June 2001/$4

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION MAGAZINE

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June 2001, Vol. 84, No. 6

AIR FORCE MAGAZINE

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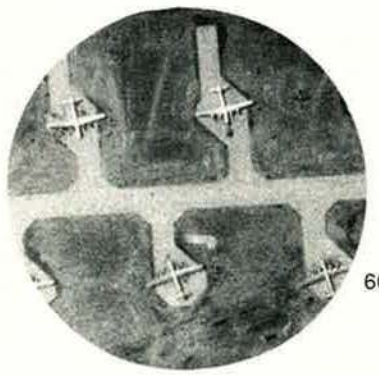
About the cover: Boeing's X-45 concept UCAV is pictured in an operational setting. See "The Vision Force," p. 24. Photo illustration by Erik Simonsen.



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Editorial

By John T. Correll, Editor in Chief

Evolution of the Aerospace Force

THE US Air Force today has 92 percent fewer airplanes and 91 percent fewer pilots than it did in World War II. Yet which air force would you rather have? The obvious answer speaks volumes about what has happened to airpower in the last 50 years.

By any measure you can imagine—speed, range, striking power, or the effects it can produce—the present Air Force would be the choice by far.

The difference is not courage or airmanship. It's technology.

In times past, it was necessary to send dozens, sometimes hundreds, of airplanes to ensure that a critical target was struck.

By contrast, in the air campaign in the Balkans in 1999, the B-2, carrying the latest "smart" bombs, hit an average of 15 separate aim points per sortie. A few years from now, a single bomber will take on 80 different targets per sortie. Aircraft of the future will be able to do even better.

This is only one example of the changes now sweeping the Air Force. Over the next 20 years, they will make it a much different force than the one we have known in the past.

Air Force planners in the Pentagon see three major dimensions of change:

- Unmanned aircraft will increase.
- Manned aircraft will decrease.
- Intelligence, Surveillance, and Reconnaissance will move to space.

In many respects, these projections are the extension of the existing trend. In the 1950s, more than 40 percent of all Air Force officers were pilots. Today, pilots account for only 17 percent of the officer force. Pilot and aircraft totals have diminished.

One reason is that airpower keeps getting better. As recently as the Vietnam War, the F-4D Phantom had to expend, on average, 200 tons of gravity bombs to drop a bridge span. Current aircraft can do it with four tons of ordnance, and they can do it in all kinds of weather. As aircraft become more capable, they grow fewer in number.

"Some may see this as an adverse 'tooth-to-tail' ratio," says Maj. Gen. Charles D. Link, USAF (Ret)., who has been studying Air Force leadership development patterns for the past year. "It is important to point out that the Air Force's large 'tail' produces a numerically small but militarily large 'tooth.' This is good. Fewer young Americans are at risk, while we leverage aerospace superiority to achieve policy goals."

Pilots, once more than 40 percent of all Air Force officers, are now 17 percent.

Technology is opening new vistas for unmanned aircraft and spacecraft. In April, the Air Force's Global Hawk unmanned aerial vehicle flew nonstop from California to a precision landing in Adelaide, Australia. The 8,500-mile trip was about two-thirds of Global Hawk's range.

Unmanned aircraft will inherit such missions as flying into the teeth of advanced enemy defenses to take out surface-to-air missile sites. Sen. John Warner, chairman of the Senate Armed Services Committee, believes that within 10 years, a third of all deep strike aircraft could be unmanned, reducing the number of airmen who must fly into high risk areas.

Other missions will follow Intelligence, Surveillance, and Reconnaissance into space. Space is taking on unprecedented importance in the national security strategy, and the Air Force has been designated to lead the way.

There will be plenty of traditional airpower in aerospace operations of the foreseeable future. In theater conflict, the first substantial force to engage the enemy will be advanced stealthy aircraft that open the door for other land, sea, and air forces to follow. It will be of continuing advantage to the nation that we can put a military airplane above any point on Earth in a matter of hours.

However, cultural change is coming for the Air Force, perhaps at a rate that will cause discomfort. But as Carl Builder, author of *The Icarus Syndrome*, and others have reminded us, the Air Force is not just about aviation; it's about airpower, evolving to aerospace power.

The Air Force mission is not only (to recall the fighter pilot's ringing credo from the 1960s) "to fly and fight." It is to support and defend the United States through the control and exploitation of air and space.

The Air Force was born of technology, specifically the technology of powered flight. Aerospace technology now points to greater range, accuracy, perspective, knowledge, and accuracy. Evolving aerospace power fits the evolving needs of the nation.

Air Staff planners believe the event that will usher in the greatest change over the next 20 years will not be the fielding of new bombers or fighters, but rather deployment of the space based radar, which will allow us to scan entire continents and to home in instantly on any point of interest or concern. Our perspective, now regional, will become global.

Historical note: In 1941, the Army Air Forces flight-tested an unmanned aircraft called the "Bug." Its sponsor was none other than Gen. H. H. "Hap" Arnold, the founding father of the Air Force, who deliberated on whether it might be as useful in bombardment as the B-17 while endangering fewer lives in combat.

It was eventually canceled, not for doctrinal reasons, but because it lacked the range from England to strike targets in Germany.

Arnold's enthusiasm for the Bug was based on his remembrance of two pilotless aircraft, built for the fledgling Army Air Service and successfully tested in 1918. ■

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Letters

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In Support of Global Reconnaissance Strike

Gen. [John P.] Jumper's proposal to support GRS with a Multipurpose Intelligence, Surveillance, Reconnaissance platform *["Providing Vigilance, Reach, and Power," April, p. 26]* is manna for many who have long seen the benefits in a combined ISR platform. (Boeing has had such a concept on the books based on their 767 platform for at least a decade.) The anticipated savings in connectivity requirements alone make the proposal worth exploring seriously.

Realistically, Jumper will have his work cut out for him just getting the concept to be taken seriously.

In the meantime, the proposal raises several intriguing questions. First, whereto peacetime reconnaissance? Will future MISR missions include all the areas Rivet Joint and Combat Sent currently target? If not, will we return total control of peacetime recce back over to [the National Security Agency] (as it was de facto years ago) and the Global Hawk [Unmanned Aerial Vehicle] (obviously of considerable merit based on fiscal factors but will the theater commanders buy off on it)? And what happens to the future of [Science and Technology] missions, particularly given the chronically underfunded Air Force [electronic intelligence] S&T program and the nonexistent Air Force [data integration] S&T program (both crucial in developing countermeasures in advance of future combat situations)? With limited available onboard space, it might be a stretch having Global Hawk cover both the peacetime recce and S&T missions simultaneously.

Second, and even more interesting—what of our linguists? Undoubtedly, leading up to the initiation of hostilities, linguists (whether airborne or remote) can play a vital intelligence collection/dissemination role.

However, is their function as critical when the bombs start falling and the bullets start flying? With all the other intel flowing around the battlefield, is [communications intelligence] critical to the prosecution of combat on a day-to-day basis? Sensible arguments can be made either way. With the MISR now in play, it is an opportune time to evaluate what the role of communications intelligence should be to support the battlefield.

What relationship will UAVs have to/with the MISR—will they simply serve as another offboard sensor input, or will operators on the MISR actually control and direct the UAVs, and if so, how large a jump is it to controlling future UCAVs (not a far stretch from the duties of current AWACS and Joint STARS weapons directors today)? These are just a smattering of the questions that will have to be answered if the MISR concept is to move forward in a serious way.

As someone who used to doodle operator workstation layouts for a combined RJ/AWACS using a 747 airframe, I envy the action officers who will get to spend part of their careers moving the MISR from concept to solid proposal to design onto the tarmac and into the air and when needed into a future battlespace. For all of us for whom the MISR has been a long-term dream, we wish you luck and much success in getting the MISR off the ground.

Terry Goodwin
Rochester, Minn.

Firing for Effects

Wholeheartedly agree with Maj. Gen. (sel.) [David A.] Deptula's article, "Firing for Effects," in the April issue *[p. 46]*. There are some concerns with the reality of its execution and the analogies used in this piece.

A former dean of the School of Advanced Airpower Studies wrote, "Airpower is targeting, targeting is intelligence, but let us not suggest earlier airmen were ignorant of effects-based approaches or parallel warfare." Their challenges were different from today's more limited police actions against overmatched opponents.

Size does matter, and when facing the heretofore world's greatest anti-access threat, the Soviet Union and its allies, there was only so much aerospace power to go around. So the airmen of the '80s prudently concentrated on first achieving the requisite and often localized air superiority over Western Europe. They were not ignorant; parallel warfare was not an available option.

Like the article's light bulb analogy, with numerically limited aerospace power (as measured by the number of effects it can produce over a period of time against a specific enemy) the result of its effective "current" is not shock, but just so many dim bulbs. One aerospace operations center weapon system senior mentor calls this effect "peanut butter airpower"—spread around all over enemy systems, aerospace forces accomplish little; [they] must be focused "like a fire hose," as yet another senior mentor suggests.

Furthermore, World War II indicated the limitations of our intelligence, especially about enemy systems and systems of systems. Air Corps Tactical School theories of the '30s, about the vulnerabilities and decisiveness of attacking German electrical systems, proved invalid. The enemy system was not the vulnerable mirror image of the United States, nor did the enemy system react predictably. Like the Serbian surface-to-air missile units in Kosovo, German electrical distribution was decentralized and protected. By 1944, the much-heralded electrical system target set fell to the near bottom of the targeting priority list.

Airmen should be firing for effects, but increased automation in aerospace operations system tools is leading astray the practitioners of the opera-

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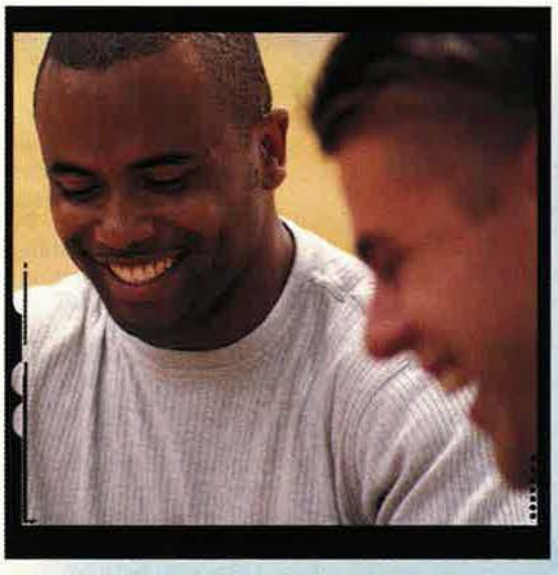

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Letters

tional art. Some strategists in the aerospace operations center weapon system claim operational assessment should be centered on counting targets destroyed against the preordained master target list. Automation supports this "bean counting" well. Such target lists and counting, even when expanded as was the target list of Col. John Warden's Operation Instant Thunder, have not guaranteed anticipated success. Airmen must have a plan, but "no plan survives contact with the enemy."

In recent Senate testimony on the USS *Cole* bombing, the Chairman of the Joint Chiefs cautioned "never to assume perfect knowledge." Our knowledge of enemy systems of systems will always be incomplete and its reactions to attack chaotic. Airmen must command airpower, develop an integrated aerospace operations plan, attack, and learn about how enemy systems behave under stress. Airmen must then have the operational freedom to adjust the plan to achieve the desired operational effect. Frankly, current joint doctrine does not support the ideal freedom to command airpower in a dynamic, high threat battlespace.

Airmen should not become accustomed to overmatched opponents. Parallel warfare against multiple enemy systems and assumed perfect knowledge of the same may not be relevant to tomorrow's aerospace operations. Limited retaliatory actions are akin to "bear baiting," and the art and science of strategic aerospace power must meet all challenges. In the future, the diffusion of best practices, proliferating technologies, and counterstrategies, not to mention size, could result in the near-peer competitor and bipolar world. Strategic aerospace power application must also focus on something more the size of a bear.

Lt. Col. Philip A. Smith
Strategy Division Chief
608th Air Operations Group
Barksdale AFB, La.

Hart–Rudman Commission

I believe that Sens. Hart and Rudman have been reading too many [Tom] Clancy novels. *[See "Hart–Rudman Calls for Homeland Defense," April, p. 64.]* To believe that we need another cabinet position in an already crowded cabinet is amazing in and of itself, but to have them suggest that we're essentially defenseless after nearly 225 years of existence is absurd. Even during the height of the Cold War we managed to have a homeland defense without another agency and cabinet member.

Our current "homeland defense" consists of two layers: (1) The best defense is a good offense, and (2) home based agencies such as the National Guard, FBI, and state and local police agencies. Layer 2 has a surprising amount of coordination when necessary.

I don't really count FEMA as a defense agency as much as it is, or should be, a relief agency. It already has rather frightening powers if you read the fine print. To roll all the home agencies into one conjures up some scary images for me: Perhaps we could call this new agency "The Committee for State Security." Oh, that's right. That name is taken (i.e., KGB).

Coordinate national defense and disaster relief? Yes. Create another bureaucracy? No.

Maj. Bill Moore
Yokota AB, Japan

JFK and Intel

The sidebar "JFK Considered Bombing China's Nuke Sites" in the April issue *["Aerospace World," p. 21]* evoked some old but vivid memories. I participated in developing intelligence estimates on the Chinese nuclear capability while assigned to the Air Force Intelligence Center in the early '60s.

Our appreciation of the significance of the fissile materials production capability at Lanchow (as we spelled it then) [now transliterated as Lanzhou] actually evolved a year or so earlier than indicated in your piece. The evidence adduced by AFIC, including the U-2 photography you referred to, was quite complete in early 1962. I am certain of this date, because I was the primary AFIC analyst on this case, and I left the center in the summer of 1962.

AFIC's argument for the existence of this nuclear capability was by no means readily accepted initially in the Intelligence Community. Ultimately, however, our point of view prevailed. The telling points in the debate were the degree of completion of the physical facilities and their obvious Soviet pedigree. While we did not at that time know the actual production readiness of the facilities, the production potential and the strategic threat were clear.

In the late spring of 1962, I led a briefing team that visited elements of 5th and 7th Air Forces in the Philippines, Taiwan, and Japan to review the emerging Chinese nuclear potential. We were surprised by the reception that we two junior analysts got and by the degree of interest shown by senior staffs. It took us a

few days to figure out that things were heating up in Southeast Asia a lot faster than we had been aware of in Washington. The light finally went on for me when I tried to call a friend in an air defense squadron at Clark Field [Philippines]. He was off station, standing alert, as I recall, at Don Muang [Thailand]. Although five more years were to pass before I got into the war, it is clear in retrospect that I was seeing its beginnings while on that staff visit.

Information on China's strategic nuclear capability was obviously a very significant backdrop to developments that the air staff in Westpac were overseeing. Of course, there was no hint at the working level of the possibility of pre-emptive removal of the nuclear weapon potential. Indeed, I learned of that possibility by reading your article, nearly 40 years after the fact.

To borrow a phrase from the ancient Chinese curse, we were obviously living in interesting times. Though I was but a captain at the time, I consider my role in developing those estimates to be as important as anything I did in 29 years of Air Force service.

Brig. Gen. William L. Shields,
USAF (Ret.)
Woodbridge, Calif.

From Khobar to *Cole*

Your article "From Khobar to *Cole*" *[March, p. 48]* was right on. From my perspective, there was an apparent failure of the Clinton Administration to negotiate or otherwise coerce the Saudi government into permitting us to properly defend ourselves. [Brig. Gen. Terryl J.] Schwalier did the best he could under the circumstances. King Abdul Aziz AB and Al-Khobar Towers housing are Saudi owned facilities separated by a multilane elevated highway. Saudi approval was required for most any actions such as expanding our defensive perimeter.

With the logic initially utilized by Cohen in ending Schwalier's career, the Clinton Administration should not only have held Cmdr. [Kirk S.] Lippold accountable for the *Cole* incident but the US ambassadors for the terrorist attacks on our African embassies.

Lt. Col. Dale A. Billups,
USAFR (Ret.)
Oregon City, Ore.

WASPs

I was with the 5th Ferrying Group and flew many P-39 and P-63s to Great Falls [Mont.]. The planes were then flown to Nome [Alaska], not to Anchorage. *[See "The WASPs," April, p. 68.]* I heard many stories from the Great Falls pilots about the crazy Russian men pilots, but I am sure that no Russian women pilots ever flew from Alaska.

Ruth Helm
WASP 43-W2
Tucson, Ariz.

In your April story on the WASPs your explanation of the death of Cornelia Fort was that "she collided with another airplane." How about the whole story?

She was the only woman pilot in a flight of seven BT-13s being ferried from Long Beach, Calif., to Dallas. Along the way she was the victim of teasing and flirting. Over Texas, about one hour from their destination, a cowboy, [Flight Officer] Frank Stamme, began buzzing her. His landing gear struck the left wingtip of her plane, tearing it off and peeling off about six feet of the leading edge of the wing, causing her to go out of control.

At his court-martial he was found at fault but was allowed to continue flying "because the Ferry Command was short on pilots." One wonders what action would have been taken against her if she had caused the death of another pilot.

The same story states that Evelyn Sharp "was killed when the engine on her P-38 failed." A P-38 is a twin engine airplane, so it should have said "when one engine on her P-38 failed."

Anna F. Pennington
Wilmington, N.C.

The Aces

In your December 2000 issue on p. 33, you indicate that Col. [Francis S.] Gabreski heads the list of aces. *[See "Keepsakes From Korea," p. 32.]* While technically true, since both the real top American ace, [Maj.] Richard I. Bong, and the second best ace, [Maj.] Thomas B. McGuire Jr., both died prior to the Korean War, Gabby's 34.5 victories fall short of Bong's 40 or McGuire's 38. While [others] were great fighter pilots and leaders, the fact remains that only Bong and McGuire were the best ever in American history.

Let's not allow their bright lights to be hidden by the proverbial bushel.

Tom A. Berry
Mesa, Ariz.

■ *In the December photo spread about Korea, the information about Gabreski being the leading ace with a combined total of 34.5 for World War II and the Korean War was not meant to imply he was the leading ace of all wars. Check our May Almanac issue,* "Air Force *Magazine's Guide to Aces and Heroes," p. 65, and specifically p. 68 which lists Bong and McGuire as the leading aces for all wars.*—THE EDITORS

Base Closings

The thrust of your item on the base closure process hit the mark. *[See "Aerospace World: Base Closings Redux," May, p. 25.]* For a variety of reasons, the prospect of further base closures has become much more tangible in the last few months.

However, it is incorrect to suggest that "Congress abruptly halted the work" of the Defense Base Closure and Realignment Commission in response to Administration actions. The 1990 legislation creating the base closure process specified all along that the commission would cease to exist after the 1995 round.

Indeed, Congress authorized that law's unprecedented limits on their own power specifically to avoid temptations to retaliate. The result was a process that—while never popular—has been cited even by critics as unusually efficient for government. In many cases, that's what they were criticizing!

J.J. Gertler
Senior analyst, DBCRC 1995
Arlington, Va.

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AFA's Mission

To promote aerospace power and a strong national defense.

To support the needs of the Air Force and Air Force people.

To explain these needs to the American people.

Letters

Just Rhetoric

I just love all of the rhetoric about which service is better and who should get the bigger pot of money out of the DOD budget: the Air Force, the Army, or the Navy. I especially liked all of the rhetoric from Mackenzie M. Eaglen *["Letters: Yeah, Right," April, p. 8]* and the quotes from the Army four-stars *["Verbatim," April, p. 63].*

It reminds me of kids in the sandbox in kindergarten. Are we ever going to get over this my service is numero uno stuff? Although I was a member of the Air Force for only 20 years, 27 days, I guess I had my priorities wrong when I followed [this list of priorities]:

1. What is best for my country.
2. What is best for my government.
3. What is best for my Department of Defense.
4. What is best for my Air Force.
5. What is best for my command.
6. What is best for my unit.
7. What is best for me.

Each service brings special capabilities to the table. I know there has been rhetoric from the Air Force about us doing it alone, but that is not true and of late, more and more Air Force general officers have tried to make this clear. However, the Air Force does bring some unique capabilities to the fight and these have been emphasized by Air Force general officers and also the editor of this magazine.

I would make one comment relative to Desert Storm. I wonder if the United States Army could have accomplished the ground battle in 100 hours if the United States Air Force had not (1) gained air superiority and (2) bombed the living heck out of [the Iraqis] before the ground campaign started. It should also be remembered that the objective of the ground campaign was to encircle and obliterate/annihilate the six divisions of the Republican Guard army so as to weaken Saddam Hussein's power base. Instead, 4.5 divisions got away. When this happens, one wonders as to the efficacy of the ground campaign completing its objective. If one wants to see what a combined campaign can accomplish all they need to do is look at the Battle of Khafji to see what the Marines were able to accomplish in an integrated air–land battle.

Maj. Robert E. Drabant,
USAF (Ret.)
Las Vegas

Col. Bernard Fisher's SPAD

In 1993, I had the pleasure of spending some time with Col. Bernard Fisher at the Maxwell Officers Club. At that time, Fisher relayed to me a story regarding the "bunny" emblem clearly visible on one of the aircraft's propeller tips. *[See "Pieces: The Fisher Spad," March, p. 80.]* When his Spad was dedicated at the Air Force Museum, Fisher observed a burnished spot where the bunny should have been. In order to maintain historical accuracy, Fisher requested the museum restore the bunny which was, obviously, accomplished. Here's the story behind the story.

During the Vietnam War, one of Fisher's fellow squadron mates, Capt. Don Patch, was a well-respected and well-liked pilot. Patch was also quite fond of the bunny and had it emblazoned on items in his hootch and on his equipment. Tragically, Patch was killed. The squadron held Patch in such high esteem, they agreed to paint a bunny on the propeller tip of every aircraft in the squadron in his honor and memory. (Fisher also noted retired Brig. Gen. Richard "ish" Ingram spearheaded the bunny effort.)

The next time you have an opportunity to visit the Air Force Museum, stop by and see Fisher's Spad. I hope you'll pause, reflect, and smile on such a little known yet extremely meaningful symbol which reflects a hidden part of our Air Force heritage.

Major Bob Kasprzak
USAF (Ret.)
Dayton, Ohio

Robin Olds

Under "Four New Names for the Aviation Hall of Fame" *["Aerospace World," April, p. 24]*, Robin Olds is listed as an Army Air Corps ace. World War II, for America, began six months

Corrections

In the May issue, three ribbons on p. 62 were placed incorrectly. The Republic of Korea War Service Medal, the Presidential Unit Citation, and Joint Meritorious Unit Award are shown upside down.

Also in the May issue, in the list of "USAF Aces of the Korean War" on p. 67, the middle initial for Maj. Stephen Bettinger should be L.

On p. 46, under "USAF Personnel Strength by Commands, FOAs, and DRUs," the numbers for the Air Force Frequency Management Agency should be 10 military and 26 civilians, for 36 total.

In the "Gallery of USAF Weapons," on p. 154, the top photo should be identified as a CBU-87.

after the Army Air Corps became the Army Air Forces. Thus, Olds may have been a World War II ace but not an Air Corps ace. Army Air Forces was established June 20, 1941.

Capt. Bill Sims,
USAF (Ret.)
San Antonio

■ *Actually, we're not exactly wrong. In general, we do refer to the Army Air Forces when talking about action after June 20, 1941, and before 1947. However, the Army Air Corps did not become the AAF. It was not disestablished until 1947. Until then it was a subordinate element to the AAF, but personnel of the AAF were assigned to the AAC.—THE EDITORS*

Your write-up on Robin Olds was only partially correct. Yes, he flew over Vietnam, but he was a fighter wing commander in Thailand.

Lt. Col. Robert W. Mix
USAF (Ret.)
Walnut Creek, Calif.

■ *"Wing commander during the Vietnam War" would have been better.—THE EDITORS*

Korean War Units

[In] reference to the letter from SMSgt. [Winton O.] Sanson, citing the Reserve units activated for duty in the Korean War *["Letters: More on Air War in Korea," January, p. 8]:* I wish to add that the 452nd [Bomb Wing] (Light), based at Long Beach, Calif., was also recalled to active duty. The wing was alerted on June 22, 1950, and the recall date was Aug. 10, 1950.

The wing commander was Brig. Gen. Luther W. Sweetser. We were based at Miho Field near Matsue on the island of Honshu, Japan. Our Douglas B-26 twin engine bombers were operational by late October 1950.

Col. William H. Fellows,
USAF (Ret.)
Riverside, Calif.

Keeping Up

After having read the letter by William V. Kennedy from Wiscasset, Maine, I felt compelled to write to you to set the record straight. *[See "Letters: Keeping Up," May, p. 9.]*

Being a European and German in particular, I would like to point out that while it is true that the majority of the west European population "enjoys" health care, this doesn't come for free in any of the countries. The only time I "enjoyed" free health care was when I was in the air force.

After I became a civilian I soon realized that health care is quite expensive, and I pay a hefty amount out of my own paycheck for the mandatory health care insurance for my family and myself. But even then, this health care is limited and no longer pays for everything. Just to name an example I just paid some $500 for a pair of glasses I needed, and the mandatory (government imposed) health care system contributed a mere $20 to that amount.

We do have to pay for health care, and that money comes out of our own paychecks until [we] reach retirement age. And the list of what is no longer covered or reimbursable grows longer each year. Our government a long time ago made health care insurance mandatory so as to avoid problems in some countries, where good medical insurance is only available for rich people.

MSgt. Andreas Hunold,
GEAF (Ret.)
Geilenkirchen, Germany

Aerospace World

By Peter Grier

Bush Nominates Service Secretaries

President Bush tapped three veterans of private industry as his nominees for secretaries of the military services.

James G. Roche, Air Force Secretary nominee, is currently a corporate vice president of Northrop Grumman. Before joining the giant defense contractor in 1984, he worked as the Democratic staff director of the Senate Armed Services Committee, as principal deputy director of policy planning at the State Department, and served 23 years in the Navy, retiring as a captain.

Thomas E. White, nominee for Secretary of the Army, is currently vice chairman of Enron Energy Services in Texas. A West Point graduate and 23-year Army veteran, White reached the rank of brigadier general and was executive assistant to Gen. Colin Powell when the latter was Chairman of the Joint Chiefs of Staff.

Gordon R. England, the choice for Secretary of the Navy, recently retired as an executive vice president of General Dynamics, where he worked for nearly 30 years.

USAF Faces $500M in Unanticipated Costs

The Air Force needs $500 million by the end of July to pay for unanticipated increases in the cost of fixing aircraft, said Gen. John W. Handy, the vice chief of staff.

Much of the money would go to repair F-15 and F-16 engine components, many of which are no longer made by original manufacturers. The cost of replacing the F-16 engine core has gone up 300 percent, for instance. The F-15's core hot section turbine now costs 236 percent more.

"We'd like to say we could predict those increases in costs and program and budget for it," said Handy. "But in fact things that are breaking on our weapons systems aren't the predictable parts that you have engineered predictions on."

If it doesn't get the money the Air Force will have to curtail flying hours, said Handy. Reflective of the overall problem, the service's flying hour program costs have increased from seven to 12 percent annually over the last five years.

USAF photo

Skillful Flying. *AFRC Pilot Maj. Greg Lloyd lands his C-5 at Rogers Dry Lake, Calif., without nose landing gear May 2. The crew and passengers were unharmed. Starting from Travis AFB, Calif., on the first leg of a supply mission to England, the crew discovered the nose landing gear door was stuck. They returned to Travis, then opted for the lake bed when it became clear the gear couldn't be freed.*

AMC Chief Says US May Need More C-17s

If it is to acquire enough airlift capacity to meet US national requirements, the Pentagon may need to buy up to 180 C-17s rather than the 134 currently planned, Air Force Gen. Charles T. Robertson Jr., head of US Transportation Command and Air Mobility Command, told a Senate subcommittee April 26.

USAF might require even more than 180 C-17s if the Department of Defense fails to fully modernize the older C-5 fleet, said Robertson. Replacement of C-5 avionics, engines, and other equipment could raise the air-

Zaire in Permafrost

"Over the past decade, Russia's population has been shrinking by almost a million a year, owing to a plummeting birth rate and a rising number of deaths from alcoholism and violence. Predictions are astonishingly grave: The country could lose a third of its population (now 146 million) by the middle of the century. This does not factor in new scourges—tuberculosis and HIV, in particular, which have been spreading exponentially since 1998. ... Russia is following the path of Mobutu's Zaire, becoming a sparsely populated yet gigantic land of natural resources exploited by an authoritarian elite as the citizenry sinks into poverty, disease, and despair."

***—From "Russia Is Finished" by Jeffrey Tayler, in the May* Atlantic.**

Rumsfeld Makes Air Force Lead Service for Space

The Air Force will become the lead military service for space activities, but the idea of a separate space service remains one for debate, Defense Secretary Donald H. Rumsfeld announced in May.

Rumsfeld offered the Pentagon's official response to the recommendations of the Commission to Assess United States National Security Space Management and Organization—usually referred to simply as the Space Commission.

Rumsfeld announced 14 steps he would take to strengthen America's military space capabilities, chiefly by streamlining the space bureaucracy. He accepted nearly all of the commission's findings, which is not surprising, given that he served as the panel's chairman until President Bush tapped him to become Defense Secretary. (See "The Space Commission Reports," March, p. 30.)

Rumsfeld, at a Pentagon press conference, said the streamlining moves were necessary because "more than any other country, the United States relies on space for its security and well-being." The steps, he said, will sharpen the military's focus on space and help discourage adversaries from attempting to exploit US "vulnerabilities" stemming from dependence on space systems.

Deterrence and Dissuasion

"History shows that deterrence and dissuasion are important," Rumsfeld said. "Our first choice is not to prevail in a conflict but to be arranged in a way that can dissuade others from engaging in acts hostile to the United States national security interests, and therefore, deterring conflict from occurring."

He emphasized that the announcement in no way signaled a US intent to weaponize space, and he insisted that he believes there is no "anti-satellite warfare race in space."

Though US policy calls for the military to be able to "defend and protect" US assets in space, Rumsfeld said there are various terrestrial means of doing so, including disruption of uplinks and downlinks.

Among Rumsfeld's initiatives:

- The Air Force, alone among the armed services, will be designated "executive agent" for US space activities, giving it official authority to plan, program, and acquire space systems. USAF will also have responsibility to "organize, train, and equip for prompt and sustained offensive and defensive space operations."
- Air Force Space Command will take over the job of performing military space research, developing space systems, and acquiring them. It will also be given the money to carry out this mission. AFSC will also be in charge of managing the space career field within the Air Force.
- Space becomes the 12th major force program and gets a special budget and accounting line in the overal DOD budget in an effort to increase the visibility of the space program.
- A four-star USAF general will be assigned to lead Air Force Space Command, and he will be instructed to focus solely on that job. US Space Command and North American Aerospace Defense Command will be commanded by a different general officer. (Until now, the same person commanded all three.) Moreover, DOD will end the practice of assigning only flight-rated Air Force officers to be CINCSPACE and CINCNORAD. In the future, the job will be filled by flag officers from any service, rated or nonrated, so long as they possess "an understanding of space and combat operations."
- The undersecretary of the Air Force will become the military's acquisition executive for space systems and also serve as director of the National Reconnaissance Office. The national security space architect will report to the Air Force undersecretary.
- The NRO will establish a new Office of Space Reconnaissance.
- The role that space plays in all manner of operations is to be worked into the curricula of professional military education in all the military services.
- The Navy and Army are to continue to develop service-unique space systems and cultivate a cadre of space-qualified officers. They will coordinate their efforts with the Air Force.
- Service labs and the Defense Advanced Research Projects Agency are to undertake demonstrations of "innovative space technologies and systems for dedicated military missions."
- On the National Security Council at the White House, a Policy Coordinating Committee for Space is being formed which will rationalize the space efforts of the military, NASA, the CIA, and other government agencies with space activities.
- The Defense Secretary and Director of Central Intelligence will meet regularly to discuss intelligence matters and coordinate space activities. They will co-chair a committee to review intelligence issues.

No Undersecretary—Yet

The only Space Commission recommendation Rumsfeld did not put into effect was the establishment of a new undersecretary of defense for space, intelligence, and information. He said he was having his staff review the responsibilities now under the assistant secretary for command, control, and communications, with recommendations to follow as to what steps may be necessary to ensure proper top-level guidance and advocacy for space.

Rumsfeld was joined at the press conference by Sen. Bob Smith (R–N.H.), who spearheaded the drive in Congress for an overhaul of military space organization. Smith said those steps requiring Congressional action will likely be approved.

Asked if the initiatives are a step toward a Space Corps or Space Force, Rumsfeld said many on the commission and Congress felt "that's where it might have been good to go now" and "that it is conceivable we could end up there in some period of years."

However, he cited the disadvantage of the cost and overhead involved in setting up such a new branch of the military and noted that some on the commission feel such a thing is "unlikely, and that you might find, if the Air Force does well with this, that they would be a space–air entity."

—By John A. Tirpak

craft's mission capable rate to 75 percent and keep them in service until almost mid-century.

One caveat, according to the mobility chief: If air carriers purchase commercial versions of the C-17 and agree to make them available to the military during times of need, the requirement increase would "adjust downward slightly."

"Bottom line: This nation's No. 1 DTS [Defense Transportation System] 'shortfall' is its ailing and numerically inadequate strategic airlift fleet," said Robertson.

Aldridge Steps into Top Acquisition Post

The Senate on May 8 confirmed former Secretary of the Air Force Edward C. "Pete" Aldridge Jr. to be the Pentagon's senior weapons official.

Aldridge assumed the post of undersecretary of defense for acquisition, technology, and logistics.

He, Defense Secretary Donald Rumsfeld, Deputy Defense Secretary Paul Wolfowitz, and the three service secretaries, will serve on a key "acquisition executive committee" formed to help carry out President Bush's new strategic plan.

Aldridge was Secretary of the Air Force during the period April 8, 1986, through Dec. 16, 1988, in the second

Bush Makes it Official: US Would Defend Taiwan

Using some of the bluntest language a President has ever employed in regards to a sensitive issue in US–China relations, President Bush on April 25 said the United States would do "whatever it took" to defend Taiwan against Chinese military aggression.

Deployment of US military forces "is certainly an option" if Taiwan is threatened by invasion, Bush said.

But he also cautioned that Taiwan should think twice before declaring independence, a move Beijing has warned could trigger an armed response. "I would certainly hope that Taiwan would not do such a thing," Bush said.

The statements about the US commitment to an island that China has long considered a wayward province came in a series of broadcast and wire service interviews meant to help mark George W. Bush's first 100 days in office.

Aides said the President did not misspeak and that his choice of words was deliberate. However, they denied the claim that Bush had altered the long-standing US policy of maintaining "strategic ambiguity" about what it would do if Chinese forces invaded Taiwan.

"Let the President speak for himself," said State Department spokesman Philip T. Reeker. "He said, very specifically, nothing has changed in our policy."

Under the terms of the 1979 Taiwan Relations Act the US is required by Congress to arm the Taiwanese so they can defend themselves, but Ronald Reagan, George H.W. Bush, and Bill Clinton kept quiet about whether the US would also send American troops to the area in a crisis. In part, this is meant to prevent the bolder factions in Taiwanese politics from unilaterally fomenting an armed clash with the mainland, secure in the knowledge that US forces were at their backs.

Whether US strategic ambiguity on Taiwan really leaves anyone guessing is an open question. When China conducted military tests off Taiwan's coast during Taiwan's 1996 elections, President Clinton dispatched two carriers to the region as a show of US resolve.

In fact, at least two high-ranking members of Bush's foreign policy team—Deputy Secretary of Defense Paul Wolfowitz and Deputy Secretary of State Richard Armitage—before taking office signed a public letter calling for a more explicit US commitment to Taiwan's defense.

President Bush's remarks triggered some consternation on Capitol Hill. Conservatives generally supported the tougher tone, yet said they remain unsure whether strategic ambiguity has been abandoned. Liberals were similarly unsure about whether policy had really been changed, but pretty sure they weren't happy about whatever had happened.

"If what the President said is in fact what he means or if it is indeed the new policy of the United States, it has profound implications for our country," said Sen. John F. Kerry (D) of Massachusetts.

The response in Taiwan itself was somewhat low-key. Officials appeared reluctant to say anything that would further anger a Chinese government already upset over the US decision to sell Taiwan Kidd–class destroyers, P-3 patrol aircraft, and to help the Taiwanese obtain diesel submarines.

Beijing, for its part, accused the Bush Administration of further damaging the already strained US–Chinese relationship.

"There is only one China in the world. Taiwan is part of China. It is not a protectorate of any foreign country," said Chinese Foreign Ministry spokesman Zhang Qiyue.

Reagan Administration. Earlier, he was undersecretary of the Air Force and director of the National Reconnaissance Office.

Bolton Confirmed for Top Arms Control Spot

John Bolton won Senate approval to become undersecretary of state for arms control and international security affairs.

The 57–43 vote to confirm Bolton was taken May 8. He is expected to play a key role in the Bush Administration drive to amend, abandon, or supersede the 1972 Anti-ballistic Missile Treaty and erect a national missile defense system.

Many Democrats voted against confirmation to signal their displeasure with the Bush Administration's missile defense and arms control plans.

Air Force Ponders Minuteman IV

The Air Force is contemplating whether it makes sense to develop and produce a next-generation intercontinental ballistic missile. It's at a "thought-process stage," said a top USAF officer.

Work on an all-new Minuteman IV ICBM could begin as early as 2004, said Maj. Gen. Franklin J. Blaisdell, Air Force director of nuclear and counterproliferation, at a Washington seminar.

Today's arsenal of 500 Minuteman IIIs dates to the 1970s. Current improvement programs to replace guidance and propulsion systems will keep the missiles in good operational order until 2020. After that, the US may need a new weapon if it intends to maintain a land-based nuclear deterrent, said Blaisdell.

The 1980s–vintage Peacekeeper ICBMs are slated for retirement if the START II treaty comes into force. Plans call for the Defense Department to carry out a full-scale nuclear posture review this year.

US Seeks Full Hearing on Veterans Case

The Bush Administration has asked a full federal appeals court to rehear arguments in a case which, if it stands, may well result in Washington being forced to provide free lifetime health care for about 1.4 million elderly military retirees.

In February, a three-judge panel of the US Court of Appeals in Washington, D.C., ruled that the US had illegally breached an implicit contract by forcing military retirees into Medicare at age 65.

Watts Takes Over Defense Department's PA&E Shop

Retired Air Force officer Barry D. Watts on May 1 became the Pentagon director of Program Analysis and Evaluation.

PA&E has been controversial since its formation in 1961. It has been known at various times as the Office of Systems Analysis and as the Office of Planning and Evaluation. Its staff of about 160 civilians and military officers analyze alternative weapon systems and force structures, program alternatives, and the cost-effectiveness of defense systems. It is sometimes said to play the role of "devil's advocate" on defense issues.

Watts is a former F-4G Wild Weasel pilot. From 1991 to 1993, he headed the Gulf War Airpower Survey's work on operations and effectiveness. Watts had been the director of the Northrop Grumman Analysis Center in Arlington, Va., since 1986.

The decision in the case directly affects only two retired Air Force lieutenant colonels, Robert L. Reinlie and William O. Schism, who entered service prior to June 7, 1956—the day Congress passed a law that limited 65-and-over retiree health care in service facilities to a space-available basis.

The plaintiffs, two Air Force retirees, have said they plan to broaden the case into a class action suit. Their counsel is George E. "Bud" Day, a retired Air Force officer and recipient of the Medal of Honor.

New Military Pharmacy Benefit Begins

On April 1, an estimated 1.4 million military retirees age 65 or older became eligible for Tricare pharmacy benefits as a result of legislation passed by Congress last year.

Under the new program, these older retirees and their families are able to obtain prescription medications via a mail-order service, Tricare network pharmacies, and nonnetwork pharmacies. Co-payments will be relatively small.

Those interested in further information can call 1-877-363-6337.

CNO Says Carriers Still Beat All

Chief of Naval Operations Adm. Vern Clark gave a tub-thumping defense of aircraft carriers at the Navy League's annual conference in Washington on April 12.

Responding to press reports that the Bush Administration might curtail or de-emphasize carrier programs in the future as a result of survivability and affordability concerns, Clark said, "For now and the near term there is no more powerful, no more capable platform ... than America's large-deck aircraft carrier."

The day of carrier vulnerability has not yet arrived, he said. One reason, he contended, is the speed of carrier movement itself. "This movement translates to a 700-square-mile area of uncertainty in 30 minutes," said Clark. "In an hour-and-a-half it grows to 6,300 miles. That presents a serious targeting problem."

Bush Calls for More Base Closures

As expected, the Bush Administration's new Fiscal 2002 budget plan calls for more base closures.

"DOD wastes money on infrastructure it does not need. ... With 23 percent in estimated excess infrastructure, it is clear that new rounds of base closures will be necessary to shape the military more efficiently," said budget documents.

USAF photo

SSgt. J.C. Clark, an assistant dedicated crew chief from the 411th Flight Squadron, Edwards AFB, Calif., marshals Raptor 4003. The F-22 had just completed its 1,000th flight-test hour April 18.

Vietnam War Erupts Anew for Ex–Sen. Robert Kerrey

As a raw, 25-year-old Navy lieutenant, former Sen. Robert Kerrey (D–Neb.) in early 1969 led a raid in Vietnam that ended in the deaths of a dozen or so noncombatants.

Kerrey's revelation of his role in the long ago Thanh Phong killings came in the face of impending news reports detailing the events. Kerrey said a Bronze Star he had been awarded for leading the raid never meant a thing to him.

"I was so ashamed I wanted to die," said Kerrey, who also received the Medal of Honor for later actions during his Vietnam tour as a Navy SEAL officer. Kerrey lost part of his right leg in the war.

According to Kerrey and five other members of his SEAL unit, the killings of the civilians were accidental and inadvertent. Kerrey had led his SEAL unit to the village on the night of Feb. 25, 1969, in search of a Viet Cong leader who was allegedly present in the area.

One former member of the unit, Gerhard Klann, says Kerrey ordered the killing for fear that leaving behind civilians would endanger the unit's retreat. Every other team member disputes this "My Lai" interpretation of events, published in the *New York Times Magazine* on April 29.

Kerrey said his memory of the events is hazy but that in any case the deaths were not intentional. Kerrey and every member of the SEAL unit except Klann signed and issued a statement that said, in part:

"At the village we received fire and we returned fire. One of the men in our squad [Klann] remembers that we rounded up women and children and shot them at point-blank range in order to cover our extraction. That simply is not true. We know there was an enemy meeting in this village. We know this meeting had been secured by armed forces. We took fire from these forces and we returned fire. Knowing our presence had been compromised and that our lives were endangered we withdrew while continuing to fire."

In the wake of the news reports, Kerrey won staunch support from three US Senators, all decorated Vietnam veterans. All said the Pentagon would be making a big mistake if it opened an investigation, as some have sought.

Sen. John F. Kerry (D–Mass.), a former Navy officer, said, "If you were to ask me, I'd say no. ... That would mean you really have to go back and look at the entire underlying thesis of the war."

Sen. Max Cleland (D–Ga.), who lost both legs and an arm in combat, said, "I'm on the Armed Services Committee and I say no."

Sen. Chuck Hagel (R–Neb.), a former infantryman in Vietnam, said, "What would be the point of it?"

In a joint article in the *Washington Post*, the three said: "For our country to blame the warrior instead of the war is among the worst and, regrettably, most frequent mistakes we as a country can make."

US Resumes Surveillance Flights Near China

Twenty-four US servicemen and -women returned to US soil April 12 after being held for 11 days in China, where they landed after their Navy EP-3 surveillance airplane collided in midair with a Chinese F-8 fighter.

Their release followed the delivery of an official letter from US Ambassador Joseph W. Prueher expressing "sincere regret" for the loss of the Chinese pilot, who was killed in the accident. The letter also said the US was "very sorry" that its crippled aircraft landed on Chinese soil without prior clearance.

The wording of the letter allowed Beijing to claim it had forced the world's only superpower to apologize and Washington to say that it had not, in fact, apologized at all.

"This has been a difficult situation for both our countries," President Bush said after receiving news of the crew's impending release.

The lumbering EP-3 was flying an overt surveillance route in international airspace over the South China Sea on a route the US Navy had used for decades.

Crew debriefings indicated it was flying on autopilot, straight and level, when it was "buzzed" three times by a Chinese pilot.

On the third time, the fighter's tail hit the EP-3's No. 1 propeller. The autopilot went off, and the Navy airplane made a steep left turn and plunged 5,000 to 8,000 feet before its pilot, US Navy Lt. Shane Osborn, managed to regain control.

Metal shards pierced the EP-3 fuselage, creating noise and wind that made communication difficult. With two engines damaged, and missing its nose cone, the aircraft struggled to make an emergency landing at the nearest suitable field—Hainan Island, off the coast of southern China.

"I am told that the crew made some 25 to 30 attempts to broadcast Mayday and distress signals and to alert the world, as well as Hainan Island, that they were going to be forced to land there," said Defense Secretary Donald H. Rumsfeld at a briefing for reporters on April 13.

In the wake of the incident, the Chinese government continued to demand that the US halt surveillance flights off its coast and over the South China Sea. US officials, for their part, said there was no chance of that happening. "Reconnaissance flights are a part of a comprehensive national security strategy that helps maintain peace and stability in our world," said Bush.

The President declared that the flights would continue. Flights resumed May 7.

China did not immediately release the EP-3. The US continued to demand its return. There was concern that China's military would be able to acquire significant intelligence and technical information from the aircraft.

Sen. John McCain (R–Ariz.) and Sen. Carl Levin (D–Mich.) introduced legislation in February that would authorize base closing rounds in 2003 and 2005.

Choice of Retirement Plans Available

Beginning this August, military personnel who joined the service on Aug. 1, 1986, or later will have new choice in retirement plans.

They will be able to either stay with the Redux system (at 40 percent of pay, plus a Career Status Bonus of $30,000) or go with 50 percent retirement under the High-3 plan.

This sweetening of the retirement pot was included in the Fiscal 2000 National Defense Authorization Act. Information about the new choices is available at the Air Force Personnel Center Web site at http://www.afpc.randolph.af.mil/retsep.

Congress Mulls Ending Tax on Bonuses

Rep. John Hostettler (R–Ind.) introduced legislation that would end the tax on re-enlistment and other retention incentive military bonuses.

Under the current system, such bonuses are taxed at a rate of at least 28 percent unless the receiving service member is deployed to a combat zone.

"The current taxation of bonuses can mean the difference between retaining a pilot that this nation has

War and Peace

"Even with the currently approved C-17 'multiyear procurement' program, we will still fall approximately 10 percent short of being able to meet ... operational war plans. Complicating matters even more, the ongoing retirement of our C-141 fleet ... is rapidly putting Air Mobility Command in a position, based on a simple shortage of airframes, where ... it is losing the flexibility to reliably and efficiently meet the country's peacetime requirements. Simply put, the authorized C-17 fleet of 134 programmed aircraft cannot and will not offer the same flexibility as did the 256 aircraft C-141B fleet it is replacing."

—USAF Gen. Charles T. Robertson Jr., commander, Air Mobility Command, from April 26 remarks to a Senate panel.

Global Hawk Goes Trans–Pacific

The Air Force's Global Hawk Unmanned Aerial Vehicle on April 22–23 became the first UAV to traverse the Pacific Ocean nonstop.

After taking off from Edwards AFB, Calif., before dawn, the aircraft flew southwestward for roughly 22 hours, at altitudes as high as 65,000 feet. It covered a distance of 8,600 miles.

USAF operators, working out of a control facility at Edwards, got the UAV airborne. Ground crews monitored the UAV's flight but did not control it. It flew autonomously on a preprogrammed route, successfully landing on a runway at an Australian military base outside the southern city of Adelaide. It touched down at 8:41 p.m. local time, April 23. It was 14 minutes ahead of schedule.

Plans called for the high-altitude, long-endurance UAV to participate in combined US–Australian military exercises through May and early June. While deployed, the Global Hawk will have the special designation "Southern Cross II," commemorating a previous US–Australian aviation event. In 1928 two US and two Australian aviators crossed the Pacific in a Fokker trimotor named "Southern Cross."

The Global Hawk's 116-foot-span wings enable the jet-powered aircraft to carry 15,000 pounds of fuel, which accounts for 60 percent of the aircraft's weight. It cruises at a speed of about 400 miles per hour.

It has a range of 13,800 miles.

Its current sensors include a synthetic aperture radar with a moving target indicator mode and an electro-optical and infrared sensor. Using a combination of these sensors, the system can "see" through adverse weather and image day or night, from an altitude of up to 65,000 feet.

spent millions of dollars to train or losing him to one of the major airlines," said Hostettler. "If we want to retain the best and most experienced people in our armed services, then we must at least provide greater incentives for them to stay."

IDA Slams Mobile Offshore Base Idea

The Mobile Offshore Base—a sort of giant, semistationary aircraft platform that some envision as fulfilling a multitude of deployment roles—would in fact be more expensive and less effective than alternatives.

That is the conclusion of an Institute for Defense Analyses study, according to "Inside the Navy," a Washington newsletter.

One 5,000-foot-long MOB would cost about $10 billion to purchase and another $25 billion to maintain over a 40-year life span, according to IDA. Aircraft carriers, large monohull sea bases, and ground bases would all be less expensive, it added.

While strike aircraft might be able to operate from an MOB, support aircraft could not, necessitating additional basing options. Furthermore, the presence of many strike aircraft in a small seaborne area could present a tempting target for ballistic missiles or other adversary weapons.

"The MOB is subject to the same threats as any large naval vessel," says the IDA study, as quoted by "Inside the Navy." "Its large size is both an advantage and a liability."

Osprey Crash Caused by Hydraulic, Software Failures

The crash of a V-22 Osprey during a training flight in North Carolina last December was caused by a deadly combination of a burst hydraulic line and defective computer software.

The accident, which killed four Marines, was not attributable to aircrew error, said officials.

"Failures and mishaps are seldom caused by a single factor. This one was no exception," said Marine Gen. Martin R. Berndt at an April 5 Pentagon briefing for reporters.

According to the report, the trouble began as the Osprey's pilot, Lt. Col. Michael L. Murphy, tried to shift the aircraft's tilt rotors from the horizontal, airplane mode into their vertical, helicopter mode.

Midway through the shift, a titanium hydraulic line burst, causing total loss of fluid in the V-22's primary flight control system. Bundled wire within the left engine compartment had chafed the tube enough to cause it to fail.

By itself, such a problem should not have caused the aircraft to crash, due to backup systems. But the fluid loss caused a flight control warning light to flash and a warning tone to sound.

"The published procedure for responding to such a failure is to press the primary flight control system reset button," said Berndt.

When Murphy did so, a software flaw caused rapid and significant changes to the aircraft's prop-rotor pitch, causing the V-22 to speed up and then slow down. He continued to press the button, as many as 10 times in a few seconds. Unbeknownst to him, that was making things worse.

"The accelerating and decelerating of the aircraft every time that button was pressed was what caused the aircraft to stall and lose controlled flight," said Berndt.

The report called for a complete redesign of the systems at issue. Such work could delay the already-troubled Osprey program anywhere from three months to two years.

Predator UAVs Begin Operating From Macedonia

USAF Predator Unmanned Aerial Vehicles began operating from Macedonia's Petrovec airport the first week in April.

The UAVs were part of NATO's increasing effort to prevent infiltration of forces across the Kosovo–Macedonia border.

Previously, the only UAVs available to help patrol for Albanian rebel insurgents moving into Macedonia were short-range German army models. Force protection guidelines restricted use of manned US reconnaissance flights.

Meanwhile, an Air Force crash report released April 12 linked the Oct. 23 crash of a Predator operating over Kosovo to improper maintenance.

Evidence indicated that propeller assembly components were improperly lubricated, and a key bolt was stripped, said the report. These faults led the Predator to crash into a hill 180 miles southeast of Tuzla AB, Bosnia.

USAF photo

Chuck Gardner, a Northrop Grumman Ryan systems engineer for the Global Hawk Unmanned Aerial Vehicle tests some of its systems before its departure April 22 on its trans–Pacific journey from Edwards AFB, Calif., to Australia.

Production of JDAM Accelerates

The Office of the Secretary of Defense recently approved full-rate production of the Joint Direct Attack Munition—a step that clears the way for production of upward of 90,000 JDAM conversion kits by 2008.

The new precision guidance kit proved its worth during Operation Allied Force in 1999. During the Kosovo campaign 652 JDAMs were dropped by B-2 stealth bombers. Weapon accuracy has far exceeded expectations, said officials.

JDAM tail kits are fitted on existing "dumb" iron bombs and use a Global Positioning System/Inertial Navigation System to steer toward a target.

Weapon requirements call for an

Female USAF Fighter Pilot Slams Dress Rules in Saudi Arabia

The top-ranked female fighter pilot in the Air Force has gone public with objections to the way in which US servicewomen are ordered to behave while deployed to Saudi Arabia, an ultraconservative Muslim kingdom.

Maj. Martha McSally, an A-10 pilot, says it contravenes US values for her commanders to order her to satisfy host nation sensibilities by wearing a black head scarf and a neck-to-toe robe when she leaves her base.

She further objects to being asked to sit in the backseats of cars, per the Saudi interpretation of Islamic tenets.

In Saudi Arabia she is "treated like a Muslim piece of property," McSally told *USA Today*.

McSally said some military women based in Saudi Arabia have had run-ins with the Saudi religious police.

"Some of our gals who have walked through a mall, they are kind of lax on the headgear thing where some of them just wear them around their neck—but there have been times where a [Saudi religious policeman] comes up and just gets angry and starts kind of hitting them with little sticks."

McSally told *USA Today* that, at a minimum, she should be permitted to wear long pants and long-sleeve shirts when traveling at night in a car between military installations and that women should be allowed to wear their uniform when off base on official business.

Her previous attempts over the past six years to get some action on her complaints within the system have been to no avail, she said.

"I understand for security reasons why we need to be allies with the Saudis," she said. "But it is also part of our national security strategy to promote American values abroad. We, in the military, sign up to give our lives for the freedoms that we value deeply and people have died for before us."

USA Today reported on April 30 that the senior American military commander in Saudi Arabia, USAF Brig. Gen. Gary R. Dylewski, will review and may change a policy requiring female military personnel deployed in that country to wear a neck-to-toe robe known as an abaya, military officials say.

Military spokesmen say that Dylewski, who assumed the command in April, would review the policy. As the new commander, they say, he is reviewing all policies, and there is no assurance he will change this one.

The dress code governing female US military personnel actually is promulgated by US authorities, not the Saudis themselves. US employees of the State Department in Saudi Arabia are not required to wear the abaya.

Part of the reason for the stricter rules is that US military personnel, unlike diplomats, are not protected from local laws by diplomatic immunity.

accuracy of 30 meters using only INS guidance, and 13 meters when INS is supplemented by GPS.

"We are getting 14 meters with INS and 8 meters with GPS/INS. So we are almost meeting the GPS–aided requirement with only the INS," said Lt. Col. Richard Walley, JDAM program deputy director.

New Munitions Dispenser Gets Green Light

The Department of Defense has approved full-rate production of the Wind-Corrected Munitions Dispenser, the Air Force announced April 10.

Officials said the WCMD had proved itself a model acquisition program. It reached the full-rate goal line in five years, instead of the 10 years typically required of a program of its size. Initially estimated to cost $25,000 per unit, WCMD kits in fact will cost around $9,000 apiece.

"We are absolutely ecstatic about the recent [full-rate] decision," said Lt. Col. Jeff Severs, WCMD development system manager.

The WCMD is a tail kit that is fitted on unguided cluster munitions to convert them into more accurate adverse weather weapons. Inertial guidance allows pilots to deliver cluster munitions from altitudes of up to 45,000 feet, without regard to wind or the possibility of launch alignment error.

Plans call for eventual purchase of a total of 40,000 units—30,000 for the CBU-87 Combined Effects Munition, 5,000 for the CBU-89 Gator mine system, and 5,000 for the CBU-97 Sensor Fuzed Weapon.

Rumsfeld Aide Tapped for DOD Policy Slot

Stephen A. Cambone, a special assistant to the Secretary of Defense, Donald Rumsfeld, has been nominated for the position of principal deputy undersecretary of defense for policy, the White House announced on April 23.

Cambone has served as staff director of the Commission to Assess US National Security Space Management and Organization and director of research at the National Defense University's Institute for National Strategic Studies. He was also staff director of the Rumsfeld Commission study of the ballistic missile threat to the US.

Air Force Proposes Langley for F-22

The Air Force has filed a draft Environmental Impact Statement with the Environmental Protection Agency regarding proposed homes for the first wing of F-22 Raptor fighter aircraft.

Among the items analyzed in the study are the estimated effect of a wing of 72 F-22s on air, water, and land quality and on the quality of life for the population surrounding proposed basing locations.

Langley AFB, Va., is the service's first choice for an initial F-22 location. Others in the running include Eglin AFB, Fla., Tyndall AFB, Fla., Elmendorf AFB, Alaska, and Mountain Home AFB, Idaho.

The Air Force has already sched-

China's Burgeoning Public Image Problem

Chinese belligerence about Taiwan and US operations in the South China Sea and other irritants are affecting US opinion.

According to a CNN/*USA Today*/Gallup poll released in late April, the American view of China has grown much more negative over the past year.

In May 2000, 51 percent of Americans thought of China as either an ally or friendly nation. Only 43 percent said China was unfriendly or an enemy.

A year later, the proportion of Americans with a positive view of China has plummeted to 27 percent. Meanwhile, 69 percent view the Communist giant as unfriendly or even as an enemy.

According to the poll, a plurality of Americans don't want Beijing to host the 2008 Olympic games.

From Bush, a "New Framework" for Defense and Deterrence

In a major security affairs address at National Defense University, President George W. Bush on May 1 called on the US to move beyond the 1972 Anti-Ballistic Missile treaty and erect missile defenses as soon as possible.

"We need a new framework that allows us to build missile defenses to counter the different threats of today's world," said Bush. He added, "This treaty does not recognize the present or point us to the future. It enshrines the past."

Such a switch could lay the groundwork for further deep reductions in nuclear warheads, said Bush. Taken as a whole these steps would create a new concept of nuclear deterrence. "We must seek security based on more than the grim premise that we can destroy those who seek to destroy us," the President declared in the Washington speech.

Bush emphasized that he did not propose to abandon deterrence but rather enhance it and put it in broader context. He said, "We need new concepts of deterrence that rely on both offensive and defensive forces. Deterrence can no longer be based solely on the threat of nuclear retaliation."

This new framework, said Bush, would in fact encourage further cuts in offensive nuclear weapons. "Nuclear weapons still have a vital role to play in our security and that of our allies," he said, but "my goal is to move quickly to reduce nuclear forces."

The United States currently has 7,295 deployed strategic warheads compared to Russia's 6,094. Russia has been looking for big cuts, while the Bush Administration unofficially has been discussing making unilateral cuts down to 1,500 US warheads.

The missile defenses envisioned by Bush officials go far beyond the limited land-based system called for in plans produced by the Clinton Administration.

The postulated near-term missile defense system might feature both sea-based and land-based technologies, the President said. Such weapons would aim to knock down ballistic missiles in midcourse or as they re-enter the atmosphere.

Bush's speech offered no system specifics. Army officials have reportedly claimed the service could have a start-up, land-based interceptor system ready in 2004, if pressed. The Navy has said that two Aegis cruisers equipped with 50 missiles optimized for missile defense could be deployed in about the same time.

In the medium-term, weapons that seek to attack missiles in their boost phase, when they are more vulnerable, could add depth to an initially deployed system. The Air Force's Airborne Laser is a preeminent candidate to provide such capability.

"We have more work to do to determine the final form the defenses might take," said Bush. "We will explore all of these options further."

The President promised to consult closely with allies on the missile defense subject. In the past, many European nations have worried that US withdrawal from the ABM accord could reignite the nuclear arms race, with a fearful Russia rebuilding its nuclear arsenal to try and make sure it can always strike US soil.

Bush's speech called for Russia and the US to work together to develop a "new foundation for world peace and security in the 21st century." Moscow's initial reaction was guarded but at least not hostile.

Russia is "ready for consultations and we have something to say," said Russian Foreign Minister Igor Ivanov.

On Capitol Hill, senior Democrats had only a negative reaction, indicating that Bush's push for missile defense could become a major point of difference between the parties.

Democrats objected to abandoning the ABM pact, which they described as a cornerstone of the world arms control regime, for a defensive system which is unproved at best and unworkable at worst.

The struggle over the issue of missile defense could become "one of the most important and consequential debates we will see in our lifetime," said Sen. Thomas Daschle (D–S.D.), the Senate minority leader.

Bush, however, said his new framework will permit "a clear and clean break from the past and especially from the adversarial legacy of the Cold War."

uled a series of public hearings in communities surrounding these installations in an attempt to gather public comment regarding F-22 basing.

The full text of the F-22 EIS statement can be found on the World Wide Web at www.cevp.com.

Property Maintenance Shortfalls Dogging AFRC

Lack of money for building new buildings and maintaining old ones is hurting Air Force Reserve Command readiness, AFRC officials told Congress.

"For the men and women of the Air Force Reserve, their quality-of-life facilities are where they train and work," Hilton Culpepper, AFRC assistant civil engineer, told a Senate panel. "When they are constantly faced with inadequate facilities that we cannot maintain, it eventually takes its toll on recruitment, retention, and mission accomplishments."

AFRC owns and operates 12 installations consisting of more than 10,000 acres, 1,000 buildings, and 12 million square feet of space.

Operating from these and 55 other locations, AFRC provides 20 percent of Air Force capability at a cost of only four percent of the service's budget, according to Culpepper.

AFRC military construction requirements are more than $683 million, yet the command only receives enough funding to complete fewer than two projects per year.

"At this rate, our facilities can be replaced only every 314 years," said Culpepper.

House Considers Military Voting Rights Bill

A bipartisan group of House lawmakers introduced legislation to protect voting rights for military members and their families.

The legislation follows last fall's Florida election controversy, which, among other things, showed inconsistencies in the treatment of service member absentee votes.

"A military person's vote should not be overshadowed by postmark discrepancies, confusion about residency requirements, or other technicalities that are often times out of their control," said Rep. Mac Thornberry (R–Tex.), a bill sponsor.

The measure would guarantee residency for service members and their families in all federal, state, and local elections. It would establish a standard 30-day period for receiving and mailing in absentee ballots and require states to find clear and convincing evidence of fraud before

Mediocre Pilot—And Much More

"Hero of the era," "martyr of the revolution," "heroic defender of the motherland," "brave serviceman," "versatile talent," "good husband," "good cook, able to prepare delicious food," "skillful tailor who made a fashionable skirt for his wife to mark their wedding anniversary," "accomplished painter," "fine singer," "flower arranger," "meticulous housekeeper," "a man of fantastic health," "adept at computers," "a man who persuaded his wife, pregnant for the first time, to have an abortion."

—Official propaganda tributes to Wang Wei, late Chinese pilot who flew his fighter into a US Navy EP-3 aircraft over the South China Sea. From report in April 27 **New York Times.**

throwing out ballots in a federal election because they lack postmarks.

Kuwait Bombing Was Pilot Error

The mistaken bombing on March 12 of an observation post at a training range in Kuwait stemmed largely from pilot error, said an accident report.

A Navy F/A-18 pilot, Cmdr. David O. Zimmerman, mistook the post for his intended target, according to the report. An Air Force ground controller taking part in the night bombing run was using an infrared beam visible through the Hornet's night vision equipment to point out the true target.

For some reason Zimmerman focused on the source of the beam and not on its endpoint.

A moment's distraction on the part of the ground controller caused him to clear the Hornet for weapons delivery moments before he realized it was in fact aiming for him. Six people died in the accident.

GD to Buy Newport News Shipbuilding

General Dynamics on April 25 announced that it had agreed to purchase Newport News Shipbuilding Inc. for $2.1 billion.

The deal has yet to be approved by shareholders and must pass legal muster with the Department of Defense and Department of Justice. If completed, it would leave General Dynamics as the nation's lone builder of nuclear-powered aircraft carriers and submarines.

Analysts said that a GD–Newport News consolidation could raise antitrust issues, but the slow pace of large shipbuilding for the military means that competition in the area is already virtually nonexistent.

Northrop Grumman announced May 9 that it has offered to acquire Newport News, citing concern that the GD merger "would create an unhealthy monopoly."

Crash Kills Two Luftwaffe Officers

Two German air force aircrew members were killed March 25 when their Tornado fighter–bomber crashed on the Nevada Test and Training Range.

The two Germans were taking part in a Red Flag exercise at Nellis AFB, Nev. Germany was one of five foreign nations that sent crews to participate in the latest Red Flag sequence.

An investigation is under way. It involves investigators from the US and German air forces.

Minuteman Refurbishing Proceeds

A newly refueled Minuteman III ICBM was recently installed in launch facility Hotel-02 at Malmstrom AFB, Mont., as part of the Air Force's ongoing Propulsion Replacement Program.

Malmstrom is the first installation to take part in the program. Minuteman units at F.E. Warren AFB, Wyo., and Minot AFB, N.D., will begin receiving updated boosters later this year.

New propellant has previously been poured into several stages of the three-stage Minuteman systems. However, the current program represents the first time all three stages have been refueled simultaneously, said officials.

"As the solid propellant [inside the boosters] ages, it dries out and shrinks," said Col. Jack Anderson,

DOD Sees Little Danger From Gulf War Chemical Agent

Two new Pentagon investigative studies conclude that no US service personnel—with the possible exception of a few special operations force units—were exposed to chemical warfare agents in the aftermath of coalition air attacks on several Iraqi munitions dumps.

One of the reports focuses on Al Muthanna, the nucleus of Iraq's entire chemical weapons programs.

During the night of Feb. 8, 1991, a USAF F-117 penetrated Al Muthanna's Bunker 2 with a laser-guided bomb. Postwar inspection confirmed that the attack destroyed hundreds of nerve agent–filled 122 mm artillery rockets.

Of an estimated nine tons of nerve agent sarin in the bunker, only about 10 kilograms escaped into the atmosphere, the new DOD study concludes. The rest was destroyed in the fierce fire that followed the attack.

Pentagon computer models estimate that the maximum hazard area extended no farther than 50 kilometers to the southeast. Yet no US forces in the region were closer than 412 kilometers from Al Muthanna.

The second study deals with the destruction of the Muhammadiyat Ammunition Storage Site as the result of a series of air raids in January and February 1991.

Coalition planners knew that Muhammadiyat was an ammo dump and suspected Scud missile depot. It is unclear whether they knew it also contained nerve- and mustard gas–filled bombs before a postwar UN inspection.

Muhammadiyat was bombed 17 times, on 15 separate days. In total, 180 kilograms of nerve agents and 2,969 kilograms of mustard blister agent were released into the atmosphere, according to DOD estimates.

The closest that US forces were to the nerve agent hazard area, at any time, was 35 miles. They never came closer than 125 miles to the possible mustard agent hazard area, according to the study.

It is possible that a few forward deployed special operations forces personnel operating in Iraq were exposed to a low level of nerve agent on Feb. 17, 19, or 24, 1991.

"For these soldiers, we cannot determine if nerve agent exposure occurred since we only know the general vicinity, not the precise location, of these soldiers during the time of the hazard," concluded the Pentagon study.

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341st Logistics Group commander. "Eventually it pulls away from the liner of the booster and leaves air spaces or gaps."

These gaps can greatly impact the nature of the propellant burn and its efficiency and reliability, said Anderson.

The approximate cost of the program is $1.8 billion for 607 boosters. Life of the ICBMs will be extended at least through 2020.

DSB Says US Should Strengthen Homeland Defense

A new Defense Science Board report says the Pentagon needs to place greater emphasis on homeland defense.

"Asymmetric" threats such as biological weapons, cyber-war, and even suitcase nuclear bombs are increasing and require a more sophisticated US response, the DSB study says, according to "Inside the Air Force."

Perimeter defense is no longer enough. DOD needs to think more about a layered approach that would include information defense, unconventional nuclear warfare defense, and intelligence for civil defense, among others.

The 2000 DSB study, "Protecting the Homeland," was recently cleared for public release. Its call for a more energetic homeland defense mirrors the Hart–Rudman Commission final report issued in late January. (See "Hart–Rudman Calls for Homeland Defense," April, p. 64.)

News Notes

■ Lt. Col. Stayce D. Harris assumed command of the 729th Airlift Squadron, March ARB, Calif., on Feb. 24, becoming the first African American woman to command an Air Force flying squadron.

■ The first Milstar II satellite has begun on-orbit testing following a successful Feb. 27 launch.

■ The Air Force has sent its 21st Defense Support Program satellite to Cape Canaveral, Fla., to prepare for a summer launch. Air Force Space Command's 3rd Space Launch Squadron is working toward an early August liftoff.

■ The Air Force took delivery of its first Block 12 C-17 on March 23. Among other improvements, this updated Globemaster version incorporates global air traffic management capability and the extended range fuel system.

■ On April 3 Raytheon Aircraft announced that the US Navy and US Air Force have ordered 59 T-6A Texan II trainers and technical support worth $148.3 million. Of the 167 ordered so far, 30 will go to the Navy and 137 to USAF, which is slated to begin training later this year. Plans call for the Navy to receive a total of 328 T-6As through 2017 and the Air Force 454.

■ Seymour Johnson AFB, N.C., is the Air Force winner of the 2001 Commander in Chief's Award for Installation Excellence. Other winners included the Army's Ft. Bragg, N.C., Fleet Activities Yokosuka, Japan, and Marine Corps Base Camp Lejeune, N.C.

■ SSgt. Pete Leija, RAF Lakenheath, UK, was selected as the Air Force Exceptional Innovator of the Year. Leija was honored for a suggestion of a change in the inspection criteria for F-100-229 engines that could save the service more than $8 million annually.

■ The Air Force recently named its 2000 Air Force Contracting Award recipients. In the Professionalism in Contracting category, the winners included: Supervisory, Maj. Thomas J. Snyder, San Antonio Air Logistics Center, Tex.; Nonsupervisory, Capt. Cameron G. Holt, Aeronautical Systems Center, Wright–Patterson AFB, Ohio; President's Committee Award, 6th Contracting Squadron, MacDill AFB, Fla.; Chairman's Award, Beatrice R. De Los Santos, 311th Human Systems Wing, Brooks AFB, Tex.

USAF photo by SSgt. Jennifer C. Wallis

SrA. Rene Marvel and A1C Frank Collins, chefs from the 21st Space Wing "Knights," serve their teammates during a food preparation event at Guardian Challenge 2001. Air Force Space Command holds the annual four-day space and missile wartime readiness competition at Vandenberg AFB, Calif.

■ Lt. Col. Tony Aretz, deputy department head for behavioral science at the US Air Force Academy, was recently named an American Council on Education fellow for 2001–02. The award will allow Aretz to spend time at a university in Denver or Boulder, Colo., studying conflict resolution.

■ On April 2, 1st Lt. Mark Hadley, Misawa AB, Japan, ejected safely before his F-16 crashed into the ocean off northern Japan. He was taking part in an air-to-ground combat training exercise at the time of the incident.

■ The winners of the 45th annual Air Force media contest were announced April 3. They include: Print Journalist of the Year, Tim Barela, Air Education and Training Command, Randolph AFB, Tex.; Broadcast Journalist of the Year, SrA. Marty Rush, Air Force News Service, San Antonio, Tex.; Military Funded Newspaper (large), "Northern Light," 35th Fighter Wing, Misawa AB, Japan, and Military Funded Newspaper (small), "Patriot," 439th Airlift Wing, Westover ARB, Mass.

■ Col. Alvin L. Hicks, former commander of the 311th Air Base Group, Brooks AFB, Tex., was sentenced April 3 to three months of confinement, a loss of all pay and allowances, and a $50,000 fine. He had been convicted of indecent assault and conduct unbecoming an officer in regards to an attack on a lieutenant under his command.

■ The Air Force's 2000 Mainte-

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nance Effectiveness Awards were announced April 4. Among 13 winners, four were selected to compete at the DOD level. They are: 20th Component Repair Squadron, Shaw AFB, S.C., for maintenance, component repair, and equipment maintenance; 37th Airlift Sq., Ramstein AB, Germany, for aircraft maintenance (medium); 62nd/446th Aircraft Generation Sq., McChord AFB, Wash., for aircraft maintenance (large); 86th Logistics Support Sq., Ramstein, for logistics support.

■ Thirty-eight residents of the US Soldiers' and Airmen's Home in Washington, D.C., were presented with Republic of Korea War Service Medals on April 11. The South Korean award went to 15 airmen, 18 soldiers, three sailors, and two Marines.

■ The US Air Force and Boeing have tied up a deal for 10 new F-15E fighters at a cost of about $571 million. The jets will be built at Boeing's St. Louis plant, company officials said.

■ An Air Force–sponsored car, driven by Elliott Sadler, of Wood Brothers Racing, won a NASCAR Winston Cup Series race on March 25. Sadler came from near the tail of the field to seal his first win in the race. USAF hopes its symbol on the race car will attract recruits with mechanical backgrounds.

Condescending Arrogance

"Words like 'atrocity' and 'massacre' are routinely being thrown about [concerning a 1969 military action in Vietnam by ex–Sen. Bob Kerrey's SEAL unit]. ... Aggressive reporters have played 'gotcha' with every Kerrey statement. 'How could he say it was a moonless night, when the charts say it was a half-moon?' ... For many who went through extensive combat in Vietnam, such parsing brings back an anger caused by memories not of the war but of the condescending arrogance directed at them upon their return, principally by people in their own age group who had risked nothing and yet microscopically judged every action of those who had risked everything and often lost a great deal."

***—James Webb, former Navy Secretary and decorated USMC combat veteran of the Vietnam War, quoted in May 1* Wall Street Journal.**

■ The US Air Force Reserve Pipe Band performed at a special Tartan Day ceremony held April 5 on the lower west terrace of the US Capitol. The band performed for an audience that included actor Sean Connery as well as political figures.

■ Starting May 1, diesel-powered government vehicles at Scott AFB, Ill., will begin testing an alternative fuel composed of 80 percent diesel and 20 percent soybean oil. Commercial use has indicated that the fuel burns cleaner than straight diesel and costs about the same.

■ Eglin AFB, Fla., won the Best Large Commissary in the US honor when the Defense Commissary Agency announced the winners of its 2000 Best Commissary Awards on April 9. Beale AFB, Calif., took home honors as Best Small Commissary in the US. Osan AB, South Korea, won the Best Large Commissary overseas award.

■ A group of West Texas ranchers—the Davis Mountains Trans–Pecos Heritage Association—has filed a suit in US District Court alleging that Air Force low-level training is damaging their property, reported the *Dallas Morning News*. At issue is the environmental impact of flights over 15 million acres of private property in Reeves, Hudspeth, Jeff Davis, Presidio, Brewster, Pecos, and Culberson counties.

■ Air Force Reserve Command formally activated the 39th Flying Training Squadron at Moody AFB, Ga., on April 2. Lt. Col. Dave Coffman assumed command of Moody's first Reserve squadron. ■

Index to Advertisers

Senior Staff Changes

RETIREMENT: Brig. Gen. Richard B. **Bundy.**

NOMINATIONS: To be **AFRC Lieutenant General:** James E. **Sherrard III.**

To be **Brigadier General:** James P. **Hunt,** John C. **Koziol,** David R. **Lefforge,** Thomas J. **Loftus,** William T. **Lord,** Arthur B. **Morrill III,** Larry D. **New,** Leonard E. **Patterson,** Michael F. **Planert,** Jeffrey A. **Remington,** Edward A. **Rice Jr.,** David J. **Scott,** Winfield W. **Scott III,** Mark D. **Shackelford,** Glenn F. **Spears,** David L. **Stringer,** Henry L. **Taylor,** Richard E. **Webber,** Roy M. **Worden,** Ronald D. **Yaggi.**

CHANGES: Brig. Gen. (sel.) Rosanne **Bailey,** from Armament Product Gp Mgr., Air Armament Ctr., Eglin AFB, Fla., to Dir., Aging Aircraft SPO, ASC, AFMC, Wright–Patterson AFB, Ohio ... Brig. Gen. (sel.) Charles C. **Baldwin,** from Command Chaplain, AETC, Randolph AFB, Tex., to Dep. Chief, Chaplain Service, Hq. USAF, Bolling AFB, D.C. ... Brig. Gen. (sel.) Arthur B. **Morrill III,** from Assoc. Dir., Log. Resources, DCS, Instl. & Log., USAF, Pentagon, to Dir., Log., PACAF, Hickam AFB, Hawaii ... Brig. Gen. (sel.) Leonard E. **Patterson,** from Dir., Ops., AFOSI, Andrews AFB, Md., to Cmdr., AFOSI, Andrews AFB, Md.

SENIOR EXECUTIVE SERVICE RETIREMENT: Horst R. **Kelly.**

SES CHANGES: Gregory W. **Den Herder,** to Exec. Dir., AFPC, Randolph AFB, Tex. ... Michael A. **Gill,** to Dir., Contracting, Ogden ALC, Hill AFB, Utah. ■

The Chart Page

By Tamar A. Mehuron, Associate Editor

The Rated Force Goes Down

Despite an uptick in the middle 1980s, the number of active duty Air Force aircraft and the number of officers with aeronautical ratings—pilots and navigators—have been falling steadily for many years.

- ***At the peak of World War II, almost 46 percent of the officer force wore wings. Today, it's about 24 percent.***
- ***In the 1950s, pilots accounted for more than 40 percent of the total officers. Today, they are 17 percent.***
- ***The number of active duty pilots has fallen by 91 percent since World War II—but the drop in the number of active duty aircraft has been even steeper, down more than 92 percent.***

Year			Pilots		Navigators		Rated Officers	
	Active Duty Aircraft	**Total Air Force Officers**	*Number of Pilots*	*Percent of Total Officers*	*Number of Navs*	*Percent of Total Officers*	*Number of Rated Officers*	*Percent of Total Officers*
1944	78,757	342,914	132,477	**38.63**	24,991	**7.29**	157,468	**45.92**
1956	24,949	141,296	56,847	**40.23**	n/a		n/a	
1978	7,121	95,242	20,029	**21.03**	9,550	**10.03**	29,579	**31.06**
1986	7,245	109,048	22,283	**20.43**	9,291	**8.52**	31,574	**28.95**
2000	6,205	69,023	11,800	**17.09**	4,437	**6.43**	16,237	**23.52**

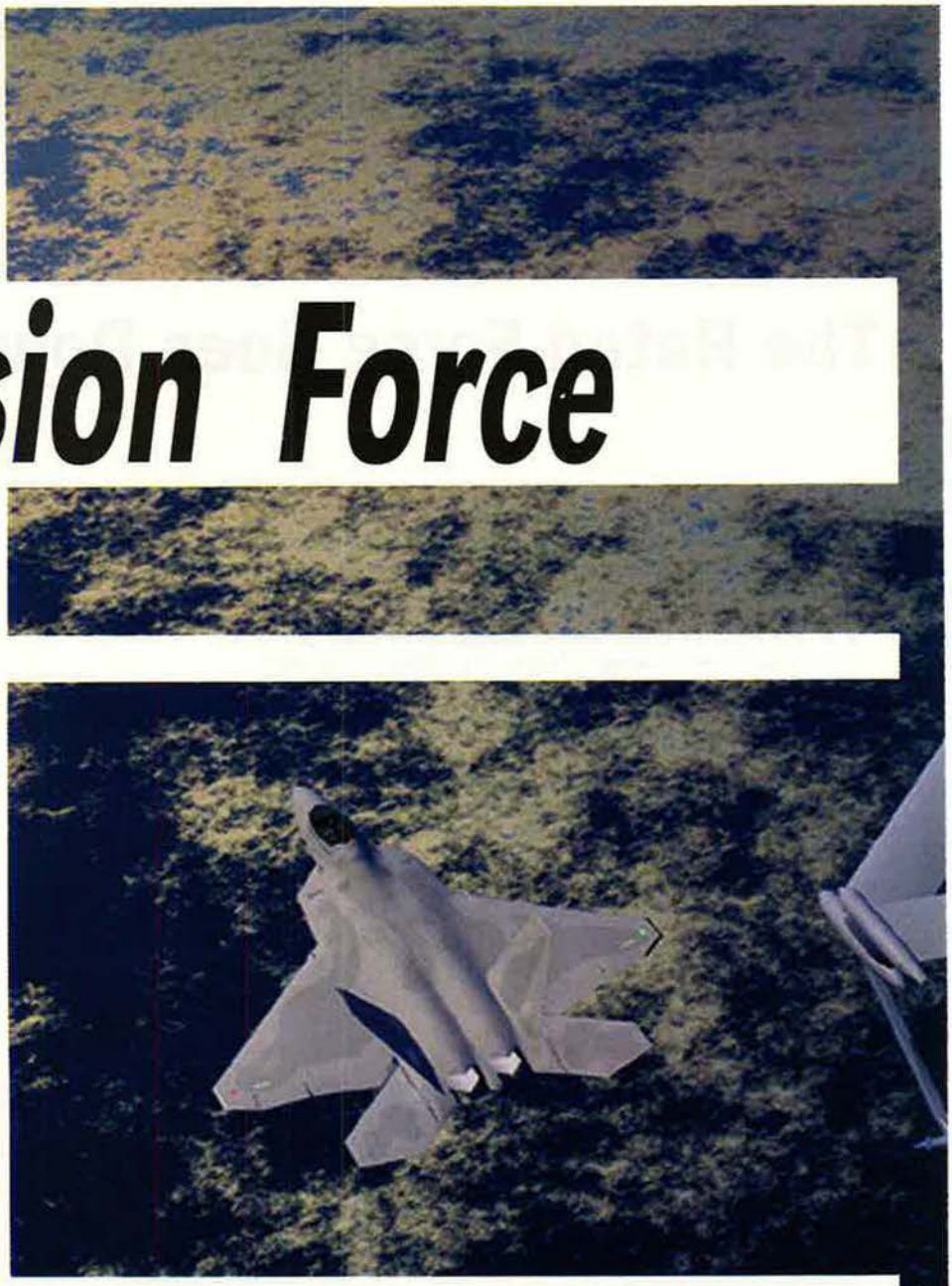
n/a = not available

Sources: *Army Air Forces Statistical Digest, World War II,* 1945; *A History of the United States Air Force, 1907–1957* ©1957, The Air Force Association; *Air Force* Magazine Almanac issues, 1987–2001.

Air Force planners look 20 years ahead and work back from there.

The Vision Force

By John T. Correll, Editor in Chief



TWENTY years from now, the Air Force could look very different in some respects.

■ When trouble begins at a distant location, stealthy Unmanned Combat Air Vehicles will come out of storage, be assembled, and be sent into action.

■ B-2 bombers, loaded with small-diameter munitions, will be able to strike 80 separate aim points on a single sortie.

■ Hypervelocity missiles, launched from standoff aircraft, will fly at six times the speed of sound to attack targets more than 500 miles away.

■ Space based radar will keep a constant watch on stationary and moving objects on the ground, anywhere on the globe.

■ The Air Force might be close to fielding a Space Operating Vehicle that could shuttle back and forth, several times a day, from low Earth orbit.

On the other hand, some parts of today's force will still be around 20 years from now. F-15E and F-16 fighters will be in service. The E-3 Airborne Warning and Control Sys-

Evolution, Revolution. *Parts of today's force will still be here in 2020, but USAF is studying revolutionary concepts such as this Lockheed Martin "box-wing" KC-X, refueling F-22s and Joint Strike Fighters in an artist rendering.*

USAF photo by SSgt. Michael E. Buytas, Jr.

BUFF for the Ages. ***The ultra–high technology systems of the Air Force's Vision Force probably will have a venerable stablemate—the B-52 bomber, cruising on toward its 70th birthday.***

tem will still be flying. So will the B-52 bomber, cruising on toward its 70th birthday.

These are among the projections for the "Vision Force," being developed by the Air Staff as a planning tool to implement the capabilities outlined in the Air Force vision, "Global Vigilance, Reach, and Power," which was adopted last year.

The planners know the projection is inexact.

"The Vision Force is an attempt to build what we think the Air Force should look like in 2020," said Maj. Gen. John L. Barry, Air Force director of strategic planning. "By stepping into the future, it is like looking backwards to see forwards. Another way to put this is 'backcasting.'

"We know that we won't get the future designs perfect; no one can accurately predict the future. However, it has been an extremely useful tool in 'looking backwards' to see what we need to work on today to have a chance of reaching the vision of Global Vigilance, Reach, and Power."

From Theater to Global

The projection also picks up on two pillars of the vision statement. The focus is on Aerospace Expeditionary Force packages, tailored to specific needs and provided to joint force commanders. And the Air Force remains committed to the integration of air and space into an operational domain of "aerospace."

A primary goal, Barry said, was to "flesh out" the capabilities of the AEFs. He summed up his orders from the Chief of Staff, Gen. Michael E. Ryan, for developing the Vision Force: "Do not be programmatically constrained. Do not be politically constrained. Do be technologically constrained. Don't plan on some kind of rocket science weapon that we are not going to have. You've got to see if it is technologically feasible."

For example, he said, one of the main projections is the movement of Intelligence, Surveillance, and Reconnaissance (ISR) capabilities into space, but there are limitations.

"The scientists and technologists told us that we would be able to have GMTI [Ground Moving Target Indicators] in space—in other words, a replacement for Joint STARS—but not AMTI [Air Moving Target Indicators]" so the E-3 AWACS will remain in service.

"Probably the most important point," Barry said, is that "we are going to move from a theater perspective to a global perspective."

Today, the deep-look radar on a Joint STARS aircraft looks out a few hundred kilometers and tracks objects moving on the ground within its sweep. That is a valuable picture, but it is local. By contrast, a single space based radar will take in large portions of a continent.

"Imagine 24 of those, up around the planet," Barry said. "You are talking about a clear global perspective. The cornerstone of global vigilance in the Vision Force is not fighters, bombers, tankers, things like that. It is space based radar."

Another broad trend is that dependence on manned platforms will go down and dependence on unmanned platforms will go up, he said.

Last year, Senate Armed Services Committee Chairman John Warner (R–Va.) said that a reasonable goal would be to make one-third of all deep-strike aircraft unmanned within 10 years.

Whether unmanned and uninhabited vehicles will reach that level in the near future remains to be seen, but there is no doubt that their presence in the Air Force will grow.

From Space and In Space

The rising emphasis on space in the Vision Force projection shows up in the provisions for the "AEF Prime," the Aerospace Expeditionary Force capabilities that do not deploy to theater locations.

Eventually, most of the radar and intelligence-gathering aircraft flying today will go away. "We'll move it up into space," Barry said. "We'll put more on UAVs [Unmanned Aerial Vehicles]."

That shift will not be complete by 2020, but one of the big pieces, the space based radar, should be in operation by then. It will consist of a constellation of some 24 satellites to track mobile targets on the ground. It will permit coverage of areas—such as the interior of China, although Barry does not talk about specific locations—that radar aircraft and UAVs cannot reach.

In addition to its other uses, the space based radar would have a strong deterrent effect on the actions of potential adversaries, who would know that "engagement quality" surveillance was in effect at all times.

"Today, we know pretty much what a potential adversary is doing," Barry said. "What the Vision Force will give us is a means to engage and create effects as well as know. It's the difference between just advertising what the bad guy is doing and doing something about it."

Well before 2020, the SBIRS (Space Based Infrared System) constellation should be up and working. It consists of about 30 satellites altogether, four in geosynchronous orbit (SBIRS High) for early warning of missile attack, 24 in low Earth orbit

(SBIRS Low) to track the missiles after they are detected, and two in elliptical orbit for fine tuning.

Some of the most dramatic changes forecast for the Vision Force are ways to reach space and conduct operations there. As it works on new space systems, though, the Air Force will keep its Evolved Expendable Launch Vehicles to put payloads weighing from 25,000 to 45,000 pounds into low Earth orbit.

"We are not going to put our eggs all in one basket," Barry said. "We've learned that time and time again. We will have an EELV capability. We'll have a Space Operating Vehicle. NASA has backed off on some of the funding, so we are going to have to take a look again at some of our analysis here."

Space Vehicles

In March, NASA killed its X-33 experimental reusable launch vehicle program, citing technical and cost problems. The X-33 was a lifting body designed to take off straight up, level out at an altitude of 60 miles, streak around the Earth at 13 times the speed of sound, and land at a military airfield.

The Air Force had hoped to draw on technology from that program and then to move beyond it. Lockheed Martin is developing a proposal to do just that, but USAF has no funding earmarked for such a project yet.

The Vision Force projects an eventual family of space vehicles, including a single-stage-to-orbit craft called the Space Operating Vehicle. "This vehicle is the truck that carries things into space and then comes back down again," Barry said. "It is programmed to be launched three times a day."

The X-33 was a suborbital first stage that was to throw off a Space Maneuvering Vehicle, which would have entered orbit, said Barry. For a first stage spacecraft to reach orbit, it must achieve a speed between Mach 17 and Mach 24.

Previously Air Force Space Command's Strategic Master Plan, published two years ago, had forecast deployment of a Space Operating Vehicle by 2015.

"We do not believe the technology will be in place to build a single-stage-to-orbit vehicle in 20 years," Barry said. "We are interested in evolving an X-33 type vehicle into a rapid launch and recovery space vehicle, but it would not be the X-33."

Next in the Air Force family of projected spacecraft is the Space Maneuvering Vehicle, also reusable, which would ride into space aboard the SOV. "The SMV will stay in orbit for four to six months," Barry said. "It could carry weapons. It could carry replacement satellites, or it could be a recoverable satellite itself. It could carry anything we want it to up there, and it can change orbit and inclinations to make it more survivable."

Concept photo by Erik Simonsen

Space Trucks. *The Vision Force projects a family of Space Operating Vehicles for regular and reliable travel between Earth and space, programmed for launch three times per day.*

USAF photo by SSgt. Wayne Clark

AWACS Must Stay. *USAF will move most Intelligence, Surveillance, and Reconnaissance to space, but not all. AWACS stays in service because space systems can't provide Air Moving Target Indicators capability.*

"Microsats" are small satellites that would serve a variety of functions. They could be used against enemy satellites, but the approach would probably be to disable or disrupt rather than to destroy.

"To do space control from space, we want to move away from kinetic and pursue nonkinetic means," Barry said. "We don't want to blow stuff up in space. There is enough junk up there anyway. The SOV releases the microsat. It goes in where the enemy satellite is, blocks the transmission, cuts it off. The intent here is that we will either jam it, stick it, net it,

whatever, to make that satellite inoperable."

The intention is for the microsats to be resuable.

In addition, Barry said, "microsats could be flown in swarms to provide very large antennas as an alternative approach for space based radar, although the technology may be further out for this idea."

Whereas the SMV and the microsats operate in space, the Common Aero Vehicle, also launched on the SOV, would re-enter the Earth's atmosphere and dispense munitions over a target area.

Out of a Box. *When needed, stealthy UCAVs (here, a Lockheed Martin concept) will come out of storage, undergo rapid assembly, and go into action against distant targets.*

"It is released to go against the target anywhere on the planet," Barry said. "When it gets down into its hypersonic re-entry, it splits open and it will have a wide-area attack munition or a small-diameter weapon that goes after the target. Ideally, if you had an SOV on alert, you can have this thing up into space and a weapon on target anywhere on the planet in less than an hour."

What the Vision Force does not project for 2020 is the Space Based Laser. Controversy surrounds this weapon, which could keep large stretches of the Earth's surface covered and knock down ballistic missiles in the boost phase. However, the Air Force Scientific Advisory Board has said that pressures for early deployment are not realistic.

"You can have some [Space Based Laser] testing up there by 2020, but you are probably not going to have a full robust capability, even if the politics allowed, the treaties allowed, and the money was available," Barry said.

Stealth and More Stealth

In March, Maj. Gen. (sel.) David Deptula, Air Force national defense review director, told a House Armed Services subcommittee that "four platforms will define the stealthy Air Force of 2020": the B-2 bomber, the F-22 fighter, the Joint Strike Fighter, and the Unmanned Combat Air Vehicle.

The feature they have in common is stealth.

The B-2 was so successful in the air war over Serbia in 1999 that there has been talk of reopening the production line, which closed in 1997. Only 21 aircraft were produced.

No airplane is closer to the Air Force's heart than the F-22. It combines fourth generation stealth with supercruise—supersonic flight for sustained periods, not just in spurts—and the capability to operate above 40,000 feet. It can get around advanced enemy air defenses and perform a variety of missions.

The Air Force wants a mix of penetrating and standoff capability in order to field a "kick down the door" force that would clear the way for other land, sea, and air forces.

"This would include using the B-2 and the F-22 in a package to penetrate and other long-range assets to stand off outside the threat envelope if the risk of penetration is too high," Barry said. "Standoff warfare is not designed to 'win' the war alone but rather to establish conditions for follow-on forces to arrive with less risk."

The Joint Strike Fighter would come on as the workhorse of the "persistence force," which Chief of Staff Ryan describes as "the pile-on, war winning force to be able to prosecute 24/7 in combat operations that sometimes will last for months."

The Boeing X-45A Unmanned Combat Air Vehicle technology dem-

Concept photo for Boeing by Erik Simonsen

Hazardous Duty. *UCAVs could be used for missions of extreme danger, such as attacks on air defense sites. Boeing's X-45A UCAV (in artist's depiction) rolled out last year.*

onstrator rolled out last September. In operational form, it is designed to be stored unassembled in a container until it's needed. Workers can unpack and reconstitute it in an hour. The X-45A is now in testing at Edwards AFB, Calif. UCAVs would be used for the most hazardous missions, such as knocking out surface-to-air missile sites.

Lockheed Martin and Northrop Grumman are working independently on their own UCAVs. Northrop Grumman, which unveiled its Pegasus UCAV design in late February, is in competition with Boeing for a Navy requirement.

These four shooters—the B-2, the F-22, the Joint Strike Fighter, and the UCAV—augmented by a residual force of F-15Es and F-16s, will be the nucleus of the Aerospace Expeditionary Force in 2020.

The Vision Force also projects a new long-range strike platform, a wide-body aircraft that would attack from standoff distance. "This is not a penetrating bomber," Barry said. "This is a truck carrying 120,000 pounds worth of cruise missiles."

These aircraft will be "leveraged enormously" by new munitions, he said. That includes improved air-to-air weapons, but the most spectacular advancements will be in precision attack munitions.

In the Kosovo air campaign two years ago, the Joint Direct Attack Munition allowed the B-2 to strike an average of 15 separate aim points per sortie. In the near future, a "smart" bomb rack assembly will let the B-2 carry up to 80 JDAMs, each of which can be targeted independently.

The next step is the small-diameter bomb, at 250 pounds. Each can be directed at a different target. Although it is small, it will be sufficiently accurate to achieve effects previously associated with larger weapons.

It is small enough that the B-2, the F-22, and the Joint Strike Fighter can carry a considerable number of them. The stealthy UCAV will carry two.

The UCAV and other platforms will also use a wide-area attack munition. "This is the swarm weapon, with automatic target recognition against mobile targets or fixed targets," Barry said. It is an air-to-surface weapon that will use laser detection and ranging to search for and engage targets.

Vision Lift. ***One mobility idea is the Advanced Tactical Transport, a short-takeoff-and-landing aircraft that would eventually replace the C-130 for combat deliveries to austere airfields.***

More stealth shows up in a new long-range cruise missile, with a range of 1,000 to 2,000 nautical miles and carrying multiple, independently targetable conventional warheads.

Another eye-catching munition is the hypervelocity missile. It might be carried by several standoff platforms and used to strike when time is urgent. It will have a range of between 500 and 1,000 nautical miles, and it will get there at a speed of Mach 4 to Mach 6. The primary targets for this missile would be launch sites for theater ballistic missiles and cruise missiles but could also include "ground based lasers or anything else that is threatening our satellites and that you need to get on, and get on quickly," Barry said. "The range for mobile targets is limited to about 600 nautical miles because of the target's ability to move and hide."

The first line of defense against theater ballistic missiles will be the Airborne Laser, a militarized Boeing 747-400 that can detect and shoot down enemy missiles from hundreds of miles away.

The Airborne Laser will patrol the edge of the battle area, flying at 40,000 feet. It will zap ballistic missiles in the boost phase with a short burst from the battle laser in its nose turret. The heat is enough to make the missile explode. Debris, including the warhead, will fall back on the area from which the missile was launched.

It will be able to destroy 20 or more ballistic missiles before landing to reload with laser fuel.

The first test shot will occur in September 2003. "Indications from all the scientists and the reviews and the technologists are that we have gone a long way toward solving the atmospheric problems and how to direct the beam," Barry said. Some of the technology from the Airborne Laser will later be adapted for the Space Based Laser.

Four Pressing Decisions

Aerospace Expeditionary Forces in 2020 will be greatly influenced by a series of decisions the Air Force intends to make about competing requirements in the next year. Barry said that four such "fork-in-the-road issues" had emerged in the course of developing the Vision Force.

■ To the surprise of hardly anyone, the Pentagon's latest mobility requirements study found a big shortfall in airlift. To close the gap, the Air Force may need to buy up to a third more C-17 airlifters than it had planned, depending on what it does with the older C-5As and C-5Bs.

To be determined is the mix of C-17s and C-5s, and whether both models of the C-5 get engine and avionics upgrades or if the modifications are limited to the C-5B.

(A Vision Force mobility projection not part of the fork-in-the-road agenda is the Advanced Tactical Transport, a medium short-takeoff-

Concept photo for Boeing by Erik Simonsen

To Transform a Force. ***Multiple-function "blended-body" aircraft, such as this Boeing concept, could be one of the systems that radically transforms the Air Force over the next 20 years.***

and-landing aircraft that would eventually replace the C-130 for combat deliveries to austere airfields. Barry said it would be a "four engine prop job that can carry about 20 tons or 130 troops. This will be key to decreasing risk inside a threat area by using dispersed operations."

The C-130s would still be in service in 2020 and for some time thereafter.)

■ The KC-135 tanker fleet is 40 years old and is wearing out. Maintenance problems are increasing, and the aircraft are frequently in the depot for work.

These tankers are among the numerous aircraft built on aging Boeing 707 airframes. (Others include the E-3 AWACS, the E-8 Joint STARS, and the RC-135 Rivet Joint signals intelligence aircraft.) The Air Force would like to move all these functions to newer platforms.

A tanker requirements study, due out this year, will propose a replacement for the KC-135. A much-discussed option is a tanker/transport derivative of the Boeing 767 wide-body jetliner. Like the KC-10, this aircraft would perform both airlift and aerial refueling functions. Another option would be to adapt the C-17 for tanker duties.

"The reason this is important to the Vision Force is that tankers underpin our ability to get to the fight fast," Barry said. The tankers establish the "air bridge" that permits the long reach of the kick-down-the-door force. They are also essential to USAF's projected capability of deploying five Aerospace Expeditionary Forces within 15 days.

■ The Air Force must decide soon what to do about the "fighter bathtub" problem. The "bathtub" refers to a projected depression in the fighter force structure chart, when F-16s will wear out and leave service before there are enough Joint Strike Fighters to replace them.

The F-16s have been flown harder and more often than expected. Cracking has shown up in wings and bulkheads. Without structural modification, part of the F-16 fleet will run out of service life much sooner than expected.

The decision will depend on what the Bush Administration decides about force commitments—a significant factor in the demand for flying hours—and aircraft modernization programs in general.

Options include modification of the F-16 and acceleration of the Joint Strike Fighter. In the event the Administration cancels the Joint Strike Fighter, the options would tilt toward buying more F-16s or even more F-22s.

■ Three of the main Intelligence, Surveillance, and Reconnaissance aircraft—AWACS, Joint STARS, and Rivet Joint—are among the modified Boeing 707 airframes the Air Force wants to shed as it moves capabilities to space and onto UAVs. "However," Barry said, "we can't get to space before these platforms wear out, so we will need a gap filler."

One approach, with strong support in Air Combat Command, would be a "common wide-body" aircraft to replace the three platforms listed above, as well as the Compass Call signals intelligence/jamming aircraft and the Airborne Battlefield Command and Control Center, both of which are modified C-130s.

Alternatives include the narrow body Boeing 737 or various business jets. The smaller aircraft become more feasible if the large mission crews, which now fly aboard several of the ISR platforms, work on the ground with the data downlinked to them.

Unmanned vehicles, already performing well in battle area surveillance, are candidates for some of the work as well.

How many of the ISR functions can be combined on a single aircraft is not yet certain, but the Air Force believes the ultimate number of different platforms will be fewer than the present five.

"The Air Force has developed a sequenced approach to modernization—we'd like to do a lot more than our limited procurement dollars allow," Barry said. "The reality of the situation is that the Air Force operates in a constrained environment: Modernization and procurement decisions are constrained by TOA [Total Obligation Authority] as well as political decisions made by the Administration and Congress.

"No decision is purely an Air Force decision. While we wish we could avoid a fighter bathtub, while we wish we could totally modernize mobility, while we wish we could modernize our combat air forces, the simple reality is that we're on a tight budget. We cannot afford to do it all, and we certainly cannot afford to do it all now. Therefore, we are forced to make difficult decisions on how best to spend the limited procurement funds we do have.

"These are the fork-in-the-road issues that we are dealing with. These are the decisions that we are forced to make in order to balance funding constraints with military requirements so we can provide the nation with a broad range of aerospace power capabilities." ■

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The F-117A stealth fighter first flew 20 years ago this month.

TWO DECADES OF

By John A. Tirpak, Senior Editor

STEALTH

For 20 years, the Air Force has enjoyed a monopoly on stealth combat aircraft. No other nation appears to be even close to deploying a capability like the F-117 Nighthawk, which made its first flight in June 1981. The Air Force plans to keep stealth at the center of its strategy, even as it evolves the technology and practice of low observables to overmatch the attempts of adversaries to counter it.

"Stealth"—a catchall term that encompasses technologies and tactics intended to reduce the detectability of a vehicle—has given the United States a previously unimagined dominance in modern warfare. The F-117 was the star of the 1991 Gulf War, routinely destroying the most fiercely defended targets in Baghdad and returning untouched.

In the 1999 Balkans war, the B-2 bomber, one generation of stealth beyond the F-117, stole the show in its combat debut by precisely hitting over a dozen targets per mission—against air defenses that had gone to school on the lessons of the Gulf War. It also returned without a scratch. In short, stealth contributed enormously to the lopsided victories of the last decade.

Fielding of the next generation of stealth aircraft—the F-22 and Joint Strike Fighter—awaits the results of the Pentagon's ongoing strategy review, due to be completed in the fall. Air Force officials, however, are confident the Bush Administration will see the indisputable value of stealth as the enabler of swift military victories.

USAF plans an all-stealth force in its future, according to Maj. Gen. (sel.) David A. Deptula, the service's national defense review director. In March, Deptula told the House Armed Services subcommittee on procurement that the Air Force's stealth airplanes will be able to "operate with great precision and survivability in the modern air defense environment—an environment where nonstealthy aircraft simply cannot go." America's intelligence, surveillance, and reconnaissance assets, "networked avionics," communications systems—and stealth—represent "the

Photo by Joe Oliva

Twenty years later, no other nation has yet fielded a stealth aircraft comparable to the F-117. It applies a variety of techniques—shaping, materials, technology—to hide from sensors as sophisticated as radar down to the human eye.

United States' asymmetric advantage and are key to retaining our position as the world's sole superpower," he told the House panel.

USAF's still-strong enthusiasm for low observable technology, however, is tempered somewhat by the reality that, after 20 years, the concept of stealth—once a word not even uttered for fear of compromise—is no longer a secret. The principles underlying stealth are now widely understood, and the nation's adversaries have had 13 years to study the F-117—from a distance—and attempt to calculate its weaknesses.

Stealth's Mystique

"Stealth is a huge advantage," said Gen. Michael E. Ryan, USAF Chief of Staff. However, he added, stealth aircraft are "not invisible," and the mystique of stealth as a cloak of invulnerability, allowing solo penetrations of enemy airspace under any conditions "simply isn't supported by science."

What might have been the most sobering event in the short history of stealth was the loss, in March 1999, of an F-117 to enemy fire in Kosovo. It shattered the aura of invincibility that had been enjoyed by the aircraft until that point. The Serb foe paraded the wreckage on television. The pieces undoubtedly were shipped to America's adversaries for scrutiny, and critics of the Air Force and stealth technology had a field day.

Senior service leaders say that, while it would have been preferable to keep pieces of the F-117 from enemy hands, neither stealth in general nor the F-117 in particular are in especially greater peril because of what happened in the Balkans.

"It doesn't worry me," said Gen. John P. Jumper, head of Air Combat Command.

From the pieces of the F-117 alone, Jumper said, it would be "very, very hard to duplicate" a stealth aircraft by reverse engineering it.

He went on, "There are intricacies to stealth that come with our many years of experience." Pieces alone—without the means to duplicate the way they were manufactured or their overall shape on the aircraft—could only give small hints about what makes the F-117 stealthy.

One program official speculated that US adversaries have probably already formed some ideas about how the F-117 works after watching it for 13 years. Being able to "put a micrometer on [some of the pieces] isn't going to tell them a whole lot extra that they didn't already know." He added that Air Force "Red Team" specialists—whose job it is to look for and identify vulnerabilities in stealth—still find the F-117 "a challenge, and they have all the data" on it.

"My opinion is, that having that hardware in their hands is certainly something we would rather not have had happen," said John Somerlot, a stealth expert with Lockheed Martin, now working on the F-22 program.

"However," he continued, "the real technological advantage is the integration and systems engineering. It's not just having some material in your hand that's able to absorb X number of [decibels].

"It's the ability to take that and design it in, produce it, deploy it, and support it. A lot of people can build models that are high performing, but when you have to put wheels on the ramp and then support those, that's where the real technology is."

Don't Ask, Won't Tell

The Air Force has been understandably reluctant to discuss the specifics of how the F-117 was brought down in Kosovo, preferring to keep US adversaries in the dark about what tactics might have been effective against the stealth fighter. However, senior USAF officials report privately that stealth technology itself was not to blame in the loss.

According to these officials, the true culprits were NATO constraints on how F-117s could approach Kosovo in the early days of Operation Allied Force, the intense media coverage of aircraft taking off from Aviano, Italy, and the presence in Italy of spies who sent immediate reports of air activity to Serbian gunners. These factors allowed the Serbs to make gross estimates of the whereabouts of aircraft en route to targets in Yugoslavia, the F-117 among them.

"We were more predictable than we should have been, under the circumstances," said one senior official.

About 20 miles outside of Belgrade, the F-117's luck ran out. An undetected surface-to-air missile battery was lurking in the darkness below. It had not appeared on intelligence maps of the area, and the F-117 pilot was not aware of it. When the F-117 became briefly visible on radar as it opened its bomb bay doors, Serb radar operators on the ground, aware that an F-117 would be entering their area, had a momentary opportunity to shoot. It is possible that they didn't even have a radar lock on the stealth airplane but were close enough to guide the missile optically. Badly damaged by the blast of the warhead, the F-117 could not be controlled, and the pilot ejected. He was soon rescued.

Jumper said the shootdown was mostly the result of "a lucky shot. Those limited times of exposure that we know exist"—when the F-117 opens its bomb bay doors, or presents certain angles to a radar—"lasted just a little bit too long. We were targeted by a SAM site that we didn't have precisely located."

Jumper added that the setback must be measured in relation to the great successes achieved by the F-117.

Photo by Joe Oliva

Designed as a "special operations" aircraft in the 1970s, the F-117 has taken advantage of evolving stealth technology to remain a potent capability. Initial plans called for just 20 airplanes, but wiser heads raised the figure to 60.

One and Only One

"We had flown hundreds of sorties in the most demanding and high-threat, ... most heavily defended ... places that we've encountered in the decade of the '90s," such as the heart of Belgrade and Baghdad, "and we lost one," he pointed out.

Had the Air Force concluded there was a fundamental flaw in stealth, it would not have continued to use the F-117 and B-2 in Kosovo or would have reassigned the types to less-challenging targets, service officials insisted.

SMSgt. Walter Franks, superintendent of maintenance for the F-117 at ACC, said there have been no maintenance change orders issued on the airplane as a result of the loss of the airplane in Kosovo.

While Jumper echoed Ryan's observation that the F-117 is not invisible, he noted that "in the right circumstances, it's very, very hard to see. It will continue to be that way. And its performance continues to improve, both in its maintainability and its stealth qualities. So, I don't see stealth being 'on the ropes' in any way."

A prominent criticism of both the F-117 and the B-2 in Kosovo centered on the fact that, even though both were billed as radar evaders, both types were supported by jamming aircraft. This was not supposed to be necessary.

Jumper said bluntly that the F-117s and B-2s "don't need escort jammers." However, senior USAF officials acknowledge that the stealth aircraft certainly did coordinate missions with jamming aircraft, particularly the EA-6Bs operated jointly by the Air Force, Navy, and Marine Corps, to increase the safety margin when attacking tough targets.

"When there was jamming in the area, we were glad to take advantage of that," said Maj. Gen. Leroy Barnidge Jr., who commanded the 509th Bomb Wing of B-2s during Allied Force and who is now vice commander of 9th Air Force.

"Anytime you can maximize the problem for your adversary, that's a good thing," he added.

Lt. Col. Jack D. Hayes, chief of the F-117 Weapons System Branch at ACC and an F-117 pilot engaged in intelligence work for F-117s operating in Kosovo, said the jamming controversy is overblown.

"I wouldn't mind having F-16CJ [that is, the defense suppression variant] and EA-6 support" on a stealth mission, said Hayes, "but all they do is make my job easier. They help hide me [and] they keep the [enemy's] radars off." Compared to an F-15 or F-16, "we're still leaps and bounds ahead of them in terms of where we can go and what we can do."

Jammers also would be a detriment on some missions, Hayes said, because the presence of jamming would alert an enemy that an attack was coming. One of the basics of being stealthy is to maintain radio—and radar—silence.

One of the lessons learned from Kosovo was that the Air Force may

Loss of an F-117 outside Belgrade was the sole blemish on an otherwise spotless combat record. USAF leaders say adversaries won't learn enough from the pieces to build their own stealth airplane or compromise the F-117's stealth.

have made a misstep in eliminating its F-4G defense suppression and EF-111 escort jammer force from the inventory, since both types were sorely missed in Kosovo. Ryan said that USAF is placing a higher emphasis on electronic warfare now and has cast stealth as "part of the overall electronic warfare issue."

"Most of our assets still need to be packaged in some way," Ryan said, meaning that strike aircraft usually need to be escorted by fighters and jammers in a "package" of capabilities to accomplish a mission.

USAF photo

Laser-Guided Bombs precisely on target at a precisely planned time are the F-117's trademark. New LGBs with backup satellite guidance mean bad weather and smoke no longer offer refuge to the enemy. More new weapons are coming.

The Best Trick

"Not always," he continued, "and that depends on the operational situation." However, "we use every good trick we have, and we package our good tricks together to give us the best trick. ... It's all about survivability."

The F-117 mission begins with meticulous planning, which takes into account known or suspected surface-to-air-defenses. The plotted mission is loaded into a computer cartridge, which is physically carried out to the airplane and plugged into it by the pilot. After takeoff, the airplane's autopilot—affectionately known as "George"—takes over, flying the airplane to the release coordinates. The autopilot also flies the F-117 home again.

The extensive use of autopilot is necessary for two reasons. One, the aircraft must always present the precise optimum attitude toward any radars it will encounter—something that is beyond the capacity of the steadiest human hand—and two, it provides a very steady ride for the pilot as he compares the target area with maps and reconnaissance photos to ensure finding and hitting the right target, at a very specific time.

Not having to maneuver the airplane, watch out for enemy missiles, or navigate and simply concentrating on bombing pays off handsomely in accuracy, according to Brig. Gen. (sel.) Marc E. Rogers, commander of the 49th Fighter Wing.

He noted that, in practice runs, the 49th does not award its pilots any credit for anything less than a bull's-eye.

"You get 100 percent or zero," he said. Such a standard is possible, he went on, because F-117 pilots practice finding the target, hitting it precisely, and timing the strike perfectly, day in and day out. "That's all they do," said Rogers, who observed that his pilots are "very, very good" at reading and interpreting reconnaissance photos.

The F-117 typically carries two Laser-Guided Bombs of the 2,000-pound variety. These usually also have a hardened warhead, to penetrate targets such as aircraft shelters or deeply buried bunkers.

Pilots of the F-117 pride themselves on "discipline on the target attack," Hayes said. "No collateral damage. That is our bread and butter: going 'downtown' and hitting only—and I repeat, only—what we're supposed to hit."

In Kosovo, Hayes said, F-117 pilots were admonished not to release weapons unless they were sure they would be able to guide their Laser-Guided Bombs all the way to impact. If a stealth airplane arrived over a target that was obscured by clouds or smoke, it had to return without dropping its bombs, since lasers can't penetrate to the ground in such conditions.

"In a lot of cases, they went in and were ... unable to employ weapons,"

Staff photo by Guy Aceto

The "platypus" is the colorful name coined to describe the F-117's unique exhaust. It hides the aircraft from infrared sensors by dispersing the exhaust heat over a wide area, mixing it with cool air and shielding it from ground view.

he said. On the positive side, F-117s caused none of the 20 or so cases of collateral damage in Kosovo. However, due to the discipline of withholding weapons if accuracy could not be guaranteed, "we wound up having a lower mission effectiveness rate overall, because of weather and because of ROE [Rules of Engagement], than we did in Desert Storm," Hayes explained.

Rogers said his F-117 pilots are learning to use the fighter in new ways. "We are getting integrated with Red Flag" exercises, he said, and experimenting with "whether it's better to be in the front, the middle, or the end of a package." Whether to be the "pathfinder" or the mop up "depends on the mission," he said.

"The more you use it, the more you learn," Rogers added.

Evolving Technology

Part of the reason the Air Force is not too worried about the safety of the F-117 is that the airplane's technology is continuing to evolve. While the outside shaping has remained the same, the technologies and techniques used to maintain its signature have been improving continually.

In the early days of the F-117, the aircraft's Radar Absorbent Materials had to be applied by hand, by maintenance personnel who described their work as "more an art than a science," said one program official. Gaps in the RAM, and access panels that needed to be opened on a regular basis, had to be me-

ALL ABOUT STEALTH

Stealth is the blanket term for the technologies, tactics, and techniques used to make an object such as an aircraft hard to detect, track, or shoot. Stealth must be taken into account in the design of the aircraft; it cannot be achieved as a developmental afterthought or with a "bolt on" device.

The principal means of detecting aircraft is by radar: Pulses of energy are broadcast, and when they strike an object, echoes come back to the receiver. The Radar Cross Section of an object is a description of how reflective it is to radar. Very large objects can be made with a small RCS and vice versa.

Stealth aircraft are shaped in a way that most of the radar energy is deflected in another direction, reducing the echo the radar set receives. The echo is further diminished by the use of Radar Absorbent Materials on the skin and in the structure of the stealth aircraft. These materials can either hold the radar energy or actually release it at an altered frequency; some of the echo comes back at a frequency to which the radar isn't listening.

By combining these techniques, the returning echo is so small that the stealth aircraft will either be lost in the electronic clutter of the radar or be mistaken for something much smaller, such as a bird.

Highly radar-reflective features, such as engine fan blades, are hidden deep within the fuselage of a stealth aircraft, at the end of a serpentine inlet that also absorbs or dissipates radar energy, or behind "blockers" that redirect radar energy.

On the F-117, radar energy is deflected by a series of facets around the airplane. This early means of radar deflection was driven by the computing power available in the 1970s, when the airplane was designed. The RCS of each facet could be calculated and their aggregate reflectivity measured. As computing power advanced, RCS could be calculated for whole areas of an aircraft and with complex, curved shapes. Once this was achieved, facets were largely abandoned in order to improve aerodynamic performance of later stealth aircraft.

A stealth airplane must also present itself differently to radars of different types, depending on the frequencies at which the radars operate. For some radars, a head-on approach is best; for others, an oblique angle may offer the most protection.

To avoid being visually detected, stealth aircraft are typically painted black and flown at night. They also tend to have a slim silhouette, making them harder to spot.

Because aircraft can be detectable by their exhaust heat, stealth aircraft do not have typical exhausts. On the F-117 and B-2, the exhausts are above the aircraft, to shield them from heat-seeking infrared detectors below. They absorb some exhaust heat with special ceramic tiles, similar to those used to protect the space shuttle from re-entry temperatures, and mix ambient cold air with the exhaust heat to reduce its intensity. They also disperse the exhaust over a wide, flat area, further disrupting and diminishing the heat signature.

Stealth aircraft reportedly also have devices that help control the creation of contrails at high altitude.

To be stealthy, an aircraft must avoid electronic emissions, such as radio signals or use of radars. Such emissions can be detected and alert defenders that an aircraft is coming. Likewise, stealth aircraft usually fly at subsonic speeds to avoid creating a sonic boom.

Stealth missions are meticulously planned to either avoid radars entirely or pass between them at the optimum angle and altitude. The 49th Fighter Wing, which operates the F-117, reportedly maintains a database of the location of every known anti-aircraft radar in the world, a database which is constantly being updated.

Photo by Paul Kennedy

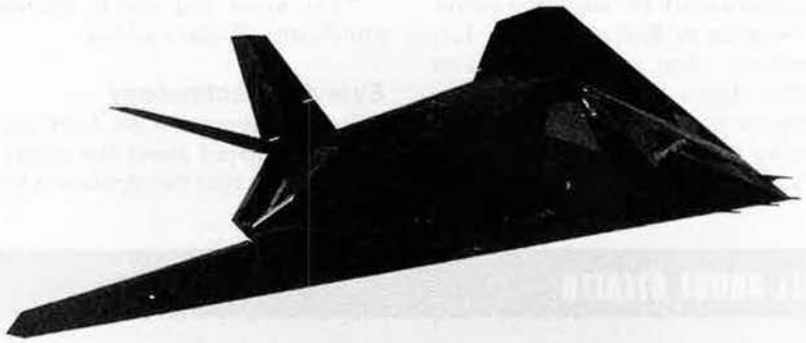
Known as "Martians" (shorthand for Materials Repair Specialist), F-117 technicians for years applied Radar Absorbent Materials in a fashion more akin to art class than metal shop. Here, A1C Kenneth Sheppa trims out a replacement piece.

A SHORT HISTORY OF THE F-117

Pyotr Ufimtsev, a Russian mathematician, laid the groundwork for modern stealth when he published a paper in the 1960s describing a new method for calculating Radar Cross Section across a large surface. The Soviet Union showed little interest, but when the paper was translated years later, it was noticed by Denys Overholser, a Lockheed Martin "Skunk Works" employee. Overholser came up with a computer program called "Echo 1" which could predict the RCS of a faceted aircraft.

The Air Force at the time was alarmed about the lethality of new surface-to-air missiles. Israel's largely American–built air force had lost 100 fighters in 18 days to Arab SAMs in the 1973 Yom Kippur War, so USAF was looking for an edge against the missiles.

With the approval of William J. Perry, then the Pentagon's engineering chief (later Secretary of Defense), Lockheed won a contract to build two demonstrator aircraft under the XST, or experimental stealth technology, program, later designated "Have Blue." The demonstrators had a Radar Cross Section thousands of times smaller than the stealthiest airplanes in the Air Force, about the size of a ball bearing.



USAF photo

This grainy, retouched photo of the F-117 was the first released by the Air Force. Details were deliberately obscured and the image distorted to keep stealth watchers guessing a little while longer about the type's true shape.

The loser of the XST competition was Northrop, which later got the contract to develop the Advanced Technology Bomber, known today as the B-2. It was the promise of stealth for future bombers that caused the Carter Administration to cancel the B-1A.

Even before testing of the Have Blue aircraft was completed, the Air Force ordered 20 full-up stealth combat aircraft. They were intended to be "special operations" airplanes for surprise strikes, such as against terrorist training camps or in wartime against critical targets behind enemy lines.

To speed development time and cut costs, off-the-shelf parts, such as landing gear, engines, and flight controls from other fighter programs, were used in the new aircraft.

At the urging of the Pentagon and influential members of Congress (former Sen. Sam Nunn of Georgia, chairman of the Senate Armed Services Committee, was one) privy to the secret program, the buy of the new stealth fighter was boosted to 60 airplanes.

The first F-117 flew June 18, 1981, at Groom Lake, a secret, remote facility in Nevada. By 1983, a stealth unit was declared operational, but the entire program was strictly special access required—only those who needed to know were briefed into it.

The origin of the designation "F-117" is still debated, but the generally accepted explanation is that it happened to be the numerical name of the manual Lockheed wrote for the airplane.

Based at Tonopah Test Range—part of the Nellis AFB, Nev., gunnery range complex—the unit, first known as the 4450th Tactical Group, practiced flying at night and in radio silence. Pilots on the program were selected for maturity and skill but led a monastic existence, living at the secret base and flying in the deac of night, and coming home to their families only on the weekends.

Caspar Weinberger, Defense Secretary during the Reagan Administration, scrubbed plans to use the F-117 in the 1983 Grenada invasion anc in Operation Eldorado Canyon, the 1986 air raid on Libya. Weinberger felt that it was too soon to tip off the Soviet Union as to the existence of stealth.

In 1988, the Pentagon released the first grainy photo of an F-117. The disclosure was due to the fact that F-117s would soon begin daytime flying, and it was only a matter of time before the aircraft was spotted. Security on the program had succeeded beyond the wildest expectations of anyone involved. Perry had predicted, in 1977, that the stealth cat would be out of the bag within two years.

The F-117 first went into action in 1989, when two stealth airplanes dropped bombs during Operation Just Cause in Panama. (A few months prior, the personnel and equipment of the 4450th Tactical Group were absorbed by the 37th Tactical Fighter Wing, which had moved to Tonopah from George AFB, Calif.) Two years later, the F-117s went to war against Iraq, routinely flying against the most heavily defended targets and returning unharmed. The stealth airplanes became associated with the quick victory in the Gulf and racked up an impressive record of destruction achieved per sortie.

As the F-117s became less classified, the aircraft were moved to Holloman AFB, N.M., beginning in May 1992, under the 49th Fighter Wing, which changed its mission from air-to-air to air-to-ground.

The F-117s also participated in Operation Allied Force, based out of Aviano AB, Italy. Again, they tackled the toughest targets in and around Belgrade, achieving pinpoint accuracy whenever they dropped their bombs.

ticulously smoothed over with a special putty and then left to cure for many hours before a mission.

"We called that process 'buttering,' " one former program technician said.

Now, the RAM is sprayed on robotically, with machines adapted from the automobile industry. And panel doors have been fitted with quick-access strips which eliminate the need for puttying and curing and speed the process of getting the airplane ready for battle.

The maintenance improvements over the last 20 years have further reduced the F-117's visibility on radar and have "shown anywhere from a 20 to 50 percent reduction in maintenance man-hours per flight hour," Hayes said.

The F-117 mission capable rate of 80 percent is "the envy of the Air Force," one senior program official said.

Avionics on the airplane have also been improved. Old-style "green" cathode-ray tube displays have been replaced with color multifunction displays and a moving map. The original inertial navigation system has been upgraded with a ring laser gyro, to further enhance precise navigation.

New weapons are also being added to the F-117. Since being fitted with Global Positioning System capability, the F-117s can now use what's called the EGBU-27: a dual-mode Laser-Guided Bomb that can switch to satellite guidance if the weather goes bad or if the target is obscured in the last seconds before impact. Such a weapon will allow the F-117 to press an attack when it would otherwise have to withhold bomb release. Other planned new weapons additions include the Joint Direct Attack Munition and possibly the Wind-Corrected Munitions Dispenser.

Extremely LO

Ryan said the Air Force is continuing to press ahead with efforts to develop extremely Low Observable technology, to make future generations of stealth airplanes even tougher to spot.

"We're still pushing to do significantly better ... as part of our science and technology [effort]," said Ryan. Perhaps, he joked, USAF will invent " 'the cloaking device,' eventually. ... Each time we do [stealth], we're a little bit better at it."

Stealth figures prominently in the Air Force's new Global Strike Task Force concept, which posits stealth aircraft removing anti-access threats to US forces as they enter a theater of operations.

Jumper warned, however, that "we need to ... make sure we don't try to buy stealth on the cheap." The Navy's F/A-18E/F, for example, takes advantage of some Radar Absorbent Materials, inlet shaping, and canopy coatings to diminish its frontal Radar Cross Section. However, the reduction in RCS is not substantial and in any event is undone by the external carriage of weapons, which are a large radar reflector.

"What good is reducing the RCS on a 'clean' airplane?" wondered Tom Burbage, Lockheed Martin's executive vice president and general manager for the Joint Strike Fighter program. "Once you have the weapons on the pylons, unless you have some way to recess them [into the wings] or give them their own treatment, you've undone whatever you achieved by treating the aircraft."

"Real stealth," Jumper said, means "internal carriage" of weapons.

"You can use the airplanes with externally configured stores when stealth is not an issue," he said, but stealth continues to be important.

In Kosovo, not all the SAMs could be found; witness the lost F-117. In such situations, where "there are still systems that are alive down on the ground, ... that means they have the opportunity to bring them up, [and] stealth in everyday airplanes is a good thing to have," said Jumper. "They are effective against those transportable systems that are down there somewhere."

The Air Force is planning to keep the F-117 around a good long time yet. Designed to execute hard, fighter-like maneuvers, the F-117 has not been maneuvered very aggressively, and ACC believes its airframe could conceivably last until 2030 or later.

"Lockheed designed it for a lot more Gs than we're flying it at," Hayes reported. Strictly for planning purposes, a retirement date has been set at 2018, but Ryan noted that USAF has always planned to "missionize" the just-as-stealthy and far faster F-22 to take on the F-117's role "sometime in the future."

Like all aircraft in the USAF inventory, the F-117 suffers from a number of "aging aircraft" problems. For example, the manufacturer of the multifunction displays used in the cockpit went out of business, so ACC bought up enough replacements to last until 2009. Other structural problems involve load-bearing devices inside the airplane and obtaining parts for other avionics systems suffering from "vanishing vendors" syndrome.

Without resolution of these problems, "we'll wind up grounding airplanes around 2009," Hayes reported. However, there are three more years to fix these problems financially, such that an early retirement can be headed off.

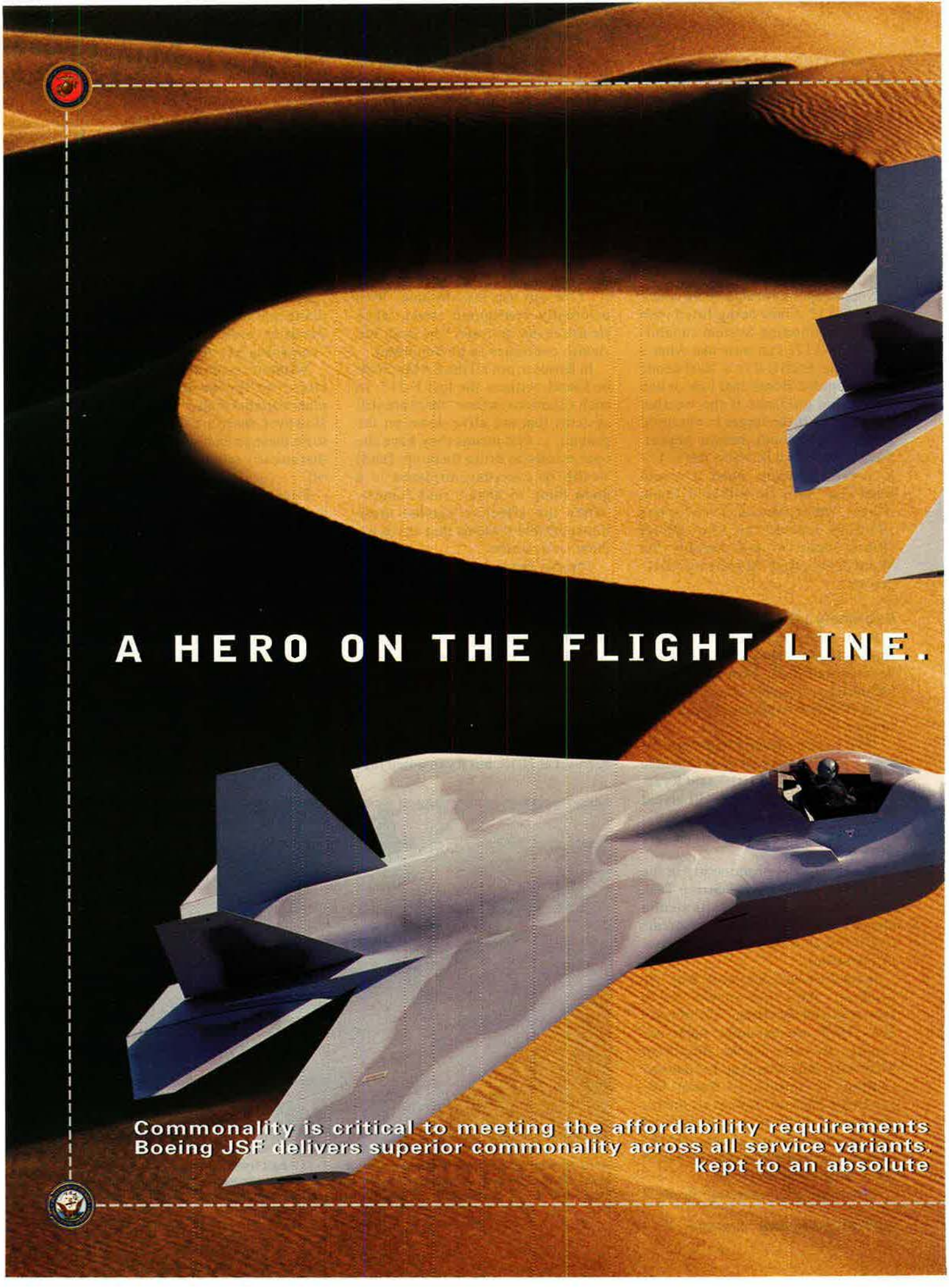
Ryan said the Air Force will likely make more use of jamming—and advances in stealth technology—to match the threat posed by new-generation double-digit SAMs. The new systems generate huge amounts of radar energy, he said.

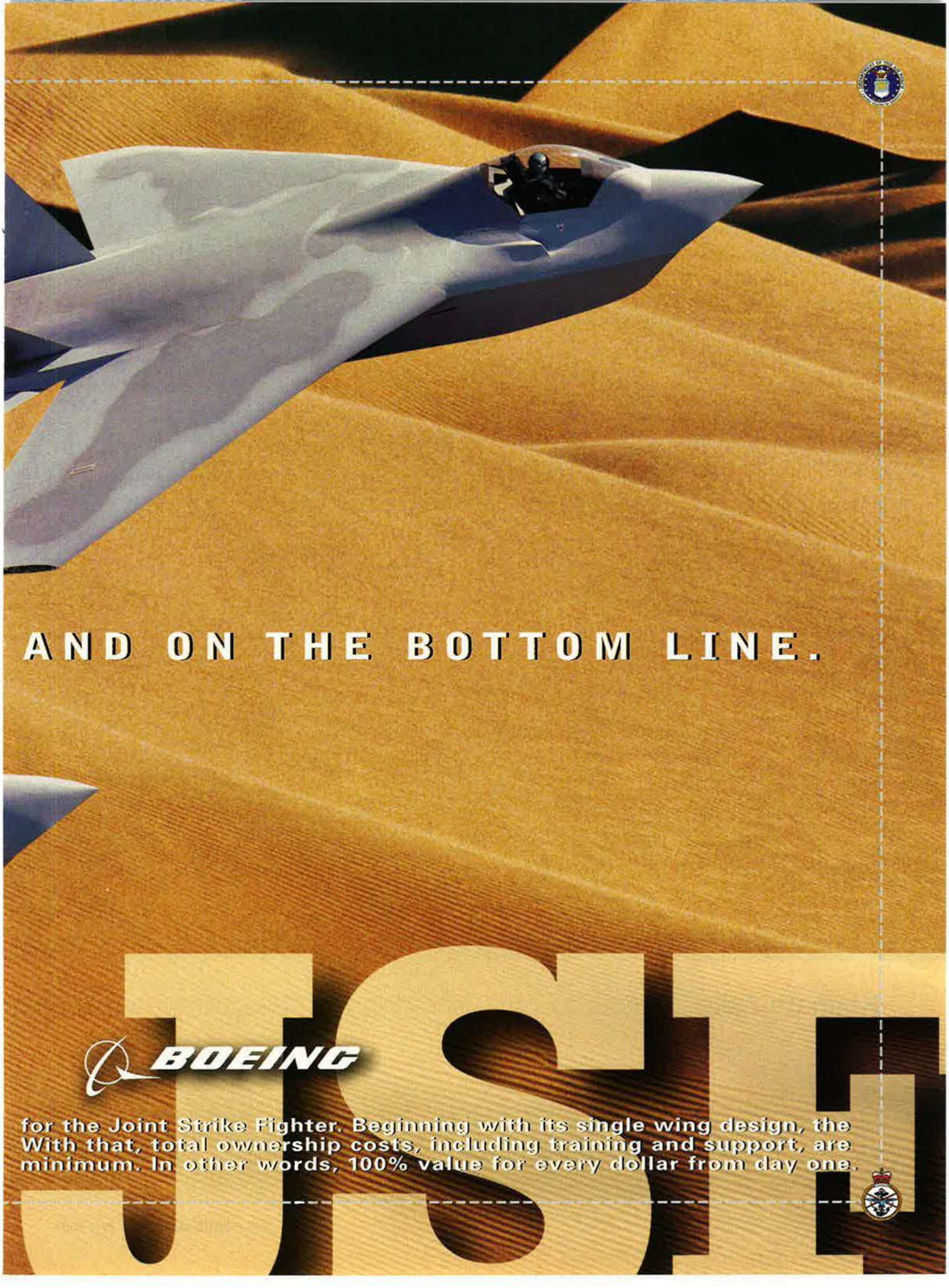
"If you put enough power out there, you can fry the skies," he noted.

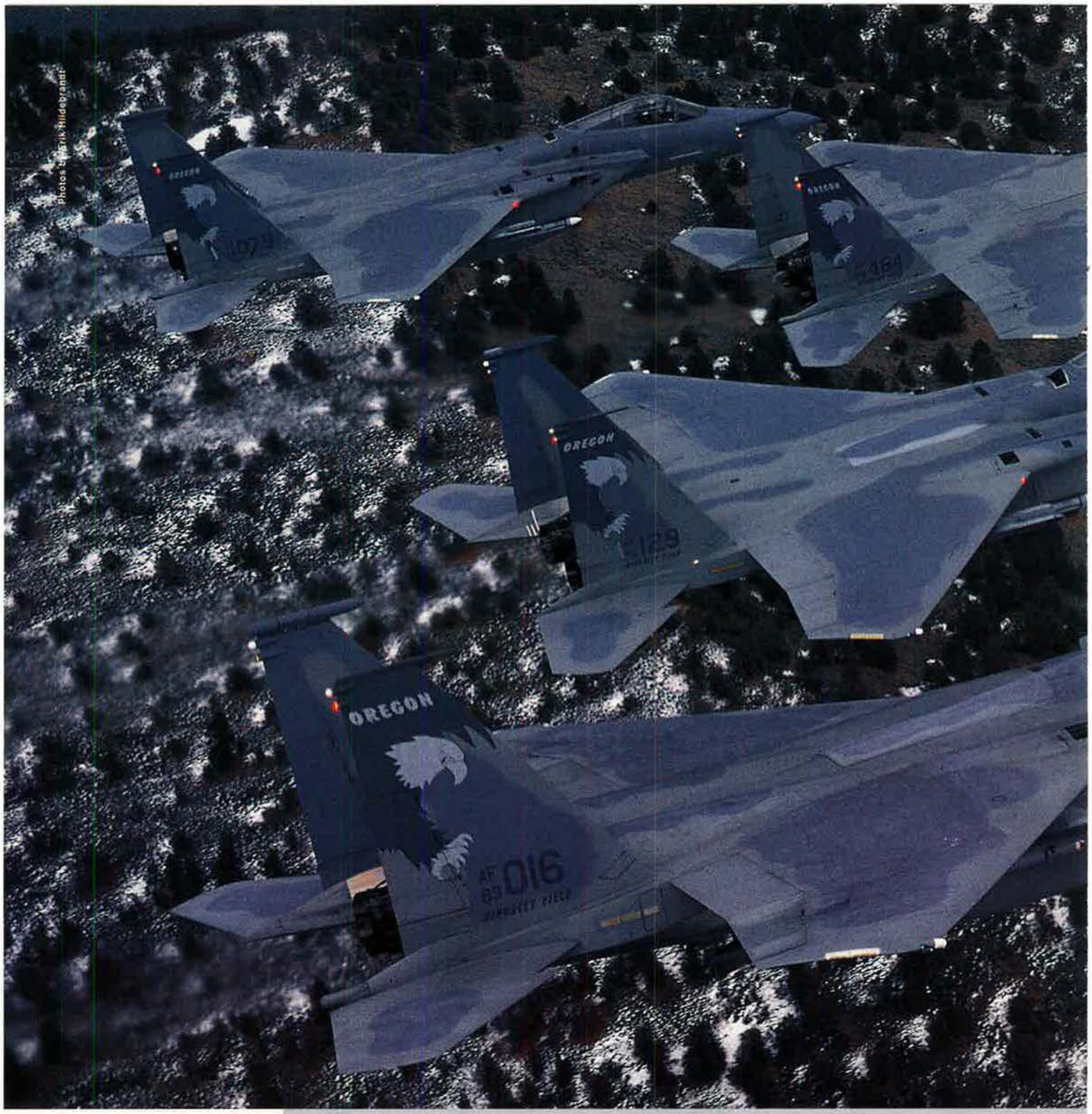
"We will ... continue to offset capabilities the other guy may come up with to counter [stealth]," he said, and in turn the Air Force will unleash a new edition of stealth which will counter the countermeasures. "It's a moving chess game." ■

Photo by Joe Oliva

Built to withstand hard maneuvering, the F-117 has instead been handled with kid gloves. The low stress on the airframe and its renewable stealth features mean the F-117 could last until 2030, though 2018 is its planned retirement.


A HERO ON THE FLIGHT LINE.
Commonality is critical to meeting the affordability requirements
Boeing JSF delivers superior commonality across all service variants,
kept to an absolute

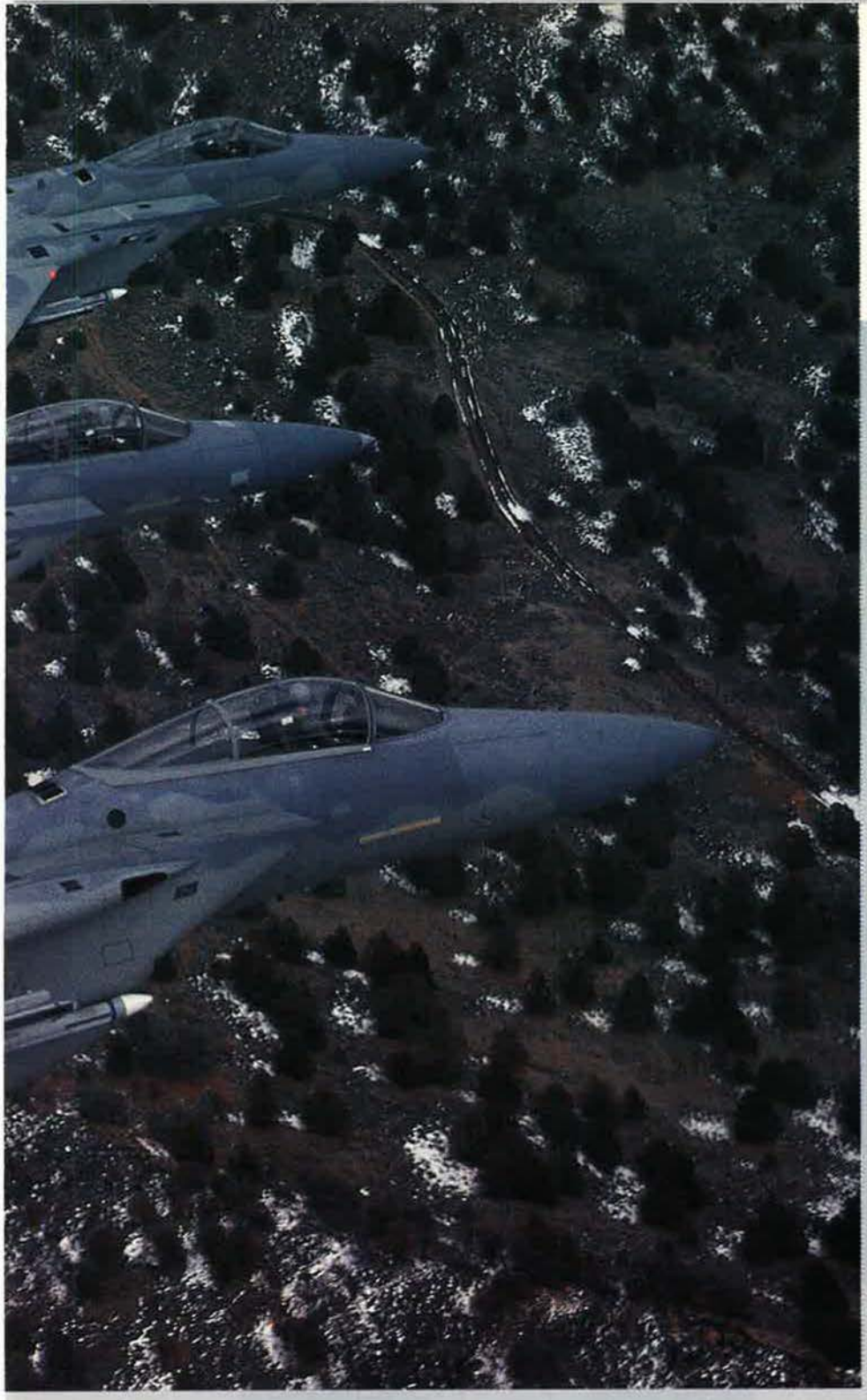

AND ON THE BOTTOM LINE.
BOEING
for the Joint Strike Fighter. Beginning with its single wing design, the
With that, total ownership costs, including training and support, are
minimum. In other words, 100% value for every dollar from day one.
JSF



Photos by Erik Hildebrandt

Klamath Falls is home to the 173rd Fighter Wing, Oregon Air Natio

The Eagles of



The primary mission of the 173rd at Kingsley Field, adjacent to the Klamath Falls airport, is to provide an F-15 air-to-air schoolhouse.

There the unit trains both active duty and Air National Guard pilots in fighter and combat maneuvers, tactical and electronic countermeasures intercepts, long-range missile employment, and basic NORAD procedures. The 173rd Fighter Wing's mission also includes training ANG flight surgeons for the demands of aviation medicine.

The field was named for Medal of Honor recipient 2nd Lt. David R. Kingsley, an Oregonian killed in a World War II bombing mission over Ploesti, Romania. During the Cold War, this location 15 miles north of the California–Oregon border was especially important: In 1954, USAF filled a critical gap in the air defense system by selecting Klamath Falls as the site for an all-weather fighter–interceptor squadron and aircraft control and warning squadron.

These F-15s on a training sortie show the subdued eagle fin flashes that mark Kingsley Field fighters.

Photography by Erik Hildebrandt

ıal Guard.

Klamath Falls

Photos by Erik Hildebrandt

The Oregon ANG began operations at Kingsley in the 1970s, providing ground radar control for fighter aircraft. The Guard flying mission at the field began with F-4s in the 1980s.

The F-4s gave way to F-16s, and in 1998 the 173rd began the switch to the F-15s (shown on these pages) it flies today.

The front door–back door style of the hangar (above) is a carryover from the full-time alert mission the Guard handled at Kingsley from1981–94. It's typical of an air defense facility: It gives alert aircraft a quick start.

Photos by Erik Hildebrandt

Kingsley Field Guard members assumed airport tower control duties from the FAA in 1995. In addition, they train air traffic controllers and provide radar approach control at the field.

Above, a tight four ship of aircraft flies in the pattern over the facility. At right: coming in for a landing.

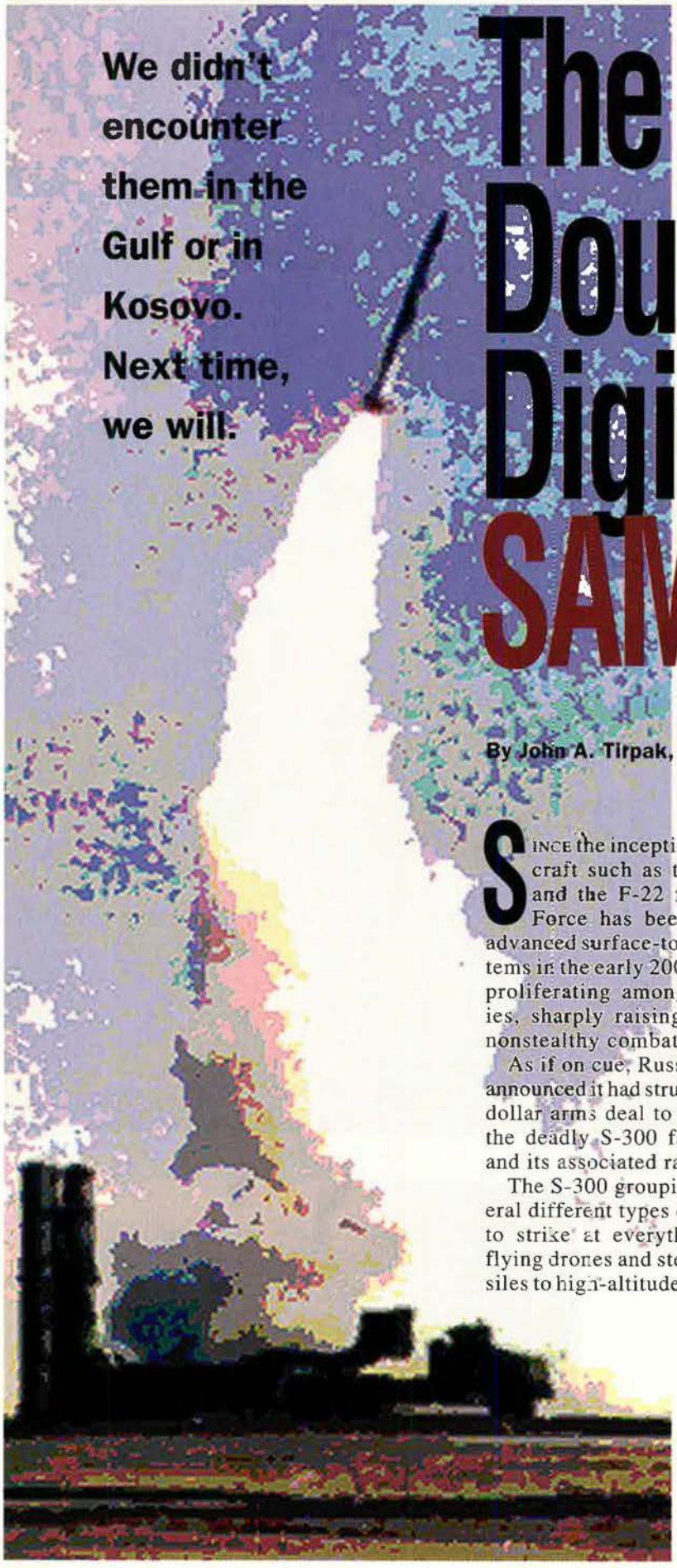
Photos by Erik Hildebrandt

Three F-15s in the air above Klamath Falls. Below, the view from a "classroom," as three jets get ready for takeoff and the day's sortie.

The 173rd supports Aerospace Expeditionary Force deployments and exercises throughout the year. In 2000, they deployed to Canada for the Maple Flag exercise. Last month, 130 personnel and aircraft from Kingsley deployed to Minsk–Mazowiecki AB, Poland, to provide training for the new NATO partner. The wing planned to train against MiG-29s and possibly MiG-21s, and Su-22s.

The skies above Klamath Falls provide a spectacular background for the 173rd Fighter Wing's Eagles. As the only ANG F-15 training unit, the wing is establishing itself as an expert in its profession. With the deployment to Poland, it has an opportunity to share this expertise in the international arena, as well.

Photos by Erik Hildebrandt



We didn't encounter them in the Gulf or in Kosovo. Next time, we will.

The Double-Digit SAMs

By John A. Tirpak, Senior Editor

Since the inception of stealth aircraft such as the B-2 bomber and the F-22 fighter, the Air Force has been warning that advanced surface-to-air missile systems in the early 2000s would begin proliferating among US adversaries, sharply raising the danger to nonstealthy combat aircraft.

As if on cue, Russia in December announced it had struck a multibillion dollar arms deal to equip Iran with the deadly S-300 family of SAMs and its associated radars.

The S-300 grouping features several different types of missiles built to strike at everything from low-flying drones and stealth cruise missiles to high-altitude reconnaissance airplanes and distant sensor platforms. Arrival of these systems in the arsenals of military foes will greatly complicate US operations, which continue to depend heavily on nonstealthy aircraft and will for years to come.

Gen. Richard E. Hawley, the now-retired former commander of USAF's Air Combat Command, told an AFA symposium in February that these new SAMs, if deployed in numbers large enough to create overlapping zones of engagement, would figuratively present "a brick wall" to nonstealthy fighters,

The S-300 series comprises the SA-10, SA-12, and SA-20 missiles and attendant radars. Each missile–radar combination is geared to operations within a range of altitudes and targets. It is the definitive "double-digit SAM" threat that has spurred the development of US stealth systems over the last 20 years.

The SA-10 "Grumble" weapon is the most common of the S-300 missiles that have been sold abroad, first by the Soviet Union and then by its successor state, Russia. It is optimized for use against fighter-type aircraft, having a range of nearly 50 miles and top speed approaching Mach 6.

The Soviet military designed the SA-12a "Gladiator" primarily for use against incoming tactical ballistic missiles, and its follow-on, the SA-12b "Giant," is considered equiva-

lent to or perhaps more capable than the US Patriot missile.

The SA-20 "Triumph" is an advanced development of the SA-12b. It has a range at least three times greater than that of the earlier version.

All of these missiles vastly outperform the Soviet–Russian systems bearing the single-digit designations SA-2 through SA-9. These older types were encountered in the 1991 Gulf War and 1999 Balkans conflict.

Pulling Out the Stops

The Russians are not shy about pushing their systems to prospective clients. Senior intelligence analysts told *Air Force* Magazine that Moscow's military has "pulled out all the stops" in marketing the very best air defense systems, selling to anyone with the hard currency to buy them.

Earlier model Soviet–Russian SAMs, now in widespread use around the world, were limited to defending against one aircraft or missile target at a time. Now, the SA-20 gives the defender the power to engage six targets simultaneously. Such engagements could take place at a range of 248 miles, three times the effective range of the SA-6 it replaces. The missile is 1.5 times faster than the previous generation and is capable of engaging targets from ground level up to the stratosphere.

"It's automated," one analyst reported. "It's digital; it's easy to reprogram." And it is considered highly jam-resistant. The system is also mobile, making it far harder to locate and destroy. "They can pack them up really quick" and move to a new location, the analyst added.

The S-300 system is billed as having capability against low-flying cruise missiles, theater ballistic missiles, and all types of aircraft and as being far easier to operate and maintain than earlier generations of SAMs.

Six battalions of SA-20s, comprising about 48 vehicles and a complement of nearly 200 "ready to fire" missiles, is estimated to be worth about $1 billion, analysts reported.

Still in development, but already being advertised, is a follow-on system called the S-400, which is an advanced version of the SA-20. However, the S-400 is expected to incorporate a number of new tricks stemming from lessons learned in the Kosovo engagement.

Russia is also marketing upgrades of those older SA-2 through SA-9 missiles, for the Russian customers that can't quite afford an S-300 or S-400, one analyst reported. These new systems feature digital avionics, additional sensors, upgraded guidance packages, and refurbished missile hardware that extends range and reliability. Poland, too, is offering digital upgrades of older SAMs.

"It's the same mentality," explained one analyst. "Take out the old Commodore 64 and let's put in a Pentium [processor]."

The Bad Guys

US intelligence services anticipate that five or six "traditional adversaries"—Syria, Iraq, Libya, and the like—will purchase SA-12/20 systems over the next five to 10 years. They will need to upgrade because their existing systems suffer from maintainability problems stemming from old technology such as vacuum tubes as well as liquid-fuel motors.

The S-300 system is already in use in China, a nation expected to begin making copies or derivatives of the system for its own use and possibly for export. Most of the former Soviet republics have the system, as do Bulgaria, India, and Cyprus.

Analysts declined to comment on whether the Russian system is truly jam-proof or jam-resistant but did say that the increase in capability represents a fundamental shift in the air defense threat.

"What it comes down to," said one, "is, you want to be able to operate pretty much freely within that area." Jamming will help, but "you can only do that for so long." Jamming buys time, he said, and "might get you in and out, but if you have to loiter inside the threat ring of a 400-kilometer [248-mile] missile, I think your average pilot would want something more than just electrons and an engineer's slide rule to live by." ■

Double-Digit SAMs by the Numbers

	Maximum Range	Guidance	Minimum Altitude	Maximum Altitude	Maximum Speed	Estimated Cost
Air Defense SAMs						
SA-10b "Grumble"	47 mi.	Radar	82 ft.	16.8 mi.	Mach 6	$60 million (system)
SA-12a "Gladiator"	47 mi.	Inertial Guidance/Radar	820 ft.	15.5 mi.	Mach 5.8	$100 million (system)
SA-12b "Giant"	62 mi.	Inertial Guidance/Radar	3,280 ft.	18.6 mi.	Mach 8	$100 million (system)
Next generation						
SA-20 (S-400 "Triumph")	248 mi.	Command/Radar	?	?	?	?
S-300PMU-1 (SA-10d)	93 mi.	Radar	33 ft.	16.9 mi.	?	?
S-300PMU-2 "Favorit"	124 mi.	Radar	?	?	?	?
Point Defense SAMs						
SA-11 "Gadfly"	19 mi.	Inertial Guidance/Radar	50 ft.	13.6 mi.	Mach 2.8	$250,000 (missile)
SA-13 "Gopher"	3.1 mi.	Infrared	30 ft.	1.8 mi.	Mach 2	$85,000 (missile)
SA-15 "Gauntlet"	7.4 mi.	Command/Radar	30 ft.	3.7 mi.	Mach 2.5	$150,000 (missile)
SA-17 "Grizzly"	31 mi.	Radar	33 ft.	15.5 mi.	Mach 4	$300,000 (missile)
SA-19 "Grison"	5 mi.	Radar	50 ft.	2.2 mi.	Mach 2.7	$90,000 (missile)

Note: Max altitude and speed are rounded.
Sources: *Air Force* Magazine, "Gallery of Russian Weapons," March 1997; Teal Group; Janes.com.

Gen. John W. Handy talks about fighters, force structure, and the danger of a "death spiral" in experience.

The Word From the Vice Chief

Photo by Katsuhiko Tokunaga

Heavyweights. *Foreign warplanes such as the Russian Su-25 match up well with current-generation USAF fighters. Without sufficient numbers of F-22s, Handy warns, "We couldn't do our job."*

Gen. John W. Handy *has been vice chief of staff of the Air Force since April 2000. He also serves as a member of the Joint Chiefs of Staff Joint Requirements Oversight Council. What follows are excerpts of April 12 remarks to the Defense Writers Group in Washington, D.C.*

Foreign Fighter Threat

"If we put our pilots in their [foreign] aircraft, ... nine out of 10 of those sorties are lost to our guys in their airplanes. What that tells you is that training is the difference between our aircraft today. It is not technology, it is training. If I were weighing the scale of capability and my challenge was I just need to train better to beat you, I am going to spend the money in training, because I've already got the technology. That is a scary thought. ... The [Russian–made double-digit] SAMs are an incredible threat. It is a scary, scary thing. There is no sense in not developing weapon systems that have the capability to defeat potential enemies and potential technology breakthroughs as well as those that we already know about."

Fighter Requirement

"[Reducing the planned buy of F-22 fighters] would represent constraints that would unquestionably lessen our ability to guarantee the security of not only air forces but deployed ground forces. We couldn't do our job. I've already said the requirement is 339. In fact, the requirement could readily be more than that. We constrained it many, many times already. You all know that as well as I do. We are down to 339. I

am saying, categorically, that in our best analysis of the threat, ground and air, our best analysis of the tempo that this nation expects, that is the number you need to prosecute the conflict."

Conventional B-2 Bomber?

"With regards to B-2C: You all know we have an unsolicited proposal, and we just don't have the money to afford the aircraft right now. We really, really like the capability that the B-2 brings to the fight. That is perhaps one of the most unremarkable statements I'll give you all day. That shouldn't surprise anybody. Its performance in the air war over Serbia was extraordinary and well-documented. ... But with the existing topline, we can't get where we are from, to there. We have an incredible list of other priorities that are desperately needed over and above that."

Aging Infrastructure

"Right now, our milcon [military construction] rate, for example, is on a 250-year recap [recapitalization] rate. ... The last people I know who could do that were the [ancient] Egyptians. ... We are not in the business of building military installations that can last 250 years. Industry rate is 50 years. When you ask about trade-offs, we've traded off a tremendous amount of our infrastructure for what we have today, and we need to get out of that. We need to get into the business of here is the requirement, send that bill to the President, and get on with it."

Two Major Theater Wars

"The whole debate about two MTWs and lesser contingencies, ... to some degree, presents more sizing constructs. ... I am not convinced that, even if we back off of the two–MTW construct—which seems to be fairly popular, if you read a lot of what you report—[it would] change a whole lot in terms of numbers, because no one can predict with certainty what the challenge is going to be out there."

Anti-Access Issue

"I differ with [critics who] go straight from anti-access as the issue ... to the B-2 as the solution—as if ... long-range strike is the only solution to anti-access. We could have an entire day together talking about how you deal with anti-access [problems]. I would assert that this nation can go anywhere in the world it chooses to, any time it chooses to, through a wide variety of kick-down-the-door accessible means. ... It is healthy to discuss potential problems, but then it is also healthy to follow that up with [a question], 'What are the appropriate methods to attack the problem?' All too often, it is just, 'long-range strike.' I am not being pejorative about long-range strike by any means. It is just one of [many] things in the tool kit, and we should never be in a position of having one arrow to fire in the name of solving a potential problem."

Joint Strike Fighter a Key

"Categorically, the Air Force, Navy, and Marine Corps need Joint Strike Fighter. We all agree to that. ... One of the issues we face as a department—I mean all of us, not just the Department of the Air Force, but all DOD—is interoperability. The Joint Strike Fighter presents a huge advantage to this nation, to get a fighter at a price that gives you a weapon system that all of us are using. That concept is right on the mark."

Fighter Trade-off?

"Why not more F-22s instead of Joint Strike Fighter? Well, I'll just make it clear that the reason for the combination of the high–low mix—F-22 air superiority and Joint Strike Fighter for the predominantly air-to-ground role—is that mix. As you migrate into the future and you want greater and nicer and more capable technology and interoperability, then it makes good sense to continue with that high–low mix concept. ... I don't want to ever get in the debate of trading one for the other; we need both. ...

"I don't think it is wise to ... try to pit ... two very specific fighters against each other. They have roles to play and the advantage that we would have in the Air Force is that in that day when you have that appropriate high–low mix between F-22 air superiority fighters and a JSF with the predominantly air-to-ground role and some variants, perhaps, of the F-22 as we go through time, that we will have replaced our very old fighter force with a very modern fighter force. Let me emphasize that. You all know the average age of our force right now is 22 years. By 2020 it is going to be 30 years, even with the current acquisition programs."

Fighter Maintenance Costs

"The thing that is killing us today [is that] our flying hour program [cost] has increased from seven to 12 percent a year over the last five years. ... The F-15 costs per flying hour, maintenance man-hour per flying hour, is on about a 45-degree

USAF photo by Gary Ell

Long-Range Airpower. *The B-2 bomber gave an "extraordinary" performance in the Balkans, and USAF would like more, but slack funding and multiple needs mean "we can't get ... there."*

F-22 team photo by Judson Brohmer

To Transform a Force. *The cost of flying and maintaining old-technology aircraft is "killing us," said Handy, who adds that the solution is modern aircraft such as the F-22 and Joint Strike Fighter.*

angle on any chart of cost. ... We've loved the F-16. We love the F-15. The A-10 is an incredible workhorse. The F-117 is an incredible aircraft. But all of those are old technology, and ... it is costing the nation too much. ... Right now, in 2001, we are looking at a $500 million increase to the '01 flying hour program due entirely to the increases in the costs per flying hour. That is $500 million that we could have been spending somewhere else, but we are going to have to find out how we get through this year."

Future Electronic Warfare

"Inside the Air Force, we debated long and hard about the EF-111 and our whole EW capabilities, and we've just last fall had a major EW summit to address some of the questions you are talking about. The Air Force is not discounting any option. On the other hand, we are not looking to— . ... The solution in the EW world is probably a joint solution. We want to work with all of our service teammates to answer the question, to discuss potential solutions. And it could be any one of the litany of things you are talking about plus others that we consider. ...

"We will continue to look at the business of EW. You could say, Is there a space solution? Is there an airborne solution? Is it a common wide-body? Is it potentially a UAV [Unmanned Aerial Vehicle]? Do you need to man a platform to do the things you are talking about doing to detect signals? Is it the manned platform or a potentially unmanned platform that really reacts? All of the above."

Excitement About UCAVs

"We are heavy into ... UCAV [Unmanned Combat Air Vehicle]. These things are neat, exciting ideas. They present some capabilities that we have never seen in the past. All services, I think, are excited about it, and I can certainly tell you the Air Force is. A lot of [this is] myth. Heck, I am a pilot, but I am not on any crusade to keep jobs for pilots. That is not what we are about. It is an issue of exciting technology. It represents some tremendous capability, and we shouldn't limit ourselves in any fashion to what we can do with the UCAV or any other unmanned, unpiloted platform."

Air Force and Osprey

"We need to see what the current facts in the [V-22 Osprey] investigation reveal. We need to see what the current test program reveals. The prudent answer is, we want to watch and see what the actual, real facts are. I really can't go any further than that. We need the V-22. Our SOF [Special Operations Forces] are in the position, almost an untenable position if we don't get the V-22. Don't misread my comments. It is just that common sense says, 'Let's look and ask some tough questions.' "

Worries About the Force

"Right now, we are able to recruit our numbers. We are about 102 to 103 percent of our goal in recruiting. We have banked 100 percent of our requirement, but we still have not met our retention numbers in the areas that you are most concerned about, and that is in second-term and career airmen. We'd like to retain 95 percent of our career people until retirement. Ninety-one percent is the current position. People are a real, real serious problem to us."

Experience "Death Spiral"

"Our maintenance folks are manning aircraft maintenance at 100 percent today. But if you look inside the number, you are overmanned in the recruit. ... We are undermanned, at about the 75 percent level across the board, [in] seasoned technicians. ... You don't have the technicians that you need to ... train the next breed of people. It can quickly become a death spiral. We can throw money at parts. We can put money against the flying hour program. It is difficult to just say that the people problem is a money issue. It is not just money. It is recruiting, training, retaining. Looking after families. Avoiding high-demand, low-density, silver bullet–type weapon systems. ... I cannot overemphasize the importance of people to us."

Two Types of Age

"There are two things to consider with the age of something. There is a technological age, and that is how you modify and modernize the system so it has got better radar, better internal capabilities. ... The other one would be the structural age or the chronological age. All of us age chronologically. You can improve yourself technically with glasses and hearing aids and knee replacements; weapon systems are not unlike that. ... B-52s [that stood] on alert in the days of the Cold War weren't flying an awful lot. So, [in] chronological age, which is the one we are both quoting, it is an old airplane. [In] flying hour age, there is a tremendous amount of flying hours left on the airplane. From an engineering perspective, not from the technological internal weapon systems, but from an engineering perspective, the airplane is not as old as the years would imply." ■

Verbatim

By Robert S. Dudney, Executive Editor

Strategic Un-Ambiguity

Q: [I]f Taiwan were attacked by China, do we have an obligation to defend the Taiwanese?

President Bush: Yes, we do ... and the Chinese must understand that. Yes, I would.

Q: With the full force of American military?

Bush: Whatever it took to help Taiwan defend herself.—***Bush, on April 25 "Good Morning America" broadcast.***

Clinton's Legacy

"I think they [President Bush's top Defense Department leaders] have been really taken aback by how much money it will take to fix the problem. It's sort of like buying a house that looks fine on the outside and then realizing, once you move in, that the wiring is old, the roof needs repairs, and the plumbing is bad."—***Andrew Krepinevich, member of a defense panel reviewing US weapons needs, as quoted in the May 2*** **Wall Street Journal.**

This Beret Thing ...

"The decision to disregard the history and proud tradition of the Rangers [by letting all troops wear the distinctive black beret of the Rangers] was the first bad decision. The decision to ... purchase the berets from China and other foreign countries, rather than buy them from US suppliers, was the second bad decision. ... The longer the situation drags on, the worse it seems to become. ... We have troops without adequate ammunition and pilots who cannot fly because of a lack of funds, so why would the Army spend $23 mill on to change the color of a hat on the whim of one general?"—***Rep. Walter Jones Jr. (R–N.C.), member of the House Armed Services Committee, in May 1 floor statement.***

... Turned Out Well

"The Army Chief of Staff has determined that US troops shall not wear berets made in China or berets made with Chinese content. Therefore, I direct the Army and the Defense Logistics Agency to take appropriate action to recall previously distributed berets and dispose of the stock." —***May 1 memo from Deputy Secretary of Defense Paul Wolfowitz to Army officials.***

A Hill of Unhappiness

"I don't think anybody is happy with Rumsfeld. I don't know of anybody, be it in the industry, the generals, or Congress, that is happy with Rumsfeld. ... He can do anything he wants to do in the strategy review, but in the end, he's got to deal with us, so he ought to cut us in now, but what he's doing is ostracizing all of us."—***Remarks of unnamed Republican defense aide on Capitol Hill, reported in April 24*** **Washington Times.**

The Frontier Spirit

"They're claiming everything from harm to the tourist industry to the sterilization of their firstborn. I wonder how they might feel if our fine Air Force is forced to enter heavy combat, and their training is lacking because of such frenzied legal attacks. They need to get a life."—***Brewster Co., Tex., property owner Aubrey Mayes, in April 23*** **Washington Times.** ***Mayes was referring to west Texas ranchers suing the Air Force for alleged damages caused by bomber training missions.***

Not Ready for Prime Time

"We recommended that the [V-22 Osprey] program be continued but restructured. We found no evidence of an inherent safety flaw in the V-22 tilt-rotor concept, that the requirement is justified, and that the V-22 has demonstrated its ability to satisfy the requirement. However, we found that the V-22 lacks the maturity needed for full-rate production or operational use."—***Gen. John R. Dailey, USMC (Ret.), head of V-22 Osprey review panel, in May 1 statement to the Senate Armed Services Committee.***

The Wild Windowless Yonder

"It [the flight of the Global Hawk Unmanned Aerial Vehicle] is mostly autonomous. The two commands we have to get it airborne [are] one, a taxi command, and second, a takeoff command. It's very similar to what we do with a manned aircraft, but I don't have a window." —***USAF Maj. Chris Jella, a Global Hawk operator, in April 30 "Defense Week." Jella gave the UAV its orders from an enclosed facility at Edwards AFB, Calif., for its flight to Australia.***

In Those Places, a Tank Is Best

"Ask any Iraqi who he feared more—[an Air Force fighter–attack aircraft or an Army M-1 Abrams tank ready to] close with and destroy [the enemy] by fire, maneuver, and shock effect? All this technology stuff is cool, but does it work in triple-canopy jungle? In mountains? My guess is no, but I don't want to find out when I'm knee-deep in combat."—***Capt. Glenn D. Hemminger, an Army tank officer, in May 1 Newhouse News Service article.***

We Call It the Army Way of War

"Against a lot of solid armies, it's necessary to go forth into death ground at bayonet point and kill the other guy, face to face. ... The United States continues to trust in airpower and magical technology, then hopes for the best. It may work. But history offers no particular cause for optimism."—***Army Col. Daniel P. Bolger, author of*** **Death Ground: Today's American Infantry in Battle,** ***quoted in May 1 Newhouse article.***

Now You Know

"The rising cost of low readiness has made it impossible to attain high readiness, even though we are spending more dollars per unit of combat power than we were at the height of the Cold War (taking out the effects of inflation)."—***DOD gadfly Franklin C. "Chuck" Spinney, a DOD tactical aircraft analyst, in April 23 "Defense Week."***

AirLand Battle was all the rage in the 1980s, but its legacy, for both the Army and the Air Force, was suspicion and distrust.

By Rebecca Grant

Deep Strife

ALMOST 20 years ago, the Air Force and the Army tried to combine forces in a new concept, AirLand Battle, designed for war in Central Europe. AirLand Battle never met that test but it cast a long shadow over operations from Iraq to Kosovo.

The epicenter of AirLand Battle was the Army Training and Doctrine Command, based at Ft. Monroe, Va. TRADOC was established in 1973 to help guide the Army back from the disaster of Vietnam—to refocus the service on conventional war in Europe and help it make the transition to an all-volunteer force.

TRADOC's initial doctrine product was called "Active Defense," codified in the Army Field Manual 100-5 as published in 1976. Active Defense moved Army doctrine out of the swamps of counterinsurgency and back to the task of defending NATO Europe against a quantitatively superior Warsaw Pact. Some criticized the new doctrine as having an overly heavy emphasis on firepower and attrition. However, Active Defense energized education and training and opened up an intellectual debate that set the stage for future developments—most prominently, AirLand Battle.

One of the intellectual breakthroughs came in FM 100-5's Chapter 8, which presented, in italics, the following statement: *"The Army cannot win the land battle without the Air Force."*

Six more years of doctrine development ensued, during which Army officers gained an even sharper appreciation of operational depth and maneuver. This led directly to inclusion of AirLand Battle doctrine in a new version of FM 100-5, published in 1982. The battlefield of the future, it noted, was going to be bigger and more lethal. Forces would have to demonstrate rapid maneuver in order to win the first battle of the next war.

AirLand Battle demonstrated a determined shift toward a doctrine of the offensive. It broke out of the narrow tactical focus of Active Defense by showcasing two distinct operational concepts:

- Deep attacks beyond the forward edge of the battle area to disrupt enemy second echelons.
- Lightning-fast offensive maneuver using mechanized forces supported by tactical airpower and attack helicopters, the purpose of which would be to exploit the initial advantage.

What the Army doctrine writers called "fires" became not only a

means of attrition but also an instrument to freeze the enemy and stun him long enough for maneuver forces to strike deep and destroy enemy forces.

AirLand Battle doctrine emphasized that any future European battlefield would be nonlinear—that is, a place where Soviet forces might attack NATO's close, rear, and deep areas at once. The philosophy of AirLand Battle was to turn around that problem and throw it back at the Warsaw Pact. Instead of holding off and then rolling back the enemy in a sequence of close engagements on a broad front, forces would synchronize close engagements with deep strikes on enemy second echelons. The key concepts were initiative, depth, agility, and synchronization of forces.

Gen. John A. Wickham Jr., the Army Chief of Staff in the 1980s, explained: "Deep operations are designed to delay, disrupt, and attrit the enemy's forces and, as a result, shape the battle conditions in which close operations will be conducted; close operations are executed to engage decisively and destroy the enemy; and rear operations are undertaken to protect our freedom of maneuver, operational continuity, and uninterrupted combat service support."

Thus, deep attack became a critical factor in the land battle. However, to attack deep, the Army corps commander of the 1980s had no choice but to rely on the air component. The Army had longer-range systems on the drawing boards, but in the early days of AirLand Battle, it had no organic capability to see deep and strike deep. The air component facilitated the shift away from attrition and toward maneuver by giving the maneuver commander the ability to see and strike deeper.

In short, maneuver warfare would depend on the air component to enable, augment, and protect land force operations.

Then Came FOFA

In 1986, the Army approved another revision of FM 100-5. This new version captured AirLand Battle doctrine at its peak of refinement. Its strong focus on nonlinear operations had been embraced by NATO and became the centerpiece of a new NATO defense strategy labeled Follow-On Forces Attack—FOFA for short. If war came, NATO's chance for victory with conventional forces would rest on the success of the AirLand Battle concept.

The stakes were high. Wickham noted, "The potential of AirLand Battle must be fully realized if we are to combat the Soviets without resorting to the early 'first use' of nuclear weapons."

The emergence of AirLand Battle was made possible in no small measure by the flourishing relationship between TRADOC and USAF's Tactical Air Command, headquartered at nearby Langley AFB, Va. Years of Army–Air Force exercises had led to improved close air support procedures. Good relations between the Army and Air Force gave AirLand Battle a special prominence, at a time when USAF doctrine was split between TAC's ground combat focus and the global war planning focus of Strategic Air Command.

Though AirLand Battle was never part of official Air Force doctrine, officials at TAC heartily endorsed its precepts. Gen. Merrill A. McPeak, the now-retired Air Force Chief of Staff, served at TAC during these years. In a statement made in the early 1990s, he remembered the move toward AirLand Battle as a change for the better.

"Recall what the Army's doctrine *was* before the AirLand Battle," McPeak remarked in a 1992 statement. "It was called the 'Active Defense'—kind of sit in prepared positions and allow the Soviets to punch through the Fulda Gap and across the north German plain." McPeak went on to say that AirLand Battle changed all that by putting a "heavy emphasis on maneuver" and "the idea of getting inside of the enemy's decision cycle time—being able to move before he could make a decision and react."

Air Force leaders saw AirLand Battle as the only game in town. Airmen had no desire to stand back from the synchronization of the combined arms team. AirLand Battle ensured airpower would be part of the ground scheme of maneuver. The prevailing USAF view of the early 1980s was that heavy concentrations of ground forces in Europe made land war the major conventional battle, and airmen believed they had a duty to provide support.

TAC's Reason For Being

Writing in the April 1988 issue of this magazine, Senior Editor James W. Canan observed that TAC headquarters had become a place where "working with the Army is an accepted way of life and where helping the Army wage and win the decisive land battle is ungrudgingly acknowledged as TAC's reason for being."

Gen. Robert D. Russ, the TAC commander, crisply summed up the situation in a 1988 memo: "Tactical aviators have two primary jobs—to provide air defense for the North American continent and support the Army in achieving its battlefield objectives."

The meeting of minds between the Army and TAC had reached a key juncture with the promulgation in May 1984 of what was known as the 31 Initiatives, a memorandum signed by the USAF Chief of Staff, Gen. Charles A. Gabriel, and Army Chief, Wickham. The initiatives covered major topics ranging from point air defense and combat search and rescue to joint target lists and the Joint STARS radar aircraft concept.

Among the more detailed items was Initiative 25, dealing with air liaison officers and forward air controllers. These issues encapsulated and symbolized the major focus on improving the Air Force's provision of close air support to ground troops.

The two service chiefs saw the memorandum of agreement as but a single step in a dynamic process in which the Army and Air Force would build "optimum airland combat capability" by working together on warfighting issues and acquisition priorities. An Air Force analyst, Richard G. Davis, wrote at that time, "The type of battlefield integration encouraged by the 31 Initiatives should make the services more effective," but he warned that it would take the "highest levels of service leadership to sustain the momentum."

AirLand Battle recognized the importance of controlling enemy forces in the deep battle. This was, in fact, its principal innovation. However, AirLand Battle was Army doctrine, and that meant actions by the air component were supposed to support the ground scheme of maneu-

ver. Retired Maj. Gen. Charles D. Link recalled, "AirLand Battle was widely if inaccurately considered the ultimate expression of airpower's contemporary potential. Basically, for lack of any other alternative, the United States Air Force enthusiastically embraced AirLand Battle. As a result, soldiers were encouraged to expect airpower to serve the land force objectives in the first instance. ... Probably worse than the soldiers' expectation, airmen developed the same expectation."

The Decisive Phase

AirLand Battle's major innovation was to recognize the importance of deep operations—but this was also the area where the Air Force would later split with the Army's doctrine. Under AirLand Battle, the air component's deep air interdiction had to be synchronized with the action of ground forces. Moreover, close combat was to be viewed as the decisive phase of battle. Deep operations were to be used to support and assist, but attention would be concentrated on the close battle area, where, in the words of a 1983 Wickham–Gabriel memo defining the terms for the Army–Air Force joint development work, "the imperative of defeating the enemy ground combat formations or at least preventing their penetration into the friendly rear area is predominant."

Deep battle area operations were to be more flexible and depend on the nature of the enemy's dispositions and the intent of the commander. Deep battle would be conducted "in accordance with the appropriate commanders' concepts of operations." The deep zone was to be split into a "near zone," where operations would be "capable of immediately affecting the outcome of the ground engagement," and another zone with fixed and mobile targets farther to the rear which "over time could influence the close battle area but are not a near-term threat to it."

AirLand Battle satisfied the Army's need for maneuver warfare doctrine. However, there was no recognition of the potential for a phased campaign where, if the deep battle became the top priority for a joint force commander, land forces might be called upon to support the air component, if ground forces could get to the battle at all.

'Soldiers were encouraged to expect airpower to serve the land force objectives in the first instance. ... Probably worse than the soldiers' expectation, **airmen** developed the same expectation."

Initiative 21 actually hinted at this problem by instructing the Army and Air Force to figure out how to "synchronize Battlefield Air Interdiction (BAI) with maneuver" and to connect the Army battlefield coordination element with the corps and land component commanders via near-real-time data links.

As the Cold War came to an end, AirLand Battle doctrine had not resolved latent Army and Air Force differences over campaign priorities, authority of the joint forces air component commander over corps commanders, and what to do in expeditionary operations where the battle plan might not follow a course of synchronized, joint force employment.

The preoccupation with close battle was natural to the soldier. Gen. Dwight D. Eisenhower, the Supreme Allied Commander of World War II, once wrote, "Every ground commander seeks the battle of annihilation; so far as conditions permit, he tries to duplicate in modern war the classic example of Cannae" (famous battle of 216 B.C. in which invading Carthaginian forces under Hannibal smashed a Roman army within Italy). AirLand Battle, for all its innovation, was no different. Deep operations would support and assist, but the attention was on the close battle area.

In the 1980s, neither soldiers nor airmen took particular note of these limitations, but the conflicts of the 1990s made them glaringly apparent.

The prime case in point was the Gulf War.

From all appearances, the massive, multicorps Gulf War offensive was a textbook example of AirLand Battle in the real world. In fact, Desert Storm used only broad-brush strokes from the operational palette of AirLand Battle. Army Gen. H. Norman Schwarzkopf, commander in chief of US Central Command, did not order up simultaneous close, rear, and deep operations, as would befit a NATO response to a Warsaw Pact attack in Europe. Rather, he constructed a campaign that began with prolonged deep air operations and which proceeded for quite some time without a ground offensive.

The coalition air and ground forces pursued not "synchronization" but "phasing." Schwarzkopf did not make the air and ground actions simultaneous, but tasked the air component to achieve a desired level of attrition on Iraqi front-line units before the launching of a ground attack. In Schwarzkopf's phased war plan, only Phase 4, the ground operation, resembled the AirLand Battle doctrine of the 1980s.

The Dilemmas

In the Gulf War, the air and land components ran into dilemmas that showed the downside of depending on AirLand Battle doctrine as the only framework for action. One sore point was target selection; Schwarzkopf wanted first to send airpower against Iraqi second-echelon units and only degrade front-line forces at the last minute, the better to prevent Iraq from reconstituting them. Ground commanders wanted front-line attacks to begin sooner and with more prominence.

Each corps commander wanted to control those air forces in his own sector. The Army had axed its field army headquarters, the traditional locus of air–ground coordination, in the 1973 reforms that

produced TRADOC. Schwarzkopf and his deputy, Lt. Gen. Calvin Waller, deconflicted the corps commanders and the air component when possible, but neither side got much insight into why decisions were made.

These competing perspectives within the command echelon posed a problem right through the last day of the Gulf War, when corps commanders established their fire support coordination lines so far forward that coalition airpower could not interdict fleeing Iraqi units. Many of these forces escaped destruction. Army doctrine still called for synchronizing maneuver, but the air component needed more room to work far out ahead of the lines.

After the war, soldiers and airmen argued over how to operate in the deep battle arena, an issue in which AirLand Battle concepts and terminology were of little help.

The Army asserted an independent right to strike deep targets. Army officers claimed a capability to do so. For example, an Army study noted that preliminary use of the Army Tactical Missile System missile suggested it would be more effective than USAF fighter–attack aircraft in this role, in that it needed "no elaborate penetration aids" and didn't risk the lives of pilots.

Those Army officers who wrote post–Gulf War doctrine were not kind to the combat achievements of airpower. A new FM 100-5, published in 1993, endorsed joint operations but continued to insist on synchronized air and land operations.

Spokesmen for ground power embraced the notion that the Army's 100 hours of combat in the period of Feb. 24–28, 1991, was the sum and substance of the war. "The recent air campaign against Iraqi forces gained not a single one of the US or UN objectives in the Persian Gulf War," said Gen. Frederick J. Kroesen, USA (Ret.), a senior fellow of the Association of the US Army's Institute of Land Warfare and former commander in chief of US Army Europe in a letter published in the *Washington Post* in November 1994. "Four days of land combat—aided immeasurably by the air campaign—achieved every goal and victory."

Sour Comments

An AUSA commemorative brochure produced to mark the 10-year anniversary of the Gulf War spoke of the dominance of land combat and how it had brought about the "wholesale destruction" of Iraqi forces. It complained about airmen who allegedly were arguing that their precision munitions could "win wars the 'clean' way, i.e., through strategic targeting."

In addition to expressing a deep reverence for things difficult and dirty, Army spokesmen and apologists over the 1990s argued hard against the very notion that there was such a thing as an air campaign. They steadfastly referred to the Gulf War air assault as "an operation" and enjoyed great success in getting joint doctrine writers to see things their way.

Such imaginative recastings of Desert Storm's phased campaign showed the price of continuing to rely on the doctrinal language of AirLand Battle. The deep battle was now warfare's new center of gravity, especially in expeditionary operations.

Now, the question of who would control the deep battle caused bitter divisions. The first skirmish came in deliberations of the Commission on Roles and Missions, which met in the period 1994–95. The real battle, though, came a bit later, and at its center was the so-called "halt phase" of war.

The problem was that AirLand Battle doctrine of the 1980s had offered only a rough outline of how to handle a deep battle. Schwarzkopf's general use of airpower in Desert Storm and the specific success of airpower at the Battle of Khafji showed that the air component commander could take charge of the deep battle and interdict enemy ground forces to great effect. This marked a departure from AirLand Battle because there was no simultaneous deep and close battle. Schwarzkopf actually pulled back forces at Khafji to give coalition airpower more room to work.

On top of this, air attacks were effective against a maneuvering enemy, in daylight and, for the first time, at night. Radar tracks produced by E-8 Joint STARS systems showed how aircraft had attacked lead vehicles in an enemy column, causing that column to halt in confusion.

Desert Storm, moreover, marked only a single data point in development of airpower effectiveness. Progress continued apace after the war. Both the Air Force and Navy quintupled their precision capabilities in the five years after Desert Storm.

Thus, the link between the Air Force and AirLand Battle doctrine was subjected to constant—and constantly increasing—strains and stresses. In the mid-1990s came the final, definitive break. The last straw was the new concept of a halt phase.

Air Before Ground?

In January 1996, Lt. Gen. Ralph E. Eberhart was the Air Force's deputy chief of staff for plans and operations, and he had just put the finishing touches on a new airpower briefing for Gen. Ronald Fogleman, the Chief of Staff. The Eberhart briefing wasn't a strategy for winning a war with airpower alone, but it did make the case for a novel concept: that a joint force commander could profitably use his air component to attack deep battle targets or at the start of an expeditionary operation *before ground forces were in place.*

Eberhart reasoned that the air component, equipped with a sufficiently large stockpile of precision munitions, could reach a level of effectiveness permitting the joint force commander to achieve many of his objectives directly, without having to engage the enemy on the ground. The briefing drew on historical examples such as the Allied interdiction of German Panzer divisions moving to the Normandy beaches and was reinforced with modeling from the Air Force Studies and Analyses Agency.

"The need for mass on the battlefield has now changed," Fogleman declared in a speech in April 1996. "We don't need to occupy an enemy's country to defeat his strategy. We can reduce his combat capabilities and in many instances defeat his armed forces from the air."

Link, Eberhart's deputy at the time, embraced the airpower briefing, extended it, and effectively made it his own.

Link subsequently drew fire for promoting this halt phase concept as a pivotal contribution to joint warfighting strategy. He insisted that

halt was not a win-the-war-alone approach, but critics were not mollified.

Whatever halt actually was, it certainly didn't look much like AirLand Battle.

In the halt phase, air forces would be deployed to theater first to interdict and halt advancing enemy columns, disrupting their offensive. The joint air halt aimed to stop enemy forces before they got too far into friendly territory, thereby creating the conditions for a political settlement or buying enough time to get heavy ground forces into action and push the enemy out. In effect, the halt phase concept was a version of Schwarzkopf's strategy, amplified by new and powerful precision weapons.

To Army officers, the halt phase was a disturbing and alien concept. Army doctrine defined the term "halt" to mean a complete cessation of the enemy's movement, whereas the airman's concept implied disruption and relative advantage. The halt phase changed the timing of counterland operations by putting joint airpower in first to interdict and control enemy forces by disrupting their scheme of maneuver.

If the halt phase attacks worked really well, the deep battle might create US battlefield dominance before enemy ground troops could ever reach the point of close contact with friendly forces. The fact that a halt strategy would point toward more airpower and fewer ground forces added salt to doctrinal wounds.

The threat to the Army was clear, and its leaders did not ignore it. By the time of the first Quadrennial Defense Review in 1997, Army generals were retaliating by taking frequent potshots at the Air Force's top priority, the F-22 fighter. The cooperative spirit of the 31 Initiatives was dead.

Then, in the spring of 1999, came the crisis in Kosovo and NATO's response—Operation Allied Force. Allied Force dealt a new blow to the pivotal AirLand Battle concept of synchronized, joint force maneuver and fires. Combat operations featured no Army forces. The air war over Serbia was all one big "deep battle" as NATO airpower hit strategic targets and at the end worked over Serbian fielded forces.

If the **halt phase** attacks worked really well, the deep battle might create US battlefield dominance before enemy ground troops could ever reach the point of close contact with friendly forces.

The **threat** to the Army was clear, and its leaders did not ignore it.

Seeking Credit

In the aftermath of Kosovo, AirLand Battle's precepts increased the interservice tension as the land power partisans sought a share of credit for a successful "joint" campaign and at the same time attempted to downplay airpower's role. The Pentagon, in its official report on the war, caved in to political pressure. DOD stated, "We successfully integrated air, land, and sea operations throughout the conflict," a statement as bizarre as it was bland.

No longer could Army and Air Force officers use a common language to talk about the lessons of the conflict. The formalized AirLand Battle terms of maneuver, fires, and synchronization did more harm than good. The phraseology just couldn't describe the military operations of Allied Force.

Many Army spokesmen who wrote about Allied Force credited the putative threat of a US land offensive from Albania and the activities of the Kosovo Liberation Army's guerrilla forces with "making the air campaign effective." Maj. Gen. Robert H. Scales Jr., reflecting on the war from his post at the Army War College, came to the conclusion that the US needed "strategic pre-emption," defined as the "use of airpower to delay the enemy long enough for early arriving ground forces to position themselves between the enemy and his initial operational objectives."

The view was summarized by retired Army Lt. Gen. Theodore G. Stroup Jr. in an August 1999 article in *Army* magazine: "The lesson of Operation Allied Force is not that airpower alone can win a war but that it takes the simultaneous application of complementary capabilities—in this case, both land and airpower."

In fact, the task of contending with Serbian ground forces in Kosovo only pointed up the wisdom of the Army doctrine writers who produced FM 100-5 in 1976. In that document, the Army stated that both the Army and Air Force could deliver firepower, destroy a tank, collect intelligence, conduct reconnaissance, and so forth, but it emphasized "neither the Army nor the Air Force can fulfill any one of those functions completely by itself." Indeed, all evidence is that NATO airmen desperately needed the Army's ground intelligence preparation of the battlefield and benefitted greatly from it once it was made available. The initial difficulties in tracking fielded forces were a reminder of why soldiers and airmen needed to combine their strengths.

The Allied Force air commander, USAF Lt. Gen. Michael C. Short, and the overall theater commander, Army Gen. Wesley K. Clark, had a number of well publicized disagreements over the targeting of fielded forces, illustrating the divergence between air and land officers over campaign priorities. The Clark–Short feud was AirLand Battle's tombstone. ■

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Space Scoreboard

Photo by Paul Kennedy

One of the oldest B-52s still in operation, NB-52B #52-008 has kept track of its milestones with an extensive pictographic history stenciled on its aluminum skin. The giant bomber made its first flight in 1955. It has been at the Dryden Flight Research Center, Edwards AFB, Calif., since 1959 and on loan to NASA since 1976. It has served as an aerial launch platform for the X-15 (right). It has air launched wingless lifting bodies and validated parachute systems as part of the development of the space shuttle. In April 1990, it air launched the Pegasus space booster. As with all aging aircraft, top-notch maintenance keeps it flying. Parts for this one, though, have occasionally had to be scavenged from museums.

USAF photo courtesy Edwards AFB, Calif.

Photo courtesy of US Air Force

At the dawn of the Cold War, air surveillance missions over "denied areas" could—and did—get pretty sporty.

The Early Overflights

By Walter J. Boyne

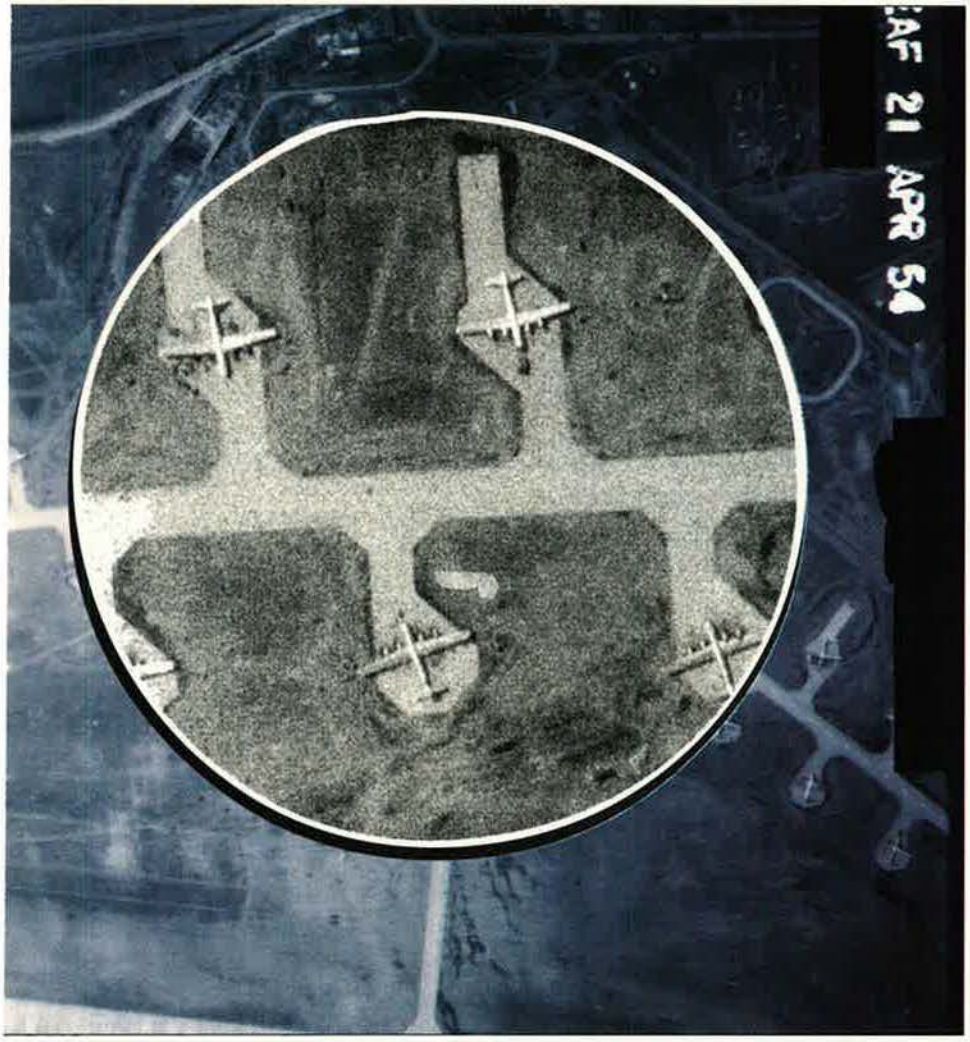
When the Cold War dawned in the late 1940s, the United States realized that it had virtually no information with which to plan a bombing campaign against the Soviet Union. Captured German maps provided some data for the western portions of the USSR, but virtually everything else was a blank slate. Entire cities were cloaked in secrecy, with no hint of their true location or, in some cases, even their existence.

This dearth of knowledge would soon become critical. The Soviet Union detonated an atomic weapon in 1949. By October 1951, there were signs that a Soviet Tu-4 bomber had dropped a nuclear weapon in an airburst test. This was followed by news of the detonation of a thermonuclear weapon in 1953. Early intelligence estimates projected that, in 1952, the Kremlin might have as many as 600 Tu-4 bombers in service and up to 100 atomic bombs in the stockpile, raising fears of a Soviet strike.

For American and British leaders, the situation was intolerable. Washington and London needed information on Soviet strategic military capabilities and on any preparations for a surprise attack on the Western alliance. It needed to develop a list of targets for either pre-emption or retaliation.

As early as 1946, the Western powers attempted to gain military information by staging flights near Soviet and satellite territories. These flights were part of the Peacetime Airborne Reconnaissance Program, or PARPRO. Such flights on the periphery of the USSR were perfectly legal and could be undertaken on the authority of the theater commander. The Soviet Union vigorously defended its airspace, however, and many PARPRO aircraft were shot down. A few strayed over Soviet territory, while all of the others were shot down over international waters.

The PARPRO flights, though useful, were not sufficiently numerous or detailed. Truly vital intelligence



Post World War II Soviet weapons development led to surveillance overflights such as this RF-86F mission in April 1954 over Khorol airfield, north of Vladivostok in the Soviet Far East.

concerning what was going on deep inside the territory of a potential adversary could be acquired only by overflying the Soviet Union and its allies. This was serious business, essentially an act of war, for during peacetime such an overflight violated Soviet national sovereignty.

Deja Vu All Over Again

The Soviet Union was especially sensitive to such overflights because it had experienced roughly similar operations just prior to Germany's invasion on June 22, 1941. Luftwaffe Col. Theo Rowehl's special reconnaissance unit had conducted almost 500 long-range overflights, pinpointing most of the major Soviet airfields. At that time, Stalin was trying desperately to avoid war with Hitler and so he failed to object or take action. Moscow would not make the same mistake again.

Such was the gravity of the Cold War overflights, however, that they could be authorized only by the President. At a recent Defense Intelligence Agency symposium on the early overflights, several speakers went to some lengths to establish the difference between a Presidentially authorized overflight and the more common PARPRO missions.

At this symposium, held at Bolling AFB, Washington, D.C., each speaker emphasized that USAF Gen. Curtis E. LeMay, the commander in chief of Strategic Air Command, never, under any circumstances, ordered such a flight without Presidential authorization. They were adamant on this point because some journalists have portrayed LeMay as a stubborn warmonger out to start World War III on his own. According to those who were there, LeMay was dedicated to having SAC ready for war and was prepared to take the war into the heart of enemy territory, but he was first and foremost an airman who obeyed his Commander in Chief. He knew there was a line, and he never crossed it.

National Reconnaissance Office Historian Cargill Hall offered a definition of an "overflight" that fits the facts. He stated, "In using the term 'overflight,' I mean a flight by a government aircraft that, expressly on the direction of the head of state, traverses the territory of another state in peacetime without that other state's permission."

The distinction is important because it highlights just how critical and dangerous the highly classified overflight mission was. All of the flights were conducted in great secrecy, at a level of security which was maintained until very recently, when, at last, the missions and imagery were declassified and the men who flew the missions could finally talk about them. Curiously, this secrecy was enhanced indirectly by the Soviet Union. It never blew the whistle on the flights, for it refused to admit to its people and to the world that it could not prevent US aircraft from overflying its national territory.

The military overflights employed the unsophisticated reconnaissance aircraft then available for use. These ranged from piston-engine aircraft like the RB-50 to the early jets. The latter category included RF-80As, slowed by huge tip tanks necessary for range, an F-84, RF-86s, RF-100s, and RB-45s, RB-57s, and B- and RB-47s. All of these aircraft led the way to the later specialized U-2 and SR-71 aircraft and ultimately to satellites.

The mission was dangerous for reasons ranging from overloaded takeoffs to MiG cannon fire. The long ranges taxed the pilot's ingenuity in stretching his fuel supply. The missions required an enormous amount of initiative and persistence. Even in the face of certain interception, the pilots had to press on from one target to the next to get the mission done.

Tight Lips

Despite the invaluable nature of the work, the missions sometimes

This RB-45C, a special version of the B-45 Tornado bomber, had five camera stations for its charting, mapping, and photoreconnaissance missions, which were carried out at high and low altitudes, day and night.

hampered the careers of those flying them. It was not unusual for a pilot selected to fly overflight missions to be unable to tell his boss, or his boss's boss, exactly what it was he was doing during the entire time of service. This was not a good way to achieve a top officer efficiency report.

Implicit in all missions was the understanding that any aircraft forced down by enemy fire or mechanical problem would be formally disavowed by the US, with "navigation error" being the favored excuse. At that point, every pilot knew, he would be on his own. There would be no rescue flights. Walking out of Siberia or Manchuria was out of the question. Some gave serious study to a MiG-15 pilot manual, staking survival on the very slim chance of stealing a MiG-15 and flying back to safety.

Secrecy was so tight that even individuals assigned to the same overflight units would not discuss their missions with each other. What would have been valuable bits of information on the position of anti-aircraft batteries, enemy airfields, and so on were not shared. Each man had to go out and learn for himself.

The first recorded USAF overflight was flown by then-1st Lt. Bryce Poe II. On May 10, 1949, Poe took his RF-80A, burdened with special long-range tip tanks, on a flight over the Kuril Islands in the extreme Soviet Far East. Later he made flights over the Soviet mainland, including one on March 10, 1950, over the closed Soviet city of Vladivostok. After North Korea invaded South Korea on June 25, 1950, Poe flew many reconnaissance missions but avoided penetrating Chinese airspace. He would fly his RF-80A along the Yalu River, banking to take oblique photos across the border in Chinese territory.

However, Poe was soon tasked with another mission that would take him over the Soviet Union again. This was "legal" now because the Soviet Union was seen by Washington as an unannounced "co-belligerent" in the Korean War. Flying out of Misawa AB, Japan, Poe covered familiar territory in the Kurils, Sakhalin, and Vladivostok. Soviet defenders tried to intercept him with piston-engine aircraft, but they failed.

Poe continued his periodic flights over the Soviet Union until he rotated home in January 1951. Unlike his successors in the overflight business, Poe interpreted the developed photos and personally briefed the theater commander in chief, Gen. Douglas MacArthur, and Far Eastern Air Forces commander, Lt. Gen. George E. Stratemeyer.

Watching China

Washington officials decided early in the Korean War to regularly overfly Chinese coastal areas, particularly mainland ports opposite Taiwan. In addition, the US began planning for flights over western areas of the Soviet Union.

Three RB-45Cs were sent to Japan in September 1950 and immediately began operations. Though fast compared to a B-29, the RB-45C was no match for MiG-15s and was roughly handled. One was lost in combat on Dec. 4, 1950. Another was badly shot up on April 9, 1951.

Fighter escorts were laid on, but a third aircraft was almost shot down Nov. 9, 1951. As a result RB-45s were withdrawn from daylight operations.

Nighttime RB-45 operations over Manchuria and the Soviet Far East encountered fewer difficulties. On the night of Dec. 17–18, 1952, USAF Capt. Howard S. Myers, veteran of 200 Berlin Airlift missions, flew a black RB-45C from Yokota AB, Japan, to the Manchurian city of Harbin, collecting radarscope photos of airfields and other military installations. Maj. Stacy Naftel flew similar missions and was targeted, without success, by anti-aircraft gunners. The RB-45C pilots continued to conduct overflight missions until April 1953.

China's intervention in Korea in November 1950 generated repercussions not only in the theater but around the world. Full war between the US and China seemed possible. Britain, still weakened by the exertions of World War II, feared that a Sino–American conflict would tempt the Soviet Union to take advantage of the situation and seize large chunks of central and western Europe.

In December 1950, Prime Minister Clement R. Attlee came to Washington to discuss the situation with President Truman. That discussion apparently resulted in a decision to conduct joint US Air Force and Royal Air Force reconnaissance missions over the Soviet Union and its satellites. In addition, the two sides evidently agreed to begin photoreconnaissance operations over China.

The Asian portion of this multinational operation got under way Jan. 16, 1951, when RAF Flight Lt. Edward "Ted" C. Powles flew his Supermarine Spitfire Mk 19 photoreconnaissance aircraft on the first of 107 missions over China. Powles's Spitfire was equipped with two F.52 36-inch vertical cameras. He would fly the aircraft at the very edge of its flight envelope, attaining an altitude of about 50,000 feet, with his airspeed indicating 120 knots and the

outside air temperature stable at minus 70 degrees Celsius.

Powles's missions ranged about 600 miles up and down China's coast. At times he penetrated Chinese airspace by as much as 100 miles. He was never intercepted, but he stretched the range of his aircraft to its limits, sometimes having to dead-stick in to his home base.

Cover Story

Meanwhile, on the other side of the Eurasian land mass, overflights were about to begin in earnest. The US and Britain devised a ludicrously simple and completely transparent cover story for the first overflights from UK bases. USAF was to provide four RB-45Cs to the RAF, which was to paint them in RAF colors and use American–trained RAF crews to fly them. If one was forced down in the Soviet Union, the US would point to the British insignia and disclaim all knowledge, while the British would make it clear that they owned no RB-45s, so it could not be theirs. Fortunately, the ruse was not put to the test.

RAF Squadron Leader John Crampton led a secret RAF special duty flight that initially trained at Barksdale AFB, La., before returning to RAF Sculthorpe in fall 1951. A SAC detachment, commanded by Lt. Col. Marion C. Mixson, flew out of Sculthorpe. Crampton's flight was attached to it. Mixson, Crampton, and his navigator, Flt. Lt. Rex Sanders, received their first overflight approval from Winston Churchill, newly returned as Prime Minister.

After a March practice mission, the first clandestine RB-45C overflight took place on the night of April 17–18, 1952. The three Tornadoes, all beautifully done up in RAF markings, flew separate routes to their targets, which were principally the operating bases of the Soviet long-range air forces. One crossed the Baltic states, the second penetrated Byelorussia, while the third—with Crampton, Sanders, and copilot Sgt. Bill Lindsay on board—went to the Ukraine.

Despite heavy responses of the surprisingly large Soviet radar defense, none of the aircraft were intercepted, and vital information on Soviet bases was acquired.

Western officials were concerned about the threat posed by Tu-4 bombers. In the spring of 1952, intelligence agents reported that the big Tupolev bombers had been sent to Siberian forward bases from which over-the-pole attacks could be launched. The Air Force and Navy established a joint program in which a special Navy P2V-3W Neptune would work in concert with an RB-50 in overflights of the Kamchatka Peninsula, the Bering Strait, and Wrangel Island off the northern Siberian coast.

The twin-engine, unpressurized P2V-3W was an unlikely formation mate for the larger, pressurized four-engine B-50. The Neptune flew at about 15,000 feet and identified radar and radio signals that would indicate radar sites and airfields. The pressurized RB-50 flew much higher and well behind the Neptune. Crews on these flights maintained complete radio silence, so everything depended upon timing, as the RB-50 was to photograph the areas the Neptune identified.

RB-50s worked successfully with the Navy P2V-3W Neptune to help evaluate 1952 intelligence reports that Soviet Tupolev bombers had been sent to forward bases in Siberia, from which they could launch over-the-pole attacks.

"Pearl Harbor Complex"

The joint Neptune–RB-50 flights were so successful that a new program, designated Project 52 AFR-18 was put into motion.

Project 52 AFR-18 originally envisioned using two modified B-47Bs from the 306th Bomb Wing, MacDill AFB, Fla., to make deep penetrations over Siberia via widely different routes. Two top crews were selected for the mission and were briefed by LeMay personally. The primary crew was led by Col. Donald E. Hillman, deputy commander of the 306th, with Maj. Lester E. Gunter as copilot and Maj. Edward A. Timmins as navigator. The backup crew was led by Col. Patrick D. Fleming. His crew consisted of Maj. Lloyd F. Fields as copilot and William J. Reilly as navigator.

The approved route took the B-47s from Eielson AFB, Alaska, north to a refueling point near Point Barrow, then west past Wrangel Island to a point near Ambarchik. It then turned southeast, to parallel the length of the Chukotskiy peninsula to Provideniya, thence east to return to Eielson.

The two B-47s took off on Oct. 15, 1952, following the two KC-97 tankers assigned to them for support. After refueling, Fleming flew to an area over the Chukchi Sea, taking up a racetrack pattern.

The mission proceeded as briefed, with Hillman flying at 40,000 feet at 480 knots true airspeed, presenting a difficult target to intercept. The Soviet air force, however, was ready, and after two targets had been photographed, the Americans became aware that they were being tracked by MiGs. Hillman broke radio silence to alert Fleming of the possibility of an attack. Gunter turned his seat 180 degrees to prepare his rear turret for firing, but the MiGs were unable to get into position and the rest of the mission went off without incident.

The flight lasted nearly eight hours

and covered roughly 3,500 miles, 800 of them in Soviet territory. The photographs revealed that the Soviet air force was not massing their Tu-4s for an attack.

Project 52 AFR-18 was embraced by newly inaugurated President Eisenhower, who was so deeply convinced of the need for reconnaissance some said he had a "Pearl Harbor complex." In any event, he took great political risks to back long-range reconnaissance, including the development of specialized aircraft for the role. Eisenhower was quite good at photo interpretation and often would inspect intelligence photos himself, magnifying glass in hand.

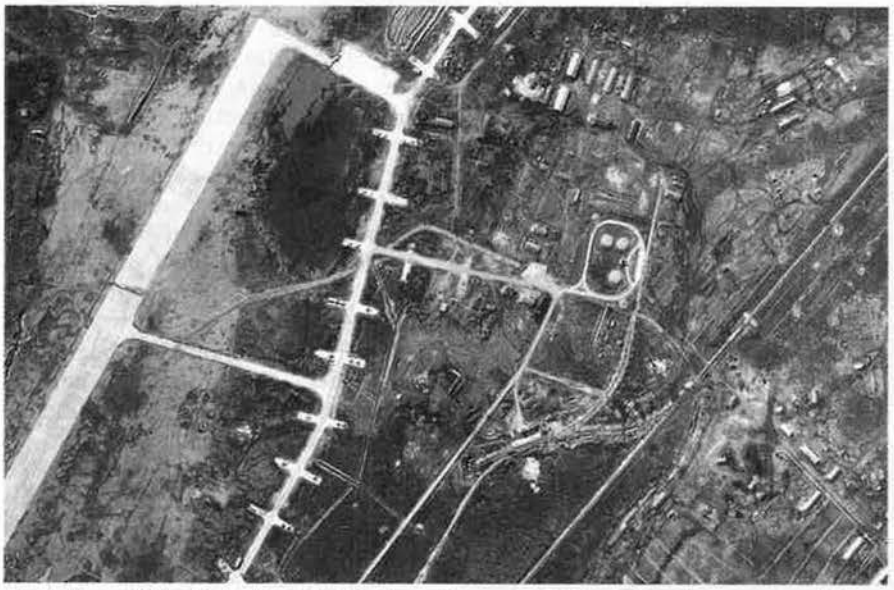
In 1954, Western leaders became concerned that the Soviet air force might station the new M-4 Bison jet bomber on the Kola Peninsula. A flight of three RB-47Es was dispatched to RAF Fairford. The three aircraft were to fly in radio silence to a point near the Kola Peninsula. There two were instructed to turn back; the third, unknown to the other two, was going to proceed into Soviet territory, flying from Murmansk south to Arkhangelsk then southwest to Onega. It would then fly due west to neutral territory over Scandinavia.

The degree of security involved in the overflight missions can be illustrated by the fact that the three RB-47Es took off on May 8, 1954, unaware that the RAF had flown the last RB-45C mission just one week earlier. The lead RB-47E was commanded by Capt. Harold Austin, with Capt. Carl Holt as copilot and Maj. Vance Heavilin as navigator.

Over Murmansk

At the designated point, two of the RB-47Es turned back. To the amazement of their crews, Austin kept on going, crossing the Kola Peninsula at Murmansk, at 40,000 feet and 440 knots true airspeed. Austin's aircraft was quickly picked up by a flight of three MiG-15s over Murmansk, but they did not attack. As they approached Arkhangelsk, six hostile MiGs began attacking. The MiGs flew in echelon, with the lead airplane firing then sliding off to be replaced by a wingman. Fortunately for Austin, their aim was poor, with cannon shells flashing above and below his aircraft.

As Austin covered the last of his targets and was about to pass over Finland, one of the MiGs' 23 mm cannon put multiple holes in the left wing and near the forward fuel tank, knocking out the intercom and damaging the UHF radio so that only the command post frequency was available. One MiG flew in very close and appeared to be threatening to ram the B-47, then banked away.



Capt. Harold Austin's RB-47E is chased by one of the MiGs that attacked his reconnaissance flight (top). Austin nevertheless covered his targets, including this MiG fighter base south of Murmansk (above). He made it back to RAF Fairford, UK, with holes in the left wing of his aircraft.

Copilot Holt had fired his tail guns, but they had jammed. Still, the threat kept the MiGs at bay until the RB-47 was in neutral airspace, and Austin returned to Fairford.

At the debriefing, LeMay asked Austin, "Why didn't they shoot you down?" Austin, striving for the right answer, said "They did not want to fly up our tail pipe because of the rear gun." To which LeMay replied "I'm firmly convinced that all fighter pilots are cowards."

On the other side of the world, the US Air Force's 15th Tactical Reconnaissance Squadron in Korea, part of the 67th Tactical Reconnaissance Wing, had operated RF-80s at first but had made a transition to the RF-86. Most of the RF-86s were custom-built aircraft, the 15th TRS making camera installations themselves. Capt . Laverne H. Griffin,

RB-47s carried out some of the most difficult overflights. In 1956, they flew out of Thule, Greenland, and covered some 3,500 miles of the Soviet Union's Arctic coastline.

the operations officer, personally selected all of the pilots for the RF-86 missions.

One of his squadron mates was Capt. Mele Vojvodich Jr., who flew 125 combat missions, including a flight over Vladivostok in an RF-86. At first, the RF-86Fs flew in pairs, with two F-86 fighters as escorts. Vojvodich pressed for solo missions and got his way. He conducted one of the longest RF-86 overflights of the war, a three-hour, 15-minute mission that took him from Kimpo AB near Seoul to Shenyang to Harbin and back. He crossed the Yalu at Antung, trailed by 24 MiGs, and dead-sticked into K-14 (Kimpo), overdue by one hour. His photos recorded details of 10 airfields, five of them previously unknown, and with Ilyushin Il-28s parked on some of them.

Most missions were relatively shallow penetrations, but the 15th TRS had specially equipped RF-86s. These had been stripped of their guns and fitted with two 200-gallon drop tanks in addition to the two 120-gallon tanks they had been carrying. Two cameras were mounted either side of the pilot's seat, enabling the pilot to take overlapping photos. Mounted vertically was a third, wide-area camera.

Telltale Contrails

Normally the flights were a quick loop, overflying targets near Vladivostok and Sakhalin in the Soviet Far East. Between April 1954 and February 1955, USAF pilots conducted nine missions, usually comprising four aircraft flying at altitudes from 45,000 to 48,000 feet. They knew they would be tracked by Soviet radar but of greatest concern were the aircraft contrails that pinpointed their location.

On Feb. 19, 1955, the 15th TRS commander, Maj. Robert E. Morrison, flew alone all the way to Khabarovsk, well within the Soviet Union, on the Amur River near the Manchurian border. Although one drop tank did not jettison when he released it, he pressed on, homing in on the Khabarovsk radio station. Just as he turned in over his target (an airfield), his last drop tank finally released, plunging down toward the city below. Morrison photographed the airfield, then, short on fuel, he flew a direct course to Chitose AB, Japan, on Hokkaido. His engine flamed out as he turned off the runway.

The largest and by far the most arduous of the overflight operations began at Thule, Greenland, and operated between March 21 and May 10, 1956. During this period, 16 RB-47Es of the 10th Strategic Reconnaissance Squadron, Lockbourne AFB, Ohio, flew with five RB-47Hs from the 343rd Reconnaissance Squadron, Forbes AFB, Kan. They were supported by 28 KC-97 tankers.

Thule is located 690 miles north of the Arctic Circle, where the cold can be indescribable, and in winter darkness prevails nearly 24 hours a day. Work on the flight line was conducted under survival conditions, and airmen worked miracles as 156 missions went off flawlessly.

The missions covered the entire Arctic coastline of the Soviet Union, a 3,500-mile rim that ran on an arc from the Kola Peninsula in the west to the Bering Strait in the far east. Operating off ice-covered runways and using grid navigation to fly in the polar areas, the missions were conducted in radio silence. Miraculously, there were no aborts, no accidents, and no losses to Soviet military action.

Normal missions called for two RB-47s, working in tandem, to fly through their sectors, with two KC-97 tankers for in-flight refueling. On one famous mission, on May 6–7, 1956, six RB-47Es conducted a "mass flight," entering the Soviet Union at Ambarchik and flying east to Anadyr.

The American overflights were of course a terrible affront to the Soviet Union, which protested bitterly. The US gave a standard reply, noting that "if" there had been "an" overflight, it was caused by navigational error and was deeply regretted. For political reasons, Eisenhower would turn the overflight role over to the Central Intelligence Agency, with USAF supporting the operations. The CIA used highly specialized high-altitude aircraft such as the U-2s, which would, in turn be complemented by satellites.

These early penetrations of the Soviet Union paved the way for future operations. There were many other overflight operations, including those by "Slick Chick" RF-100s, "lightweight" RB-57As, and highly classified Sea Lion missions by the RB-57Ds. All were characterized by the deepest secrecy and by the utmost bravery of the crews. ■

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George Marshall, facing imminent war, acted decisively to free airpower from the General Staff's obstruction and delaying tactics.

The First Air Staff

By Herman S. Wolk

SIXTY years ago this month, the United States Army created the Army Air Forces. With that critical June 1941 action came the establishment of the first American Air Staff. That staff reported directly to a new AAF Chief of Staff, Lt. Gen. Henry H. Arnold. All were momentous steps in development of airpower.

Creation of the Air Staff stemmed from apprehension about general

Principals in establishing the Air Staff, Maj. Gen. H.H. Arnold and Gen. George C. Marshall are shown here at Randolph Field, Tex.

USAF photo

President Roosevelt—here at an airfield in Sicily talking with Arnold—believed the US had to gear up for war. He sought a huge increase in military aircraft and pilots.

wars in Europe and Asia—events that sparked calls for an expansion of airpower and reorganization of the Army air element. Particularly disturbing to Arnold and President Roosevelt was the major role the German air force played in the defeat of France in 1940. FDR declared, "Military aviation is increasing at an unprecedented and alarming rate." Consequently, he and Congress sought a huge increase in American aircraft and pilots.

Even before the outbreak of war, Roosevelt was much concerned about America's lack of preparedness. In 1938, he sent his confidante, Harry Hopkins, on an inspection of US aircraft plants. Hopkins claimed Roosevelt "was sure we were going to get into war, and he believed that airpower would win it."

Shortly thereafter, an airplane crash claimed the life of Maj. Gen. Oscar Westover, Chief of the Army Air Corps. Hopkins, who had the ear of the President, suggested he appoint Arnold to the post, which Roosevelt did in September 1938.

Roosevelt believed that America's military had to immediately gear up for war. In mid-November 1938, he convened a meeting at the White House to consider responses to the events unfolding in Europe and Asia. Present were Arnold, Hopkins, Assistant Secretary of War Louis Johnson, and Brig. Gen. George C. Marshall, chief of the Army's War Plans Division. Roosevelt directed increased aircraft production and by August 1940 the Air Corps had completed an expansion plan, envisioning production each year of 12,000 new pilots and 54 combat-ready groups.

The Eye-Opener

Marshall, subsequently promoted to Army Chief of Staff, shared Roosevelt's concern and, moreover, agreed with Arnold that the Air Corps required a stronger ability to plan for expansion. The Air Corps had found an invaluable ally in the struggle for a more powerful air force. In 1938, Maj. Gen. Frank M. Andrews, then commanding General Headquarters Air Force, had taken Marshall on a nine-day tour of air bases, inspecting units and meeting senior Air Corps commanders as well as visiting the Boeing plant in Seattle. Marshall and Andrews struck a close relationship. Later, Marshall said this tour had opened his eyes to what air forces could do and what they required. He quickly determined that airmen best knew how to run the Air Corps and make it work.

On this cross-country trip, Andrews had taken the opportunity to make Marshall aware of conflicts between the few airmen and the many ground officers assigned to the General Staff. In later remarks, Marshall said he realized that "air had almost no representation on the General Staff," and most of the General Staff types "had little interest in the air, mostly antipathy, and it was quite marked." Indeed, Marshall added, "I found everyone on the Staff hostile to Air."

Marshall was greatly impressed with Andrews. In August 1939, he made the airman assistant chief of staff for operations and training, the first airman ever to serve in this position. Subsequently, when Marshall became Army Chief of Staff, he named Andrews to positions of theater command in the Caribbean and the Middle East and as commanding general of US forces in the European theater. Tragically, in May 1943, Andrews was killed in an airplane crash in Iceland, cutting short a brilliant career of one of the nation's most distinguished airmen.

The Luftwaffe's performance in Europe in 1940 increased Congressional pressure for the creation of a separate Air Force, but Arnold was convinced that this was not the right time to divide the air arm from the rest of the Army. Marshall and Arnold needed a rapid, efficient expansion of the Air Corps itself to prepare for the possibility of war. Arnold emphasized in 1940 that "right at this minute it looks to me as if it might be a serious mistake to change the existing setup when we are all using every facility available in order to take care of the present expansion of the Air Corps." Any serious organizational change now might actually impede the buildup.

Fortunately, Arnold and Marshall maintained confidence in each other, with Arnold agreeing not to press for independence. He would, instead, count on Marshall to provide an appropriate degree of autonomy during this period of national emergency. For his part, Marshall was determined to see that the air arm got

USAF photo

Maj. Gen. Frank Andrews had the foresight to take Marshall, then chief of the Army's War Plans Division, on a tour of air bases in 1938. Later, Marshall said the tour opened his eyes to the capabilities of air and its needs.

what it required in organizational flexibility, as well as equipment. This meant that he would have to present a rationale to the War Department Staff and make organizational changes that would have credibility with airmen.

The ABC Meetings

The airmen's drive to gain more freedom from the War Department had been boosted early in 1941 when representatives of Britain's armed services came to the US for strategy discussions, which became known as American–British Conversations (ABC-1). These ABC-1 meetings between a US staff committee and the British delegation were held in the period January–March 1941, and they ranged over topics as varied as strategy, joint operations, geographical responsibilities, and command arrangements.

Air Vice Marshal John C. Slessor represented the Royal Air Force, and Col. Joseph T. McNarney sat in for the Air Corps. The purpose of the conversations was to determine the best means with which the US and British might defeat Germany and her allies "should the United States be compelled to resort to war."

The Anglo–American representatives agreed that, in event of war in both Europe and the Pacific, the major effort would first be made in Europe. This would include a sustained air offensive against Nazi Germany. A strategic defensive would be mounted in the Far East. Arnold noted that, in early 1941, "We were planning for war, even though we were not in it." In response to the British request for American–produced aircraft, he emphasized to Marshall and Roosevelt that "we must first meet our own requirements" and then should give allies "only such items as they could use effectively."

These talks subsequently led to formal creation in August 1941 of the Combined Chiefs of Staff representing the British and US military forces—including Arnold, representing American airpower. Arnold, of course, was subordinate to Marshall, Army Chief of Staff. However, it was necessary for Arnold to be present when the Combined Chiefs formulated grand strategy. Thus, the air forces' movement toward autonomy was aided by the fact that the RAF had long ago gained independence and its opposite American number needed to be at the table.

"I often wondered," Arnold later noted, "how I came to be included at Argentia [in Newfoundland, site of the meeting that founded the CCS]. Prior to that time, Air items on a higher level had been handled by the Chief of Staff and by the General Staff. At all conferences, even though an Air representative sat in, the General Staff or the Chief of Staff did the talking."

Subsequently, Arnold learned that Hopkins had insisted on Arnold's attendance at the conference. Hopkins, for his part, continued to press for an airpower buildup. "I don't know why," he exclaimed "we are producing 600,000 automobiles for pleasure-seeking people, when we need airplanes and engines!"

Bureaucratic Behemoth

The Air Corps continued to have difficulty prompting meaningful action on air matters from the War Department General Staff. Marshall knew that officers on the General Staff failed properly to support the airmen. As a result, air actions tended to be postponed and bottlenecks appeared. The General Staff, Marshall said, had "lost track of its purpose," becoming, in his view, "a huge, bureaucratic, red tape–ridden operating agency." He added, "It had slowed down everything."

In summer 1940, Marshall asked Arnold to provide his views on reorganization. Marshall was concerned not only about air matters; he believed that the War Department had evolved into "the poorest command post in the Army." Arnold responded by proposing the appointment of three Army deputy chiefs of staff—for ground, air, and service forces. However, the War Department Staff opposed this step and remained committed to the idea that the mission of the air arm was to support the ground forces.

Still navigating between the War Department Staff and the airmen, Marshall in October 1940 named Arnold his acting deputy chief of staff for air—responsible for coordinating all air matters—and Maj. Gen. George H. Brett as acting chief of the Air Corps. However, the GHQ Air Force was removed from the jurisdiction of the Office of the Chief of Air Corps, assigned to General Headquarters, and placed under the direct control of the commander of Army field forces.

This setback was ameliorated in December 1940 when the Secretary of War, Henry L. Stimson, named Robert A. Lovett to be special assistant to the Secretary of War (redesignated in April 1941 "assistant secretary of war for air"). Lovett would make the case for airpower directly to Stimson. A banker well-informed on the subject of aircraft manufacturing, Lovett surveyed the industry with an eye to substantially increasing production. His main job was to improve delivery of aircraft over-

seas while maintaining a balance between the needs of foreign clients and those of the Army air arm.

Marshall wanted all air matters handled by Arnold, unencumbered by General Staff objections and delaying tactics. The Army Chief of Staff emphasized: "I want this procedure put in force without delay. The Air Corps has a tremendous procurement program tied in with new developments and now has a tremendous personnel problem. ... They will be turning out pilots initially at the rate of 7,000 a year. We have to operate on a simpler basis than our present system. I desire to proceed on a basis of evolution and general understanding between all."

In early 1941, Marshall and Lovett met with Stimson, impressing on him the need for more freedom and flexibility for Army airmen who were being asked to build up the air forces as rapidly as possible. Although Lovett favored an independent Air Force, he emphasized to Stimson a need for a reorganization that would provide tactical independence in a time of crisis.

USAF photo

In October 1940, Maj. Gen. George Brett became acting Chief of the Air Corps when Marshall named Arnold his acting deputy chief of staff for air. In June 1941, Arnold became Chief of the new Army Air Forces, which included the Army Air Corps and Air Force Combat Command.

Auxiliary No More

Stimson evidently found Lovett's case to be compelling. He stated, "Air warfare involves not merely a new auxiliary weapon for the ground troops. ... [I]t is becoming clear now that it involves independent action quite divorced from land and sea. The difficulty is finding just how far to go in freeing them, but it seems to be my job now to try to solve that. It is a very big one." Stimson truly believed that "the moment has now come" to develop a strong American Air Force.

The issue was how to give the Army Air Corps sufficient autonomy while keeping it part of the Army. Brig. Gen. Carl A. Spaatz, chief of Arnold's Plans Division, had been working on this problem even as Lovett's staff struggled with this issue. Spaatz and Lovett agreed that the solution lay in revising Army Regulation 95-5, which described the position of the Air Corps in the Army. Lovett and Spaatz briefed Arnold, who in turn, took the idea to Marshall. Stimson meanwhile, was bearing down on the problem, emphasizing that staff work required decentralization, "to permit Air Force autonomy in the degree needed." The Air Corps, he said, should be "as modern as the instrument it uses."

This confluence of thought proved decisive because Stimson was under heavy pressure from Congress to grant more freedom to the Air Corps. In May 1941, Marshall stepped in and informed Stimson that a revision of Army Regulation 95-5 was ready for implementation. "It thus gave me something with which to meet the threat of an independent Air Corps created by (Congressional) legislation," said Stimson.

A leading proponent of independence was Hugh J. Knerr, who served as Andrews's chief of staff at GHQ Air Force in the late 1930s. Knerr subsequently had been relieved and ostracized for beating the independence theme and in late 1938 had left the Air Corps. On the outside, he continued to agitate for independence.

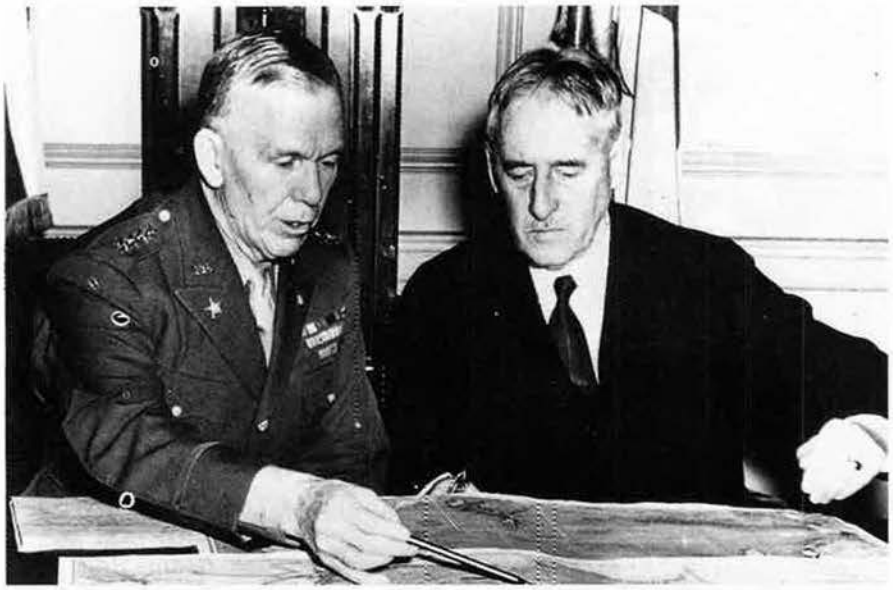
Another proponent was Andrews, who in early 1941 was commanding general, Panama Canal Air Force. He maintained that the Army's air arm could not be properly developed "under an organization which considers it an adjunct of surface forces, even with a man as broad-minded and farseeing as Marshall at the head of the Army." He added, "No matter how progressive Marshall may be himself, the rank and file of the Army has not changed materially."

Andrews, who did not always see eye-to-eye with Arnold, nonetheless considered him "a good politician" and was confident that Arnold could handle this issue.

Taking the Step

Having gotten a green light from Stimson, Marshall on June 20, 1941, put into effect revised Army Regulation 95-5—redefining the organization and functions of the Air Corps—and officially established the Army Air Forces. It gave Arnold the title of Chief, AAF (he continued to be deputy chief of staff for air), responsible to the Army Chief of Staff and the Secretary of War. Under 95-5, Arnold had the authority to coordinate the Office of the Chief of the Air Corps (Maj. Gen. George Brett) and Air Force Combat Command (Lt. Gen. Delos C. Emmons), redesignated from the GHQ Air Force and which previously had reported directly to Marshall. Combat Command

USAF photo



Secretary of War Henry Stimson (right) with Marshall. Stimson recognized that the Air Corps needed autonomy and believed "the moment has now come."

would develop air doctrine and plans for operational training. The Chief of the Air Corps would supervise research and development, supply, and maintenance.

Most important was the fact that the revised regulation provided Arnold with an Air Staff to formulate policy and plans. As one historian noted, the Air Staff—a title borrowed from the British—was created "to encourage more intelligent planning for the future." Arnold named Spaatz to be chief of the Air Staff and Lt. Col. Harold L. George as head of the new Air War Plans Division.

Additionally, the Air Staff included assistant chiefs of staff for personnel, intelligence, and materiel, maintenance, and distribution. The Air Staff also included an air inspector and air adjutant general.

It was a major step in the institutionalization of the nation's airpower, but it wasn't a cure-all. Formation of the Air Staff failed to break Arnold of one of one of his bad habits—his addiction to calling informally on trusted individuals to carry out various assignments. He subsequently created a group of close personal advisors to review current policies and to undertake specific tasks.

Thus, Arnold's advisory council became his own personal group of "idea men." In World War II, this council at various times included Colonels Jacob E. Smart, Fred M. Dean, Emmett O'Donnell Jr., Charles P. Cabell, and Lauris Norstad.

Smart recalled that Arnold had directed him to spend all of his time "thinking" rather than dealing with mundane staff matters. However, Arnold on one occasion had failed to convince Marshall of something or other, and he admonished Smart: "From now on, you spend 30 percent of your time thinking and 70 percent on how to sell an idea."

As it happened, the new Air Staff barely had caught its breath before being faced with a large challenge. The German war machine had major spectacular victories in Europe, Britain's plight grew desperate, and the Roosevelt Administration continued to prepare for war. The ABC-1 discussions and the subsequent Rainbow No. 5 war plan stipulated that for the United States the European theater would be decisive.

Following establishment of the AAF with its Air Staff, Arnold directed expansion of the Staff's Air War Plans Division. He named George to organize and enlarge the division "to develop overall plans for the Army Air Forces."

The Barbarossa Factor

The war took a new turn when Hitler, on June 22, 1941, launched Operation Barbarossa—a massive, full-scale invasion of the Soviet Union. In early July 1941, Roosevelt—having stressed the importance of air expansion—ordered the War Department to develop an estimate "of the overall production requirements required to defeat our potential enemies." The President wanted prompt action. The War Plans Division of the War Department prepared to respond.

However, at the insistence of Spaatz and George, Arnold recommended to the War Department that the Air War Plans Division of the Air Staff prepare the air requirements as directed by Roosevelt. Brig. Gen. Leonard T. Gerow, head of the War Department's War Plans Division agreed, and as a result, the now-famous AWPD-1 air war plan was born. Written by George, Lt. Col. Kenneth N. Walker, Maj. Laurence S. Kuter, and Maj. Haywood S. Hansell Jr., it described requirements for wartime victory in the air.

The creation of the Army Air Forces and its Air Staff did not, of course, solve all problems of air coordination. Marshall demonstrated an understanding of the need for improved efficiency and coordination between airmen and others on the War Department General Staff. His close relationship with Arnold prefigured the sound partnership between the two during the war. Marshall and Arnold, in their own ways, had carried on a campaign designed to gain more freedom and flexibility for Army airmen.

Nonetheless, the War Department's War Plans Division still blocked the AAF from a clear, sustained role in overall strategic planning. Even greater freedom with complete autonomy would have to wait until early 1942 when the AAF would become coequal with Army Ground Forces and Services of Supply.

By that time, Arnold's Air Staff had made its mark and would continue to do so throughout the war. It shaped Army Air Forces plans, strategy, and resources. Moreover, with great foresight, the expanded Air Staff (at Arnold's direction) created detailed plans to organize an independent Air Force once the war was over. ■

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Books

Compiled by Chequita Wood, Editorial Associate

Air Power: Promise and Reality. Mark K. Wells, ed. Imprint Publications, Inc., 230 East Ohio St., Ste. 300, Chicago, IL 60611 (312-337-9268). 339 pages. $39.95.

Fighter Units & Pilots of the 8th Air Force September 1942–May 1945, Vol. 2: Aerial Victories, Ace Data. Kent D. Miller. Schiffer Publishing, Ltd., 4880 Lower Valley Rd., Atglen, PA 19310 (610-593-1777). 347 pages. $59.95.

The Man Who Flew the Memphis Belle: Memoir of a WWII Bomber Pilot. Col. Robert Morgan, USAFR (Ret.), with Ron Powers. Dutton, 375 Hudson St., New York, NY 10014 (800-778-6262). 388 pages. $25.95.

Body of Secrets: Anatomy of the Ultra-Secret National Security Agency, From the Cold War Through the Dawn of a New Century. James Bamford. Doubleday, 1540 Broadway, New York, NY 10036 (800-726-0600). 721 pages. $29.95.

Green Berets in the Vanguard: Inside Special Forces, 1953–1963. Chalmers Archer Jr. Naval Institute Press, 2062 Generals Hwy., Annapolis, MD 21401-6780 (800-233-8764). 139 pages. $28.95.

QDR 2001: Strategy-Driven Choices for America's Security. Michèle A. Flournoy, ed. GPO, Supt. of Documents, PO Box 371954, Pittsburgh, PA 15250-7954 (202-512-1800). 388 pages. $30.00.

British Aviation Squadron Markings of World War I. Les Rogers. Schiffer Publishing, Ltd., 4880 Lower Valley Rd., Atglen, PA 19310 (610-593-1777). 296 pages. $69.95.

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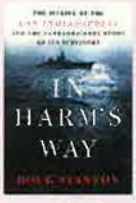
Chino: Warbird Treasures Past and Present. Order from: Fox-2 Productions, PO Box 20121, Riverside, CA 92516 (909-274-0547). 180 pages. $39.95.



In Harm's Way: The Sinking of the USS Indianapolis and the Extraordinary Story of Its Survivors. Doug Stanton. Henry Holt and Co., 115 West 18th St., New York, NY 10011 (888-330-8477). 333 pages. $25.00.

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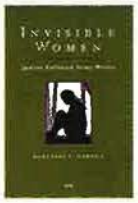

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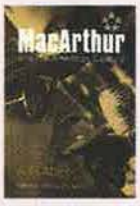
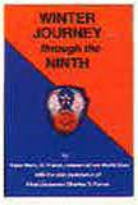


MacArthur and the American Century. William M. Leary, ed. University of Nebraska Press, 233 North 8th St., Lincoln, NE 68588-0255 (402-472-3581). 522 pages. $40.00.



Winter Journey Through the Ninth. Harry A. Franck, with Charles P. Porter. Order from: Prince of the Road Press, c/o Bookmasters Distribution, 30 Amberwood Pkwy., Ashland, OH 44805 (800-247-6553) 305 pages. $21.95.

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AFA / AEF National Report

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By Frances McKenney, Assistant Managing Editor

Georgia Chapter Gains 124 New Members

The **Carl Vinson Memorial (Ga.) Chapter** gained 124 new members in what Chapter President Arthur D. Bosshart called its most successful membership drive.

Jack H. Steed, an AFA national director, had begun laying the groundwork for this membership drive last year. He introduced AFA state leaders to key wing personnel at Robins AFB, Ga., and asked the latter, "What can we do for your wing?"

"That gets their attention," Steed explained. The wing asked the chapter to include an award for bomber technicians in its awards program. Another outcome of the meeting: The appointment of a liaison, ANG Lt. Col. Daniel J. Zachman.

An aircraft generation squadron commander with the 116th Bomb Wing (ANG), Zachman signed up 42 new members during the chapter's four-week recruitment period.

"I believe in the association," Zachman said. "It's a good value." He walked from office to office, talking to people individually and using an AFA brochure as an outline for his pitch. He also went to a first sergeants' and a wing staff meeting to promote membership. It wasn't hard to round up new members, he said. Most were familiar with AFA but didn't realize the benefits of membership until he listed them.

Zachman's efforts brought at least one AFA member back into active membership. Lt. Col. William "Jay" Freeman III told Zachman he was a life member but hadn't received *Air Force* Magazine in 15 years. They eventually determined that AFA had lost contact with Freeman when the then–lieutenant PCSed in 1985 and forgot to notify the association of his new address.

House of Success

So many members wanted to help with the **Hawaii Chapter's** latest community relations project that Chapter President Jack L. DeTour had to limit the number of volunteers.

The chapter members turned out in March to install k tchen cabinets, prepare walls for painting, and power wash the outer walls of a therapeutic living facility called Hale Holopono (Hawaiian for "house of success"). The house is operated by Chilc and Family Services, a private human services organization.

Among the volunteers wie ding tools and hoses with DeTour on this Saturday project were Michael E. Solomon, state pres dent, and Norm Baker.

Later that month, chapter officers took AFA National Pres dent John J. Politi to Hale Holopono, to show off just one example of the chapter's several community service projects.

Marking the end of the Carl Vinson Memorial Chapter's membership drive are (l–r) Maj. Gen. Dennis Haines, Warner Robins Air Logistics Center commander; ANG Lt. Col. Daniel Zachman, who signed up the largest number of new members; Lt. Col. Jeffrey Whittall, chapter membership drive chairman; and Arthur Bosshart, chapter president.

Visiting PACAF

Polit was in Hawaii on the first stop of an outreach and orientation visit to Pacific Air Forces bases. At the invitation of Gen. Patrick K. Gamble, who was then PACAF commander, Politi also visited several USAF bases in Japan and South Korea.

By his count, Polit made a dozen presentations abou: AFA to 1,400 airmen, from Hickam AFB, Hawaii, to Kunsan AB, South Korea, and reached many more through nine media interviews.

At every stop on his two-week journey, he met with enlisted personnel and junior officers and learned of their concerns.

In Japan, airmen told of the back-breaking workload for those staying behind when portions of a unit deploy. They also spoke of problems brought on by the loss of midlevel supervisors—a testament to one of USAF's current retention challenges. Airmen in Korea were forced to cope with dilapidated infrastructure and barely adequate housing. At Kunsan they related problems caused by not receiving adequate hardship pay or a cost of living allowance.

Politi said airmen in Japan and Korea look to AFA as their voice on Capitol Hill.

At Misawa

From the **Miss Veedol Chapter** at Misawa AB, Japan, TSgt. Jeffrey R. Benton, chapter publicity represen-

tative, wrote that Politi kicked off his visit by having breakfast with some of "Misawa's finest": the 35th Fighter Wing's CCMSgt. Anthony Finklea and about 30 enlisted personnel.

Politi received a wing mission briefing and toured a fighter squadron before having lunch at the Tohoku Enlisted Club with Brig. Gen. Loyd S. "Chip" Utterback, wing commander, Col. David E. Geyer, chapter president, and other chapter members. Politi presented Alesha Frederick with an AFA Citation.

Seeking ANG Nominees

The Aerospace Education Foundation and the National Guard Educational Foundation will sponsor the George W. Bush Outstanding Traditional Guard member recognition for traditional Air National Guard members who have participated in Aerospace Expeditionary Force deployments.

The recognition includes $500 each to three ANG officers and three enlisted persons and $500 to the members' employers, who must be in the nongovernment sector.

Each state/territory may nominate three officers and three enlisted members, using AF Form 1206 (July 2000) in a specific format.

Nominations are due by June 29.

For more information, contact: SMSgt. John Vallario, ANG/DPFOC, 1411 Jefferson Davis Hwy., Arlington, VA 22202-3231, DSN 327-5779.

Mission to Mars

With sponsorship by the **Leigh Wade (Va.) Chapter** and the Virginia Space Grant Consortium, a group of students at Colonial Heights Middle School in Petersburg, Va., simulated the launching and navigation of the Mars Global Surveyor from Earth to the Red Planet.

The students belong to the school's Aeronautics and Space Club, whose sponsors are chapter members Melinda D. Kelley and Sheila Padlo. Kelley received the AEF Christa McAuliffe Memorial Award last fall; Padlo is the chapter's nominee for the AEF State Teacher of the Year award.

Using computers in the school's library, the students logged on to a simulation program modeled after the November 1996 Mars Global Surveyor mission launch.

The students were assigned various positions, read from a script, and followed the script to carry out actions on their computers.

Newspaper reporters from Richmond and Petersburg covered this mission simulation, gaining publicity for the chapter.

On a PACAF orientation and outreach tour, AFA National President John Politi visited six USAF bases and other military sites. Here, he speaks with Capt. Jeffrey Willis (right), new member of the Kadena (Japan) Chapter, who escorted Politi through part of the squadron operations group building.

Homemade Hovercraft

Students in a Powder Springs, Ga., school used an AEF Educator Grant to build a homemade hovercraft.

Christy L. Garvin, a teacher for fourth- and fifth-grade gifted students at Vaughan Elementary School, wrote a thank you letter to AEF in March, describing how she used the $250 grant for the hovercraft project's supplies. Her 65 students first researched the topic, then each built small models that used a hair dryer to generate an air cushion. "Using the scientific method, the students tested each variable in their small models to determine which characteristics yielded the best results," wrote Garvin.

The students went on to build a working hovercraft from plexiglass, plastic sheets, and lumber, with a leaf blower to create the air cushion. They used this homemade vehicle on a simulated space mission and showed it off to other classrooms and even persuaded their principal to ride it.

Way Up North

The **Fairbanks Midnight Sun (Alaska) Chapter** joined the city's Chamber of Commerce and the local Association of the US Army chapter in sponsoring the 33rd annual Military Appreciation Banquet in March.

Lt. Gen. Ronald T. Kadish, director of the Ballistic Missile Defense Organization, described the national missile defense program for the all-services group.

Honored guests included Alaska Sen. Ted Stevens (R), chairman of the Senate Appropriations Committee, and Lt. Gen. Norton A. Schwartz, commander of Alaskan Command, Alaskan North American Aerospace Defense Command Region, and 11th Air Force at Elmendorf Air Force Base.

Another highlight for the approximately 400 banquet attendees was presentation of awards, including Chapter President Barton S. Lebon's recognition of eight active duty USAF and reserve personnel.

Scowcroft Awards

Gen. Ralph E. Eberhart, commander in chief, North American Aerospace Defense Command and US Space Command, and commander, Air Force Space Command, served as keynote speaker for the Northern Utah Chapter's annual Scowcroft Awards Banquet for outstanding performers in the area's missile, space, and command, communications, and computers communities.

According to the Hill AFB, Utah, newspaper, Eberhart told the audience, "We have to protect our interests and capabilities in space. And, yes, others are paying close attention, and we must be able to deny them use of space."

Maj. Gen. Scott C. Bergren, commander of Ogden Air Logics Center, thanked the honorees—12 individuals, two directorates, and the ICBM System Program Office—telling them they represented "the best part of our Air Force."

Scowcroft awards are named after retired Lt. Gen. Brent Scowcroft, an Ogden, Utah, native who was the national security affairs assistant to

Presidents Ford and George H.W. Bush.

AFA leaders in Utah—including AFA National Secretary Daniel C. Hendrickson, National Director Stephen P. "Pat" Condon, State Chairman of the Board Craig E. Allen, and Chapter President Grant Hicinbothem—were among the awards presenters.

Tops In Blue Suits

At the **Alamo (Tex.) Chapter's** annual Joe Kellogg Blue Suit Awards Banquet, more than 60 awards were presented to recognize contributions by chapter members, active duty USAF, Air National Guard, and Air Force Reserve Command personnel, and civilians in the San Antonio area.

Among the recipients were Capt. Seth J. McKee III, a security forces instructor at Lackland AFB, Tex., who was honored as Officer of the Year; CMSgt. Carlos Massiatte, command chief master sergeant for the 433rd Airlift Wing, named Airman of the Year; and B.J. Bjorge, an Air Force retiree, who was named Civilian of the Year.

Chapter Secretary Kaye H. Biggar reported that a record 480 guests attended the event at the Lackland Gateway Club. Chapter President Karen S. Rankin served as master of ceremony, while Chapter Vice President Daniel J. O'Neal presented awards.

New Alliance

The **Wright Memorial (Ohio) Chapter** cohosted a reception to highlight a new partnership between the chapter, the National Defense Industrial Association, Aeronautical Systems Center, and Air Force Research Laboratory.

Lt. Gen. Robert F. Raggio, ASC commander, and Maj. Gen. (sel.) Paul D. Nielsen, AFRL commander, both from Wright-Patterson AFB, Ohio, spoke to the 140 reception guests about the National Aerospace Systems and Technology Conference that their organizations sponsored in May in Dayton, Ohio.

Chapter President Daniel E. Kelleher said Raggio also gave a briefing on the Air Force's modernization planning process and the role the conference plays in providing a forum for discussing the technology needed to support future warfighters.

USAF photo by A1C Jera Stubblefield

SrA. Eric Sawyer (second from right), canine handler from the 11th Security Forces Squadron, Bolling AFB, D.C., was among the outstanding enlisted USAF members honored at an annual breakfast sponsored by the Donald W. Steele Sr. Memorial (Va.) Chapter. On hand to congratulate Sawyer were (l–r) his commander, Lt. Col. James Vaught; Lt. Gen. Stephen Plummer, principal deputy assistant secretary of the Air Force for acquisition; and James Hannam, chapter president.

AFA Conventions

June 1–3	North Carolina State Convention, Wilmington, N.C.
June 8–10	Nevada State Convention, Las Vegas
June 9	Alabama State Convention, Montgomery, Ala.
June 9	Louisiana State Convention, Barksdale AFB, La.
June 15–17	New York State Convention, Hempstead, N.Y.
June 16–17	Washington State Convention, McChord AFB, Wash.
June 22–23	Iowa State Convention, Des Moines, Iowa
June 22–23	Ohio State Convention, Wright–Patterson AFB, Ohio
July 19–21	Virginia State Convention, Charlottesville, Va.
July 20–22	Texas State Convention, Fort Worth, Tex.
July 27–29	Florida State Convention, Tampa, Fla.
Aug. 10–11	Michigan State Convention, Oscoda, Mich.
Aug. 10–11	Oklahoma State Convention, Enid, Okla.
Aug. 10–12	Georgia State Convention, Robins AFB, Ga.
Aug. 10–12	Indiana State Convention, Indianapolis
Aug. 10–12	Minnesota State Convention, Sioux Falls, S.D.
Aug. 24–25	Missouri State Convention, Lake of the Ozarks, Mo.
Sept. 15–19	AFA National Convention, Washington
Sept. 21–22	Colorado State Convention, Colorado Springs, Colo.
Sept. 21–23	Delaware State Convention, Dover, Del.
Sept. 28–30	New Hampshire State Convention, Portsmouth, N.H.
Oct. 12–14	Pennsylvania State Convention, Altoona, Pa.

Rebecca Spaatz Nagel

Rebecca Spaatz Nagel died March 31 in Washington, D.C., after a stroke. She was 77 years old. Ms. Nagel was one of three daughters of Gen. Carl A. "Tooey" Spaatz, the US Air Force's first Chief of Staff.

A generous supporter of the Aerospace Education Foundation, Ms. Nagel was also active in AFA events and frequently traveled to New York, to meetings of the AFA chapter there named for her father. She had, just weeks before she died, been on hand to present the chapter's Tooey Trophy to Rep. Benjamin A. Gilman (R–N.Y.) at a chapter gathering at West Point.

Ms. Nagel was born in San Antonio and attended the Peabody Conservatory in Baltimore and the Royal Academy of Music in London. She became a concert pianist and taught piano at National Cathedral School in Washington, where she had lived since 1958.

The chapter will join its new partners in hosting the conference, next year.

Also in March, the chapter sponsored the 12th annual all–Air Force drill meet hosted by the AFJROTC unit at Tecumseh High School in New Carlisle, Ohio. Brig. Gen. Paul Cooper, 445th Airlift Wing (AFRC) commander, was on hand to present trophies to winning teams from among the 20 schools in nine states that participated in the event.

Industry Partners

Lt. Gen. Leslie F. Kenne was the keynote speaker for the fourth annual Industry Partners' Luncheon hosted by the **Gen. E.W. Rawlings (Minn.) Chapter** in April.

Kenne has been the commander of Electronic Systems Center at Hanscom AFB, Mass., since June 1999.

In her remarks to the luncheon guests at the Ft. Snelling Officers Club, she described ESC's lead role in the integration of USAF command-and-control, intelligence, surveillance, and reconnaissance systems. She also spoke about ESC's product lines, covering functional information, ammunition management, information assurance, global air traffic management, and the airborne warning and control systems and the joint surveillance target attack radar system aircraft.

And the Winner Is

A second-generation **John W. DeMilly Jr. (Fla.) Chapter** member, 2nd Lt. Jason A. Breslin, won the grand prize in the chapter's fund-raising raffle in April.

Breslin, who is stationed at Los Angeles AFB, Calif., as a budget and acquisitions officer, won a ride on one of the historic World War II–era bombers operated by the Collings Foundation of Stow, Mass. The aircraft tour the US, and when they arrive in California, Breslin will have an opportunity to fly in either a B-17 Flying Fortress or a B-24 Liberator.

Though living in the Golden State, Breslin is a DeMilly Chapter member and the son of AFRC CMSgt. John H. Breslin, a former chapter president and former member of AFA's Reserve Council.

More AFA/AEF News

■ The **Panhandle (Tex.),** which recently absorbed the Lubbock (Tex.) Chapter, has instituted a telephone tree method of keeping in touch with members. Chapter President Barry Smith calls the program Chapter and Flights. It involves appointing about 18 members, who are called flight leaders. They, in turn, are responsible for communicating with 10 chapter members by e-mail or telephone. Such an outreach is necessary, Smith said, because of the vast area the chapter covers. He said this communication chain, "patterned on the old SAC recall method," has had the added benefit of putting the chapter in touch with several members who had not been active in years. Smith added that this communication technique beats his old method of driving for miles and miles, visiting individual members.

■ The **Brig. Gen. Harrison R. Thyng (N.H.) Chapter's** March meeting featured guest speaker Brig. Gen. (sel.) Edward L. Mahan Jr., director, Integrated Command and Control Systems Program Office, Hanscom AFB, Mass. Chapter President Eric P. Taylor reported that Mahan presented an overview of the Aerospace Expeditionary Force and how the acquisition process is adjusting to the concept. Also at the meeting, chapter member James R. Thyng, son of the chapter's namesake, received a proclamation signed by the state's governor, declaring his father a Korean War hero. The elder Thyng had five aerial victory credits each in World War II and the Korean War.

■ **The Fort Wayne (Ind.) Chapter** held an awards banquet in December to honor the 122nd Fighter Wing (ANG), Fort Wayne IAP, Ind., with the chapter's military achievement award; Allen P. Feeback and Marjorie A. Feeback as state Members of the Year; and Erik Haberkorn, state Teacher of the Year. The chapter also noted its national-level and regional-level awards from last year. Lt. Col. Jeffrey A. Soldner, 122nd Operations Group commander, presented a briefing on the wing's mission and deployment to Prince Sultan AB, Saudi Arabia, in 2000 as part of Operation Southern Watch. Soldner's slides showed living and working conditions, and he emphasized the training and coordination exercises they conducted during the deployment, reported Theodore Huff Jr., the chapter's communications vice president.

■ The **Colorado Springs/Lance Sijan (Colo.) Chapter** representatives and Howard R. Vasina, an AFA national director, presented AFA's Gen. Edwin W. Rawlings Award for Environmental Excellence (Management) for 1999 to Lt. Col. Brian J. Cullis of the US Air Force Academy. Rhonda Scurek, the chapter's vice president for publicity, noted that Cullis is one of DOD's foremost experts in technology supporting natural resource management. ■

Unit Reunions

reunions@afa.org

6th Combat Cargo Sq. Oct. 18–21 at the Ramada Plaza Hotel & Inn in Kissimmee, FL. **Contact:** Tilson King, 1305 Timber Trace, Auburn, IN 46706 (king@aol.com).

9th BG. Sept. 12–16 in Wichita, KS. **Contact:** Pat Carnevale, PO Box 1230, Sonoita, AZ 85637 (800-659-8808) (carne@dakotacom.net).

9th Troop Carrier Sq. June 14–17 at Wright–Patterson AFB, Hope Hotel and Conference Center in Fairborn, OH. **Contacts:** Logan and Steven Williams, 14900 Deer Park Rd., Bainbridge, OH 45612-9505 (937-365-1988) (kic@dalco.net).

19th BG Assn. Oct. 31–Nov. 4 at the Crowne Plaza Powers Ferry NW in Atlanta. **Contact:** Gerald Michael, 5946 Linton Ln., Indianapolis, IN 46220 (317-253-9265) (gmichael@indy.net).

37th FS (WWII). Sept. 26–28 at the Landmark Hotel in Columbus, MS. **Contact:** L.E. Knapp, 9819 Gemini Dr., San Antonio, TX 78217 (lesknapp@juno.com).

44th BG, BW, SMW. Oct. 15–18 at the Isle of Capri Casino & Hotel in Bossier City and Barksdale AFB, LA. **Contact:** Mike Yuspeh, 7214 Sardonyx St., New Orleans, LA 70124-3509 (phone: 504-283-3424 or fax: 504-283-3425) (mikeyuspeh @worldnet.att.net).

48th FS, FIW, FTS. Oct. 10–13 in Orlando, FL. **Contact:** Joe Onesty, 455 Galleon Way, Seal Beach, CA 90740-5937 (562-431-2901) (jonesty2 @juno.com).

55th FG/442nd ASG, formerly 97th Service Gp, Det. A. Aug. 24–25 at the Hope Hotel and Conference Center, Wright–Patterson AFB, Ohio. **Contacts:** Neil Webster (563-252-3786) (nwebster @alpinecom.net) or Dick Baribault (941-383-4518) (rbaribault@aol.com).

64th Troop Carrier Gp. September, in Branson, MO. **Contact:** Vern Montgomery, 6744 Carlsen Ave., Indianapolis, IN 46214-3238 (317-241-5264).

98th BG/BW Vets Assn. Oct. 9–13 at the Palo Verde Holiday Inn in Tuscon, AZ. **Contact:** Bob Schrawger, 101 Crepe Myrtle Ln., Georgetown, TX 78628-4724 (512-864-0303).

168th BS/126th BW (1950–53). Sept. 4–6 in Chicago. **Contacts:** Gene Westerman (847-742-8711) (westy895@juno.com) or Robert Schricker (onerailroad@cs.com).

309th Sq, 31st Gp (WWII). Sept. 13–15 in Colorado Springs, CO. **Contact:** Ralph Apple (719-267-3721).

317th TCG, Hq, 40th and 41st TCS, Fifth AAF (WWII). Sept. 26–30 in Washington, DC. **Contact:** Vince Krobath, 22 Lantana Dr., St. Louis, MO 63123 (314-842-2484).

317th Veterans Gp, including 317th Tactical Airlift Wg, 317th Troop Carrier Wg, and 317th Airlift Gp. Sept. 27–30 in Seattle. **Contact:** Jim Timmons, 758 221st St., Pasadena, MD 21122 (410-255-2735) (jimt0708@aol.com) (www.usaf317thvet.org).

341st SMW EMT (1974–79). Aug. 18–20 in Great Falls, MT. **Contact:** Tom Pritchard (541-745-6340) (tfpritchjr@home.com).

361st FG, Eighth AF (WWII). Oct. 14–17 at the Doubletree Hotel in Tucson, AZ. **Contact:** David Landin, 8419 Michael Rd., Richmond, VA 23229 (804-288-5889).

380th BG. Oct. 3–7 in Dayton, OH. **Contact:** Pat Carnevale, PO Box 1230, Sonoita, AZ 85637 (800-659-8808) (carne@dakotacom.net).

387th BG, including 556th, 557th, 558th, and 559th BSs. Oct. 3–7 at the Handlery Hotel and Resort in San Diego. **Contact:** Lloyd Swenson, 36666 Tallowood Dr., Palm Desert, CA 92211 (phone: 760-360-8057 or fax: 760-360-7638) (lswen123@earthlink.net).

436th FS, 479th FG, Eighth AF (WWII). Oct. 3–7 at the Four Points by Sheraton Hotel in Niagara Falls, NY. **Contact:** Al Massey, 485 Fries Rd., Tonawanda, NY 14150 (716-832-5760).

449th BG Assn (WWII). Aug. 30–Sept. 2 at the Doubletree Hotel Crystal City in Arlington, VA. **Contact:** Lee F. Kenney (321-242-8654).

450th BG (H). Sept. 12–16 at the Regal Maxwell House in Nashville, TN. **Contact:** Doid K. Raab, 5695 Ireland Rd. NE, Lancaster, OH 43130 (740-536-7635).

453rd BG, Eighth AF, Old Buckenham, UK (WWII). Sept. 14–17 at the Crowne Plaza Hotel in Dayton, OH. **Contact:** Lloyd W. Prang, 2451 Willow St., Greenwood, IN 46143 (phone or fax: 317-885-0224) (lloyd2ad@yahoo.com).

454th BG, Italy (WWII). Sept. 4–9 in Colorado Springs, CO. **Contact:** Ralph Branstetter, PO Box 678, Wheat Ridge, CO 80034-0678 (303-422-6740).

454th BS, 323rd BG, Ninth AF (WWII). Oct. 17–21 at the Westchase Hilton and Towers in Houston. **Contact:** Joe Havrilla, 1208 Margaret St., Munhall, PA 15120-2048 (412-461-6373).

455th BS, 323rd BG, Ninth AF (WWII). Sept. 29–Oct. 2 at the Ramada Hotel in Natches, MS. **Contact:** Robert Mims, 615 State St., Natches, MS 39120 (mimsr.101@bkbank.com).

474th FG Assn (WWII). Sept. 5–9 in Branson, MO. **Contact:** Lloyd Wenzel, 204 Turtle Creek Dr., Tequesta, FL 33469 (561-747-2380) (lloydw@att.net).

483rd BG (H) Assn (WWII). Oct. 2–6 in Denver. **Contact:** Robert Bailey, 5844 W. Roland Pl., Littleton, CO 80128-3973 (303-979-4983) (rbbblueskies@aol.com).

484th BG Assn, Fifteenth AAF, Italy (WWII). Oct. 3–8 in Atlanta. **Contact:** Bud Pressel, 436 Hunting Park Ln., York, PA 17402 (717-757-1218).

485th BG, Fifteenth AF (WWII). Sept. 6–9 at the Hilton Hotel (Downtown) in Harrisburg, PA. **Contact:** Lynn Cotterman, 6425 Dorado Beach NE, Albuquerque, NM 87111 (505-823-2283) (lyncott@juno.com).

489th BG, Eighth AF (WWII). Sept. 12–16 at the Clarion Hotel in Minneapolis. **Contacts:** Francis and Virginia Bodine, 11122 Bloomington Ferry Rd., Bloomington, MN 55438 (fax: 952-943-8654) (virginiabodine@worldnet.att.com).

601st Tactical Control Wg, Germany (1945–95) and all subordinate units. Sept. 19–23 in Colorado Springs, CO. **Contact:** John B. Haggard, 6843 E. Nelson Dr., Tucson, AZ 85730 (520-790-4747) (haphagg1@juno.com).

6927th RSM, Onna Point, Okinawa. Oct. 7–11 in Lancaster, PA. **Contact:** Ray Thibodaux, 6108 Milne Blvd., New Orleans, LA 70124-2014 (504-488-8214) (raytib@aol.com).

AAF Pilot Primaries at Tulare and Visalia, CA (WWII). Sept. 28–30 in Tulare and Visalia, CA. **Contact:** Bruce Baird, 9322 Melba Dr., Garden Grove, CA 92841-1249 (714-539-9747).

BAD 2 Assn, Warton, UK (WWII). Sept. 13–16 in Salt Lake City. **Contact:** Dick McClune, 527 Quarterfield Rd., Newport News, VA 23602-6140 (bad2trsr@earthlink.net).

Columbus AFB, MS. July 14 in Columbus, MS. **Contact:** 1st Lt. Keith Anderson (662-434-7066) (keith.anderson@columbus.af.mil).

Matador/MACE Missileers. Oct. 4–7 in Orlando, FL. **Contact:** Joe Perkins, 2019 Cornell Rd., Middleburg, FL 32068 (904-282-9064) (perkster@fcol.com).

Moroccan Reunion Assn, all personnel stationed at Nouasser, Sidi Slimane, Benguerir, and Rabat ABs. Sept. 20–23 in Clearwater, FL. **Contact:** Bob Bradshaw, PO Box 13362, Omaha, NE (robertb247@aol.com).

Nha Trang AB, Vietnam, including Special Forces Camp, Camp McDermott, and Nha Trang City. Sept. 21–24 in Asheville, NC. **Contact:** C.R. Timms 620 Lowery Ln., Seneca, SC 29678 (864-888-4133).

OV-10 Bronco Assn. Oct. 19–21 at the Clarion Hotel in Fort Worth, TX. **Contacts:** Jim Bloomberg (817-589-2309) (1BOOMER1@netscape.net) or Ron Fix (817-488-5581) (sndlr07@aol.com).

Pilot Training Class 42-X. Oct. 10–12 at Barksdale AFB, LA. **Contact:** E.Y. Brown, 1216 Manor Pl., Shreveport, LA 71118 (318-686-3245).

Pilot Class 45-A, Craig Field, AL, and Columbus, MS. March 13–16, 2002, in Tucson, AZ. **Contacts:** Bill Meyer, 3332 Otter Run N.W., Bremerton, WA 98312 (360-830-2548) or Del Light, PO Box 190, Liberty Lake, WA 99019 (509-255-5129) or (208-443-2748).

Pilot Class 49-B. Sept. 1–4 in San Diego. **Contact:** Jack Stolly, 11323 Cotillion Dr., Dallas, TX 75228 (972-681-8290) (flyingjack@juno.com).

Pilot Class 52-F. Mid-September 2002 in central Florida. **Contact:** Gene Rocque, 220 Lee Ave., Satellite Beach, FL 32937 (rerocque@palmnet.net).

Pleiku AB Assn, including PCS or TDY personnel. Sept. 12–16 at the Radisson Green Tree Hotel in Pittsburgh. **Contact:** (tr.pleiku@verizon.net) (www.pleikuab.com).

SHAEF/ETOUSA Veterans Assn (WWII). Oct. 12–15 at the Galt House Hotel in Louisville, KY. **Contacts:** Don Thriffiley, 7340 Dundee St., New Orleans, LA 70126 (phone or fax: 504-241-3065) (donshaef@netzero.net) or Alan F. Reeves, 2301 Broadway, San Francisco, CA 94115 (phone or fax: 415-921-8322) (afreeves@webtv.net).

University of Miami AFROTC alumni. Nov. 2–3 in Miami. **Contact:** Bill Jennewine, 614 Sandy Creek Dr., Brandon, FL 33511 (bgtd96@aol.com). ■

Mail unit reunion notices well in advance of the event to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

AFA State Contacts

Following each state name are the names of the communities in which AFA chapters are located. Information regarding these chapters or any of AFA's activities within the state may be obtained from the appropriate contact.

ALABAMA (Birmingham, Huntsville, Mobile, Montgomery): **Austin S. Landry,** 154 Lucerne Blvd., Birmingham, AL 35209-6658 (phone 205-879-2237).

ALASKA (Anchorage, Fairbanks): **Steven R. Lundgren,** 4581 Drake St., Fairbanks, AK 99709 (phone 907-452-1751).

ARIZONA (Green Valley, Phoenix, Prescott, Sedona, Sierra Vista, Sun City, Tucson): **Arthur W. Gigax,** 3325 S. Elm St., Tempe, AZ 85282-5765 (phone 480-838-2278).

ARKANSAS (Fayetteville, Hot Springs, Little Rock): **Jerry Reichenbach,** 501 Brewer St., Jacksonville, AR 72076-4172 (phone 501-988-1115).

CALIFORNIA (Apple Valley, Bakersfield, Edwards AFB, Fairfield, Fresno, Los Angeles, Merced, Monterey, Orange County, Palm Springs, Pasadena, Riverside, Sacramento, San Diego, San Francisco, Sunnyvale, Vandenberg AFB, Yuba City): **James H. Estep,** 6251 N. Del Rey Ave., Clovis, CA 93611-9303 (phone 559-299-6904).

COLORADO (Colorado Springs, Denver, Fort Collins, Grand Junction, Pueblo): **Terry Miller,** 65 Ellsworth St., Colorado Springs, CO 80906-7955 (phone 719-574-9594).

CONNECTICUT (Brookfield, East Hartford, Storrs, Stratford, Torrington, Waterbury, Westport, Windsor Locks): **Joseph R. Falcone,** 14 High Ridge Rd., Ellington, CT 06029 (phone 860-875-1068).

DELAWARE (Dover, New Castle County): **Ronald H. Love,** 8 Ringed Neck Ln., Camden Wyoming, DE 19934-9510 (phone 302-739-4696).

DISTRICT OF COLUMBIA (Washington): **Rosemary Pacenta,** 1501 Lee Hwy., Arlington, VA 22209-1198 (phone 703-247-5820).

FLORIDA (Avon Park, Broward County, Daytona Beach, Fort Walton Beach, Gainesville, Homestead, Hurlburt Field, Jacksonville, Leesburg, Miami, New Port Richey, Orlando, Palm Harbor, Panama City, Patrick AFB, Tallahassee, Tampa, Vero Beach, West Palm Beach): **David R. Cummock,** 2890 Borman Ct., Daytona Beach, FL 32124 (phone 904-760-7142).

GEORGIA (Atlanta, Savannah, Valdosta, Warner Robins): **Robert E. Largent,** 906 Evergreen St., Perry, GA 31069 (phone 912-987-2435).

HAWAII (Honolulu, Maui): **Michael E. Solomon,** 98-1217 Lupea St., Aiea, HI 96701-3432 (phone 808-292-2089).

IDAHO (Mountain Home, Twin Falls): **Dale W. Smith,** R.R. 1, Box 123, King Hill, ID 83633 (phone 208-366-2710).

ILLINOIS (Belleville, Chicago, Galesburg, Moline, Springfield–Decatur): **Keith N. Sawyer,** 813 West Lakeshore Dr., O'Fallon, IL 62269-1216 (phone 618-632-2859).

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Pieces of History

Photography by Paul Kennedy

Plan it, Build it, Maintain it

Firefighting gear, a laptop, and tool belt symbolize the varied functions of Air Force civil engineers. The career field has roots dating to the Army Signal Corps. In World War II, aviation engineers carried out such extraordinary construction feats as building a 7,000-foot runway using pierced steel planks while under aerial attack. During the Korean War, engineers built or repaired 55 airfields, many for newer aircraft having stringent runway design requirements. Emergencies such as the 1962 Cuban Missile Crisis led to creation of civil engineering teams called Prime BEEF, first deployed in May 1965. For the more long-term, heavy construction jobs of the Vietnam War, RED HORSE units were organized. More recently, Air Force engineers have built tent cities in Saudi Arabia and bare base facilities in the Balkans.


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