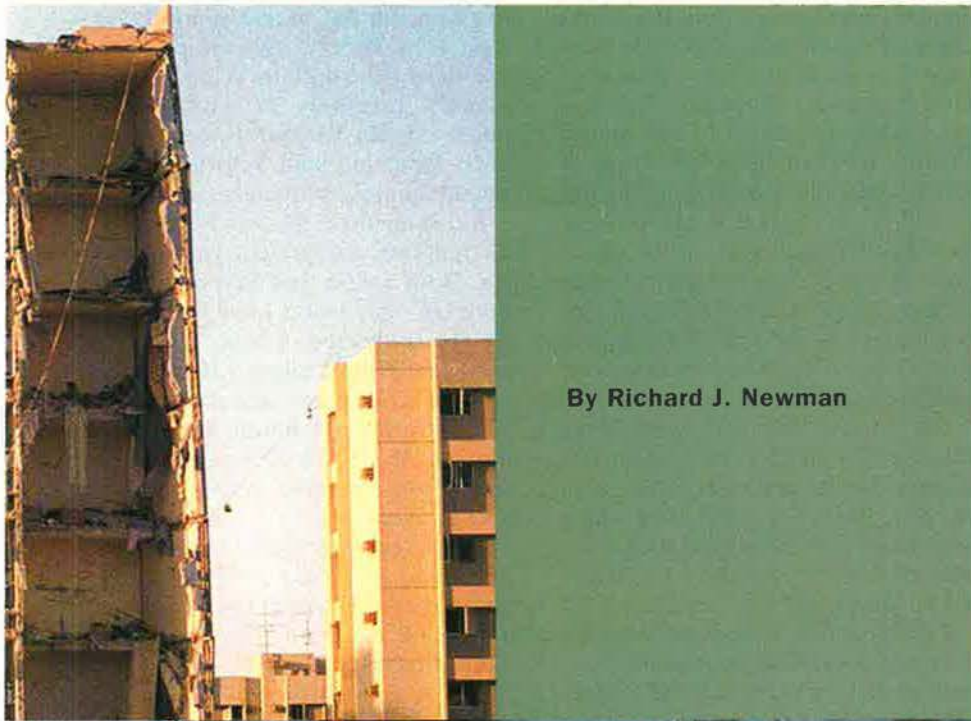
The Air Force intensified new security procedures worldwide. Force protection, which the Pentagon claimed was underemphasized and underfunded at the time of the attack, has become such an overriding concern that airmen in Saudi Arabia generally aren't allowed off base unless their jobs require it.

## And Now, the Navy's Turn

The Navy has been going through the same drill ever since Oct. 12—the day terrorists bombed the destroyer USS *Cole* in Yemen's Aden harbor, killing 17 and injuring 42. The attack, sprung on the ship's crew during a refueling stop, pushed the sea service into a massive review of force protection procedures.

Like the Air Force, the Navy seems to be undergoing a fundamental shift in its approach to protecting its people. "The attack revealed weaknesses in our force protection program," acknowledged Adm. Vernon E. Clark, Chief of Naval Operations, in his endorsement of the Navy's review of the *Cole* incident. He specifically cited "inconsistent force protection schemes" and "inadequate





By Richard J. Newman



to Cole

guidance on interpreting and executing existing force protection measures.”

After the 1996 Khobar Towers bombing, the Air Force did an immediate review of security and quickly changed numerous procedures. The Navy, however, was more relaxed about the threat. In the fleet, this was hardly a secret, as attested by the skipper of one ship that had refueled in Yemen shortly after the 1996 Khobar Towers attack. He recalled, “Force protection was *not* Job 1.” He and his sailors clearly understood, he explained, that the Navy had made a conscious decision to take risks in order to show the flag in the Middle East region.

That’s changed. Since the *Cole* bombing, the Navy has taken steps resembling those instituted by the Air Force after Khobar Towers. The 1996 attack, for instance, led the Air Force to build fences, berms, and other physical barriers to keep any intruders hundreds of yards away from work or living areas. When Saudi officials wouldn’t allow such construction around Khobar Towers itself, the Air Force pulled up stakes and moved everybody and everything to the remote confines of P-SAB, where human lookouts and sensors can spot and monitor approaching vehicles at a distance of more than a mile.

The Navy, seeing the protective value in these measures, recently enacted waterside versions. In Groton, Conn., Norfolk, Va., and several other East Coast ports, the Navy is using oil booms and other floating barriers to establish “exclusion zones” around its ships. Civilian vessels are not permitted inside. At other harbors, the Navy has erected signs warning unauthorized craft to stay out and has set up sensors to detect violators.

The Navy operates a test bed of security enhancements in the harbor in Bahrain, the Gulf nation in which the US maintains its Navy Fifth Fleet headquarters. That system is one of the most sophisticated in the world: Radars on land and at sea track ship traffic more than five miles out. Underwater sonar buoys and other sensors form a “swimmer detection system” that can detect the movement of a lone scuba diver. Video cameras on the masts of US ships zoom in on traffic of special interest. An unmanned boat rigged with a small cam-



era patrols the harbor, sidling up to suspicious vessels for a closer look.

The Navy might end up piggy-backing on many other Air Force security developments. In 1997, for instance, the Air Force stood up a force protection battlelab at Lackland AFB, Tex., to develop new security technologies and evaluate new anti-terrorist tactics and strategies. It developed vehicle search strategies—that is, good ways to detect bombs in cars. Lab workers rigged cars with explosives so tests could proceed under realistic conditions. “We have to learn to do it by doing it for real,” declared Air Force Brig. Gen. James M. Shames, the director of USAF security forces. Proven techniques are quickly shipped out to places like P-SAB, where security forces probe every opening of vehicles permitted onto the base.

### “First-In” Unit

The post-Khobar Towers Air Force established a unit that specializes in force protection and that can augment or supplant the security provided by a unit’s own security forces. The 820th Security Forces Group, based at Moody AFB, Ga., is a “first-in” unit that quickly establishes security at forward operating bases during a contingency.

The unit already has faced a major test. During the 1999 NATO air campaign over Kosovo, the Air Force dispatched the 820th to Tirana, Albania, to help safeguard airmen and troops taking part in relief operations. The 820th took over for a much smaller unit sent by US Air Forces in Europe. The USAFE unit thereby was freed to tend to other needs in the busy theater.

The 820th, when completely filled out in September, will have about 620 troops. It will be able to design or revise force protection plans for units at bases throughout the world.

Now, the Navy is signaling its own need for specialized units. In November, Fifth Fleet requested 100 additional coastal-warfare specialists—Navy and Coast Guard port security experts—to help maintain force protection in Bahrain. More centralized force protection planning, such as that provided by the Air Force’s 820th, may be a particularly useful model for the Navy. Up until the *Cole* attack, every ship’s force protection plan would be designed by the skipper.

The Joint Staff publishes guide-

lines for force protection. However, many of the measures are advisory only. For example, the guidelines for a ship under Threatcon Bravo—the mid-level state of alert under which *Cole* had been operating in Aden—state that a ship’s commander should deploy picket boats to interdict approaching craft “if the situation warrants.” *Cole*’s skipper, Cmdr. Kirk S. Lippold, didn’t do that. Investigators found that if he had, it could have helped prevent or mitigate the attack.

On Jan. 19, the institutional Navy delivered its official conclusion: The skipper didn’t need to go down with the ship, at least not this time. Navy head Clark concluded that, while Lippold made some mistakes, he should not be punished for the incident.

Clark reached that conclusion even though Navy investigators found Lippold took only half of the 62 protective measures he should have taken when *Cole* pulled into Aden harbor. Working-level Navy investigators recommended disciplinary action for Lippold and three other officers.

However, senior commanders disagreed. In a forceful rebuke to the investigators, Adm. Robert J. Natter, commander in chief of the Navy’s Atlantic Fleet, argued that even if *Cole* had been on a higher alert status, it could not have thwarted the attackers. That’s because the bombers never showed any “hostile intent” that would have justified waving off or firing upon local citizens. Clark backed up Natter.

“There is a collective responsibility,” said Clark. “We all in the chain of command share responsibility for what happened.”

Cohen agreed with the Navy. This time, no one would be held individually responsible.

### Cohen the First

Five years ago, when the issue was the attack on Khobar Towers, the story was very different.

Initial probes pointed to intelligence problems as the principal cause of the disaster. Secretary of Defense William J. Perry blamed the “inconclusive nature of the intelligence,” while Rep. Floyd D. Spence (R-S.C.), House National Security Committee chairman, said there were “intelligence failures” at Khobar Towers.

Then came a report by retired Army Gen. Wayne Downing. In a surpris-

ing turn, he put blame squarely on Brig. Gen. Terryl J. Schwalier, commander of the 4404th Wing (Provisional), members of which were housed at the Khobar Towers complex. Downing said Schwalier “did not adequately protect his forces.”

Subsequently, the Air Force conducted two comprehensive inquiries. Both found that Schwalier had done all that could have been reasonably expected of him. The wing commander had taken 130 specific actions to improve security in the year before the bombing and implemented 36 of the 39 recommendations from the most recent vulnerability assessment.

However, that didn’t satisfy Cohen, who was new to the job. He conducted his own review, after which he declared that Schwalier “could have and should have done more” to defend Khobar Towers. He canceled Schwalier’s previously approved promotion to major general.

In the endgame of the *Cole* investigation, however, Cohen demonstrated a reversal of form. “Navy leaders have concluded that the overall performance of the captain and his crew does not warrant punitive action, and I agree with that conclusion,” he said. Cohen left office the next day.

In the cases of both Khobar Towers and *Cole*, intelligence deficiencies figured heavily. Air Force officials say they have succeeded in formulating ways to get intelligence about a terrorist threat to the people who need it. An improved push-pull system designed after the 1996 bombing places emphasis on getting national-level intelligence—information gathered by spies, satellites, or other top secret efforts—down to unit commanders in the field.

Unit-level threat working groups evaluate fragmentary intelligence tidbits to see whether they can divine a threat to their region or installation. When commanders need to “pull” additional information out of the system, they can call Air Intelligence Agency at Kelly AFB, Tex., around the clock for quick updates or assistance with analysis. Any newly determined threats are quickly sent back up the chain of command, and ideas for improving force protection are circulated among commanders and force protection officers.

As its review of force protection procedures continues, the Navy may



	Cohen Remarks on Khobar Towers, 1997	Cohen Remarks on USS <i>Cole</i> , 2001
Warning	"In light of the available strategic intelligence and a precursor attack in Riyadh, ... the risk ... was clear."	"[W]e need better, more specific intelligence to prepare commanders for new and uncertain locations."
Chain of Command	"He [Schwalier] never referred any protection problems up the chain of his command. Therefore, I've concluded that no adverse action should be taken against [superior] officers in [the] chain of command."	"[W]hat I am saying is that we need [senior leaders in the chain of command] to do a better job, and we haven't done as well as we needed to, and I think that that responsibility is ours."
Deficiencies	"It seems to me that what we have to insist upon is that our commanders take all reasonable measures to protect their troops—not that they take every conceivable measure but [take] what is reasonable under the circumstances."	"[E]ven though there were certain deficiencies or dissatisfactions, they did not rise to a level that would warrant courts-martial."
Accountability	"Force protection is first and foremost the responsibility of the commander on the scene. ... Yes, there are those who are superior in the chain of command who can provide advice, can provide some resources, but they are not generally in a position to challenge the commander on the ground."	"The question of accountability is deeper and more complex than the performance of the crew alone. ... [A]ll of us in the leadership positions ... needed to engage more vigorously in examination of the range of potential threats."
Fixing Blame	"It is not enough merely to learn and move forward. We must ask whether [dangers] should have been anticipated."	"We have pointed out that we didn't do all that needed to be done. We have learned from this experience."
Service Views	"[An Air Force report] concluded that no action should be taken against any officer. I disagree with that conclusion."	"Navy leaders have concluded that the overall performance of the captain and his crew does not warrant punitive action, and I agree with that conclusion."
Scapegoating	"He [Schwalier] is not being made a scapegoat. He's being held accountable."	"It would have been easy for me to walk out of this office today and say it's somebody else's responsibility, but it happened on my watch."
Prevention	"I believe they [additional security enhancements] would have been helpful. Whether or not they would have, in fact, saved all the lives ... is an open question."	"[T]he commander of the ship didn't take every specific step that its force protection plan called for, [but] ... full implementation of the force protection plan probably could not have prevented the attack."
Inattention	"Force protection ... did not get [Schwalier's] specific attention with regard to developing adequate defensive measures against a perimeter attack."	"There was insufficient attention directed toward ships in transit as they are about to either make a port call or a refueling stop."

Secretary of Defense William Cohen had to deal with fallout from two major terrorist attacks on US troops—the June 25, 1996, truck bombing of Khobar Towers in Saudi Arabia and the Oct. 12, 2000, boat-bomb attack on USS *Cole* in Yemen. Cohen made extensive remarks about both, presenting what some charge are inconsistent views (see above).

Cohen also came to different conclusions about "accountability." At Khobar Towers, Cohen found negligence by USAF Brig.

Gen. Terry Schwalier, commander of the wing that took most of the casualties. Cohen withdrew Schwalier's nomination for his second star, effectively ending his career.

Four years later, however, the story was different. Cohen accepted the judgment of senior Navy leaders (though not investigators) that *Cole's* skipper, Lt. Cmdr. Kirk Lippold, should not face personal discipline. No one in the chain of command was punished.

develop new ideas to share with the Air Force and other services. Take, for example, a recent seminar wargame sponsored by the Navy and Marine Corps and run by the Potomac Institute for Policy Studies, a northern Virginia think tank. Out of the wargame came several recommendations for improved force protection techniques, from the simple—mounting more guns on ships—to the complex. In the latter category would be:

- Installation of devices that can detect explosives from a distance.
- Use of "vehicle stoppers" that can electronically shut down the engines of certain cars.

■ Robots that can detect bombs and, if necessary, disable threatening vehicles with small-arms fire.

Retired Marine Corps Col. Gary Anderson, the leader of the Potomac Institute wargame, said the military services need to look beyond their own security strategies: "We need to think about an interagency approach to force protection."

One of the most important lessons for the military services may be learning from each other. The *Cole* bombing, for instance, prompted the Air Force to go back and take another look at post-Khobar security procedures. USAF investigators discovered no glaring deficien-

cies, but security officials are hardly relaxing.

"You can never say ... in force protection that you're finished," said Shames, the security forces director. "Force protection is one of the most difficult things in the world. Terrorism is worldwide. It goes on forever." ■

*Richard J. Newman is the Washington, D.C.-based defense correspondent and senior editor for US News & World Report. His most recent article for Air Force Magazine, "Submarine Salesmanship," appeared in the January 2001 issue.*



# Verbatim

By Robert S. Dudley, Executive Editor

## The Basics, According to Bush

"We will build our defenses beyond challenge, lest weakness invite challenge. We will confront weapons of mass destruction, so that a new century is spared new horrors. The enemies of liberty and our country should make no mistake: America remains engaged in the world by history and by choice, shaping a balance of power that favors freedom. We will defend our allies and our interests. We will show purpose without arrogance. We will meet aggression and bad faith with resolve and strength."—**President George W. Bush, Jan. 20 inaugural address.**

## Adventures in Fantasyworld

"Initially, we [the European Union Rapid Reaction Force] would in no way want to compete with NATO. In the early years, we will be looking at things below the NATO threshold, things NATO doesn't do, like disaster relief and evacuation of citizens. In due course, once our collective capabilities are developed and we have strategic transport, the EU should be in a position to go higher. At that point, there will have to be a critical conversation between the European Union and NATO over who takes on what."—**British Maj. Gen. Graham Messervy-Whiting, head of EU military staff, quoted in Jan. 31 London Daily Telegraph.**

## True South From Tariq Aziz

"Iraq was the victim of a conspiracy against its sovereignty, national interest, and Kuwait was part and parcel of the conspiracy. So Kuwait got what it deserved in 1990."—**Iraqi Deputy Prime Minister Tariq Aziz, in remarks at a Jan. 16 Baghdad news conference on 10th anniversary of start of the Gulf War.**

## Now That's Cooperation

"Russia ... claims to lack the financial resources to eliminate weapons of mass destruction but continues to invest scarce resources in the development of newer, more sophisticated ICBMs and other weapons. We would not want the US in-

vestment in the CTR [Cooperative Threat Reduction] program to become the means by which Russia frees up resources to finance its military modernization programs."—**Secretary of Defense Donald H. Rumsfeld, written response query propounded by the Senate Armed Services Committee before Jan. 11 confirmation hearing.**

## Re-Examine Your Portfolio

"A case can be made to re-examine the traditional sharing out of the [Pentagon] budget in more or less equal shares among the services. If we are really going to rely on airpower as the instrument of first and hopefully last resort, then we had better start looking at why we spend as much money as we do on ground forces."—**Jeffrey Record, a member of the faculty of the Air War College, in Jan. 8 issue of Defense Week.**

## Ground Forces Did Better?

"It is difficult to comprehend [Record's] comment. ... [W]hile aerospace forces are excellent at responding to emergencies, they failed to prevent aggression from Korea to Vietnam, to Iraq and Yugoslavia."—**Retired USAF Maj. Earl H. "Butch" Tilford, Jr., former editor of Air University Review, now director of research at the US Army War College's Strategic Studies Institute, in Jan. 15 letter in Defense Week responding to the comments of Record.**

## The Distant Mirror

"There is scarcely a [national defense] category that does not require immediate and costly improvement. The military's situation is eerily similar to the one it faced in 1981. That year, at my first Congressional hearing as [President Reagan's] Secretary of Defense, I was repeatedly asked, 'What is your highest priority?' I told the committee I had several 'highest priorities.' The first was to restore the morale of our forces. ... The second was to restore, modernize, and improve our weapons. Once again, we must do the same for morale and weapons. Only then

will we regain the strength lost by Mr. Clinton's dangerous 'procurement holiday'."—**Caspar W. Weinberger, former Secretary of Defense (1981-87), in Jan. 22 issue of Forbes.**

## Big Bad Wolf

"[Chinese leaders] will try to shift the blame [for new American arms sales to Taiwan], but their own behavior over the last three or four years has made it very hard for the United States to accept how the Chinese are approaching a whole set of issues. ... There'll be a big debate and a big brouhaha, and in the end, we're going to end up with more arms sales [from the US during the Bush Administration] than the Clinton folks would have made, and there'll be an element of risk involved. But there's not much the Chinese can do about it. They're going to huff and puff, but, in the final analysis, where can they go?"—**Michel Oksenberg, Stanford University China expert, in Feb. 3 Los Angeles Times.**

## Back to the Future?

"The parallels between the early struggle for airpower that led to the creation of the Air Force and the issues we face today in seeking space power are truly astounding. Today, military space is only used to support air, land, and sea warfare—essentially, the space component of information superiority. Opportunities to leverage the uniqueness of space ... continue to be unfunded."—**Sen. Bob Smith (R-N.H.), in Jan. 22 Space News.**

## Space Force

"When mankind decides we're going to break the surly bonds of orbital pull, that's when we will go to a separate Space Force. I don't think we're going to be extraorbital from a commerce standpoint for a heck of a long time unless we have some huge breakthrough in our capability with lift. And I don't think that's going to come for 50 years."—**Gen. Michael E. Ryan, Air Force Chief of Staff, at a Feb. 8 aerospace conference in Washington, D.C.**



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**European forces lag behind in most critical capabilities, including precision strike, stealth, and standoff weapons.**

# **Why the Allies Can't Keep Up**





By Adam J. Hebert

**N**ATO has always been a US-dominated alliance, but recent military operations show NATO's European allies are falling ever farther behind the United States in military capabilities. This has generated potentially serious problems. The alliance, warn officials, could become fractured if American capabilities continue to greatly exceed those of the Europeans or if American systems are unable to link up with European aircraft in joint operations.

Some argue that NATO-Europe is already marginalized. The allies lack precision guided munitions, cruise missiles, stealth aircraft, and advanced command-and-control capabilities of the type and quality that the US relies upon in aerial warfare. Moreover, experts warn that the capability gap is widening. While the United States appears committed to advanced military technology, Europeans in many cases do not.

The political consequences could be severe, a fact pointed out by no less a figure than former US Defense Secretary William S. Cohen. Cohen, writing in a January *Washington Post* commentary before he left office, said Operation Allied Force in Yugoslavia in 1999 revealed stark disparities in NATO capabilities.

European members subsequently pledged to correct the situation. "Regrettably," said Cohen, "progress since has been less than brisk. ... [I]nequities in defense commitments inevitably will yield political consequences that are likely to subvert rather than strengthen NATO solidarity."

A downward trend in European military investment and increased reliance upon European military equipment also pose a threat to fundamental military effectiveness. Though the US has taken the lead in recent air operations, NATO-Europe still contributes significant numbers of aircraft and personnel to support these missions. If NATO-Europe cannot contribute effectively to combat, the US will be forced to pick up

an ever-larger share of the burden. As one recent study found, "NATO allies may not be able to perform military missions at US performance levels."

### Known Far and Wide

This is hardly a military secret. The experience of recent operations has made the allies well aware of their shortcomings, and both political and military leaders have voiced concern. One such warning was issued in Berlin late last year by George Robertson, the NATO secretary general.

"In Kosovo, we saw that some NATO members had to carry a disproportionate share of the burden when it came to the high-tech, sophisticated missions," Robertson said. "[European] allies simply didn't have the capability to participate at all levels. This imposes an unfair and politically unsustainable division of labor within the alliance." Robertson added, "Quite simply, a 'two-class NATO' will not work."

Similar warnings have come from Gen. Klaus Naumann, the retired German army leader and former chairman of NATO's military committee. Naumann has pointed out that most NATO-Europe members will find themselves excluded in the early days of a future NATO air campaign, as happened during Allied Force.

Naumann noted the initial phase of the Balkan air campaign could only be done by the US and Britain, the two NATO nations in possession of cruise missiles. "The guidance was clear—we were not allowed to enter the airspace with manned aircraft initially."

Naumann called that situation "unpleasant" and went on to say "many" NATO members are pursuing stand-off weapon capability in response to being left on the sidelines during the early days of Operation Allied Force over Kosovo.

However, few are optimistic that the situation will improve either soon or dramatically. In a recent study of the interoperability challenge, RAND's Project Air Force found that NATO-

**Commonality concerns.** Adding to the disparity between US and NATO forces is the growing tendency for Europe to look to its own military industrial base for weapons. The new EF-2000 Typhoon fighter is a prime example. This trend, analysts say, increases costs, thereby limiting the quantities of weapons the Europeans can buy.



Europe faces systemic barriers to its acquisition of capabilities on which the US has come to rely in the early days of a conflict.

“At the strategic level,” said the RAND analysts, “the allies do not put high-intensity conflict at the center-piece of their planning. They do not see a superpower threat to NATO ... or any serious military threat to their well-being. Hence, their strategic focus is on peace operations and crisis response. The result is proportionately lower investment relative to the United States in developing and acquiring advanced military systems such as stealth aircraft” and all-weather precision guided munitions.

While the US Air Force is modernizing its fighter and bomber forces with long-range and precision-strike capabilities in mind, “US allies are not likely to follow suit to the same extent,” stated the RAND report, “Interoperability: A Continuing Challenge in Coalition Air Operations.” It went on, “This divergence in capabilities between the United States and its allies is becoming more apparent and must be properly managed to ensure that the potential benefits of coalition operations are realized.”

Typically, RAND noted, the US is

not only the largest participant in coalition operations but also the nation with the most-capable systems. “Recent coalition operations demonstrate the growing divergence between US and NATO ... air forces in all-weather precision-strike capabilities to minimize collateral damage and employment of standoff weapons, as well as in stealth to minimize the risk of aircraft attrition to enemy defenses,” RAND stated.

### Few, Very Few

RAND also said that, although it’s hard to find exact numbers, it appears that even the largest NATO–Europe air forces have only a few thousand direct attack guided munitions. Few have plans in place to buy additional quantities of smart weapons.

The entire realm of precision attack is dominated by US forces. The allies are expected to continue to lag behind in this capability, despite pronouncements from NATO members that they will pursue more guided munitions.

The US Air Force is moving forward with plans for the next-generation advanced targeting pod, which is intended to give F-16s enhanced targeting capability to perform destruction of enemy air defense mis-

sions. The advanced targeting pod will “enhance and maintain” the lethality of the USAF strike mission with a “cost-effective” system, the service says. The Air Force is also procuring additional F-16CJ aircraft used for air defense suppression.

For NATO–Europe, however, precision guided munitions, standoff weapons, and targeting pods are all in short supply. The RAND study said that, though there are some exceptions, most NATO nations have not announced any plans to procure Global Positioning System–guided weapons and thus will not be able to take advantage of their aircrafts’ abilities to employ such weapons.

Most NATO–Europe air forces will soon have large numbers of night-attack and precision strike–capable platforms. However, said RAND, “only one [nation] will have enough targeting pods to employ these aircraft in this role on a large scale. Relatively modest investments in targeting pods could enhance this capability considerably.”

Meanwhile, NATO–Europe is struggling to acquire any kind of air defense suppression capability at all. According to RAND, “Only the German and Italian air forces field a specialized aircraft for this mission. The high cost of these platforms limits the ability of other nations to procure them.”

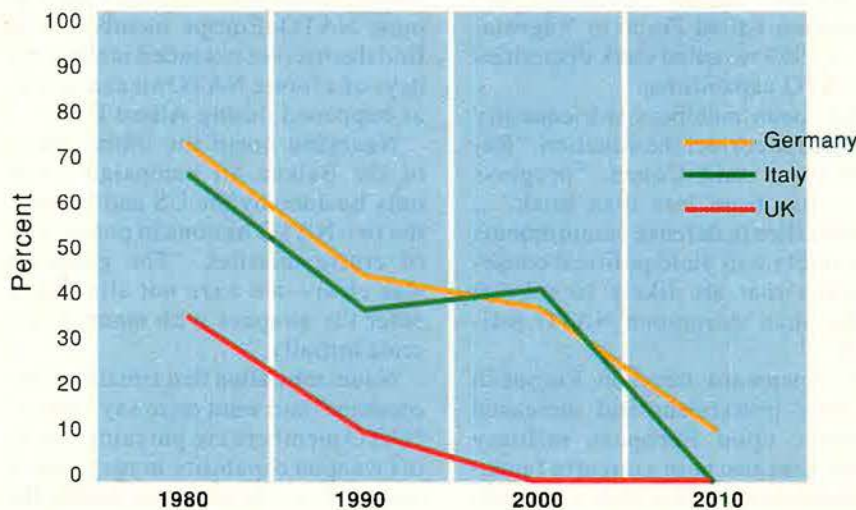
Enhancing these capabilities would greatly increase the flexibility of NATO allies’ air forces, allowing fighters from European nations to substitute for US aircraft in multiple mission areas, RAND found.

“The relatively modest costs of the targeting pods and direct attack munitions should put them within the reach of most NATO nations,” said the study. “Further, the United States should continue to encourage its NATO allies to acquire advanced precision munitions. GPS–guided weapons are particularly promising in that they are relatively inexpensive and can be employed without a targeting pod.”

### Command-and-Control Problems

The problem is not confined to attack hardware. As Naumann observed, “It is definitely not only the cruise missiles. I think [it is] the entire area of C<sup>4</sup>I [Command, Control, Communications, Computers,

## US-Designed Aircraft as a Percentage of Major NATO Allies’ Fighter Fleets



Source: RAND’s Interoperability Report

*In the Cold War, NATO interoperability was enhanced by the dominance of US-designed fighters in allied forces. As late as 1980, US designs made up much of the fighter element of major allied air forces except for France and Britain. (France is not represented here because it has not fielded a US design in this period.) Multinational European aircraft manufacturing in the 1970s and 1980s reduced the US footprint in forces in Britain, Germany, and Italy, as well as other forces. (Does not project sales of Joint Strike Fighter.)*



and Intelligence] where we have to take corrective action.”

NATO is not pulling its own weight in developing new, joint C<sup>4</sup>I systems. Gen. Gregory S. Martin, the commander of US Air Forces in Europe, recently observed, “We haven’t solved the command-and-control battle management and communications issue as well as we’d like to. We’ve got lots of individual capabilities that can send information rapidly, put it on a scope, but it is stovepiped; [the information] is not integrated, fused, and displayed” in its totality.

In the current budgetary environment, NATO seems unable to close these capability gaps. “Allies have recognized the value of [advanced] systems but have yet to make comparable investments,” RAND noted.

Martin observed that almost all NATO nations—Britain is an exception—“have either reduced their defense budget or have flat lined it, and there are no indications that they are willing to turn that around and spend more on some of these programs.”

“The forces of all NATO’s nations need to have the equipment and the technology to work together seamlessly, and they must be appropriate for modern operations,” Robertson observed.

The RAND study came to essentially the same conclusion.

“With current budgetary constraints and weak public support in some countries for defense expenditures, it is not clear that the NATO allies will make the necessary investments by increasing the defense budgets ... to acquire the needed capabilities. According to Secretary of Defense William Cohen: The challenge Europe faces today is to turn words into action,” RAND reported.

NATO’s Robertson pointed out that the European allies spend only about 60 percent as much as the US spends on defense. Moreover, Europe gets nowhere near as much as 60 percent of the return on its investment. He added that European NATO members will spend, combined, about one-quarter what the United States does on Research and Development.

Naumann takes an especially dim view of the science and technology gap. It is, he said, a “very telling fact” that the US spends \$36 billion per year for R&D and the Europeans



Photo by Gert Kromhout

**Tough task.** This Luftwaffe Tornado ECR, shown in Italy during 1996 Bosnian operations, is one of few European aircraft used for the critical SEAD role. RAND says adding SEAD capabilities will be one of NATO’s most difficult tasks.

and Canada spend only \$10 billion. NATO, he continued, has no master plan, so each member spends its paltry R&D budget meeting individual needs, not to address a unified plan.

“It doesn’t come as any surprise at all ... that they don’t achieve major progress,” Naumann has observed. And more than once he has said, “The Europeans definitely have to think about how they can get their acts together and work better together. They all are doing it on a national basis, and this of course is like spreading a little bit of water—and to spread it thinly.”

### Un-Common Fighters

Another concern is that the shift by NATO away from US aircraft over the next decade, to a primarily European fighter fleet, could harm interoperability through the loss of common systems. Currently, many NATO members fly air forces dominated by US products such as the Lockheed Martin F-16. But, partly because of concerns about the European military industrial base, this will shift dramatically in the next 10 years.

“Over the next 10 years,” RAND reported, “US-designed aircraft will become a small percentage of NATO fighter fleets as the EF-2000 (Typhoon) comes into service. The lack of system commonality between the US Air Force and the larger NATO allies’ air forces, both in their fighters and the munitions they carry, is

of particular concern in that the larger allies tend to participate most frequently in coalition operations.”

By 2015, only Belgium, Denmark, the Netherlands, and Norway—hardly the NATO military heavyweights—are expected to be flying significant numbers of US-designed aircraft, RAND observed.

Contributing to this problem is the fact that NATO-Europe now tends to look to European solutions for weapons requirements. This tendency drives up costs and reduces the quantities purchased, compared to what could be obtained if US-systems were procured instead.

The US-produced Joint Strike Fighter should be able to restore fighter commonality if NATO allies buy the new aircraft in large numbers. However, JSF will probably not make a major interoperability impact until at least 2015. The US Air Force is not expected to achieve initial operational capability with JSF until 2010—and the program’s schedule has repeatedly been called into question.

Current European investments tend to be funneled into an area in which the alliance is already strong—the air superiority mission. And that capability will become even stronger when the F-22 Raptor becomes available to USAF units in Europe.

The JSF will increase NATO fighter interoperability and improve upon the NATO air defense suppression shortfall—but RAND neverthe-





**NATO leads.** In one area the Europeans are ahead of USAF. NATO has 17 E-3 AWACS, with another six in the UK—all of which have the latest radar system improvement. USAF won't complete the upgrade for its 32 E-3s until 2006.

less found expensive, major programs like JSF are not the most effective routes to interoperability.

“Mindful of the current budgetary environment on both sides of the Atlantic, we emphasize lower-cost, short- and medium-term” solutions, the report found, such as unified NATO standards, organizational reform, and joint systems based on already existing technology.

The Europeans should pursue these options “rather than new, major weapon programs” so as to “encourage the United States’ NATO allies to ‘turn words into action,’” said RAND. This does not imply that indigenous European efforts such as the NATO alliance ground surveillance capability should be abandoned but rather that “a common platform approach should not be the dominant factor in addressing interoperability challenges,” RAND believes.

**Success Story**

One frequently cited success is the NATO E-3 Airborne Warning and Control System fleet. While the US Air Force owns 32 E-3s, NATO owns and operates 17, and Britain has declared six of its seven AWACS to be devoted to the alliance, meaning they will be available to NATO at any time the United Kingdom does not require them for domestic missions. The European-owned aircraft are essentially the same as the USAF systems, meaning the two AWACS

fleets are largely interchangeable for joint missions.

Oddly enough, however, the Air Force finds itself to be lagging behind Europe when it comes to AWACS technology, and this creates some minor interoperability concerns in the airborne early warning realm.

NATO AWACS have now completed the Radar System Improvement Program. The Air Force’s aircraft will not complete their version

of the program until 2006. Therefore, “for missions requiring RSIP capability, only a fraction of the US AWACS fleet will be interchangeable with the NATO AWACS fleet. ... Moreover, NATO has planned and fully funded additional E-3A upgrades,” which the US has not, RAND found.

A final concern about AWACS, according to RAND, is that NATO tends to train operators to focus on defensive surveillance missions, while US crews devote much more time to offensive aircraft control missions.

The potential for Europe to significantly upgrade systems for interoperability exists only if new investments are made. All sides acknowledge Europe must spend more, but there is much debate about how much interoperability is ultimately needed and how much NATO should be willing to pay for the benefits.

Retired Navy Adm. Harold W. Gehman Jr., the former commander in chief of US Joint Forces Command, said he faced interoperability problems regularly while serving with NATO forces. Gehman, however, does not believe allies require significant commonality to achieve mission goals, and he cautioned against “hopelessly expensive and complicated solutions.”

“You can prescribe allied inter-

**Fighter Aircraft Projections for Selected NATO Allies’ Air Forces (Year 2010)**

Country	Platform	Primary Mission	Number (Combat-Coded)
Belgium	F-16AM	Multirole	60
Denmark	F-16AM	Multirole	45
Netherlands	F-16AM	Multirole	89
Norway	F-16AM	Multirole	38
UK	EF-2000	Air superiority	105
	Tornado IDS	Ground attack	84
	Harrier	Ground attack	48
Germany	EF-2000	Air superiority	88
	Tornado IDS	Ground attack	178
	Tornado ECR	SEAD	35
Italy	EF-2000	Air superiority	59
	Tornado IDS	Ground attack	45
	Tornado ECR	SEAD	15
France	Rafale	Multirole	116
	Mirage 2000C/N	Multirole	136
	Mirage 2000-5	Multirole	37
Spain	EF-2000	Air superiority	43
	EF/A-18A	Multirole	55

Source: RAND’s Interoperability Report

*Projections for the fighter components of NATO–Europe air forces are shown here. What is readily apparent is that the Europeans have few US–designed fighters. These are limited to older model F-16s and F/A-18s. They are considered far less capable than current generation American fighter aircraft.*



operability requirements to [the point] where no one can do it and no amount of money can ever afford it," he observed, "or else you can really get serious about it and say that what we and our allies ... really need is a common view of the battlefield so we don't get in each other's way, we don't shoot at each other, and each of our allies can bring expertise to the battle without fumbling and bumbling or causing any problem."

### Common Data Communication

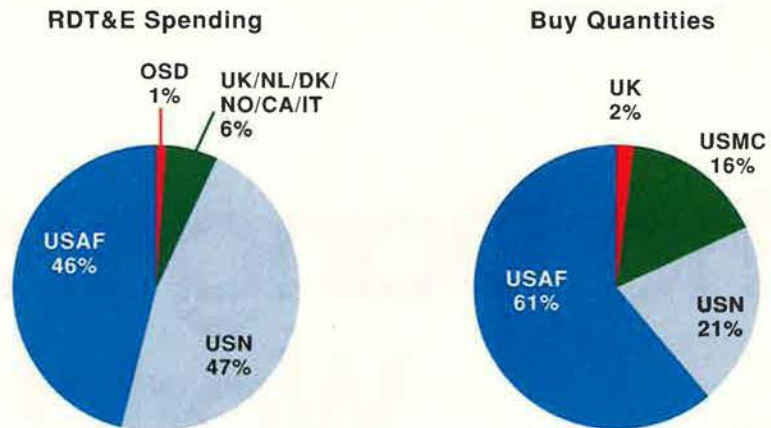
An example of pushing existing technology is the Multifunctional Information Distribution System, to be used by US and NATO fighter aircraft. Euromids, a European consortium, was awarded a contract to supply to France, Germany, Italy, and Spain a secure, jam-resistant, interoperable Link 16 communications link for fighter aircraft. It is a capability needed for "critical NATO operations," DoD said in a December statement announcing the contract.

The capability addresses RAND's finding that "there has long been a need for interoperable data communications for fighter aircraft." Today, most US and NATO allies' fighters communicate using unsecure analog radios that provide only interactive voice communications.

The United States is pursuing similar Multifunctional Information Distribution Systems for its own Navy and Air Force fighters. Air Combat Command sought to add \$20 million to the 2002 Air Force budget to accelerate the installation of a MIDS fighter data link aboard F-15E Strike Eagles, an upgrade the service describes as an "urgent" improvement to combat effectiveness. The Air Force says Link 16 capability will dramatically improve fighter aircraft situational awareness by providing an integrated air picture, targeting data, and the locations and headings of friendly and hostile aircraft.

By making comparable systems available to allies, the US should find it much easier to conduct joint and combined combat operations in the future. The Pentagon said the MIDS agreement comes as a response

## Joint Strike Fighter Acquisition



Source: RAND's Interoperability Report

*In 1996, the US began to develop the Joint Strike Fighter. Britain joined the program later that year, and the Netherlands, Denmark, and Norway joined in 1997. Italy has also played a role. However, the largest NATO nations have already made substantial investments in other systems—the UK, Germany, Italy, and Spain have invested \$19 billion in the EF-2000 alone. The worry is that these nations will end up buying few JSFs and interoperability will be limited. However, in January, the UK made a formal commitment to cooperate in JSF engineering and manufacturing development. UK industry is slated to receive a "sizable share" of the development work, according to DoD.*

UK=United Kingdom NL=Netherlands DK=Denmark NO=Norway CA=Canada IT=Italy

to lessons learned during Operation Allied Force. "One of the most important recommendations coming out of the Kosovo action was for greater interoperability of communications assets in order to improve joint political and military interface during crisis situations," the DoD announcement stated.

Interoperability manifests itself not only in successful operations but also in maintaining a sometimes fragile coalition of political entities. A frequent criticism of Allied Force was that the need for multiple governments to approve targets slowed the Air Force's ability to attack those targets.

"The importance of minimizing casualties—including those of friends and even possibly adversaries—has arguably increased in the post-Cold War world," RAND said. "This is because NATO politicians who ultimately decide if military intervention is warranted put a high value on minimizing casualties in efforts to mitigate public opposition."

In this environment, precision munitions will enable the United States to maintain coalition support

for combat by reducing collateral damage—and the political pressures it can create.

While there remains a potential for NATO to close the capability gap with the United States, RAND remains pessimistic about some capabilities. "Encouraging more NATO nations to procure standoff weapons or weapons carrying anti-armor submunitions would probably be ... difficult," the report noted, and "enhancing NATO allies' SEAD [Suppression of Enemy Air Defenses] capabilities may be even more difficult."

In sum, RAND found that being interoperable enhances combat power and strengthens NATO, but the United States seems to be leaving its allies behind in many key warfighting capabilities. NATO, therefore, needs to reprioritize its spending or increase its defense budget to maximize participation in future operations.

Gehman, the former US theater commander, is all for that. The United States and NATO will have to determine the "proper" level of interoperability, he said, in order to share information and conduct unified operations. As Gehman said, "Odds are, in the future ... if you cannot talk on an allied secure voice network you probably will not be invited to the party." ■

*Adam J. Hebert is associate editor of Inside the Air Force, a Washington, D.C.-based defense newsletter. His most recent article for Air Force Magazine, "Learning to Live With the Pilot Retention Problem," appeared in the January 2001 issue.*



Welcome to the future, as seen by the CIA's National Intelligence Council.

# The Dangerous World of 2015

By James Kitfield

**I**N 2015, the United States will still be the pre-eminent global power, unmatched in military, technological, and economic prowess. Even so, the world stage on which it will play such a dominant role will be more dangerous.

This world will be trickier—more complex, prone to rapid shifts in course, filled with a startling array of challenges.

Globalization and the continued networking of the global economy will not only generate great wealth by 2015 but also fuel tensions between haves and have nots. The information revolution will show itself to be the greatest influence on world affairs since the industrial revolution, but it will also empower nonstate actors such as international criminals and terrorists.

The rapid proliferation of advanced technology will significantly increase the threat posed by missiles and weapons of mass destruction.

Rapid aging in the industrial world and the arrival of a billion new inhabitants in the developing world will create giant waves of immigration and stoke competition for scarce resources such as water.

Both China and India will start to emerge as assertive actors in Asia. Russia will continue its decline. Japan will drop out of the top rank of economic powers. The Mideast will seethe with religious and ideological extremism.

Welcome to the future foretold in

“Global Trends 2015,” a 68-page study produced by CIA’s National Intelligence Council. Essentially a strategic threat assessment, the report represents an attempt to track world trends by tapping into the best minds in the private sector, academia, and think tanks.

“This is not a traditional intelligence assessment, depending on classified sources and methods,” wrote CIA Director George Tenet upon its December release. “Rather, it reflects an Intelligence Community fully engaged with outside experts.”

GT 2015 identifies seven “global drivers” in international affairs, overlays them on various regions of the world, and then estimates their relative impact 15 years hence.

While GT 2015 presents a generally positive view of future events, its authors do hedge their bets. The report acknowledges the possibility of significant “discontinuities,” or alternative scenarios (see box), that could lead to a far more negative outcome.

What follows is a summary of the report’s views in the seven key areas.

## 1. Future Conflict

Risk of war among developed nations will probably decrease over the next decade and a half, but the international community will likely confront relatively frequent internal upheavals and less frequent regional interstate wars.



The potential for conflict among regional rivals in Asia—specifically, India–Pakistan and China–Taiwan—and among numerous antagonists in the Middle East is great and will grow.

Conflicts of this type will be made worse by availability of ever more lethal weapons of mass destruction and the means to deliver them.

Internal conflicts stemming from religious, ethnic, economic, or political disputes will remain at current levels or increase.

In the future, export control regimes and sanctions will be less effective than today because of the diffusion of technology, porous borders, defense industry consolidations, and reliance upon foreign markets to maintain profitability. Arms and weapons technology transfers will be more difficult to control.

In the realm of war and military affairs, the US will be the heavyweight champion, maintaining a strong technological edge in information-heavy “battlefield awareness” and precision guided weaponry.

Even the United States, however, will face three significant types of threats:

**Asymmetric warfare.** State and nonstate adversaries will avoid direct engagements but devise strategies, tactics, and weapons—some improved by “sidewise” technology—to minimize US strengths and exploit perceived weaknesses. (Sidewise technology, per the report, includes developing innovative applications for “old” computer chips.)

**Strategic weapons of mass destruction.** Russia, China, “most likely” North Korea, “probably” Iran, and “possibly” Iraq have the power to strike the United States with nuclear missiles. In addition, there will be growth in the potential for unconventional delivery of weapons of mass destruction by states or nonstate actors.

**Regional threats.** A few countries will maintain large military forces with a mix of Cold War and post-Cold War concepts and technologies, posing a credible challenge to US might.

## 2. United States Power

Given its decisive edge in both information and weapons technology, as well as its economic power, the experts consulted for GT 2015 believe the United States will main-

## Dark Scenarios

While GT 2015 is generally upbeat in its projection of America's relative position in the world in a decade and a half, the study's authors note that the possibility exists for a far more negative future. Specifically, they point to eight darker scenarios that could result if the drivers and trends outlined in the report are managed badly.

■ **Middle East Meltdown.** Though the report predicts that Israel will attain a sort of “cold peace” with its Arab neighbors, GT 2015 notes that a change-resistant Middle East in general is poorly positioned to thrive in an age of globalization and information revolution. “With the exception of Israel, Middle Eastern states will view globalization more as a challenge than an opportunity,” the report states. With more than half the population in the Middle East presently under 20 years of age, the nations of the region are likely to face severe demographic pressures. By 2015 much of the Middle East population, for instance, will be significantly larger, poorer, more urban, and more disillusioned. Thus, “serious deterioration of living standards for the bulk of the population in several major Middle Eastern countries, and the failure of Israel and the Palestinians to conclude even a ‘cold peace,’ [could] lead to serious, violent political upheavals in Egypt, Jordan, and Saudi Arabia.”

■ **A Super Terrorist Cartel.** Apparently with the alliance between narco-traffickers and ultraviolent leftist insurgents in Colombia in mind—as well as the increased proliferation of weapons of mass destruction—the report cites as a significant potential “discontinuity” the trend toward more diverse, freewheeling transnational terrorist networks. Such alliances could lead “to the formation of an international terrorist coalition with diverse anti-Western objectives and access to [weapons of mass destruction].”

■ **A Global Pandemic or Environmental Emergency.** Another global epidemic on the scale of HIV/AIDS—or rapidly changing weather patterns attributable to global warming—could lead to grave damage with enormous costs for many developed nations. Such a crisis would likely spark “an enduring global consensus on the need for concerted action on health issues and the environment.”

■ **Nation-State Implosion.** A major crisis could result if a state of significant strategic concern to the United States—such as Iran, Israel, Saudi Arabia, or Nigeria—failed to manage serious internal religious or ethnic divisions.

■ **Globalization Backlash.** Apparently with a mind to disruptive protests against globalization in places such as Seattle, Washington, D.C., and Warsaw, Poland, over the past year, the report warns of a growing “anti-globalization” movement that could become a powerful and sustainable global political and cultural force, thus “threatening Western governments and corporate interests.”

■ **Anti-US Coalition.** With fears growing around the world over US hegemony, the report warns that China, Russia, and perhaps India could form a defacto geostrategic alliance in an attempt to counterbalance US and Western influence.

■ **Trans-Atlantic Division.** With the United States and the European Union already engaged in acrimonious disputes over various trade issues and an emerging independent European foreign affairs and defense identity, the report warns that the US–European alliance could collapse with potentially disastrous results.

■ **Global Economic Rift.** Major Asian countries could establish an Asian Monetary Fund or Asian Trade Organization, the report warns, thus undermining the International Monetary Fund and World Trade Organization and potentially crippling the United States' ability to exercise global economic leadership.

tain a dominant world position—if it wants to do so.

“This power,” says the CIA report, “not only will ensure America's pre-eminence but also will cast the United States as a key driver of the international system.”

America's unparalleled economic strength, investment in research and development, and highly regarded university system will all serve to bolster its pre-eminent position.

The study's authors do not underestimate the role that plain military might still plays in world affairs.

“Many potential adversaries, as reflected in doctrinal writings and statements, see US military concepts, to-

gether with technology, as giving the United States the ability to expand its lead in conventional warfighting capabilities,” the report concludes.

Allies and adversaries alike will factor continued US military pre-eminence in their calculations of national security interests and ambitions.

At the same time, both allies and adversaries alike “will try at times to check what they see as American ‘hegemony.’”

“There will be increasing numbers of important actors on the world stage to challenge and check—as well as to reinforce—US leadership,” the study says. It refers to countries such as China, Russia, India, Mexico, and



## Growth in Mega-Cities

(Millions of inhabitants)

City	1950	2000	2015
Beijing	1.7	11.7	19.4
Buenos Aires	5.25	12.2	13.9
Cairo	2.1	10.5	14.4
Calcutta	4.45	12.5	17.3
Dhaka (Bangladesh)	0.4	10.0	19.0
Jakarta	2.8	9.5	21.2
Karachi	1.1	11.0	20.6
Lagos	1.0	12.2	24.4
Los Angeles	4.0	12.9	14.2
Mexico City	3.5	17.6	19.0
Mumbai (India)	2.8	16.9	27.4
New York	12.0	16.5	17.6
Sao Paulo	2.3	17.3	19.0
Shanghai	4.3	13.9	23.4
Tokyo	6.2	27.7	28.7

The 2000 figures are estimates. The 2015 figures are projections. Population count covers entire metropolitan area. Source: NIC's Global Trends 2015.

Brazil; regional organizations such as the European Union; and a vast array of increasingly powerful multinational corporations and nonprofit organizations with their own interests.

For better or worse, the world will continue to identify the US as the leading proponent and beneficiary of globalization.

US economic actions, even when pursued for domestic goals such as

adjusting interest rates, will have a major global impact because of the tighter integration of global markets by 2015.

America will remain in the vanguard of the technological revolution from information to biotechnology and beyond.

### 3. Population and Demographics

In forecasting the state of the world

in 2015, GT 2015 takes note of two significant world population trends:

- In developed nations, the aging of the population, leading to a lower ratio of workers to retirees.

- In the developing world, a huge population boom, with most new inhabitants drawn by the magnet of urban "mega-cities."

The aging of the population in the Western industrialized nations—spurred by declining birth rates and advances in health care—will cause major strains on social services, pensions, and health care systems.

Governments will seek to counter those tensions by delaying retirement, encouraging women to enter the workforce, and relying more heavily on immigration and migrant workers.

GT 2015 warns especially of rapidly aging populations in Europe and Japan. There, immigration remains controversial. Rapid increases in immigration could cause conflicts over national identity and fissures in the social contract, potentially leading to increased xenophobia and nationalism.

If growth in Europe and Japan falters for lack of workers, the burden on the US economy will increase, weakening the overall global economy.

World population will grow from 6.1 billion today to 7.2 billion in 2015, with fully 95 percent of that increase coming in developing countries.

The number of people living in Third World mega-cities (those with more than 10 million inhabitants) will double to more than 400 million.

Such rapid population growth and urbanization will sorely test the social policies and service delivery of weak governments in the developing world.

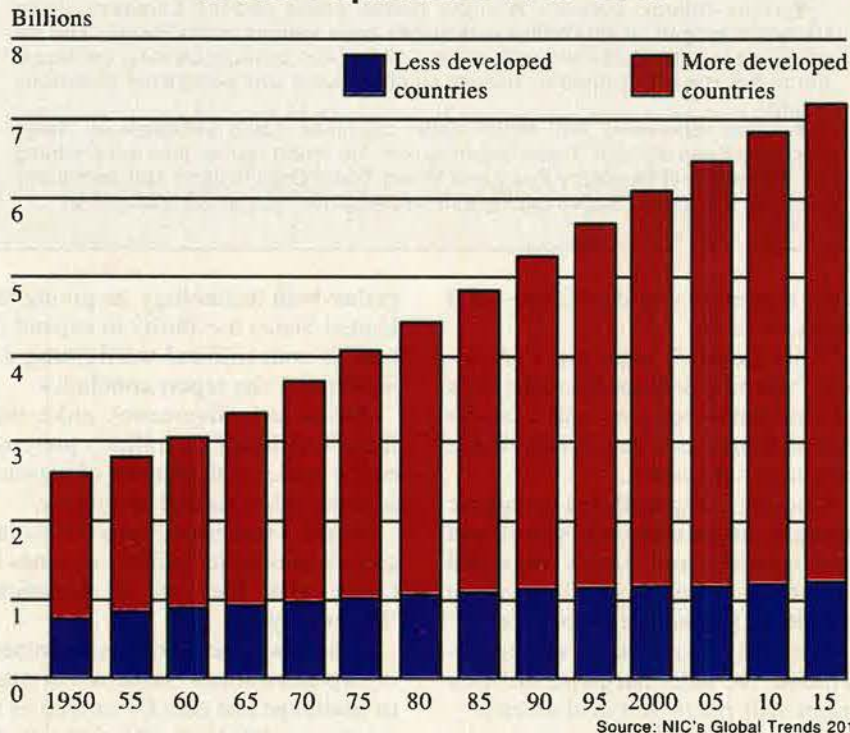
### 4. Science and Technology

GT 2015 experts agree that the information revolution under way around the world represents the most significant global transformation since the industrial revolution.

Continued fusion of advanced technologies—information, biotechnology, materials science, and nanotechnology—could well prolong and broaden that technological revolution.

Looking ahead another 15 years,

## Global Population: 1950–2015



In a mere half century, world population more than doubled—from 2.5 billion in 1950 to 6 billion in 2000. The number will spurt again to 7.2 billion in 2015.



the world will encounter more quantum leaps in information technology and in other areas of science and technology, the report forecasts.

The revolution's leading edge will be "continuing diffusion of information technology" and "applications of biotechnology."

Advances in science and technology, however, likely will prove to be a two-edged sword.

Examples: By 2015, local-to-global Internet access and new constellations of low-cost satellites will bring near-universal wireless connectivity via handheld devices. The rise of biotechnology will drive medical breakthroughs sure to increase human health and longevity. Genetically modified crops will help feed the world's people.

However, poorer and less developed nations are likely to fail in this endeavor and benefit less than others. As a result, the gap between "haves" and "have nots" will increase.

### 5. Globalization

Closely tied to the technological revolution is an increasingly networked global economy that is driven by rapid and free flows of informa-

tion, ideas, cultural values, capital, people, and goods and services.

This is globalization, whose dynamism is reshaping world economics, politics, culture, and more.

So dynamic is globalization, in

fact, that GT 2015 predicts that over the next 15 years global economic growth will return to the high levels reached in the 1960s and early 1970s, the final years in the post-World War II "long boom."

Dynamism will be strongest among so-called "emerging markets"—especially in the two Asian giants, China and India—but will be broadly based worldwide, taking in industrialized and developing countries, the report concludes.

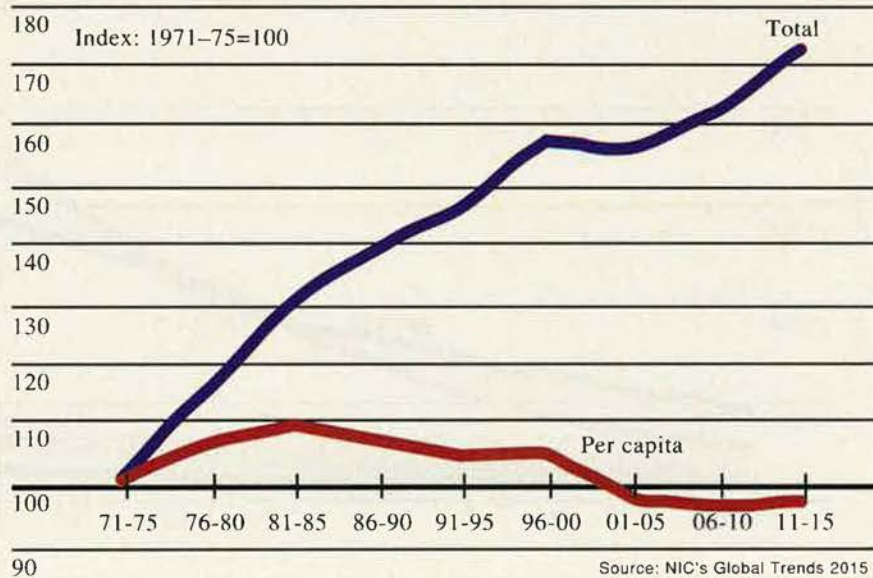
One thing will not change: The economy will produce losers as well as winners. "The rising tide of the global economy will create many economic winners, but it will not lift all boats," says the report.

Regions, countries, and groups that feel left behind by globalization, the report predicts, will face deepening economic stagnation, political instability, and cultural alienation. The result will likely be greater political, ideological, and religious extremism, along with the violence that often accompanies it.

The new global, interconnected economy will be volatile in ways not seen in the past. If the US economy suffers a prolonged downturn, for instance, international financial markets might face profound instability and disruption.

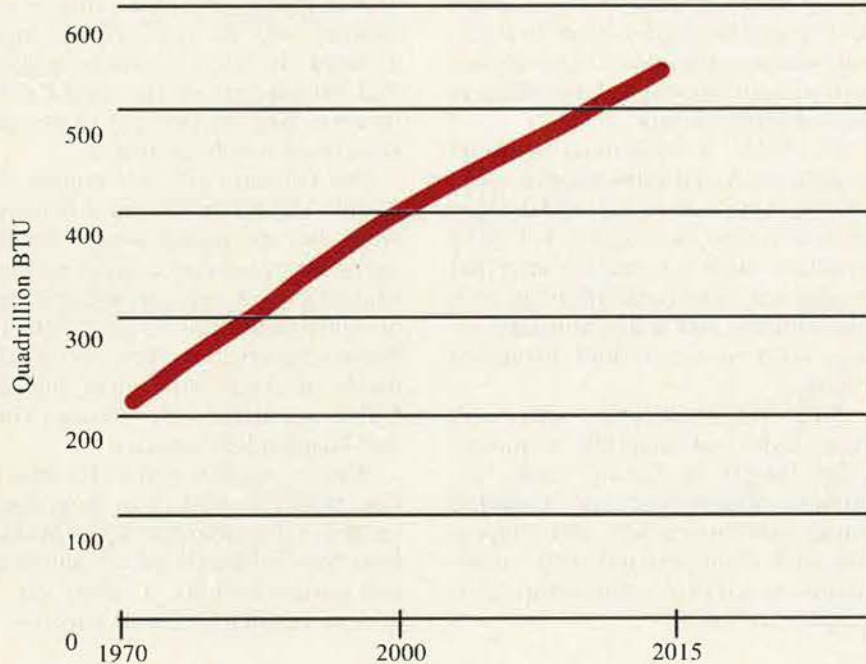
"The US economy—the most important driver of recent global

### Global Grain Production: 1971–2015



As this graphic shows, total production of grain will nearly double between 1971 and 2015. However, the amount of grain available to each person has been declining since the early 1980s—a trend expected to worsen.

### World Energy Consumption: 1970–2015

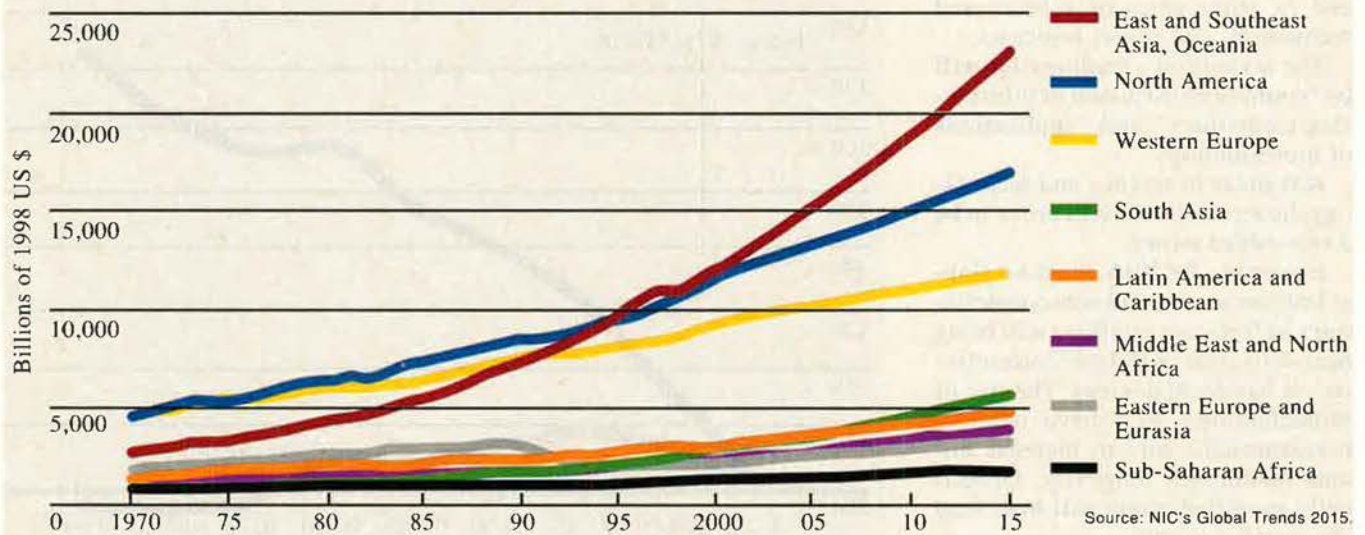


Source: NIC's Global Trends 2015

Energy consumption, which doubled in 1970–2000, will nearly double again in the next 15 years. However, the CIA study projects an adequate supply of energy.



## Regional Gross Domestic Product: 1970–2015



**For 30 years, a gap has been opening between “haves” and “have nots.” This will get worse over the next 15 years, as the economies of North America, Western Europe, and the Asian-Pacific region pull further ahead.**

growth—is vulnerable to loss of international confidence in its growth prospects,” states the report. This could well cause a painful downturn, with negative consequences around the world.

GT 2015 warns that its generally upbeat economic predictions might have to be drastically revised if:

- China or India fail to sustain high economic growth and discontinue their economic reforms.
- Global energy supplies suffer major disruption, perhaps as a result of war among key energy-producing states.
- Emerging-market countries in Asia and Latin America fail to reform financial institutions and lose access to capital.

### 6. National and International Governance

Governments able to adapt to dramatic changes in the world environment will thrive in 2015. The reverse also is true.

Internationally, governments will increasingly form cooperative alliances and partnerships to exploit increased flows of migration, information, capital, and new technologies.

Internally, they will eliminate stovepipe-style government organizations that inhibit rapid problem solving actions.

“Shaping the complex, fast-moving world of 2015 will require re-

shaping traditional government structures,” the authors write, noting that the requirement favors the US and the other Western democracies.

The freer flow of information and multiple channels of information flow will complicate and undercut the authoritarian’s ability to maintain control.

While nation-states will continue to dominate world affairs, nonstate actors ranging from business firms and nonprofit organizations to international terrorist and criminal groups will play increasingly large roles in international affairs.

By 2015, transnational criminal organizations will have become adept at exploiting technology and the free flow of goods and capital. GT 2015 predicts such organized criminal groups will form loose alliances with one another and other nonstate actors such as terror and insurgent groups.

Such unholy alliances will “corrupt leaders of unstable, economically fragile or failing states, insinuate themselves into troubled banks and businesses, and cooperate with insurgent political movements to control substantial geographic areas.”

### 7. Natural Resources and Environment

The world of 2015 will produce enough food, in the aggregate, to feed 7.2 billion human beings. Even so, the world will lack sufficient infrastructure and distribution.

This problem, combined with political instability and chronic poverty, portends malnourishment in parts of Sub-Saharan Africa.

Despite a 50 percent increase in global energy demand, energy resources will be sufficient to meet demand; the latest estimates suggest that 80 percent of the world’s oil reserves and 95 percent of its gas reserves are still untapped.

The Persian Gulf will remain the world’s largest single source of petroleum, but the global energy market will encompass two distinct patterns of distribution: one serving consumers (including the US) from Atlantic Basin reserves, the other meeting the needs of Asian customers (mostly China and India) from Persian Gulf and Caspian Sea supplies.

Water scarcities and water allocation problems will pose great challenges to governments in the Middle East, Sub-Saharan Africa, South Asia, and northern China, a factor that is sure to heighten regional tensions. ■

*James Kitfield is the defense correspondent for National Journal in Washington, D.C. His most recent article for Air Force Magazine—“Are We Wearing Out the Guard and Reserve?”—appeared in February 2001.*



# Industrial Associates



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

3M/Federal Systems AAI Corp. ACS Defense, Inc. Advanced Technical Products Aerojet Aerospace Corp. Aerospaiale, Inc. Alliant Techsystems, Inc. American Ordnance LLP Analytic Services, Inc. (ANSER) Anheuser-Busch, Inc. Anteon Corp. ARINC Armed Forces Journal International AT&T Federal Systems Atlantic Research Corp. Autometric, Inc. BAE SYSTEMS, Canada BAE SYSTEMS, Inc. Battelle Memorial Institute Bell Helicopter Textron BFGoodrich/UPCO Boeing Co. Bombardier Inc., Canadair Booz Allen & Hamilton, Inc. Bose Corp. Brown & Root Services Corp. Burdshaw Associates, Ltd. CACI, Inc.—Federal Camelbak Computer Sciences Corp. COMSAT Aeronautical Services CSC/Nichols Research Cubic Defense Sys- tems Cypress International, Inc. Derco Aerospace, Inc. DFI International Dowty Aerospace Dynamic Concepts, Inc. DynCorp Eastman Kodak Co., C&GS ECC International Corp.	EDO Corp., Govern- ment Systems Div. EDS EFW, Inc. E.H. Industries E.I. du Pont de Nemours & Co. Emergent Information Technologies, Inc. Evans & Sutherland Firearms Training Systems, Inc. FLIR Systems, Inc. GE Aircraft Engines GEICO General Atomics General Dynamics Gentry & Associates, Inc. Georgia Tech Research Institute Gulfstream Aerospace Corp. Harris Electronic Systems Sector Harris Government Communications Systems Div. Harris Government Support Systems Div. Honeywell, Inc., Space and Aviation Control Howell Instruments, Inc. Hughes Space and Communications IMO Industries, Inc. Ingersoll-Rand Co. Intergraph Corp. Interstate Electronics Corp. Israel Aircraft Indus- tries International, Inc. ITA Corp. ITT Defense Jane's Information Group JGW International Johnson Controls World Services, Inc. Kollsman Lear Siegler Services, Inc. Litton Advanced Systems Litton Guidance &	Control Systems Litton Industries Litton Integrated Systems Litton PRC Lockheed Martin Corp. Lockheed Martin Aeronautics Co. Lockheed Martin Systems Integration Lockheed Martin Corp., Fairchild Systems Lockheed Martin Technology Services Lockheed Martin Space Systems Co. Logicon, Inc. Logistics Management Institute Lucas Aerospace, TRW Aeronautical Sys- tems Lucent Technologies, Inc. Management Consult- ing & Research, Inc. Martin-Baker Aircraft Co., Ltd. Miltop Corp. Motorola, Inc., GSTG MTS-3, Inc. NavCom Defense Electronics, Inc. NCI Information Systems Nortel Networks Northrop Grumman Corp. Northrop Grumman, Airborne Ground Surveillance & Battle Management Sys- tems Orbital Sciences Corp. Perry-Judd's, Inc. Per Udsen Co. Precision Echo, Inc. PricewaterhouseCoopers, LLP Racal Communications, Inc. Rafael USA, Inc. RAND Rational Software Corp. Raytheon Aircraft Co. Raytheon Co. RECON/OPTICAL, Inc. Reflectone, Inc.	Robbins-Gioia, Inc. Rockwell Collins Avionics & Commu- nications Div. Rolls Royce, Inc. Sabreliner Corp. Sargent Fletcher, a Cobham plc com- pany Science Applications International Corp. SDS International, Inc. SecureInfo Corp. Sensis Corp. Sikorsky Aircraft Smiths Industries, Aerospace & Defence Systems Spectrum Astro, Inc. Sun Microsystems Federal, Inc. Sverdrup Technology, Inc. Symetrics Industries, Inc. Systems & Electronics, Inc. Teledyne Brown Engineering Teledyne, Inc. Telephonics Corp. Textron Textron Defense Systems Themis Computer Thiokol Corp. Titan Systems Corp. TRW Space & Elec- tronics Group TRW Systems & Infor- mation Technology Group Ultra Electronics Unisys Corp. USAA UTC, Hamilton Sundstrand UTC, Pratt & Whitney UTC, Pratt & Whitney/ Space Propulsion Operations Veridian Virtual Prototypes, Inc. Vought Aircraft Industries Williams International W.L. Gore & Associates
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**“History shows that weakness is provocative.”**

# Rumsfeld's New Order



*Donald H. Rumsfeld, chosen by President George W. Bush to lead the Pentagon, was sworn in as the 21st Secretary of Defense on Jan. 20. He held the same post under President Ford in 1975–77. Rumsfeld served on active duty as a naval aviator. He also has chaired several high-profile defense commissions in recent years. What follows are excerpts from his confirmation hearing on Jan. 11 before the Senate Armed Services Committee.*

## **Peace Through Strength**

“If I know anything, I know that history shows that weakness is provocative. Weakness invites people into doing things they wouldn’t otherwise think of. And what we have to do is better understand what we’ll deter and what we’ll defend against this new range of threats.”

## **No Graduated Response**

“I’m no fan of graduated response. If we’re going to do something, let’s do it.”

## **Defense Investment**

“If you’re not investing for the future, you’re going to die. You simply run out of gas at a certain point. ... The country, this committee, this department, simply must be willing to make those investments.”

## **Infusion of New Weapons**

“The need to swiftly introduce new weapons systems is paramount. The transformation of US military power to take full advantage of commercially created information technology may require undertaking a near-term investment to acquire modern capabilities derived from US scientific and industrial pre-eminence, rather than simply upgrading existing systems.”

## **Go for Missile Defense**

“There’s no question but that ... we should deploy a missile defense system when it’s technologically possible and effective.”

## **Defense and Deterrence**

“The ability to defend ourselves and our friends against attacks by

missiles and other terror weapons can strengthen deterrence and provide an important complement to purely retaliatory capabilities. ... Effective missile defense ... must be achieved.”

## **Dangers of Defenselessness**

“We talk frequently about the risks of deploying missile defense. ... What are the risks of not deploying missile defense? I would mention several. ... If some countries that have significant technological capabilities decide that they are vulnerable to ballistic missiles from their neighbors and that we lack the ability to assist them in defending against that capability, we may contribute to proliferation by encouraging them to go forward and develop their own nuclear weapons and their own ballistic missiles. ... If we know of certain knowledge that another country has a nuclear warhead that can affect us, and we don’t feel we have a good grip on their motivations, their behavior patterns, what could dissuade them, and we know that they are capable of using it, we are forced into one of two courses of action. Either we acquiesce and change our behavior and change our interests and alter what we would otherwise have done, or we have to pre-empt.”

## **Russia and Missile Defense**

“There’s no way I can prove what I’m going to say, but I have a feeling that, once the Russians understand that the United States is serious about this and intends to deploy [a system], they will ... in fact, find a way in the ... discussions that take place to accept that reality.”



## Clinton's NMD Plan

"The current system was designed to fit within the [ABM] treaty. ... That treaty is ancient history. It dates even back farther than when I was last in the Pentagon. That's a long time. Think what's happened to technology in the intervening period. I mean, to try to fashion something that fits within the constraints of that [treaty] and expect that you're going to get the most effective program, the earliest to deploy, and the most cost-effective, it boggles the mind."

## Nuclear Deterrence

"Credible deterrence no longer can be based solely on the prospect of punishment through massive retaliation. Instead, it must be based on a combination of offensive nuclear and non-nuclear defensive capabilities working together to deny potential adversaries the opportunity and benefits from the threat or use of weapons of mass destruction."

## Rogue State Deterrence

"The problem with ballistic missiles, with weapons of mass destruction, ... is they work without being fired. They alter behavior. ... If Saddam Hussein, a week before he invaded Kuwait, had demonstrated that he had a ballistic missile and a nuclear weapon, the task of trying to put together that coalition would have been impossible. There is no way you could have persuaded the European countries that they should put themselves at risk to a nuclear weapon."

## Prevention Is Paramount

"We don't want to win wars. We want to prevent them. We want to be so powerful and so forward looking, that it is clear to others that they ought not to be damaging their neighbors when it affects our interest."

## Criteria for Use of Force

"Is what you think you want to do actually achievable? It may be meritorious, it may need to be done, but if you can't really do it, oughtn't you maybe not to try? ... Do you have the resources? You might be able to do it, but if you're spread all over the world and you simply don't have the capabilities at that given moment, then you've got to face up to the truth ... that you can't do

everything. ... To what degree is this particular activity or recommendation truly a part of our national interest?"

## Public Support

"You mention overwhelming public support as a criteria [for committing troops abroad]. I'm uncomfortable with that. I think that leaders have to lead and build support. And I look back at history, and I think there have been times when we have had to do things when the public was not there yet. ... You can't sustain anything without it, I quite agree. But I think that thinking that you're going to have it at the outset is optimistic."

## Overwhelming Force

"It's a proper thing to say we don't want to do something unless we're going to put the force into it we need, but the concept of overwhelming force in isolation, I would think needs to have another dimension, and it is this. In the pre-crisis period, in the early period, you can do things to alter people's behavior that does not require 500,000 troops and six months to build up."

## New US Commitments

"Let's try not to get into things we can't get out of. Let's try not to get into things we can't finish well."

## Americans as Peacekeepers?

"I don't think that it's necessarily true that the United States has to become a great peacekeeper, if you will. I think we need to have capabilities ... that are distinct from warfighting capabilities, but I also think other countries can participate in these activities."

## Nation Building

"We're not geniuses at nation-building. ... People say, '[Look at] the Marshall Plan.' Goodness gracious, those [Western European] countries were there, they were capable, they were confident. We gave them money. They did what they did. And the analogy of the Marshall Plan to some of the kinds of continents that we've been dealing with and the problems we've been dealing [with], I think is a mismatch."

## Command and Control, Space

"A modern command, control,



communication, and intelligence infrastructure is the foundation upon which US military power is employed. The development and deployment of a truly modern and effective command, control, communication, and intelligence system is fundamental to the transformation of US military forces."

## Space Vulnerability

"We know that Russia or former Russian republics are selling ... handheld jammers that can jam satellite signals. We know that there is an organization in England that makes and puts in space micro-satellites that have a variety of capabilities for lots of countries. China has a relationship with them, and many other countries do as well. If you are as dependent as our country is on space, you are, by definition, vulnerable, more vulnerable than others."

## Militarization of Space

"We know what's been done on land by way of military conflict, we know what's been done on the sea, and we know what's been done in the air. I think it would be a stretch to suggest that space will not, at some point in the future, find itself receiving similar attention."

## Deterrence in Space

"We have a lot of assets in space. ... There's no question in my mind but that it's in our interest to create the kinds of deterrents and capabilities so that it's not attractive to disable the United States [by taking advantage of] our enormous dependence on space assets."





### **Efficacy of Drug War**

"I'm one who believes that the [United States'] drug problem is probably overwhelmingly a demand problem. If the demand persists, it's going to find ways to get what it wants, and if it isn't from Colombia, it will be from somebody else."

### **Biological Terror**

"I would rank bioterrorism quite high in terms of threats. ... It does not take a genius to create agents that are enormously powerful, and they can be done in mobile facilities, in small facilities. It is something that merits very serious attention."

### **European Defense Force**

"Let me just put it this way: I think anything that damages the NATO cohesion would be unwise for Europe, for the United States, and for our ability to contribute to peace and stability in that part of the world."

### **US and China**

"It is true, as the President-elect said, that we are competitors. ... We see their defense budget increasing by double digits every year, and we see an awful lot of their military doctrine talking about leapfrogging generations of capabilities and moving towards asymmetrical threats to the United States—cyber-warfare and these types of things. ... They are not strategic partners, in my view."

### **International Criminal Court**

"It pose[s] a risk to the men and women in the armed services, that

they could be doing the bidding of the United States government ... and be hauled before an international court for war crimes. It concerned me and it concerned a whole series of former Secretaries of State and Secretaries of Defense."

### **Terrorism**

"The problem of terrorism is an exceedingly serious one. It's a problem for us in our homeland. It's a problem for deployed forces. It's a problem for our friends and allies. And I think it was Lenin who said that the purpose of terrorism is to terrorize, and that's what it does. It changes people's behavior."

### **Readiness**

"It's one thing to say, 'Here are our readiness categories, and here are the levels of readiness that we need to meet.' That's well and good, but the first thing to do is to say, 'Ready for what?' And we need to make sure that ... they aren't simply categories that existed and fit the prior period but are not well-adapted to the future."

### **North Korea**

"It's hard to believe that a country that can't feed its own people, that has a dictatorship that is repressive and damaging to its country as anything on the face of the Earth, could be developing and marketing and benefitting financially from the proliferation of these [mass-destruction-weapon] technologies, but it's a fact."

### **Aircraft Carriers**

"As an ex-Navy pilot, I'm not unaware of the value of aircraft carriers, but the last thing I'm going to do is start speculating about one weapon system. I've got an enormous task to gather some folks and look at the whole picture and see that they come into a coherent whole, and I'm reluctant to start piecing things up prematurely."

### **Weapon Acquisition System**

"The pace of [new weapon] development has become slower, while the pace of technological change has become far more rapid. These two opposite trends conspire to create a situation where it is difficult for the acquisition process to produce anything other than capabili-

ties that are already a generation behind when deployed. This problem must be addressed. Simply tinkering with the present acquisition system will not provide the innovation and speed necessary to satisfy future military needs and take advantage of powerful new technologies."

### **No Half Measures**

"The task facing the Department of Defense is enormously complex. It is not a time to preside and tweak and calibrate what's going on. It is a time to take what's been done to start this [defense] transformation and see that it is continued."

### **Shedding the Unuseful**

"While much of the existing defense establishment can be adapted to 21st century needs, a good deal cannot. We must move forcefully to rationalize the costly burden of force structures and practices that do not contribute to current and future US security needs."

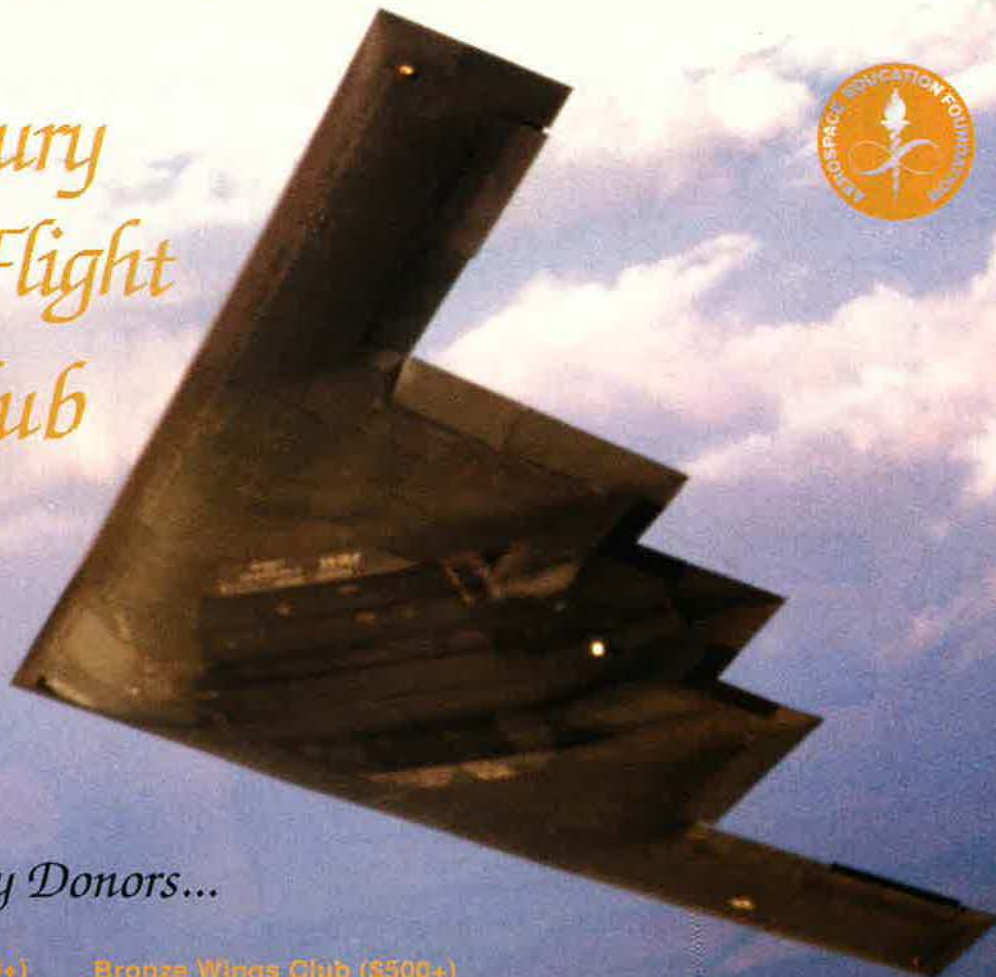
### **Defense Industrial Base**

"[The decline of] the defense industrial base ... is a very serious problem. I mean, the return on investment in the defense industry today is not sufficient to attract investment. And the government doesn't make things. We purchase things, we acquire things, and that industry has to be there. And to be there, it has to be viable from an economic standpoint or people are not going to invest in it. It is a very serious problem." ■





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# Minuteman

The nation's ICBM workhorse is still going strong.

# Turns 40

By Bruce D. Callander

**L**IKE the B-52 bomber, C-130 transport, and precious few other weapons, the Minuteman missile legitimately can be called a workhorse. Forty years have passed since its flawless first test flight. Even so, it remains in active service, having outlasted all rival ICBMs and most aircraft.

Minuteman is special. How long has it been around? John F. Kennedy had been President for all of 12 days when the first test missile, on Feb. 1, 1961, blasted off from Cape Canaveral, Fla., and flew successfully to a target 4,600 miles downrange.

Over the next 40 years, three versions of Minuteman logged millions of hours of operational duty. (The Minuteman III reached 100 million hours in 1995.) To achieve that record, the venerable ICBM had to survive budget cuts, arms negotiations, drawdowns, ban-the-bomb campaigns, and numerous Air Force reorganizations.

Already, Minuteman has lasted years beyond its projected service life. It has gone from having a single warhead, up to two and three, and now back down to one. And it is programmed to be America's premier ICBM for another 20 years, minimum.

Minuteman was a child of the Cold War. By the time its development began in the late 1950s, the Soviet Union already had acquired atomic weapons, put a satellite into orbit, and fielded its own formidable ICBM.

US efforts had suffered serious setbacks, spectacular failures, and spiraling cost. The US had deployed two generations of ICBMs, but the Air Force still was looking for one that could be built, operated, and maintained at a reasonable cost. Those early weapons were liquid-fueled missiles. The Air Force wanted





a system that would be safer to handle and based more securely.

In February 1958, the Defense Department approved an Air Force plan to develop a more-effective and more-survivable solid-fueled ICBM. USAF settled on the Minuteman design, a three-stage, rocket-powered missile with a 6,000-mile range. It was equipped with a single nuclear warhead.

Minuteman was to have an all-inertial guidance system and be launched from hardened, widely dispersed underground silos.

### Working on the Railroad

In the program's earliest days, Strategic Air Command declared that it wanted to deploy up to 150 Minuteman missiles on railroad cars, but the corporate Air Force opted to emphasize deployment in silos. Defense Secretary Robert S. McNamara later canceled the mobile Minuteman. (The idea would be resurrected with the Peacekeeper (MX) program during an ICBM controversy in the 1970s.)

The development and test program proceeded briskly. The initial flight of Minuteman marked the first time that a test missile was launched with all systems and stages functioning. Procurement and deployment came right away.

In December 1961, SAC deployed the first Minuteman I (Model A) squadron at Malmstrom AFB, Mont. It would later add two more units. The next 13 squadrons to be deployed received the more advanced Model B Minuteman. On Feb. 28, 1963, the first unit—the 10th Strategic Missile Squadron—was declared operational.

Each missile was housed in an underground, unmanned bunker. It was controlled by a two-officer crew in a separate hardened launch control center set up to monitor 10 missiles.

In 1966, the Air Force began a nine-year modernization program to replace all Minuteman Is and early IIs with more advanced weapons. The last Minuteman I was deactivated in 1972.

The new missile, the Minuteman II, had been in the works since 1963. This F model had a larger second stage and improved guidance. Its range was extended, but it still carried a single nuclear warhead.

In all, 450 Minuteman IIs were fielded. To accommodate them, the

Air Force retrofitted the original Minuteman I launch and control facilities, making them more survivable.

By the time the last Minuteman II was in place, the Air Force already was well on the way toward developing an even more advanced Model G. This Minuteman III would have a still better guidance system.

Even more importantly, the new missile would feature, for the first time, a so-called Multiple Independently Targetable Re-entry Vehicle system, which would permit the Air Force to equip each missile with two or three thermonuclear warheads.

In April 1970, the first Minuteman III was placed in a silo at Minot AFB, N.D. Hundreds more followed, and nearly 15 years later SAC launched a massive upgrade and modification program called Rivet MILE, for Minuteman Integrated Life Extension program, to carry the ICBM well into the next century.

The prime contractor for Minuteman III was Boeing, with Thiokol providing the first stage rocketry, Aerojet-General the second, and United Technologies the third. The missile is almost 60 feet long, has a range of more than 7,000 miles, a

speed of 15,000 mph, and a ceiling of 700 miles.

### Not First

Minuteman was not the first American ICBM, but it was less difficult and dangerous than earlier liquid-fueled systems. It was a long time coming. The nation embarked on missile development following World War II but not with any great vigor.

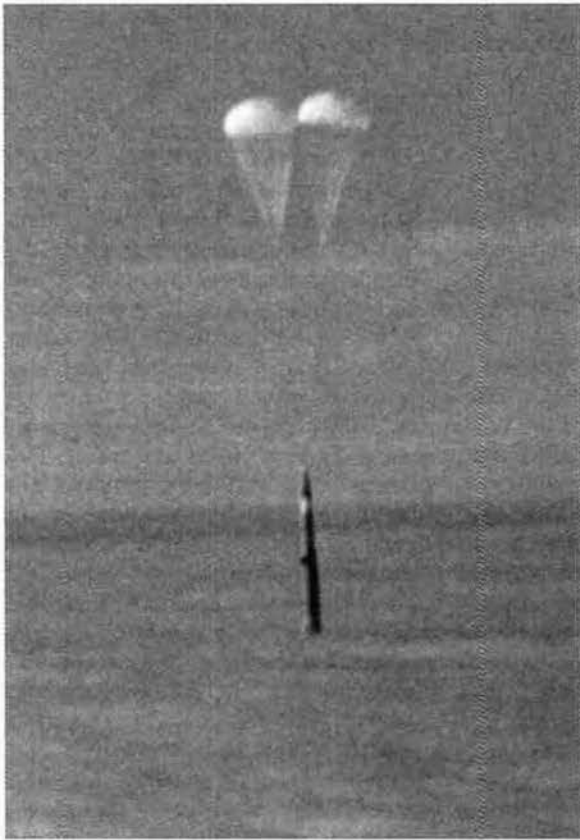
If support for the ICBM effort lagged in the immediate postwar period, it picked up dramatically after 1949, when the Soviet Union detonated its first nuclear device. The Korean War and the discovery that the Soviets already were developing large long-range rockets further spurred US efforts.

Several factors had given the Soviets an edge. One was that they had not wasted time on winged vehicles, as the US had, and focused from the start on ballistic missiles. Another was that they hadn't worried that nuclear warheads were so large and heavy for the existing rocket engines. They just built bigger missiles to accommodate them. And, the Soviet Union had not divided its efforts between military missiles and the civilian space program to the extent the US did. By the early 1950s, the



*Just 10 months after the successful test of the Minuteman ICBM in February 1961, Strategic Air Command deployed the first squadron. The squadron was declared operational in February 1963. This 1971 photo shows a Minuteman combat crew in the white crew uniform of the era.*





***At the Western Test Range off California in October 1974, a Minuteman I is lowered by parachutes before it ignites as part of an air mobile feasibility demonstration.***

United States was playing catch-up. The election of President Dwight D. Eisenhower brought a new team to Washington, and modernizing the forces—especially long-range missiles—became a priority.

Among the new movers and shakers were Trevor Gardner, special assistant for Research and Development to the Secretary of the Air Force, and Donald A. Quarles, the DoD point man for R&D who soon would become Air Force Secretary. These two initiated crash studies of defense and service Research and Development programs, from which they learned that it was technically possible to develop a rocket-powered ICBM with a nuclear warhead but that doing it quickly would require a new, streamlined management approach.

The Air Force's answer was to form the Western Development Division of Air Research and Development Command (later Air Force Systems Command). It put Brig. Gen. Bernard A. Schriever in command and gave him broad powers over not only R&D but also procurement.

Schriever assembled the best available personnel and facilities and used the newly formed Ramo-Wooldridge Corp. to provide general systems

engineering and technical direction. He scrapped the traditional process of nursing weapons systems through a succession of evolutionary steps and pressed development on several fronts concurrently.

The first program to bear fruit was the Atlas missile. WDD gave Convair a development contract for it in January 1955, and the first A version was test launched in June 1957. This one had a relatively short range but later models reached distances of some 7,475 miles. The program led to deployment of Atlas D, E, and F missiles.

The last of these weapons had an all-inertial guidance and was fitted with improved 390,000-pound-thrust engines, which gave it a quicker launch time than earlier models. It also could be deployed vertically in hardened silos for greater protection.

In 1955, while the Atlas program was still taking shape, the Air Force began two other programs, one for the short-ranged Thor and the other for another ICBM, the Titan.

### **Service Competition**

Meanwhile, the Army was working on missiles with various ranges, and the Navy was pursuing a number of projects, including a sea-launched

missile that would evolve into the Polaris.

Each service developed its own rationale for why it should be the agency to exploit missile technology. The Army considered missiles of any range to be a logical extension of artillery. The Navy saw missiles as another threat to its turf and moved to take a role in their use. The Air Force, still new and struggling for its place on the defense team, viewed ICBMs, like long-range bombers, as another form of airpower.

In 1956, Secretary of Defense Charles E. Wilson stepped in and defined roles and missions for each service regarding missiles and aircraft. Under these orders and later refinements, the Army and Navy were circumscribed, and the Air Force got sole authority to operate land-based intermediate-range ballistic missiles and ICBMs.

While the Air Force already had achieved intercontinental range with the Atlas and the Titan, both had serious limitations. Both were liquid fueled. This made them more powerful but also dangerous. It also took longer to get them ready for launch and thus made them more vulnerable.

Within the aerospace community, it had long been held that solid-fueled rockets promised greater reliability, readiness, and ease of handling in most military applications. The problem was they offered poor performance in terms of net payload weight for total missile weight. This was the difficulty the Soviets had overcome simply by building bigger missiles.

The Americans found another solution, however. By 1957, solid fuels had been improved and the weight of nuclear warheads had been reduced.

This set the stage for the solid-fueled Minuteman. It would be more economical to operate than its predecessors, more reliable, and because it could be launched from hardened and widely dispersed underground silos, better able to evade or survive a Soviet nuclear first strike.

In its early stages, the Minuteman project was viewed as somewhat marginal. However, the first Minuteman test was such a spectacular success that views changed. Gen. Curtis E. LeMay, Air Force Chief of Staff, approved plans to begin phasing out the Atlas. McNamara accel-



## Forty Years of Minuteman

**Feb. 1, 1961.** The first Boeing LGM-30A Minuteman ICBM is launched from Cape Canaveral Missile Test Annex in Florida. It travels 4,600 miles and hits the target area. This is the first time a first-test missile is launched with all systems and stages functioning.

**Feb. 28, 1963.** The first Minuteman squadron, the 10th Strategic Missile Squadron at Malmstrom AFB, Mont., is declared operational.

**April 11, 1963.** The first successful launch of a fully operational Boeing Minuteman I from Vandenberg AFB, Calif., is conducted.

**Oct. 17, 1963.** The first SAC Minuteman I operational test launch is carried out at Vandenberg AFB by a crew from Malmstrom AFB. The shot is a partial success. The re-entry vehicle overshoots the target.

**Feb. 1, 1965.** The first Boeing LGM-30F Minuteman II unit, the 447th SMS at Grand Forks AFB, N.D., is activated.

**March 1, 1965.** An unarmed Boeing LGM-30B Minuteman I is successfully launched from an underground silo 10 miles north of Newell, S.D. It is the first time a site other than Vandenberg AFB or Cape Kennedy AFS, Fla., is used for an ICBM launch.

**Aug. 16, 1968.** The first test launch of a Boeing LGM-30G Minuteman III is carried out from Cape Kennedy AFS, Fla.

**Oct. 24, 1974.** The Air Force's Space and Missile Systems Organization carries out a midair launch of a Boeing LGM-30A Minuteman I from the hold of a Lockheed C-5A.

**Jan. 26, 1975.** The force modernization program, a nine-year effort to replace all Boeing LGM-30B Minuteman Is with either Minuteman IIs (LGM-30F) or Minuteman IIIs (LGM-30G), is completed, as the last 10 LGM-30Gs are turned over to SAC at F.E. Warren AFB, Wyo.

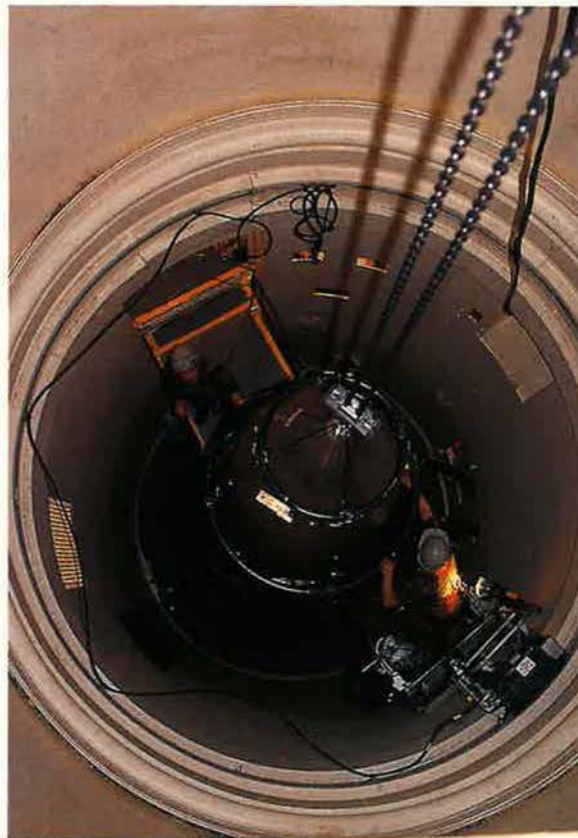
**Nov. 30, 1978.** The last Boeing LGM-30G Minuteman III is delivered to the Air Force at Hill AFB, Utah.

**Jan. 1, 1988.** SAC changes its missile crew assignment policy to permit mixed male/female crews in Minuteman and Peacekeeper launch facilities.

**July 8, 1995.** Minuteman III achieves 100 million hours of operational duty.

**Feb. 1, 2001.** Fortieth anniversary of Minuteman first flight.

*Near F.E. Warren AFB, Wyo., in 1996, maintenance crew members help guide a missile section being lowered into a silo. The 90th Space Wing missileers control, maintain, and operate 150 Minuteman IIIs as well as 50 Peacekeepers.*



Staff photo by Guy Acelo

### Minuteman

**First flight:** Feb. 1, 1961

**Military designation:** LGM-30A/B/F/G

**Classification:** ICBM

**Diameter:** 6 feet

**Length:** LGM-30A, 50 feet; B, 55 feet 9 inches; F, 59 feet

**Weight at first stage interstage:** A/B, 65,000 pounds; F, 70,000 pounds; G, 76,000 pounds

**Top speed:** More than 15,000 mph

**Range:** More than 7,000 miles

**Payload:** Nuclear warhead

**Power:** Three solid-fueled rocket engines

**Launcher:** 80 feet deep, 12 feet in diameter; each site surface area two–three acres

erated the phaseout, ordering retirement of the last Atlas Fs by the end of 1968. Minuteman III deployment was still under way in 1971. The last Minuteman was delivered to the Air Force on Nov. 30, 1978.

As a result of all these shifts, the collection of some 1,500 Minuteman weapons became SAC's prime ICBM force. Minuteman held that distinction until the first deployment in the 1980s of the 10-warhead Peacekeeper. However, only 50 of the new missiles were deployed, and under provisions of START II, they are soon to be removed and destroyed.

Under Start II, the Air Force also will "de-MIRV" the remaining 500 Minuteman IIIs now in service, changing them from three-warhead to single-warhead weapons, which are expected to remain operational in the American West until 2020.

If that scenario holds up, Minuteman may well go into retirement as the heavyweight champ, the longest-lived weapon in Air Force history. ■

*Bruce D. Callander, a regular contributor to Air Force Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, serving as editor from 1972 to 1986. His most recent story for Air Force Magazine, "The Anthrax Issue," appeared in the December 2000 issue.*



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By Frances McKenney, Assistant Managing Editor

## Everyday Heroes

CMSgt. Michael Fusco, command chief master sergeant for the 99th Air Base Wing at Nellis AFB, Nev., spoke about Air Force heroes in a moving speech to a December luncheon meeting of the **Thunderbird (Nev.) Chapter**.

Fusco, who is also a chapter member, pointed out that among today's Air Force heroes are those who support the high operations tempo yet still find time to volunteer for community projects. He cited a Nellis RED HORSE squadron whose members built a playhouse for handicapped children in the area and USAF volunteers who helped a local church feed the homeless.

"Their sense of volunteerism is incomparable; after all, they are even volunteers to serve their country in the first place," he said.

## In San Diego

AFA National President John J. Politi spoke at the December meeting of the **San Diego (Calif.) Chapter**.

He encouraged chapter members to educate themselves and the public on the importance of aerospace power as a key element in military preparedness, reported Gerald S. Chapman, chapter vice president for industrial relations.

Politi joined Capt. Thomas A. Reppart, chapter president, in presenting a 2000 AFA Exceptional Service award to Arthur F. Trost, national director. On hand to receive chapter awards were several AFROTC cadets from San Diego State University, where Reppart is the executive officer for AFROTC Det. 75.

Also addressing the chapter that evening was retired history professor Charles Hanlon, who spoke about the Japanese attack on Pearl Harbor.

## Five for SOCOM

Five Florida chapters joined the **Gen. Nathan F. Twining Chapter** at a luncheon it sponsored at MacDill AFB, Fla., for Army Gen. Peter J. Schoomaker, outgoing commander



Boeing photo by Gina Vanatter

*While on December visits to several AFA chapters on the West Coast, National President John Politi (at right) and Terri Politi also had an opportunity to see the Boeing C-17 production facility in Long Beach, Calif. Here, the Politis listen to Dave Eastman from Boeing's C-17 business development office.*

in chief of US Special Operations Command.

Schoomaker retired after 30 years of military service and had two weeks earlier turned over command of SOCOM to USAF Gen. Charles R. Holland. Holland is the first USAF officer to command all US special operations forces.

Guests at the gathering came from all services and included representatives from local government and civic groups. AFA leaders on hand were David R. Cummock, Florida Region president, and Chapter Presidents Robert D. Perry from the **Brig. Gen. James R. McCarthy Chapter**; Kenneth R. Beers, **Florida Highlands Chapter**; Lt. Col. Stan L. Vanderwerf, **Jerry Waterman Chapter**; and from the **Central Florida Chapter**, Tommy G. Harrison, who is Florida state vice president for membership, and Dennis M. Moran, Florida state vice president, government relations.

## Flying the Flag

The **Spirit of St. Louis (Mo.) Chapter** donated an Air Force flag for dis-

play by the Missouri Military Funeral Honors Program.

In 1998, Missouri's governor signed legislation providing for military funeral honors to be conducted by the state's National Guard. Several St. Louis Chapter members participate in the military funeral honors program, according to CMSgt. Gary M. Young, chapter vice president for membership.

The flag donated by the chapter is displayed in the foyer of National Guard facility where the Military Funeral Honors Program is based. The foyer has banners from other services and a display case of service hats, plaques, and other mementos but so far has only received a USAF and a Marine Corps flag, according to Young.

W. Graham Burnley, Midwest Region president; Loran Schnaidt, chapter president; and Young presented the flag to honors program officials.

## A&A Days

When Davis-Monthan AFB, Ariz., held its air show and open house—called Aerospace and Arizona Days 2000—events kicked off with a lun-



cheon sponsored by the **Tucson Chapter**.

Maj. Gen. Bentley B. Rayburn, director of plans and programs at Air Combat Command, Langley AFB, Va., served as guest speaker for the chapter's Air Force Appreciation Luncheon. According to James I. Wheeler, chapter president, 350 guests attended, among them Brig. Gen. Barry W. Barksdale, 12th Air Force vice commander; the Thunderbirds aerial demonstration team; Scotty Wetzel, Southwest Region president; and Arthur W. Gigax, state president.

Special guests at the November event were 43 members of the Airman Leadership School class and faculty. Their attendance was sponsored by Tucson businesses that purchased a large number of tickets that were then given to the First Sergeants' Council for distribution to junior enlisted personnel.

An estimated 625,000 visitors attended A&A Days, which featured 68 static display aircraft and two days of military and civilian aircraft aerial demonstrations.

### Learning About Tuskegee Airmen

Two members of the Tuskegee Airmen, Inc., Tidewater Chapter spoke to a council meeting of the **Langley (Va.) Chapter** in December, relating their experiences in the segregated World War II military.

Retired Army Lt. Col. Francis L. Horne Sr. and retired USAF CMSgt. Grant Williams also showed a video on the Tuskegee Airmen that related the background of America's first black combat pilots.

Horne served in WWII as an enlisted mechanic's helper and radio maintenance person at Tuskegee AAF, Ala. After the war, he was commissioned through the Army ROTC program at what is now Hampton University (in Hampton, Va.) and served as a maintenance officer.

Williams was assigned to Tuskegee AAF for basic training and then stationed in Selfridge, Mich., with the 96th Maintenance Group (later named the 96th Air Service Group), which supported the Tuskegee flying units. He also served as sergeant major for a follow-on organization, the 524th Air Service Group, deployed to Italy. Williams served with the Air Force Reserve after the war and was called up for Korea. He continued his USAF career, earning a second Bronze Star in Vietnam.

Today, both men live in Hampton.

### Eagle Grants

Representing the **Wright Memo-**



*At the Travis AFB, Calif., Air Museum, Michael Peters, president of the Brig. Gen. Robert F. Travis (Calif.) Chapter, presents a \$100 donation to Kim Briand, a representative of the Fisher House. The nonprofit Fisher House Foundation provides houses near military facilities to keep families of service members or veterans together during medical emergencies. The chapter raised the money for its donation through a golf tournament.*

**rial (Ohio) Chapter**, Christine Spivey attended the Community College of the Air Force October graduation ceremony at the Air Force Institute of Technology, Wright-Patterson AFB, Ohio, to present four Aerospace Education Foundation Eagle Grants and two chapter educational awards.

Spivey, who is the chapter's membership vice president, awarded the AEF grants to SSgt. Elmarko P. Magee, SSgt. John W. Carty II, TSgt. Paul E. Gallagher, and TSgt. Robert V. Galloway. In addition, Galloway and SSgt. Brian W. Cornett received \$200 each in educational grants sponsored by the chapter.

Eagle Grants are one-time awards of \$400 to selected top USAF enlisted personnel graduating from CCAF and planning to pursue a bachelor's degree.

### "There I Was ..." Connection

With the imminent closing of McClellan AFB in California, the **C. Farinha Gold Rush Chapter** is looking to the McClellan Aviation Museum as its nearest link to military aviation. The link works both ways.

The chapter's latest newsletter features an article about a museum exhibit—a photo display of aviation cartoons by the late Bob Stevens. The

## AFA Conventions

April 20-22  
April 26-28  
May 4-6  
May 18-20  
July 19-21  
July 20-22  
July 27-29  
Aug. 10-11  
Aug. 10-12  
Aug. 10-12  
Aug. 18-20  
Aug. 24-25  
Sept. 15-19  
Sept. 21-23

New Jersey State Convention, Wildwood, NJ  
California State Convention, Edwards AFB, Calif.  
South Carolina State Convention, Columbia, S.C.  
Mississippi State Convention, Columbus, Miss.  
Virginia State Convention, Charlottesville, Va.  
Texas State Convention, Fort Worth, Tex.  
Florida State Convention, Tampa, Fla.  
Colorado State Convention, Colorado Springs, Colo.  
Georgia State Convention, Robins AFB, Ga.  
Indiana State Convention, Indianapolis  
Michigan State Convention, Mount Pleasant, Mich.  
Missouri State Convention, Lake of the Ozarks, Mo.  
AFA National Convention, Washington  
Delaware State Convention, Dover, Del.



## AFA/AEF National Report

display, including the large L-shaped exhibit case it resides in, was provided by the chapter.

The chapter has original sketches (on loan from Stevens's widow, Barbara), which it had photographed and framed for the museum exhibit. The sketches themselves, which are over-size, include some from Stevens's early Air Force days. The display also features his book *There I Was ... 25 Years* and a section on the history of the Farinha Chapter.

Robert M. Stevens, who served as a combat pilot during World War II and retired in 1964 as a lieutenant colonel, contributed cartoons on Air Force life and flying to *Air Force Magazine* for 30 years. The last cartoons ran in December 1993. Stevens died the following June in Fallbrook, Calif.

### More AFA/AEF News

■ **Dallas (Tex.) Chapter** garnered a lot of attention in the city's Veterans Day parade. The 221st Combat Communications Squadron (ANG) in Garland, Tex., provided the chapter with two 2.5-ton trucks, loaded with combat communications set ups. Camouflage netting, flags, and a huge AFA banner completed the parade entries. Chapter President Jack Red-



On behalf of the Ark-La-Tex (La.) Chapter, National Director Ivan L. McKinney (right) presented \$500 scholarships to (l-r) AFROTC cadets Rodney Wall, Lewis Benton III, and Gradie Moore from Grambling State University of Grambling, La., and Cortize Durham, Gordan Edwards, and Guadalupe Trevino from Louisiana Technical University, Ruston, La. It was the third consecutive year that Moore and Wall had received chapter scholarships and the fifth year the chapter has awarded them.

mond headed the list of chapter members—some wearing their old USAF uniforms—on the trucks.

■ The Dallas Chapter is representing the Air Force as host service for the Dallas Military Ball to be held at the Dallas Fairmont Hotel on March 17. The theme for the annual ball is "Air and Space 2001: A Salute to the Air Force Astronauts." The event was established 37 years ago by representatives from AFA, the Navy League, Association of the US Army, US Marine Corps Association, and National Guard and Reserve organizations. The chapter uses its share of funds raised by the ball for its aerospace education efforts.

■ For nine days in November and December, members of the **Lloyd Schloen-Empire (N.Y.) Chapter** wrapped purchases made by customers at the Barnes and Noble bookstore in Massapequa Park, N.Y. They collected \$172 in donations, which the chapter turned over to the Air Force Memorial Foundation.

■ The **Phoenix Sky Harbor (Ariz.) Chapter** visited the 107th Air Control Squadron (ANG) at Sky Harbor IAP, Ariz. Squadron Commander (and chapter member) ANG Lt. Col. Susan L. Wehrle presented briefings on the unit's history and mission, noting that it had been selected in 1999 to become ANG's command-and-control training organization. Arthur W. Gigax, Arizona state president, and Hector F. Evans Jr., chapter president, were among those on the tour. ■

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**A5 Polo Shirt.** 100% cotton interlock by Lands' End. Embroidered "Air Force Association" and logo. Available in dark blue and white with contrasting colors on collar and cuffs. Unisex sizes: S, M, L, XL. **\$35**



**5th AF** (WWII and Korea). Sept. 12–16 in Fort Mitchell, KY. Units include 314th Composite Wg and Hq squadron, 5th Bomber Command, 5th/108th Station Hospital, 80th Service Gp, 405th Signal Co, and 502nd Tactical Control Gp. **Contacts:** Louis Buddo, PO Box 270362, St. Louis, MO 63127 (314-487-8128, 314th Composite Wg and 5th Bomber Command) or Jeff Seabock, PO Box 3635, Hickory, NC 28603 (828-324-6464, 5th/108th Station Hospital).

**6th BG Assn**, Tinian Island (1945). May 17–20 at the Sheraton West Port Hotel Plaza Tower in St. Louis. **Contacts:** R. DeFilippo, 1321 Montevale Ct., Fenton, MO 63026-3016 (636-343-8555) (rdefilippo@aol.com) or Willis Kunz, 23 Chesterston Ln., Chesterfield, MO 63017-7837 (636-527-0191).

**18th Fighter-Interceptor Sq.** Sept. 6–8 in Bloomington, MN. **Contact:** Barney Wolverton, 4305 S. Terwilliger Pr. SE, Benton City, WA 99320-8517 (509-627-2545) (valbarney1@aol.com).

**22nd Military Airlift Sq.** May 1–3 at Wright-Patterson AFB, OH. **Contact:** Ray Daley (937-323-6304).

**27th FS**, FIS, and TFS (WWII). April 5–8 in Pensacola Beach, FL. **Contact:** Bob Correia, 3 Midway Dr., RI 02886.

**27th Fighter/Fighter-Escort/Strategic Fighter Wg**, Kearney AFB, NE, and Bergstrom AFB, TX (1947–57). Sept. 26–29 in Colorado Springs, CO. **Contact:** G. Santalia, 2032 Lark Dr., Colorado Springs, CO 80909-1864 (719-632-3043) (mjloftus@prodigy.net).

**41st FS** (1941–60). April 29–May 3 in San Francisco. **Contact:** Bob Brewer, 617 Fairmont Dr., Salinas, CA 93901 (831-758-6274) (bobada@redshift.com).

**47th BW**, all squadrons, RAF Sculthorpe, UK (1947–62). Oct. 4–8 in Arlington, VA. **Contact:** Caryl Lawson, 105 Lake View Way NW, Leesburg, VA 20176-2038 (703-779-4670) (crlawson@erols.com).

**51st FIW** (Korea). June 7–10 at the Pontchartrain Hotel in New Orleans. **Contact:** Dee Cothron, 315 Catherine St., Lockport, LA 70374-3007 (504-532-3837).

**56-F Pilot/Flying Training Class**, officers and aviation cadets. May 11–13 at the Embassy Suites in Colorado Springs, CO. **Contacts:** Richard Bowen, 1203 Old Stable Rd., McLean, VA 22102 (phone/fax: 703-356-4337) (rab1203@aol.com) or John Pratt, 3409 Canadian Pkwy., Fort Collins, CO 80524 (970-482-2675) (jcpratt@lamar.colostate.edu).

**58th FG** (WWII), 58th Fighter-Bomber Gp (Korea), including 69th, 310th, and 311th Sqs. June 27–July 1 in Branson, MO. **Contact:** Bob James, 13083 Ferntrails Ln., St. Louis, MO 63141 (314-878-5953).

**61st FS**, Newfoundland, Canada, and Truax AFB, WI (1950s). Sept. 20–22 in Minneapolis. **Contact:** Charles Christianson, PO Box 326, Monticello, MN 55362 (phone/fax: 763-295-2861) (cmeask4it@aoncom.com).

**100th BG**, supporting units and friends. Oct. 5–7 in Omaha, NE. **Contact:** Don Bradley, 1310 Hansen Ave., Bellevue, NE 68005 (duckb1@msn.com).

**320th BG** (North Africa, Sardinia, France). Sept. 6–8 at the Mountain View Holiday Inn in Albu-

querque, NM. **Contact:** Ralph Woolf, 4095-A Palm Bay Cir., West Palm Beach FL, 33406 (phone: 561-686-9075 or fax: 561-478-1261) (woolfden@aol.com).

**324th FG**, 314th and 316th Sqs (WWII). May 9–12 at the Hilton Suites in Lexington, KY. **Contact:** J.W. Wurmser, 3409 Westridge Cir., Lexington, KY 40502 (859-277-0217) (p47pilot@aol.com).

**351st BG Assn**, Polebrook, UK (WWII), including families and friends. June 6–10 near Polebrook, UK. **Contact:** Clint Hammond, PO Box 281, Mechanicsburg, PA 17005 (717-766-1489).

**357th FG**. Sept. 6–9 in Dayton, OH. **Contact:** Bill Overstreet, 3387 Pasley Ave., Roanoke, VA 24015 (540-343-3133) (woverstreet@iopener.net).

**364th FG** and all supporting units, Honington, UK (WWII). Sept. 15–25 at the Holiday Inn City Center in Peoria, IL. **Contact:** Dan Leftwich, 6630 Caldero Ct., Dayton, OH 45415 (937-890-3641).

**444th FIS**, Charleston AFB, SC (1954–68). April 19–22 at the Airport Holiday Inn in Charleston, SC. **Contact:** Wallace Mitchell, 535 Mimosa Rd., Sumter SC 29150 (803-469-3297).

**446th BG**, Eighth AF (WWII). May 10–13 in New Orleans. **Contact:** Bill Davenport, 13382 Wheeler Pl., Santa Ana, CA 92705 (714-832-2829).

**448th BG, 2ADA** (WWII). May 9–12 at the Holiday Inn Financial Plaza in Shreveport, LA. **Contact:** Cater Lee, PO Box 1850, Foley, AL 36536-1850 (334-943-7000) (clee@vulcaninc.com).

**459th BG**, Fifteenth AF (WWII). Sept. 6–9 at the Savannah Desoto Hilton Hotel in Savannah, GA. **Contacts:** Archie Erwin, 1381 Delta Corners, Lawrenceville, GA 30045 (678-344-6028) or John Devney, 90 Kimbark Rd., Rochester, NY 14610 (716-381-6174).

**466th BG Assn** (WWII). April 18–21 at the San Remo Hotel in Las Vegas. **Contact:** Lou Loevsky (973-226-4624).

**487th BG**, Eighth AF, AF Station 137, Lavenham, UK (WWII). Oct. 3–7 at the Sheraton West Port Lakeside Chalet in St. Louis. **Contact:** Howard Todt, 13502 Featherstone Dr., Town & Country, MO 63131 (314-821-5449) (hctodt@aol.com).

**494th BG Assn**, Seventh AF (WWII), including Hq, 373rd, 864th, 865th, 866th, and 867th Sqs. May 30–June 2 at the Doubletree Hotel Minneapolis Airport in Bloomington, MN. **Contact:** Daniel Otten, 9114 Medley Cir., Golden Valley, MN 55427 (612-545-5580).

**500th BS Assn**, 345th BG (WWII). Aug. 27–31 in Savannah, GA. **Contact:** Bill Lambert (912-598-1721) (llamb56984@aol.com).

**511th AC&W Gp**. Sept. 12–16 in Branson, MO. **Contact:** Don Simmons, 704 S. Grove Rd., Richardson, TX 75081 (972-231-6518) (dona7112@iadf.net).

**530th FS**, 311th FG, CBI (WWII). Sept. 21–24 at the Hilton Atlanta Northwest/Windy Hill in Atlanta. **Contact:** F.H. Wilbourne, 4118 Keagy Rd., Salem, VA 24153 (540-387-0562).

**556th Recon Sq.** April 6–7 in Las Vegas. **Contact:** Donald Chase, 3923 N. 111th Plaza, Omaha, NE 68164 (402-493-5612).

**6160th ABW**, Itazuke AB, Japan (1951–55). May 16–20 at the Holiday Inn Resort in Long Boat Key, FL. **Contact:** Nick Bakalis, 7227 39th Ln.,

Sarasota, FL 34243-5134.

**A-1 Skyraider Assn**. Oct. 4–6 at The Menger Hotel in San Antonio. **Contacts:** Rocco DeFelice (210-659-5965) or Ralph Hoggart (210-494-3190).

**Aeromedical Evacuation Assn** (1942–2001). June 6–9 at the Flamingo Hilton Hotel/Casino in Laughlin, NV. **Contact:** George White, 302 Glenmoor Dr., Fredricksburg, TX 78624 (830-990-1447).

**AF Public Affairs Alumni Assn**. April 19–21 at the Hilton Old Town Alexandria Hotel in Alexandria, VA. **Contact:** Jim McGuire, 316 Prince St., Unit #1, Alexandria VA 22314 (703-518-0634) (www.afpaaa.org).

**Air Force Gunners Assn**. Aug. 30–Sept. 4 in Rapid City, SD. **Contact:** Eugene Steele, 1117 Johnson Dr., Fort Worth, TX 76126 (817-249-0150) (e.d.steele@juno.com).

**Angel Flight, Arnold Air Society, and Silver Wings alumni**. April 13–16 in New Orleans. **Contact:** Terry Miller (phone: 719-574-9594 or fax: 719-527-1370) (aas-alumni@arnold-air.org).

**ATC Hump Pilots**. May 2–5 in Boston. **Contact:** Arthur Sutton, 2154 Tudor Castle Way, Decatur, GA 30035 (770-981-4640) (suttonatchpl@mindspring.com).

**Flying Class 51-F**. Sept. 13–16 in Las Vegas. **Contacts:** Bob Reagan, 200 W. Miracle Strip Pkwy., #404, Fort Walton Beach, FL 32548 (850-243-6149) (bobreagan@sprintmail.com) or Tom Gamble, 394 Benicia Dr., Santa Rosa, CA 95409-3431 (707-537-1459) (togamjr@aol.com).

**Flying Tigers of the 14th AF Assn** (WWII), veterans of the American Volunteer Group (1941–42), the China Task Force (1942–43), and 14th AF (1943–45). May 24–27 in Arlington, VA. **Contact:** Robert Lee, 717 19th St. S., Arlington, VA 22202-2704 (703-920-8384).

**Flying Tigers of the 14th AF Assn**. Oct. 3–6 at the Radisson Hotel in Branson, MO. **Contacts:** Ron Phillips, PO Box 49, Butler, MO 64730 (660-679-5365) (flytiger@iland.net) or Clifford Long, 1833 Page Pl., Malvern, PA 19355 (phone: 610-296-5988 or fax: 610-296-0259).

**NATO Tiger Assn**. June 18–25 in Belgium. **Contact:** www.natotigerreunion.org.

**OCS Class 58-A Alumni Assn**, Oct. 4–7 in Dayton, OH. **Contact:** Merle Browning (318-641-9683) (m.r.browning@worldnet.att.net).

**Pilot Class 43-K**, all training commands and schools. April 26–29 at the Radisson Hotel in Houston. **Contact:** Harold Jacobs, 17545 Drayton Hall Way, San Diego, CA 92128 (858-485-9422) (jakes43k@aol.com).

**Pilot Training Class 52-E**. Oct. 1–4 in Las Vegas. **Contact:** Tom Dinwiddie, 329 Market St. West, Apt. 111, Gaithersburg, MD 20878 (301-990-7726) (tdinwiddie@erols.com).

**Pilot Training Class 61-F**. May 3–6 at the Radisson-Port Canaveral Hotel in Canaveral, FL. **Contact:** Mike Larkin, 1975 SW J Hwy, Plattsburg, MO 64477 (mikellark@aol.com).

**TAC Recce**. Oct. 7–10 at the Doubletree Hotel in Durango, CO. **Contacts:** Harrold Shipp, 30 Animas Pl., Durango, CO 81301 (970-247-8848) (hshipp@frontier.net) or Jim Murphy, 565 Horse Thief Ln., Durango, CO 81301 (970-247-0450) (murfmar@frontier.net). ■



# Pieces of History

Photography by Paul Kennedy

## The Fisher Spad



Severely damaged in combat during the Vietnam War, this Douglas A-1E Skyraider, known as a "Spad," was restored by the US Air Force Museum in Dayton, Ohio, and put on display. It had played a special part in Air Force history. USAF Maj. Bernard F. Fisher flew this two-seater on March 10, 1966, in the A Shau Valley, South Vietnam, supporting ground troops that were

under attack by 2,000 North Vietnamese army regulars. When a Spad piloted by Maj. D. Wayne Myers crash-landed onto the A Shau runway, Fisher landed his own A-1E on the airstrip and, ignoring small-arms fire, pulled Myers into his aircraft and took off. Fisher became the first USAF recipient of the Medal of Honor for action during the Vietnam War.

Courtesy of the US Air Force Museum, Wright-Patterson AFB, Ohio





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