

NOVEMBER 1986/\$2

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION


MAGAZINE

*Odds and
Evens in
Ground
Attack*



Checkmate in Europe?

AFA's Stand on the Issues

An aerial photograph of a dark-colored F-20 Tigershark fighter jet on a runway. The runway is a dark, straight line cutting through a vast, arid, brown landscape. The jet is positioned in the lower-left quadrant of the frame, facing towards the upper-right. Its shadow is cast onto the runway surface. The surrounding terrain is uneven and textured, with some small rocks and sparse vegetation visible.

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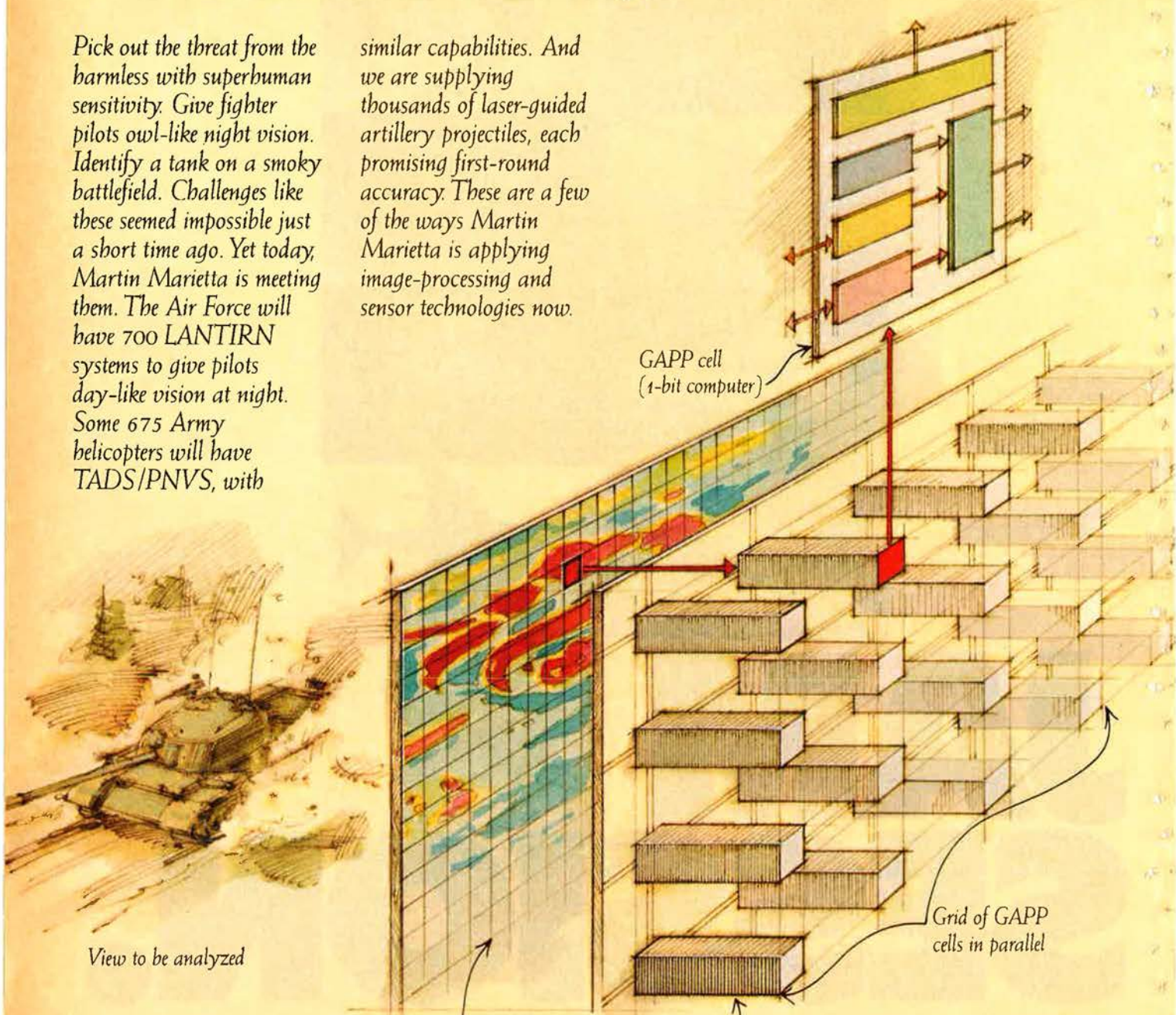
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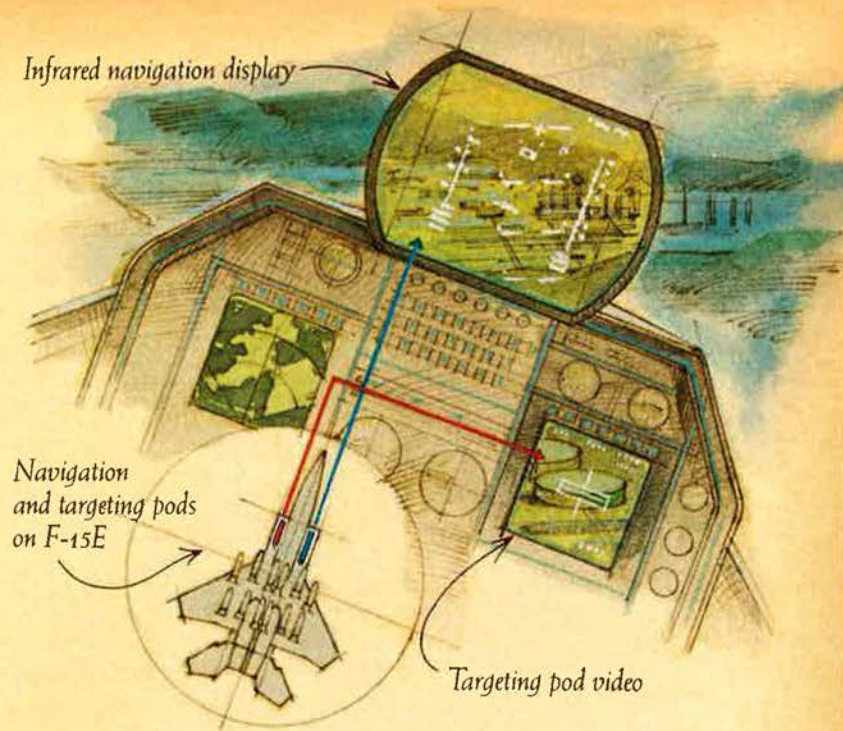
GAPP cell (1-bit computer)

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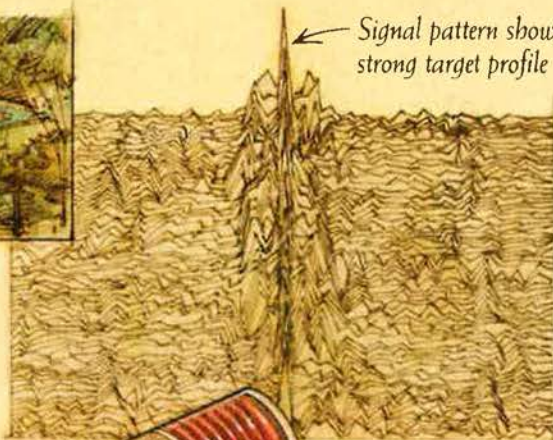
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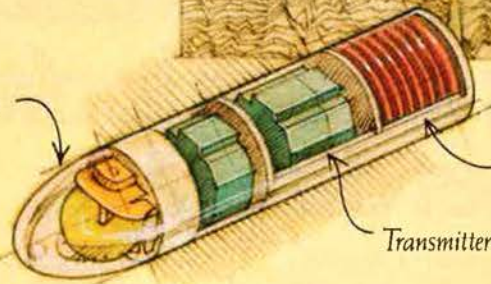
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**INTERSTATE
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About the cover: A diving F-111 with GBU-15s mounted and afterburners on symbolizes the power of USAF ground-attack aircraft. Defense Editor Jeffrey P. Rhodes explores how the Air Force is "Improving the Odds in Ground Attack" beginning on p. 48. (Photo by H. L. Mills)

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AN EDITORIAL

Government's First Responsibility

*The 1986-87 Statement of Policy,
adopted by delegates to AFA's National
Convention on September 15, 1986.*

THE nation's fundamental priorities stand in danger of being muddled and distorted. The reasons are too much politics and not enough candor; arithmetics that don't add up; and widespread unwillingness to face hard facts and make tough choices. To hold out the hope that government can be all things to all people—that is, provide for a strong defense, reduce the budget deficit while reducing taxes, and increase social spending—is to trade history and logic for the expediencies of public relations.

A balanced budget is desirable for economic reasons, but is no viable substitute for a balance of military power that deters nuclear holocaust. The preservation and expansion of social entitlements at the expense of national security, over the short term, may be politically attractive, but over the long term means that government is abdicating its central social function—to keep its citizens alive and free.

The Air Force Association believes that the nation stands at a historic crossroad: We face hard choices in all directions. But America's requirement of meeting undiminished external threats with undiminished military capabilities is not a matter of choice; it is an imperative that must not be sacrificed for political advantages or compromises.

Mutual, equitable, and fully verifiable arms reductions may well enhance global stability. But paper treaties do not void the requirement for military capabilities that are the bedrock of credible, effective deterrence. Reduced stridency in Moscow's rhetoric almost certainly is—as it has been in the past—a matter of calculated atmospherics and does not signal the abrogation of the USSR's long-term global goals. There simply is no tangible evidence that the new Soviet leaders are prepared for changes that could lead to the collapse of Communist ideology and the failure of international socialism.

We and our allies must remember also that the Soviet historic record remained true to the militant philosophies of communism regardless of the USSR's frequent economic crises and staggering economic burdens imposed on the Soviet people. And that same record points up the folly of judging Soviet leaders by their words rather than by their deeds.

Given the facts clearly and precisely, the American people in times of crisis in the past have been willing to pay the price of essential preparedness. There is no reason to doubt their willingness to respond to candor in the same way now. We, therefore, feel duty bound to put on the public record essential facts.

For one, emasculating already sparse defense budgets

through the imposition of "spread-the-pain" spending cuts is likely to cost the nation dearly in the future. The risk of conflict will go up as our ability to deter aggression goes down. The nation will be forced to send its armed forces into harm's way more—with less.

Further, the Soviet Union continues its comprehensive military buildup and political expansionism without sign of letup. The USSR's Five-Year Plan enacted by the new Kremlin leadership continues the steady expansion and modernization of Soviet strategic and conventional forces launched more than two decades ago. The cumulative effect of this buildup is so great that the US has only begun to catch up. Backing up the arms buildup are growing Soviet force projection capabilities, proliferating numbers of political as well as military bridgeheads in pro-Soviet countries around the world, and shifting geographic circumstances that bring Soviet and surrogate forces ever closer to strategic areas and chokepoints vital to this nation and its allies.

There is no more urgent task in preserving peace and freedom than the deterrence of nuclear confrontation or war. Our country launched a five-pronged strategic modernization program five years ago designed to restore the military effectiveness and survivability of its nuclear deterrent forces. America can look with pride on the initial successes of this program. The essential feature and greatest strength of the Strategic Modernization Program is its integrated, reinforcing nature. Funding cutbacks and program delays now threaten to squander the progress we have made and the effort—and money—we have invested thus far. We must not falter now. The nation should understand clearly that an effective nuclear deterrent extends well beyond the prevention of nuclear war.

Our strategic programs provide benefits that far outweigh the less than fifteen percent of the defense budget they consume. In calculating what Moscow calls "the correlation of forces," Soviet political and military leaders treat the perceived nuclear balance with this country as the overriding factor. A strong US strategic deterrent decreases the threat of any Soviet aggression—nuclear or conventional—against us, our allies, or our interests abroad. Conversely, real or perceived weakness in America's nuclear deterrent capabilities would invite the Soviet Union to exploit such an advantage by political and military means.

The question of how much nuclear strategic deterrence is enough can't be answered on the basis of Washington's perception of sufficiency. America will have enough nuclear deterrence only when the Soviet leaders—given their own values and attitudes—have no



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doubt as to our capabilities or our will to strike back effectively and deny them success in their military aggression, regardless of the attack scenario they might choose.

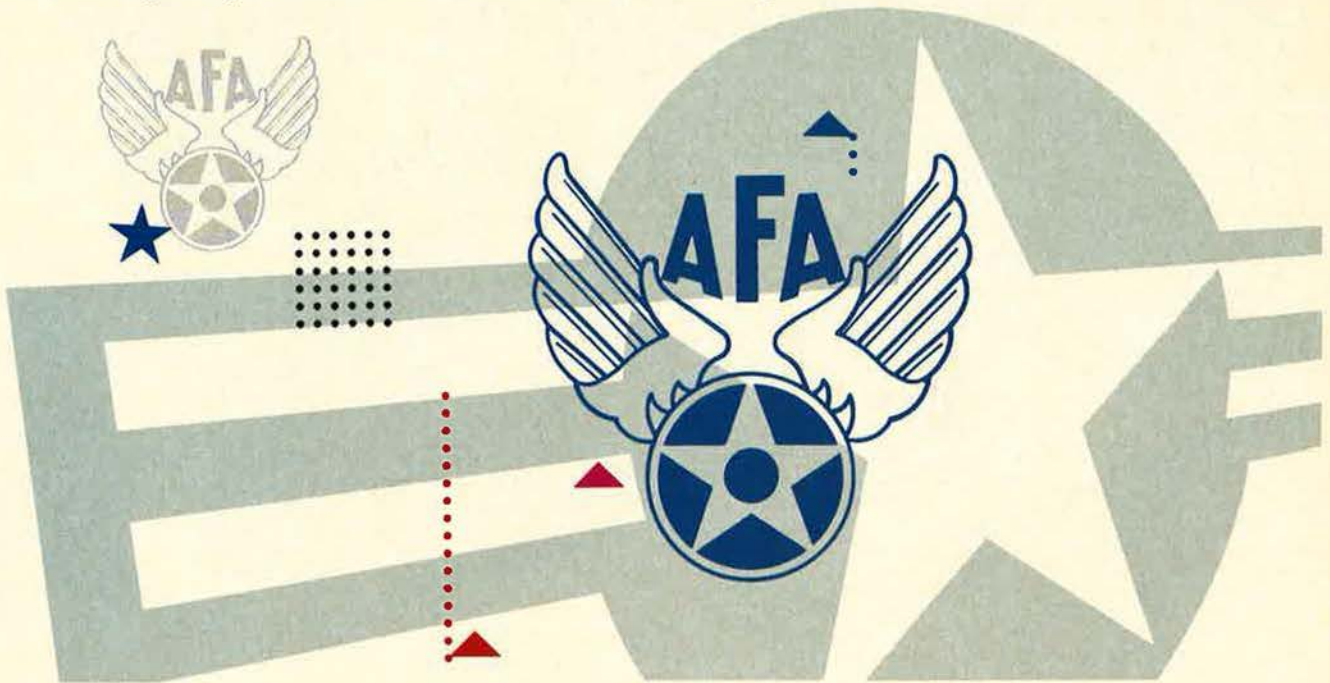
This Association believes the first order of business in the strategic arena is to correct lacking US capability to retaliate promptly against hardened Soviet nuclear forces. The essential, rational foundation for an affordable strategic force to deal with the destabilizing Soviet lead in prompt, hard-target capability is to deploy the full complement of 100 Peacekeeper ICBMs. Any other approach would cost more and provide less. Soviet reliance on their massive ICBM capabilities is clear and incontestable. If we fail to restore the strategic equilibrium, nuclear deterrence—the core of our defense policy that has ensured four decades of peace with our primary adversary—is in jeopardy. We must not let this happen.

Nor must we let budgetary and political compromises undermine the readiness, sustainability, modernization imperatives, and force levels in the conventional warfare arena.

It is not enough to contain Soviet expansionism at the highest end of the conflict spectrum. Regional deterrence must augment global deterrence. America's con-

nuclear forces, our technological edge needs honing in terms of conventional warfare capabilities. Slowing down or halting the modernization of our tactical air warfare and airlift capabilities at a time when essential military revitalization programs have not yet reached the production stage would mean losing the momentum at the starting line. And it would provide exploitable military advantages to our adversaries. This Association believes that the nation can no more afford to slacken in ensuring US tactical air warfare superiority or improving air mobility than to acquiesce to Soviet strategic superiority. In short, it is both unrealistic and dangerous to expect the Air Force—and the other services—to go on doing more with less.

Lastly, our overarching concern remains people. While weapons and hardware are critical to deterrence or the conduct of war, the final determinant of success or failure, of victory or defeat, are those who fight. The fabric of confidence in the profession of arms that became frayed in the 1970s has been strengthened over the past few years. The men and women of the armed forces have regained confidence in their country's commitment to them. And the nation strengthened its confidence in the military's commitment to provide for its freedom and its peace.



ventional deterrence capabilities are essential to the preservation of vital US and allied interests abroad. These forces are the backbone of alliances that are elemental to our own security, the maintenance of international order, and the protection of the Free World.

Central to US conventional deterrence is aerospace power. Its responsiveness and "long reach" make it the crucial and most suitable means for projecting force effectively and flexibly, including support of troops in battle. Aerospace forces provide the highest return on investment in readiness, sustainability, modernization, and force structure.

In a unique manner, aerospace power capitalizes on one of the nation's greatest strengths—the development and application of new technology. As in the case of our

Here, above all else, we must not let budgetary expediency cause an erosion of hard-won gains. We must not revert to treating our armed forces as "a sometime thing," neglected materially and in other ways most of the time, yet relied on in crisis or war to ensure national survival. We have made progress in improving the quality of life for the men and women in uniform. But more needs to be done.

As we strive for a more perfect Union in this, the bicentennial year of America's Constitution, we must remember that in order to secure the blessings of liberty for ourselves and our posterity we must provide for the common defense. If we default on this pivotal priority, eventually we may forfeit the very blessings granted us by the Constitution, the essence of America. ■

"SPEAK SOFTLY & C



When you are first to fight, you must carry your own weapons with you. That is why the US Marines fought so hard to get the AV-8B Harrier II.

The day the Marines acquired the Harrier II, they acquired vastly more clout.

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goes with the Marines: ready in some nearby forest clearing, aboard an assault ship or by a small country road, always available to provide the additional rapid punch that can mean the difference between success and failure.

In the STOVL (Short Take Off and Vertical Landing) mode, it can carry over 9000 lbs of lethal ordnance. Fitted with an advanced bombing system, it can deliver everything from sophisticated 'smart' missiles to 'dumb' bombs with pinpoint accuracy.

CARRY A BIG STICK™

THEODORE ROOSEVELT



↳ This Marine machine, the Harrier II, is manufactured by McDonnell Douglas and British Aerospace, but its unique capabilities are made possible by a unique engine: the Rolls-Royce Pegasus F402.

↳ The Pegasus has an exceptional thrust to weight ratio with up to 22000 lb thrust available through 4 nozzles which direct the thrust from vertically downwards to straight aft - or even to some degree forward.

It is this vectored thrust capability that makes the

airplane's unique basing flexibility and consequent unique rapid response possible. It also provides for unique inflight agility which, when combined with Sidewinder air-to-air missiles and the modern high velocity 25 mm gun, makes the Harrier II a dangerous airplane to attack.

Just the sort of 'Big Stick' Teddy Roosevelt had in mind way back in 1901.



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AIRMAIL

A Question of Reform

I have just read and enjoyed Gen. T. R. Milton's "Reformers and Their Solutions" in the September 1986 issue of AIR FORCE Magazine.

I thought you might be interested to learn that the quotation attributed to me by Dave Packard isn't quite accurate.

During my "one-on-one" session with the Packard Commission, I raised a "warning flag" that there were a number of people around Washington who thought that jointness should mean total integration, e.g., the Canadian model. In this context, I read to the members this passage from the 1950 edition of *The Armed Forces Officer*:

"And on the question of fundamental loyalty, the officer who loves every other service just as much as his own will have just as much active virtue as the man who loves other women as much as his own wife."

I was tempted to correct the record after Dave Packard's "misquotation," but decided why bother!

I just thought that you would like to know how it really was and what "the General really said."

Gen. P. X. Kelley, USMC
Washington, D. C.

Once again your thoughtful article on defense reorganization has hit the mark (see "Reformers and Their Solutions," p. 152, September '86 issue). It is a very strange situation here in Washington, where nearly all of the best defense people are opposed to the current bill as it is shaping up, yet it proceeds without prospect of revision. Keep up the good work.

You may be interested to know that I just returned from RAF Lakenheath, UK, where I awarded the 48th Tactical Fighter Wing the first ever Navy Meritorious Unit Commendation for their great performance in the Libyan raid.

The Hon. John Lehman
Secretary of the Navy
Washington, D. C.

MAC's Moment of Truth

Your September 1986 issue arrived today with the article "MAC's Moment

of Truth." The timing is perfect! The CBI Hump Pilots Association will be holding its forty-first national convention in Little Rock, Ark., from September 24-28. I am the convention chairman for 1986. Certainly, most of our members will enjoy this article immensely.

As a Hump pilot who stayed after World War II, I can personally testify to many of the author's observations regarding Operation Big Slam. It was a bear, from the aircrews' standpoint. My unit came all the way from Hawaii to participate.

One of my most vivid recollections is of a night flight from Brookley AFB toward Ramey AFB in Puerto Rico. We were involved in heavy weather and even heavier air traffic. Finally, it got so bad that New Orleans Center, which was controlling air traffic, advised all Big Slam aircraft to reverse course on their signal—and at the same altitude. Talk about a madhouse!

The command structure of MAC and its equipment have changed many times since Big Slam, but the *esprit de corps* of aircrews is a constant. It was my privilege to spend nearly all of a thirty-three-year military career in the airlift business. From the "Gooney Bird" to the C-5 represents quite a distance, but it is plain from "MAC's Moment of Truth" that we haven't seen anything yet.

Col. William H. Ramsey,
USAF (Ret.)
Poplar Bluff, Mo.

The caption on page 115 in the article "MAC's Moment of Truth" in the

Do you have a comment about a current issue? Write to "Airmail," AIR FORCE Magazine, 1501 Lee Highway, Arlington, Va. 22209-1198. Letters should be concise, timely, and legible (preferably typed). We reserve the right to condense letters as necessary. Unsigned letters are not acceptable, and photographs cannot be used or returned.

September 1986 issue speaks of the old slogan about MAC never fighting a war.

While it makes a statement about MAC's biggest mission, it completely ignores the fact that, in Grenada, MAC forces were the only ones to fire a shot from a USAF aircraft. Hurlburt Field's 1st Special Operations Wing has been a small but significant part of MAC since March 1983.

How quickly some forget! No wonder special operations forces funding is inadequate!

Lt. Col. Dick Koeteuw,
USAF (Ret.)
Tallahassee, Fla.

• Our caption writer points out that the slogan was coined prior to the Grenada rescue mission. For a report on the Grenada operation, see "Blue Christmas Coming Up" on page 78 of the January 1984 issue.—THE EDITORS

Don't you just love it when the self-appointed editors write you to tell you of your journalistic errors? I know I get a kick out of your responses to their jibes.

Guess what? Here comes another! This one is good-natured and just poking fun.

Take a look at the photo on page 127 in the article "MAC's Moment of Truth" in the September 1986 issue. It pictures a C-141. In the caption that accompanies the photo, you state that the C-141 is unloading. Unless they are starting to teach the troops to march backward, that plane is loading, not unloading!

I think you folks are doing a great job with the magazine. I enjoy reading it every month. I am proud that we have such a fine magazine in our country.

Sorry about the zinger, but I just had to rib you about that one!

Cliff Ashbridge
Falls Church, Va.

• Our caption writer just walked backward out of the office and is presently unavailable for comment.—THE EDITORS

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AIRMAIL

Airlift and the C-17

On the whole, I agree with Lt. Col. Michael Gallagher that the C-17 will bridge the gap between the strategic and tactical airlifters in the current fleet (see "Airmail," p. 17, September '86 issue). I do not agree that the C-17's performance and survivability features give it an edge in a hostile environment. After all, it hasn't come off the drawing board!

The true determination of the C-17's performance and survivability will depend on the training and experience of the crew members. Developing tactics and maneuvers consistent with the design limitations of the aircraft is the key to survivability. It is one thing to have a "test pilot" fly a prototype of the C-17 through all kinds of demonstrations. The real "test" for the C-17 will come when the aircraft is flying the line mission with a 1,900-hour aircraft commander and a 500-hour copilot.

The C-17 is going to have a big reputation to live up to after all the promises we are hearing from "Mother MAC." I, being an airlifter, pray that it can do the job and do it safely.

Gen. Duane Cassidy claims in his article "MAC's Moment of Truth" in the September 1986 issue that "on a 500,000-square-foot ramp with a single entry point, eight C-17s (because of their ability to back and their ground maneuverability) can be parked for loading or offloading in the same space required for three C-5s." I ask, "Sir, who are going to be the wing walkers if you take away our engineer and scanner?" I, for one, appreciate those extra sets of eyes in the cockpit. There has been many a time that a scanner or engineer has saved me from dinging a wingtip, not counting the times that he or she has pointed out conflicting traffic.

I think MAC should seriously reconsider the question of eliminating that extra person. It is a small price to pay to have a flying crew chief or an engineer when you consider all of the advantages. I have lost count of the times that my engineer has saved a delay at a remote station. Is MAC planning to increase the ground time for the pilots to refuel and preflight the aircraft?

Capt. Nicholas P. Berdeguez,
USAF
Travis AFB, Calif.

After reading about the C-17 controversy over the last few months in "Airmail," I can only think back to articles that appeared in the middle and late 1960s in AIR FORCE Magazine extolling the virtues of the new C-5 in tactical airlift situations.

If memory serves me right, the C-5 was publicized as being capable of taking a combat cargo into and out of a 4,000-foot unimproved airstrip. Also, I recall the much-publicized taxi tests on sod, dirt, and sand. To quote from the May 1970 issue of AIR FORCE Magazine: "The C-5 is the only plane capable of transporting the heaviest pieces of Army combat gear. . . . Moreover, with its 28-wheel landing gear, the C-5 can land on semi-improved landing strips, delivering its cargo directly to forward areas, with enough fuel in reserve to fly out again to a rear support base."

It sounded like the C-17 for a minute.

Mike Smith
San Antonio, Tex.

Jungle Jim SOFs?

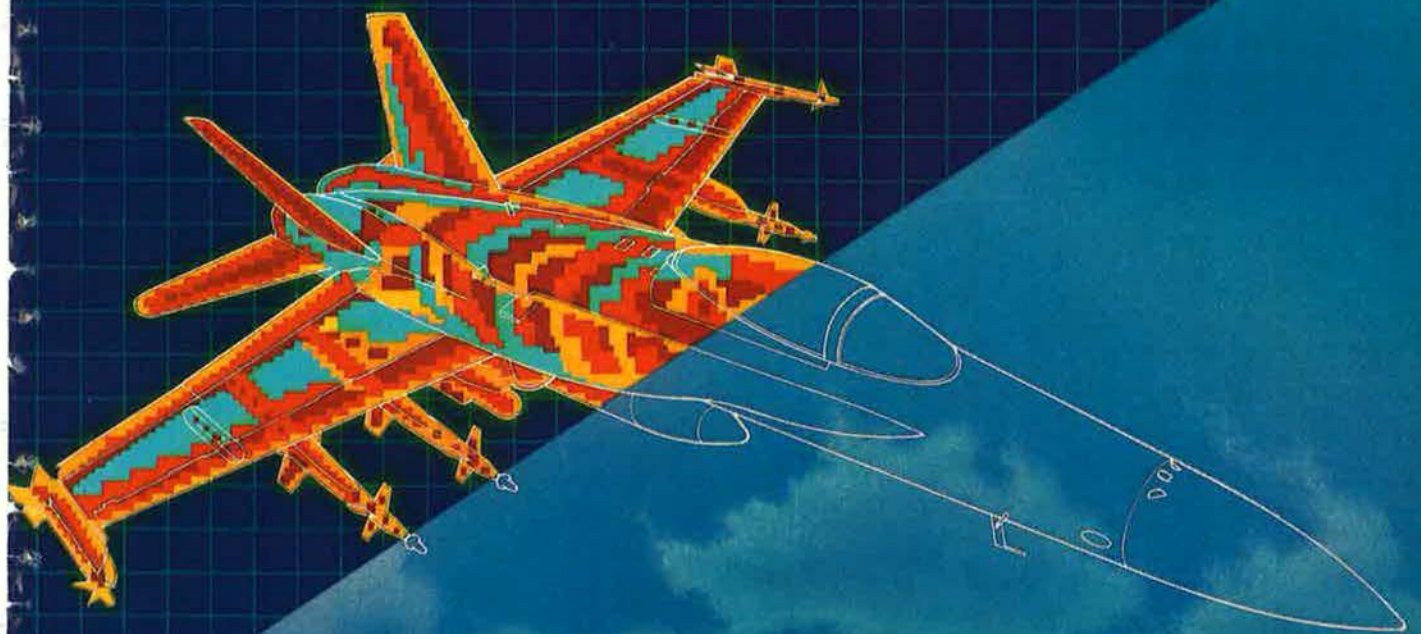
One of the rites of passage for a young planner at USAFSOF/XP in the 1960s was to produce a paper on the merits on an independent special operations force. The concept outlined in "Dealing With Ambiguous Warfare" on page 26 of the September 1986 issue could have been lifted directly from any of about twenty papers on the subject. Then, as now, it was impolitic to discuss the three problem areas that have historically doomed such ventures and that will do so again. Nevertheless, consider the following.

First, unconventional warfare is a local matter. In the main, we're not willing to accept that. Trying to impose our brand of liberalism and morality on a culture that has no experience with the concepts is gratuitous and leads to bizarre results. Remember Vietnamization and Phoenix?

Second, commanders aren't willing to allow units not under their control to operate in their areas. The situation degenerates to one where neither group will let the other know its plans. Meetings become comic minuets in which the cast changes with each agenda item. The only useful result is that everyone has someone on whom to hang the blame when an operation goes sour.

Third, special operations are non-quantifiable and thus hard to evaluate. I was told by an extremely senior person that "our job is not to win or lose in this area, but rather to keep the water muddy." This concept was, and is, unacceptable to the military estab-

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ishment. With our fixation on demonstrable and quick results, who is willing to equate his performance with "muddy water"?

Whereas it's encouraging to see that there is high-level interest in the field of special operations, the truth of the matter is that this iteration of "Jungle Jim" will be yet another flirtation with gadgets and cute tricks. . . .

Lt. Col. Hardy F. LeBel,
USAF (Ret.)
Providence, R. I.

General Twining

I just read the September 1986 issue of AIR FORCE Magazine, and it was great as always.

I believe the identification of then-Lt. Nathan F. Twining in the caption for the picture on page 60 is incorrect (see "Arnold," p. 59, September '86 issue). Isn't Lieutenant Twining third from the right in the front row?

I never met General Twining, but I often saw him in the Southwest Pacific during World War II when I was an operations clerk with the 5th Bomb Group and Hq. Thirteenth Air Force.

CMSgt. Arthur DeBaun,
USAF (Ret.)
Randolph AFB, Tex.

● *Sergeant DeBaun is correct. The proper identification of all the officers in the photo on page 60 of the September 1986 issue is as follows:*

Front row, from left: John D. Corkville, Harold M. McClelland, Ray A. Dunn, Westside T. Larson, Ralph A. Snively, Nathan F. Twining, John S. Mills, and Hez McClellan.

Back row, from left: Lawrence J. Carr, Charles B. Howard, Malcolm C. Grow, Hugh J. Knerr, Henry H. Arnold, Ralph Royce, John S. Griffith, and Lenard F. Harman.—THE EDITORS

Wrong Cat

Having served a tour on exchange duty with the US Navy in the late 1950s, I found the article "Carriers Jubilee" in the September 1986 issue interesting, to say the least.

On page 108, there is a picture of an aircraft that the caption proclaims to be a Grumman F9F Panther. I believe, if you will make a closer inspection, that you will find that the aircraft is a Grumman F9F-6 Cougar. The early model F9Fs had straight wings and were called Panthers. Later models had sweptwings and were called Cougars.

I had the privilege of serving in the last operational squadron of Cougars. We had the F9F-8, which had an in-flight refueling capability. Our unit's commander, incidentally, was Capt. Jim Davidson, who is men-

AIRMAIL

tioned in the article as the pilot of the first jet to land on an American aircraft carrier.

I also have a first. . . . After rounding Cape Horn in July of 1958 aboard the USS *Ranger*, I became the first aviator of any service to be catapulted from a *Forrestal*-class carrier in the Pacific Ocean. They didn't even bake me a cake, but I enjoyed my tour of duty and will always have a soft spot in my heart for my friends in the Navy.

Col. J. Robert Lilley,
USAF (Ret.)
McCall, Idaho

● *Colonel Lilley is correct.—THE EDITORS*

Choppers and Missiles

We must be talking to different people. In an item in "Aerospace World" in the September '86 issue (p. 41), you say that the Army's AH-64 Apaches are now capable of firing AIM-9 Sidewinder missiles. Capable they may be, but equipped they are not, according to an official at the Army's aviation school and development center at Fort Rucker, Ala.

He told me recently that there are no plans to mount air-to-air missiles on attack helicopters. What is being tested is the use of a modified Stinger missile for an air-to-air role, but he said that that is only being tested on OH-58C and D scout helicopters.

Another item on page 52 in the September '86 "Aerospace World" concerned the stationing of Apaches at Fort Hood, Tex. Although the first Apache units are being formed up at Fort Hood, they are destined to be stationed in West Germany, according to a Pentagon spokesman specializing in helicopter development.

Evans Johnson
New York, N. Y.

● *"Aerospace World" columnist Jeffrey P. Rhodes replies: "Mr. Johnson notes correctly that I reported that AH-64s are now capable of firing AIM-9s. I did not report that the helicopters were being equipped with the missiles.*

"According to my sources, the Marine Corps is studying the feasibility of mounting air-to-air missiles on AH-1 helicopters permanently.

"Lastly, I reported correctly that the 100th AH-64 had been delivered to

Fort Hood, Tex., where the helicopters are currently assigned. The AH-64s may eventually be transferred to Europe, but they will be assigned to Fort Hood for the time being."

Remember the Backseater

I recently read your "Valor" article entitled "The Practice of Professionalism" in the August 1986 issue (p. 113). It was about Capt. Merlyn Dethlefsen, and I found it encouraging to learn that an aviator (awarded the Medal of Honor) was recognized for "just doing his job." Articles of this caliber keep the air in Air Force and remind all that the mission of the Air Force is to fly and fight and don't you forget it!

However, you make short mention of the "backseater," Capt. Kevin Gilroy, and don't mention what medal he received for risking his backside. After all, he is a professional, too!

Capt. Kenneth W. O'Reilly, USAF
Zaragoza AB, Spain

Lowry AFB Anniversary

The Lowry Technical Training Center History Office is looking for photographs to use in a fiftieth anniversary pictorial history of Lowry AFB, Colo.

Some of the best photos may be in the collections of private citizens who once served or worked at Lowry. I hope that many of these individuals will be willing to loan their photos for the commemorative history.

The history will be published next year to coincide with the fiftieth anniversary of the first flag-raising over Lowry on October 1, 1937. It is one of several projects and activities being planned to mark the occasion.

Any photos received will be copied and promptly returned. If possible, individuals should accompany each photo with a short descriptive caption and the approximate date that it was taken.

Please contact the address below.
Mike Levy
Hq. LTTC/HO
Lowry AFB, Colo.
80230-5000

Phone: (303) 370-2003

340th AREFW

The 340th Air Refueling Wing is proud of its heritage and would like memorabilia from former members of the 340th Bombardment Group, the 340th Bombardment Wing, and the 340th Air Refueling Group for permanent display in our new operations/maintenance building.

We are looking for photographs, slides, monographs, articles, and artifacts. If you have items of interest but do not wish to part with them, please

give us the opportunity to have them reproduced.

Interested individuals should contact the address below.

340th AREFW/HO
Altus AFB, Okla.
73523-6004

Phone: (1-405) 481-6275
AUTOVON: 866-6275

Kadena Security Ops

The 6990th Electronic Security Group is attempting to compile a pictorial history of Kadena-based Pacific TRANSEC/COMSEC operations.

Former members of Detachment 1, 6927th Security Group; the 6905th Security Squadron; and the 6990th ESG are requested to forward photos and background data for permanent retention. We specifically need photos and data dealing with Onna Point, Kadena buildings 92, 3519, and 3520, and operational equipment and missions throughout the Pacific.

MSgt. Bill Buchsbaum, USAF
PSC 1, Box 28167
APO San Francisco 96230

Axis Aircraft

My first book, *Air Min*, detailed testing of captured Luftwaffe and Italian aircraft in England. I am now researching a second edition that will be titled *Axis Aircraft in Allied Hands* and that will include German and Japanese aircraft evaluated in the US during and after World War II.

I would like to contact test pilots and engineers involved with the evaluation of Axis aircraft at Wright, Freeman, Eglin, Tulsa, and Chanute Fields and at NAS Anacostia and NAS Patuxent.

I would especially like to hear from anyone involved with the Tactical Air Intelligence Center in the Southwest Pacific and the Allied Technical Air Intelligence Unit in Southeast Asia. I am looking for anyone having photographic or engineering data or log books relating to the evaluation of captured Axis aircraft.

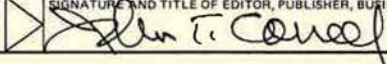
Any assistance that readers might be able to provide would be greatly appreciated.

Phil Butler
35 Gawsworth Rd.
Golborne, Warrington
Cheshire WA3 3RB
United Kingdom

Japanese Balloon Attacks

I am an author who is researching Japanese balloon bomb attacks during World War II. I would like to contact pilots in Fourth Air Force units who were assigned to balloon interception duties in early 1945.

I am also interested in contacting

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PS Form 3526, Dec. 1985

anyone who participated in Operation Firefly and who served with the 1st Troop Carrier Command, 161st Observation Squadron, or 555th Parachute Infantry Battalion. I also need information on Capt. Joseph J. O'Connor, commander of the 161st. Please contact me at the address below.

Michael E. Unsworth
Michigan State University
Libraries
East Lansing, Mich.
48824-1048

Boeing C-135s

I am soliciting information and photographs or any other material on the

Boeing C-135 aircraft and on any variant. I would appreciate any information that readers can provide. This information is being gathered for an article and book on the C-135.

Please send any information to the address below.

Joe Cupido
P. O. Box 20121
Riverside, Calif. 92516

Thor Missile Ops

I am a historian who is seeking names and addresses of USAF personnel who were assigned to Thor missile units that were stationed in England, on Johnston Island, at Vandenberg AFB, Calif., or at Cape Ca-

naveral, Fla. Copies of group orders and personnel listings would be most welcome.

Please contact me at the address below.

Eric Lemmon
The Thor Association
P. O. Box 5566
Vandenberg AFB, Calif. 93437

Unit Associations

Now that I have had to take an early retirement for medical reasons, I am keeping myself busy by compiling a complete list of all the Air Force unit associations and organizations that have card-carrying members and regular reunions. I am covering such organizations from units of the Army Air Corps of the 1920s up to the present. This list will not be used for commercial reasons; it's just for my own curiosity. It may be an impossible job, but I'm going to try it anyway.

I'm asking for help from any readers who may be able to provide any information on such unit associations. If you can help out, please contact me at the address below.

L. S. "Tad" Allen, Jr.
5136 S. Wheeling
Apt. 102
Tulsa, Okla. 74105
Phone: (918) 749-3009

AIRMAIL

Roll Call

I am trying to locate the following members of my crew. We served with the 600th Bomb Squadron, 398th Bomb Group.

They are Harvey B. Kramer, Clarence Franks, Jr., Douglas A. Chisnell, and Raymond D. Montgomery.

Anton A. Sistek
2410 Dan & Mary St.
Elizabeth City, N. C. 27909

Phone: (919) 335-4716

Our 455th Bomb Squadron from World War II is attempting to locate one of our Martin B-26 "Whitetail Raider" pilots who flew with us in England and France. He is Arthur J. Kalezewicz, formerly from Alhambra, Calif.

Ralph M. Wefel
114 Fontana Dr.
Oxnard, Calif. 93033

Phone: (805) 488-1343

I am trying to locate Lt. Col. Robert L. Estes, who was a navigator on the

first B-52 shot down over Southeast Asia. The bomber was shot down by a SAM on Thanksgiving Eve, November 22, 1972. Then-Captain Estes and the crew that night were on temporary duty at U-Tapao, Thailand, from Dyess AFB in Texas.

Colonel Estes was based at March AFB, Calif., in 1981. He and his wife have two grown daughters, April and Danielle. If anyone knows their whereabouts, please contact me at the address below.

Kevin Parker
866 Presidio Dr.
Abilene, Tex. 79605

I believe that two relatives on my mother's side were aviators during World War I. They were James W. Morris, who was killed during a barnstorming flight in Georgia sometime in the early 1920s, and Capt. John P. "Jack" Morris, his brother, who died February 24, 1984. Each was born and raised in Bridgewater, Pa.

Any information that readers may have will be appreciated.

Donald W. Miller
3 Lockwood Ave.
Old Greenwich, Conn. 06870

I am very anxious to locate Capt. David L. Knight, who was our pilot on

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The radar on the U.S. Air Force F-15 Eagle fighter can be tested and repaired faster and more economically now that Hughes Aircraft Company has opened an advanced Contractor Repair Facility. The specialized complex, designed to operate more efficiently than smaller field facilities, contains a test station for each of the APG-63 radar's major electronic components and an expanded test bench for the entire system. The test bench includes several items of test equipment used during the radar's development. By late 1987, the facility will provide comprehensive repair support for the F-15's new APG-70 radar. The long-range goal is to offer a consolidated radar repair facility for all Hughes built airborne radar systems, including those on the Navy and Marine Corps F/A-18 Hornet Strike Fighter and the Navy's upgraded F-14D Super Tomcat.

An advanced long-range air defense radar uses a sophisticated computer to continuously monitor operating characteristics and to adjust for optimum performance under adverse weather and jamming conditions. The Hughes Air Defense Radar can be rapidly reprogrammed to meet new threats and changing requirements. HADR is part of an extensive series of upgrades in the automation of West Germany's ground-based command and control system. Four HADR installations supply long-range surveillance data into the system, allowing commanders to rapidly detect and respond to airborne threats. HADR also features extensive fault detection and isolation techniques to make maintenance quick and easy, while reducing the number of skilled personnel needed to keep the system operating.

Nine Value Engineering changes in a standard shipboard display system will allow the U.S. Navy to save thousands of dollars on each new display. The changes proposed by Hughes for the AN/UYQ-21 display incorporate new design and manufacturing methods, including stamped and molded parts, flat cable harnesses, embedded power, standard discrete devices, and printed circuit cards. The changes stem from technology that was not available at the time the original contract was signed. Under the Department of Defense Value Engineering program, Hughes will share in the savings. The Value Engineering program is designed to encourage employees to look at the functions of a product and develop alternatives that cost less, perform better, and are more reliable.

Enemy submarines have nowhere to lurk now that the U.S. Navy has deployed a totally new passive sonar system. The Surveillance Towed Array Sensor System (SURTASS), now operational, is an array of miniaturized hydrophone listening devices towed behind a dedicated T-AGOS ship. It acquires and transmits acoustic information to shipboard processors, while shore stations analyze the data to detect and classify targets. A SURTASS preproduction development program is under way at Hughes to replace the present large array with one having a smaller diameter. This new version will simplify storage and handling, as well as allow for a faster towing speed.

Drivers of U.S. Army combat vehicles will be able to help pinpoint targets despite darkness, smoke or haze, thanks to a new infrared imaging unit. The Driver's Thermal Viewer (DTV) is planned for installation in the M1 Abrams tank, M2/M3 Bradley Fighting Vehicles, and M60A3 tanks. It produces a TV-like image by sensing temperature differences among objects in a scene. Although designed as a driving aid, the DTV will have a wide field of view to help the crew acquire targets. The device, designated the AN/VAS-3, is in full-scale engineering at Hughes.

For more information write to: PO Box 45068, Los Angeles, CA 90045-0068

a B-26 crew during World War II. I was stationed with him at Lake Charles, La., several bases in England, and on the continent of Europe.

Anyone having any information on Captain Knight should please contact me at the address below.

Clarence Clay Cafferty
Box 155
Chester, Neb. 68327

Phone: (402) 324-5722

I am trying to locate SMSgt. Marty Gish, USAF (Ret.). He is a friend of my father, and the last we heard from him, he was somewhere in Hawaii.

Anyone having any information as to his location is asked to contact me at the address below.

2d Lt. Jeffrey R. Buddendeck,
USAF
708 George St., Apt. B
Belleville, Ill. 62221

I am trying to locate two persons who were members of my B-17 crew in the 390th Bomb Group. They are Herman (Dusty) Miller and Fred H. Wessel, Jr.

Please contact me at the address below.

Otto Vent
8357 Elm Dr.
Watervliet, Mich. 49098

Phone: (616) 463-5565

I am searching for individuals having any information about 1st Lt. James L. Bradley, USAF, who was killed in action in Vietnam in 1968. I have very specific and honorable reasons for seeking information on Lieutenant Bradley.

Please respond to the address below.

O. G. Thomas
4107 Whitford Circle
#807
Glen Allen, Va. 23060

I am interested in contacting anyone who knows the whereabouts of MSgt. B. D. Lamb, who was stationed at Cannon AFB, N. M., in the late 1950s and early 1960s. I believe he's now retired and living in the southeastern US.

Please contact me at the address below.

M. Pharris
2950 Routier #70
Sacramento, Calif. 95827

Collectors' Corner

The K. I. Sawyer NCO Preparatory School has established a Wall of Honor that is dedicated to the contributions of enlisted personnel of the Army Air Forces and US Air Force. We have a few displays concerning Medal of Honor, Air Force Cross, and Silver

AIRMAIL

Star recipients and the Chief Master Sergeants of the Air Force.

We would welcome any donations that we might receive; however, we are looking specifically for AAF/USAF rank insignia, pilot wings, air police badges, letters, and pictures.

If you have something that you would like to donate, please contact the address below.

MSgt. Douglas Gill, USAF
K. I. Sawyer NCO Preparatory
School
K. I. Sawyer AFB, Mich.
49843-5000

I'm retired Air Force and a patch collector. After spending twenty-three years in the Air Force, my love is still with the first command to which I was assigned—the Air Defense Command. The aircraft and their mission are what made it colorful and the envy of many.

As a former member of two F-106 units, I've been trying to complete a set of patches from all twenty-one units that flew the F-106. My luck has been good, except for two. The two that I need are the 11th FIS, Duluth IAP, Minn., and the 319th FIS, Homestead AFB, Fla.

Please write to me at the address below.

Dick Kiertzner
2535 Cambridge Dr.
Florissant, Mo. 63033

Phone: (314) 838-2527

I have a large collection of stickers and embroidered cloth patches from the US space program. I'd like to contact others interested in selling or trading such emblems. I would be pleased to exchange photocopies or descriptions of the items.

I would also appreciate emblems from any corporate contractors.

John F. Bisney
5803 Ryland Dr.
Bethesda, Md. 20817

I have started a collection of TAC and SAC squadron patches. I would like to add more patches for different planes (like the A-10, F-111, B-52, etc.). If necessary, I can pay for patches.

If you have any spares, please contact me at the address below.

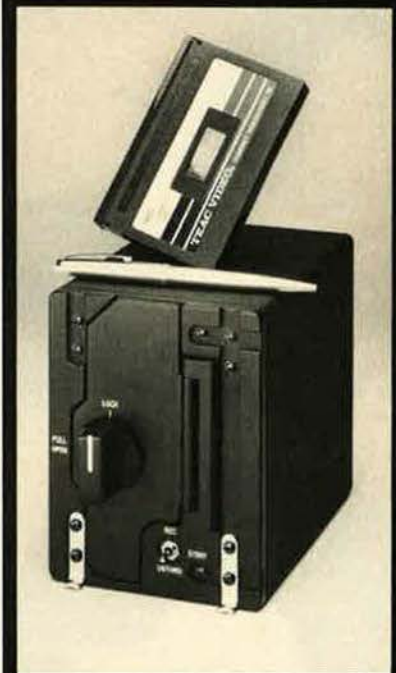
Richard O. Phaneuf
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Stanley, Kan. 66224

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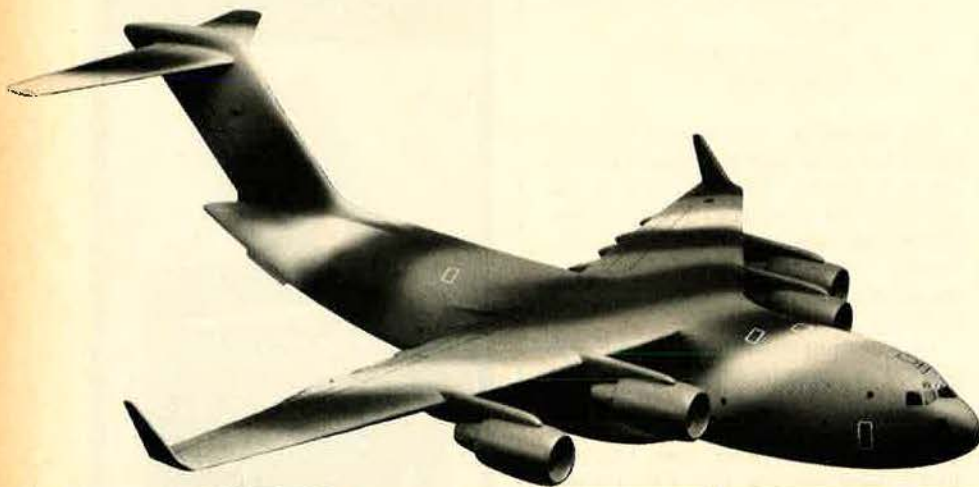


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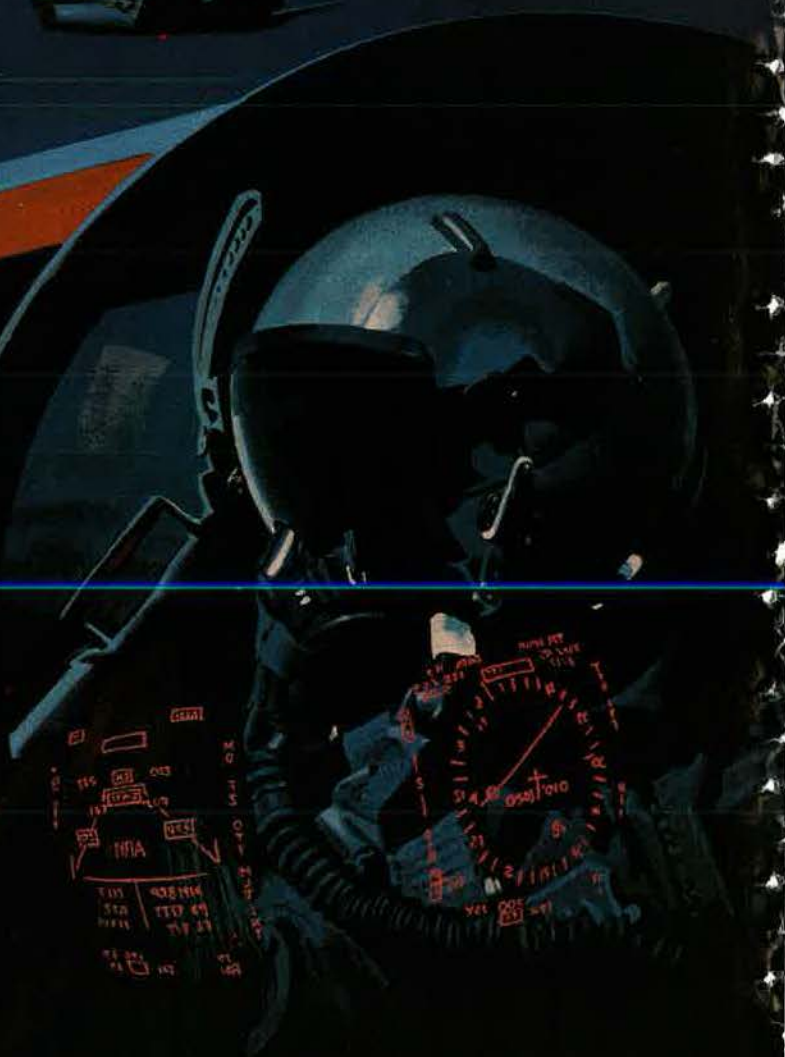
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Stealth in the Nick of Time

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Low-observables technology will offset the growing advantage of Soviet defenses and force the USSR to shift its military planning. But stealth will not be fielded without some difficulties.

Washington, D. C., Sept. 26



If the proposition is valid that technologically advancing and proliferating Soviet air defense capabilities threaten to clip the wings of US airpower in the years to come,

then stealth technology is arriving just in the nick of time. While the picture they are painting about the decline of "conventional" airpower may be too bleak, respected US defense analysts in and out of uniform who do so can undergird their arguments with substantial evidence. The intensifying contest between penetrating aircraft and air defenses relying on guided missiles and other weapons is real and rough. Even under the best of circumstances, the imperative of curtailing aircraft payload to make room for various ECM and other self-defense features exacts a heavy toll in battlefield utility and cost-effectiveness.

Enter low-observables technology (LOT), popularly called "stealth." If the US manages in the years ahead to stay ahead of the Soviets in masking the inherent emissions and observable reflections of its new aircraft, cruise missiles, and other platforms, the 1990s may indeed become the "age of stealth." In a recently published article, *Krasnaya Zvezda*, the newspaper of the Soviet armed forces, acknowledged as much. Under the headline "Why the Pentagon Needs 'Invisibility' and 'Stealth,'" *Krasnaya Zvezda* carps that "the US Administration states with blatant cynicism that [LOT] may become part

of the policy of 'economic attrition' conducted by US militarist circles and the NATO bloc."

Marshal of the Soviet Union N. V. Ogarkov, while not referring to "stealth" by name in a *Krasnaya Zvezda* interview, clearly had LOT in mind when he warned that "this qualitative leap will inevitably entail a change in the nature of the preparation and conduct of operations, which in turn predetermines the possibility of conducting military operations using conventional systems in qualitatively new, incomparably more destructive forms than before."

The USSR's frantic reaction to US stealth programs presages a twofold Soviet response, in the view of most US experts. The advent of the first operational American LOT vehicles will prompt the Soviets to attempt to develop effective defenses against them as well as to field stealth vehicles of their own, which current US radars and radar-guided weapons may have difficulty tracking. While long-term forecasting about the outcome of the impending US-Soviet "stealth" race may be risky, it is clear that the first round has gone to the American side.

Technologically advanced as they are, the latest Soviet fighter-interceptors—the MiG-31 Foxhound, MiG-29 Fulcrum, and Su-27 Flanker—are seemingly meant to defeat enemy aircraft through a "first-look, first-shot" advantage. USAF's advanced tactical fighter (ATF) offers a realistic chance to turn out to pasture the latest generation of Soviet fighters, because its high maneuverability, combined with LOT, promises to deny the Soviets that first-look, first-shot advantage. It is a safe bet in the view of US stealth experts that this country has the ability to widen its early lead in LOT, thereby imposing disproportionate costs, greater uncertainties, new mission requirements, and staggering stresses on Soviet forces.

While the persistent Soviet charge that the US stealth programs are meant to put this country into a first-strike posture is hardly credible, LOT is bound to play a major role in the nuclear strategic deterrence equa-

tion as well as in conventional warfare roles. The ATB (advanced technology, or "Stealth," bomber) and the stealth-intensive advanced cruise missile (ACM) that is now in flight test clearly breathe new life into the air-breathing leg of the strategic triad by bolstering its capability to penetrate Soviet defenses. In the case of the ATB, its stealthiness may make it SAC's best hope for finding and destroying such imprecisely located targets as the roadmobile SS-25 ICBM and the larger, railmobile SS-24. An additional plus that accrues to the ATB is its reusability, which in the case of protracted strategic nuclear warfare—unlikely as that may be—would be invaluable.

It is also quite clear that such stealthy systems as ATB and ACM will drive up the cost of Soviet air defense significantly and make that task far more difficult. The continued presence in the US inventory of B-52s, B-1s, and FB-111s, on the one hand, will force the Soviets to maintain and improve their current SAMs and interceptors for years to come. The US LOT vehicles, on the other hand, will compel the Soviets to come up with a whole new generation of air defense systems that are bound to be extremely costly and, initially at least, only marginally effective. It can be argued plausibly, therefore, that because LOT forces the Soviets to up the ante on the defensive side in a massive, long-term fashion, the Soviets will have to limit their investments in offensive strategic systems that are intrinsically more destabilizing than territorial air defenses.

Lastly, past US willingness to use single integrated operational plan (SIOP) assets for conventional warfare missions—such as the B-52s in Vietnam—probably suggests to Soviet planners that under certain circumstances this country might use ATBs and ACMs armed with nonnuclear munitions and warheads against targets in the USSR, Eastern Europe, or even at sea. This eventuality is apt to intensify further Soviet efforts to field air defenses against LOT vehicles.

It can also be argued that the pros-

pects of US involvement in low-intensity conflicts in the Third World, possibly fomented by Moscow, are greater than the likelihood of either general nuclear war with the USSR or a Warsaw Pact conventional attack on NATO. In case of contingencies of this type, an ATB that can project power directly from CONUS bases over great distances within hours would provide immeasurable psychological leverage.

An ATB could fly such missions at medium or high altitudes, thereby reducing to close to zero the chance that invaluable crews and valuable aircraft will be lost to such relatively primitive air defense weapons as AAA or hand-held SAMs. With the political and human risks of using conventional military force in low-intensity conflict sharply diminished, the credibility of US intervention, and hence the deterrence of such conflicts, obviously is enhanced.

But the "age of stealth" is not likely to dawn without some doctrinal transition pains, in the view of most defense analysts. In the case of ATB, SAC faces some fundamental challenges. For one, there is the question of sheltering ATB from the prying sensors of Soviet reconnaissance satellites in order to preserve the weapon system's stealthiness. Presumably, the degree of operational security that SAC and the Air Force impose on ATB is affected by assumptions about how much useful information regarding LOT the Soviets might glean from their overhead sensors.

If shape, for instance, is crucial to ATB's stealthiness—and Soviet satellites are judged capable of sufficient resolution to detect that shape clearly in three dimensions—SAC might not want to park ATBs in the open. Out-of-sight sheltering would also make it much harder for the Soviets to track ATB deployments on a day-to-day basis. On the other hand, parking 132 ATBs in hangars over their operational life would be neither easy nor cheap.

Another operational security problem that needs to be resolved before ATB achieves operational status involves training. While there is every indication that ATB's mission simulators will be quite effective, some aircrew training, in the view of LOT experts, is essential. The resultant operational strictures are unprecedented. SAC's doctrine with regard to ATB presumably will stipulate special precautions with regard to the take-offs and landings associated with ATB training missions. During daytime at least, there is the acute danger of clandestine photography from rela-

IN FOCUS...

tively close, off-base locations. If that can't be controlled, then the value of sheltering the aircraft in hangars to hide them from Soviet reconnaissance satellites, of course, would quickly become moot.

Special precautions also seem to be called for with regard to flying ATBs in airspace monitored by non-military traffic control radars. Daily exposure of the Stealth bomber's radar profile to domestic air traffic control radars, over time, might enable advanced signal-processing techniques to assemble an identifiable signature. LOT experts are quick to point out that there are ways to overcome this problem, provided the right measures and procedures are in place and relatively free of bugs at the time ATB achieves initial operational capability (IOC). It would seem possible, for instance, to provide ATBs with the means to present magnified, disguised, or false signatures for peacetime training missions.

New analyses of measures likely to prevent compromises of ATB's stealth technology also suggest the need for a special watchdog organization to detect, catalog, analyze, and prevent avoidable breakdowns in operational security. These studies also underscore the importance of anticipating countermeasures to the ATB. Essential here may be the creation of a US "LOT Red Team" that would be charged with not only building and testing the most promising counters to ATB that the US defense community can come up with but doing the same with LOT systems that the Soviets appear to be pursuing. Three specific requirements would seem to ensue from ATB's operational security concerns: regular testing of platform signatures; sustained monitoring of operational patterns, practices, and vulnerabilities; and an aggressive, dynamic search for countermeasures.

Most defense analysts tend to believe that LOT will cause the Air Force to look for new ways of doing business. Centralized control and strikeforce packaging are probably the antithesis of such LOT vehicles as ATB that depend on reducing observable signatures to the point of carrying out missions undetected. Hence it would seem preferable, tactically, to operate ATB in very small formations or, better yet, as single units. Another doctrinal

challenge associated with ATB stems from the fact that "conventional" communications required for "real-time" control over ATBs operating deep in enemy airspace seem at odds with the aircraft's need to avoid detection.

In the case of ATBs hunting down imprecisely located targets, such as mobile Soviet ICBMs with nuclear weapons, the wisdom of operating even two Stealth bombers in the same area is questionable in light of potential fratricide from nuclear ordnance. The most plausible mode in which to employ ATB, LOT experts argue, will therefore be as single aircraft operating with great autonomy, in a manner not unlike that for SSBNs, the ballistic-missile-launching nuclear submarines.

USAF's Role in Libyan Raid

Misunderstandings in Congress and the executive branch about the performance of USAF's F-111s during the raid on Libya in April 1986 arose from stringent rules of engagement rather than inadequate performance, according to Gen. Bernard Rogers, Commander in Chief of USEUCOM: "The pilots and the weapon systems officers of the F-111s were told in very plain English if there was any doubt about whether or not 'you have identified the target properly'—and that really meant identifying the radar offset point—'or if you have any doubt about your equipment working properly, do not drop your ordnance.' We had at least two instances in which these instructions were followed."

In one instance, General Rogers told a group of Pentagon correspondents recently, the weapon systems officer was not sure about the condition of the relevant equipment, and in another, there was a question about proper identification of the offset point. In another case, however, one crew realized too late that the radar offset point for a specific target had been misidentified, with the result that the weapon went astray and damaged the French embassy, according to General Rogers. Allegations that the Air Force's F-111s were brought into play because of interservice rivalry are "baloney," he asserted.

Immediately following the go-ahead order for the mission from Washington—which spelled out the specific targets and timing—the senior commanders in Europe decided that in order to attack the five targets properly, "we would put the Navy on the targets in the east and the Air Force on the targets in the west. I, for one, was convinced that we had to have carriers as well as F-111s," ac-



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cording to the USEUCOM Commander.

The retaliatory strike against Libya had to be planned with several contingencies in mind. Had the British refused the use of the F-111s stationed on their soil, General Rogers explained, the raid would have to have been confined to four targets, with the aircraft from one carrier striking two targets in Tripoli and those from the other one going after two targets in Bengasi. Other variables affecting the planning of the mission hinged on overflight rights across France or Spain as well as whether or not a sufficient number of tankers could be brought into the theater in time to support the long, circuitous route the F-111s eventually had to fly.

Use of CONUS-based B-52s was not considered in the case of the April 15 mission because "we confined ourselves to assets in the theater," according to the SACEUR. He hastened to add, however, that if it became necessary to convince Qaddafi of the "virtually unlimited reach" of US airpower in the future, Stateside-based B-52s might well be brought into play.

The F-111s employed in the April 15 raid encountered some difficulties: "We lost one aircraft that we don't believe had gotten to the target yet. [Another F-111 realized after getting refueled] and dropping off that he was headed in the wrong direction." Had that pilot tried to turn around and catch up with the other aircraft, "he would have had to go so fast that he [might] not have had enough fuel to go over the target and make it back to the refueling rendezvous. So he didn't go over the target. These are some of the reasons why we didn't get all of the targets." General Rogers added that the F-111s that encountered difficulties were supposed to go after a single target complex.

Asked if from a military point of view he would replicate the April 15 operation or come up with a different approach, General Rogers conceded that "fourteen hours [the flight time of the F-111s] is a hell of a long time, but it really was a professional performance," especially if allowance is made for the teamwork with the tanker force. Expressing doubt that the US government would ask British Prime Minister Margaret Thatcher to release the F-111s stationed in England for another strike against Libya, General Rogers said that even if that were to happen, "I am not sure whether I would use [the UK-based] F-111s again or not. It depends on the targets we will select." At the same time, he pointed out, "the fact is they could do it again."

IN FOCUS...

The targets inside Libya that were struck "related directly to terrorism," such as terrorist training camps, according to the SACEUR. Expressing what he termed a personal opinion, General Rogers said that Qaddafi ought to be made to understand that "if he involves [himself and his country] again in sensational terrorist acts against US personnel or facilities and [if] his fingerprints are found" on these acts, then the US must strike again. "Otherwise, why did we strike the first time?" He explained that he was not talking about "landing the US Marines on the shores of Tripoli, but [recommending] use of the kind of assets that can reach targets within Libya without [having to] put platforms over the targets. We have got the B-52s in the US, and [Qaddafi] just has to understand, I think, that he is subject to that kind of treatment again."

The US, the SACEUR reported, will continue to conduct military exercises within Libya's FIR, or flight information region, when this nation's naval carriers are transiting the eastern Mediterranean. But at this time, the US does not plan to breach what Qaddafi calls the "line of death." So far as "old Bernie Rogers is concerned as CINCEUR and SACEUR, because we obviously are interested in what happens in the North African states along the Mediterranean littoral should we have a confrontation in Allied Command Europe, we ought to keep that guy [under stress] all the time." The punitive strike last April, General Rogers asserted, had telling psychological impact on the Libyan strongman, triggering a "routine of withdrawal and depression that he is just now coming out of."

ICBM Basing Mode Questions

The Senate Appropriations Committee's Report on the FY '87 defense bill stipulates deferral of full-scale development of the Small ICBM (Midgetman) by one or two years because of alleged uncertainties about weight, cost, schedule, and deployment details. The committee also recommends corresponding slips in the missile's initial and full operational capability (IOC and FOC). The Air Force contends that on the basis of progress to date, the program is ready to transition to full-scale develop-

ment, assuming a go-ahead decision by the Joint Resources Management Board (JRMB) expected late this fall.

The Chairman of the House Appropriations Committee's Defense Subcommittee, Rep. Bill Chappell, Jr. (D-Fla.), told this writer that his panel opposed the Senate's position and that Congress should make its decisions on both Midgetman and Peacekeeper without further delays. There is concern among some members of Congress as well as in the Pentagon that a delay in the Midgetman program might doom this project as well as the chances for deploying the second fifty Peacekeeper ICBMs in an as-yet-unspecified basing mode.

The Defense Department plans to decide late this year on a Peacekeeper deployment mode that meets Congress's survivability mandate. Among the deployment modes for the second fifty Peacekeepers currently under consideration by the Air Force is an approach called garrisoned/railmobile. A variation on a theme used by the Soviets for their new SS-24 ICBM and on one that the Air Force had first proposed two decades ago, garrisoned/railmobile envisions the deployment of two MX Peacekeeper ICBMs each per railroad train. Three or four trains would be "garrisoned" on individual ICBM bases. Up to seven bases could be involved. Individual trains would be sheltered in "revetments" dug into hillsides to provide hardness levels comparable to those of the early Minuteman ICBM silos. Two crews, operating in alternating shifts and including four launch controllers and about fifteen security troops, would be assigned to each train.

The system would react to strategic warning by moving "off the reservation." Within several hours after being "flushed," the fifty railmobile ICBMs could "generate" about 60,000 rail miles, meaning that the Soviets would have virtually no chance of knowing precisely where within the CONUS the missiles might be at a given moment. The railroad cars housing the Peacekeepers would be essentially indistinguishable from regular new railroad cars that US railroads have on order.

The Peacekeeper trains would be able to exit the garrisons in one of several directions. The garrisoned/railmobile concept probably could not respond to tactical warning, because under "quiet" conditions, the crews would not be aboard the trains. The concept presupposes that there will be sufficient warning to generate the system and rules out the possibility of a "strike out of the blue." ■

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By Brian Green, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Sept. 22 Defense Reorganization Sails Through

Congress has overwhelmingly approved a compromise defense reorganization bill that reconciles the differences between the House and Senate versions. The new legislation is intended both to enhance "jointness" and the authority of the unified and specified commanders and to reduce redundancy between the service Secretariats and the military staffs.

The measure will:

- Establish a new "joint specialty." Fifty percent of all designated joint-duty positions in grade O-4 (major or lieutenant commander) and higher must be filled by officers specially educated and trained in the joint specialty.

- Require that an officer may not be promoted to general or flag rank without a joint tour of duty and that the Chairman of the Joint Chiefs of Staff (CJCS) evaluate the joint-duty performance of those recommended for three- and four-star rank. Service Chiefs must also have significant joint-duty experience.

- Make the CJCS the principal military advisor to the President. The Chairman would be required to submit any dissenting advice from the other Chiefs to the national command authorities.

- Create the new four-star position of Vice Chairman of the JCS, designated as the second ranking military officer just below the Chairman. The Vice Chairman—who is selected from a service other than that of the Chairman—could participate and vote only when serving as acting Chairman in the absence of the Chairman.

- Consolidate responsibility for research and development, acquisition, and other functions in the service Secretariats, removing responsibility for such functions from military headquarters staffs.

- Reduce Secretariat and military headquarters staffs.

- Require unified and specified commanders to have joint experience and authorize those combatant com-

manders to exercise greater control over the forces and personnel in their command.

The Air Force has expressed concern over some of the provisions of the bill. Senior officer careers could be lengthened when new requirements for promotion are added to existing in-service requirements. Consolidation of R&D and acquisition in the Secretariats also could eliminate the position of Deputy Chief of Staff for Research, Development and Acquisition and its staff.

Senate Unit Approves Funding

The Senate Appropriations Committee (SAC) approved an FY '87 defense appropriations bill of \$277.1 billion in budget authority (BA) and \$264.5 billion in outlays. The bill, which excludes Department of Energy military programs and military construction, is consistent with a total defense budget of \$292 billion in BA and \$279 billion in outlays.

The funding measure includes:

- \$3.4 billion of \$4.8 billion requested for the Strategic Defense Initiative.

- The full twenty-one MX ICBMs requested and \$700 million of the \$1.4 billion request for the Small ICBM.

- \$300 million of the \$355 million requested for the Joint Surveillance and Target Attack Radar System (Joint STARS). The House provided no funding for Joint STARS.

- \$362 million of \$612 million requested for C-17 R&D, but no money for advance procurement. That will delay the program another year and raise program costs by about \$1 billion.

- No funding for the T-46 trainer or the Precision Location Strike System, both of which the Air Force has canceled, but for which the House has continued funding.

- \$3 billion in Air Force money for the construction of a new Shuttle dedicated to military missions.

The bill will be rolled into an omnibus continuing resolution (CR) that will include other major appropriations bills. Both the House and Senate will have to approve CRs, resolve their differences in conference, and

approve the compromise CR. If the CR is not approved by October 1, the start of the new fiscal year, an interim funding measure will have to be adopted.

Democrats on Defense

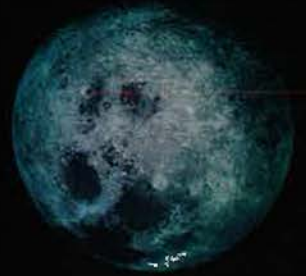
The Democratic Leadership Council has released a major statement on defense policy that identifies the "fragility of the world economic structure" and the national debt as a major threat to US national security, urges continued compliance with SALT II, and suggests serious consideration of universal national service. The report was authored by Sens. Sam Nunn (D-Ga.) and Albert Gore (D-Tenn.) and House Armed Services Committee Chairman Rep. Les Aspin (D-Wis.).

While conceding Soviet military capabilities, the report also emphasizes the vulnerabilities, lack of allies, tenuous lines of communication, and weak economy that limit Soviet power. The US is much more likely to face low-intensity conflicts than global war, and the report says US forces "should reflect this reality."

The report charges that strategic nuclear modernization, the Administration's highest priority, has been "overemphasized at the expense of conventional force capabilities" and that the nation has not gotten its money's worth during the recent defense buildup. It identifies an unaffordable proliferation of new weapons as a serious source of Pentagon waste. The Pentagon has cited large increases in readiness, combat capability, and improvements in strategic forces to counter similar claims.

To correct perceived deficiencies, the report advocates adopting the Packard Commission reforms, accelerated development of "smart" stand-off weapons, more reliance on reserve forces, a campaign to pressure our allies to bear more of the defense burden, and a serious examination of universal national service, both civilian and military. It also recommends continued compliance with SALT II and a strengthening of the Anti-Ballistic Missile (ABM) Treaty. ■

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GENERAL DYNAMICS

AEROSPACE WORLD

... PEOPLE ... PLACES ... EVENTS ...

By Jeffrey P. Rhodes, DEFENSE EDITOR

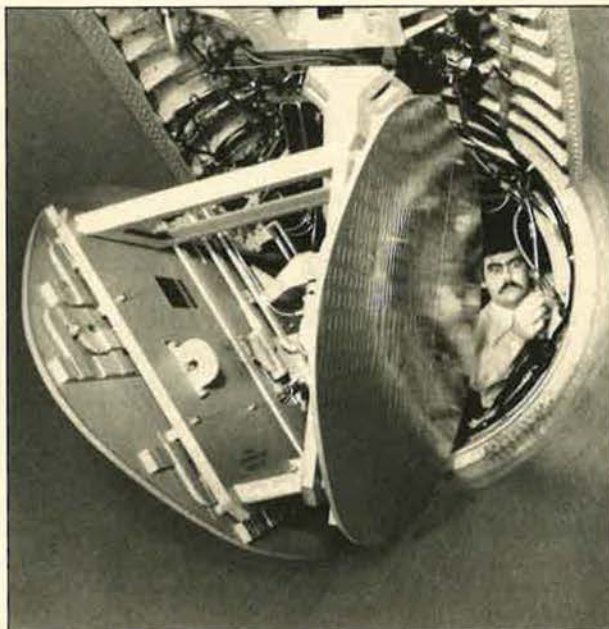
Washington, D. C., Sept. 19
★ The Peacekeeper (LGM-118A) intercontinental ballistic missile program passed another milestone on August 23 when the four-stage missile successfully delivered its reentry vehicles to two different sites in the Kwajalein Missile Test Range in the Pacific. This was the thirteenth successful test launch in the Peacekeeper program.

The missile was launched from a modified Minuteman III silo at Vandenberg AFB, Calif., and flew the 4,200 miles to the test range in thirty minutes. Five of the unarmed Mk 21 reentry vehicles on board the Peacekeeper came down in the water, and the other four fell on a land target. The two locations were reportedly seventy miles apart. The RVs were delivered with acceptable accuracy.

The missile was launched by personnel from the Air Force Operational Test and Evaluation Center at Kirtland AFB, N. M., and from F. E. Warren AFB, Wyo.

The Ballistic Missile Office at Norton AFB, Calif., is managing the Peacekeeper test flights, and through the course of the program, the emphasis has shifted from component functional performance to systems and operational objectives. AFOTEC is conducting the ongoing operational tests and evaluations.

In late August, Prince Henri of Luxembourg was taken on an orientation flight in an F-15 from the 36th Tactical Fighter Wing at Bitburg AB, Germany. The US Ambassador to Luxembourg, Jean Gerard, was flown as the Prince's wingman. Pilots for the flight were Capt. Steven Fiechtner and David Richmond, both from the 22d Tactical Fighter Squadron. During the flight, the duo pulled up to six Gs.



This is the first production Advanced Synthetic Aperture Radar System-2 (ASARS-2) being connected in the nose of a TR-1. The V-shape of the ASARS antenna enables the side-looking radar to map the ground on either side of the aircraft without having to turn the airplane or the dish. ASARS-2 will provide real-time, high-resolution radar ground maps from high altitudes.

Initial operational capability (IOC) of the first ten (of fifty currently planned) missiles at F. E. Warren AFB is scheduled for December.

In other ICBM news, the launch of an unarmed LGM-30G Minuteman III from Vandenberg was aborted on August 28 when an unspecified anomaly developed in flight. The command destruct signal was transmitted to the missile by safety officers of the Western Test Range. This missile, which

entered the active inventory in 1976, was previously based at Minot AFB, N. D. The aborted flight was the 123d flight in a series of operational test launches. The cause of the anomaly during the terminated flight is under investigation.

★ With two successful firings in the space of eight days in late August, the AIM-120A AMRAAM (Advanced Medium-Range Air-to-Air Missile) program



has now recorded the highest success rate, at this point in development, ever enjoyed by any complex air-to-air missile. With twelve successful firings in fourteen attempts (including one shot ruled as a "no test"), AMRAAM is doing better than the AIM-7 Sparrow test program in the late 1950s.

The first of the latest tests, held on August 20 at White Sands Missile Range, N. M., proved the missile could be fired from a beam aspect with heavy ground clutter radar return. In a beam aspect shot, the target movement relative to the missile is briefly reduced to zero.

The unarmed AIM-120 was fired in a look-down, off-the-nose attack from an F-15 flying at Mach 0.9 at an altitude of 14,000 feet above ground level. The QF-100 target drone, which was traveling at Mach 0.85 7,000 feet below the F-15, executed an evasive turn at five and a half Gs, but the missile effectively tracked the target and passed within lethal distance.

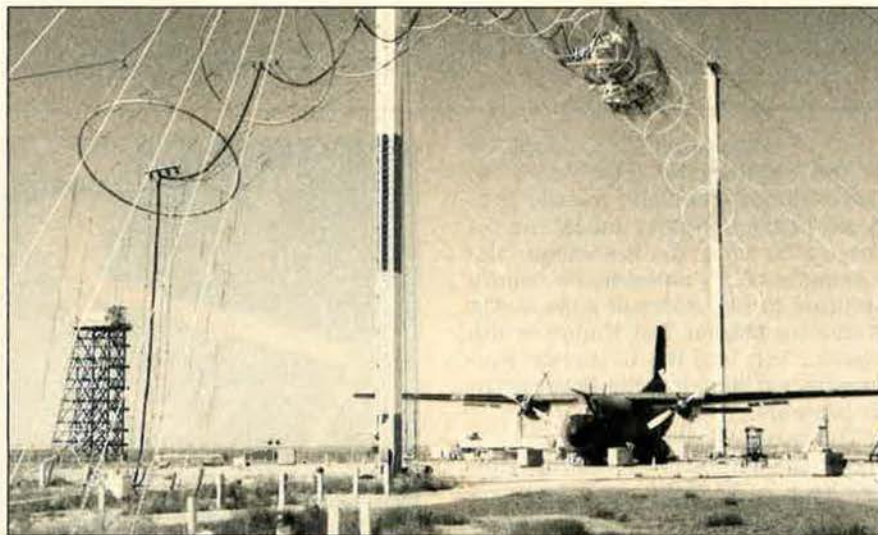
The other test, held August 28 at the Navy's Pacific Missile Test Center at Point Mugu, Calif., proved the missile could perform in a high-clutter chaff environment at short range. This shot was also the first successful ejector launch in the test program.

This AMRAAM was launched from a production F/A-18 Hornet flying at Mach 0.5 at 1,000 feet above sea level. The QF-86 drone, flying at Mach 0.5 at 700 feet over the Pacific, dispensed chaff (aluminum strips loosed to confuse radar), but the AIM-120 acquired the target with its on-board active radar and passed within lethal range of the QF-86.



A twenty-year era ended in August when the Air Force retired the last O-2 "Duck." The O-2 was assigned to the 21st Tactical Air Support Squadron of the 507th Tactical Air Control Wing at Shaw AFB, S. C. (USAF photo by A1C Russ Fitzgerald)

AEROSPACE WORLD



A French Air Force C-160 Transall cargo aircraft gets "zapped" at the Horizontally Polarized Dipole at the Air Force Weapons Laboratory at Kirtland AFB, N. M. The facility is used to test the resistance of systems on board the aircraft to the effects of electromagnetic energy. (USAF photo by Amn. Julia Burkey)

The AMRAAM program is managed by Air Force Systems Command's Armament Division at Eglin AFB, Fla. Current plans call for the production of 24,000 missiles for the Air Force and the Navy. Hughes Aircraft Co. is the prime contractor for the AIM-120, while Raytheon is the second-source manufacturer.

In related news, the rocket motor for the Rockwell AGM-130 standoff

weapon was successfully fired for the twenty-fifth time, thus concluding a failure-free safety-of-flight test series. The weapon has also passed safe separation tests and captive-carry missions. Flight testing of the AGM-130 is scheduled to begin this fall.

★ An era came to an end this summer when the Air Force retired its last Duck. No, the service has not been using waterfowl for combat. Rather, the O-2 forward air control aircraft, affectionately called the Duck, has concluded a near-legendary twenty-year career.

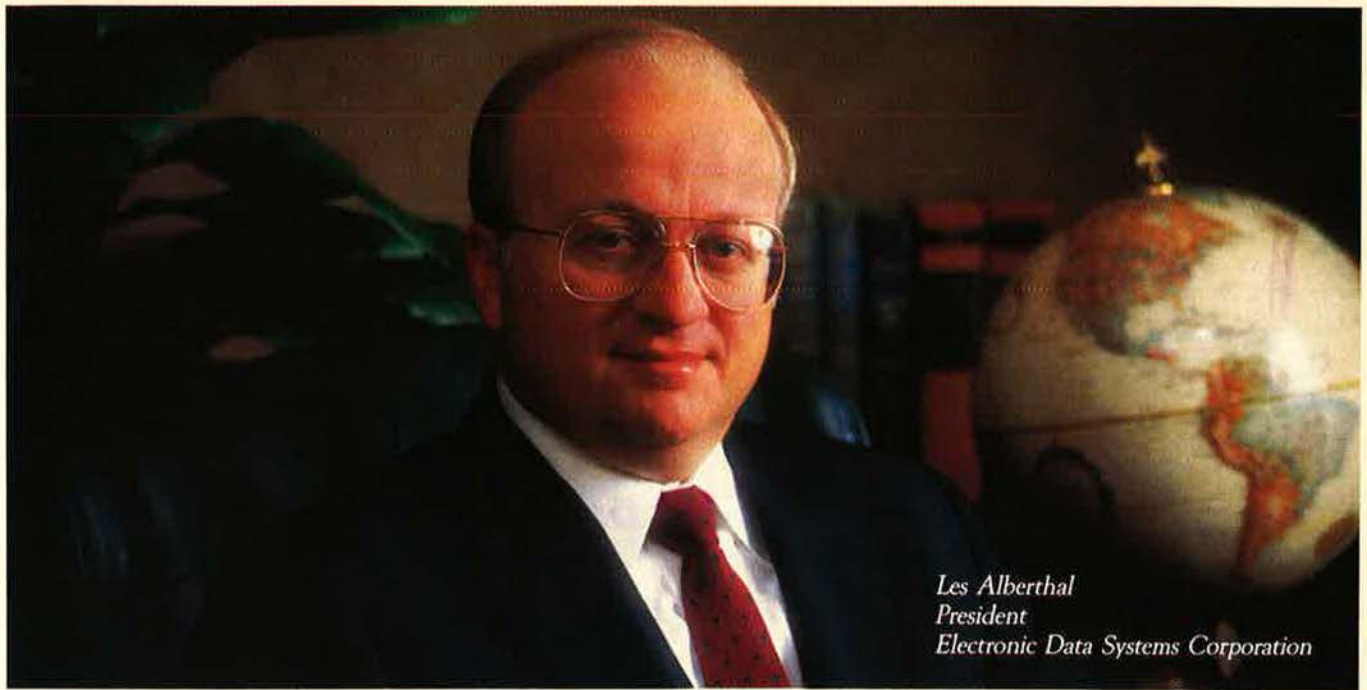
Called the Duck because of the way the landing gear retracts, 346 of the push-pull O-2As were purchased "off the shelf" from Cessna in 1966 as a replacement for the single-engine O-1 Birdog.

The O-2 proved its worth in Vietnam, enabling FAC pilots to direct fighter aircraft against ground targets more effectively with its improved radio and ordnance-carrying capability. Several O-2s were modified for psychological warfare operations with the addition of a large broadcast speaker in the side of the airplane. These aircraft were designated O-2Bs.

The last Duck was assigned to the 21st Tactical Air Support Squadron of the 507th Tactical Air Control Wing at Shaw AFB, S. C. The 21st TASS, the 549th Tactical Air Support Training Group at Patrick AFB, Fla., the 24th Composite Wing at Howard AFB, Panama, and the 25th TASS at Eielson AFB, Alaska, were the last units to fly O-2s.

To replace the Super Skymasters, as the Ducks were officially called, the

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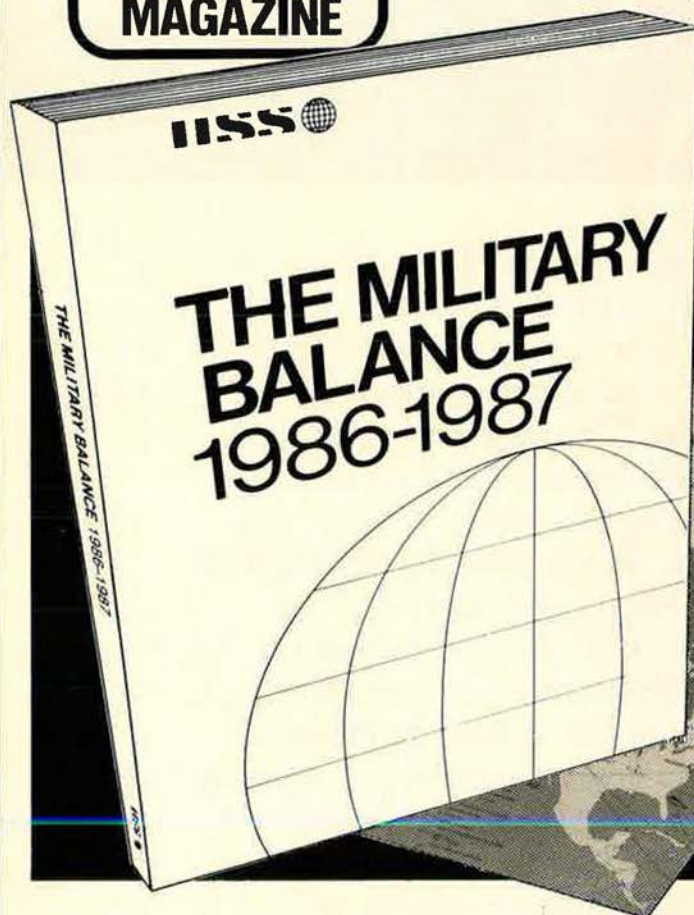


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THE MILITARY BALANCE 1986-1987

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21st TASS and the 549th TASTG will transition to T-37Bs, the 25th TASS will get OV-10s, and the 24th Comp Wing will be equipped with OA-37s.

★ The C-130 has always had a distinctive-looking nose, but now one Hercules belonging to the 4950th Test Wing at Wright-Patterson AFB, Ohio, has another "outstanding" feature—a belly button.

The aircraft's "belly button" is actually a retractable turret called the Airborne Seeker Evaluation Test System (ASETS). The system consists of the 2,000-pound turret that allows for precise five-axis measurement and several racks of electronic and data-recording equipment. ASETS will be used to test and evaluate sensors and seekers under the exact same conditions for use in air-to-ground missiles.

Modifications to the aircraft, which were done by Air Force Systems Command's Aeronautical Systems Division, included cutting a fifty-eight-inch hole through three mainframe structural members, the installation of clamshell doors to cover the hole, and a primary and backup hoist to raise and lower the turret. The thimble-shaped turret extends forty

The International Institute for Strategic Studies, which compiles "The Military Balance," is no longer offering "The Military Balance" for reprint in AIR FORCE Magazine. "The Military Balance" had been a longtime annual feature of our December issue. We regret any inconvenience this may cause our readers.

—THE EDITORS



This modified C-130 is carrying out the first flight test of the Airborne Seeker Evaluation Test System (ASETS). ASETS extends forty inches below the C-130 fuselage and can evaluate several seekers or sensors at the same time. (USAF photo by SMSgt. William L. Patterson)

AEROSPACE WORLD

ASETS C-130 will fly approximately 100 hours in conjunction with this effort.

★ A British Westland Lynx helicopter, fitted with new all-composite rotor blades, broke the absolute speed rec-



Army 2d Lt. William W. Basnett (left) and his brother, AFROTC Cadet Maj. John Basnett, earned their parachute wings together this summer with the completion of their fifth jump from a C-130. Keeping it in the family, Brig. Gen. William W. Basnett, Commander of the 94th Tactical Airlift Wing at Dobbins AFB, Ga., was the pilot on the flight. (USAF photo by SFC Henry Brooks)

inches below the C-130's belly when lowered. The turret has to be retracted for takeoffs, landings, and ground operations.

First flight of the ASETS C-130 was August 20. The system was checked at altitudes ranging from 5,000 to 18,000 feet during the two-and-a-half-hour flight.

Sensor/seeker testing will begin at AFSC's Armament Division at Eglin AFB, Fla., in 1987. It is expected the

ord for any helicopter on August 11, flying 249.1 mph (400.87 kilometers per hour) over a fifteen-kilometer course in England. The record dash broke the old record of 229 mph set in 1978 by a modified Soviet Mi-24 Hind-A helicopter.

The Lynx was modified specifically for the record attempt. It was fitted with British Experimental Rotor Program (BERP) blades, a rerated gearbox, and increased area horizontal and vertical stabilizers. The Rolls-Royce Gem 60 engines were also modified to accept water/methanol injection.

The advanced-concept BERP blades have sweptback tips and are the result of more than ten years of research by Westland and the Royal Aircraft Establishment at Farnborough. Conventional blades stall at speeds around 225 mph, but the BERP blade has three twists in its composite structure to give it a much higher stall speed.

The record is provisional, pending certification by the Fédération Aéronautique Internationale (FAI), the international aviation authority. Westland's chief test pilot, Trevor Eggington, was at the controls of the record flight. Derek Claws served as the flight engineer.

★ Seizing the initiative after President Reagan announced his plan to

open space launches to private companies (see October 1986 "Aerospace World," p. 31), Martin Marietta Corp. announced on September 4 that a reservation agreement had been signed with Federal Express Corp. for a 1989 launch date.

AEROSPACE WORLD



The first ultra-high-bypass turbofan engine was successfully flown on this modified Boeing 727 on August 20. The aircraft reached speeds of 300 knots and altitudes as high as 21,000 feet during its sixty-seven-minute flight. The General Electric proof-of-concept unducted fan engine has the potential to revolutionize commercial aviation in the 1990s.

The 16,000-pound Expressstar, a high-powered K_u -band satellite, will be launched into orbit by a Titan III rocket manufactured by Martin Marietta.

Federal Express has deposited \$100,000 with Martin Marietta to establish a launch manifest priority. Negotiation of a full launch services contract is under way. Federal Express also took an option to launch a second satellite on a Titan III in 1990.

The Titan III can launch multiple payloads and can carry 32,000 pounds of payload into low-earth orbit or 12,500 pounds into geosynchronous transfer orbit. The Titan has successfully launched 129 satellites in 134 operational launches since 1966.

In related news, Martin Marietta Denver Aerospace received a \$27 million contract from the Air Force in mid-August for initiation of work required to build thirteen additional heavy-lift Titan IV launch vehicles. The Titan IV (formerly called Titan 34D-7) can launch a 10,500-pound payload directly into geosynchronous orbit. Ten of these vehicles have already been funded. This latest contract also calls for the activation of a Titan IV launch site at Vandenberg AFB, Calif.

★ Propulsion for transport aircraft of the 1990s may very well be by means of a throwback to the past—the propeller. Not just any propeller, though, but one of advanced-technology design as an integral part of an ultra-high-bypass turbofan.

On August 20, General Electric became the first engine manufacturer to demonstrate this new technology when its UDF (unducted fan) proof-of-concept engine was successfully tested over the Mojave Desert. The UDF engine features rear-mounted, variable-pitch unducted fan blades driven by a contrarotating turbine. The engine has no gearbox.

The starboard engine of Boeing 727-100 was replaced by the UDF engine, and the hybrid was flown for sixty-seven minutes at speeds up to 300 knots. Altitudes as high as 21,000 feet were also reached.

Flight testing is being conducted by GE and Boeing, and the seventy-five-hour test program is scheduled to be completed by the end of the year. Certification of the 25,000-pound-thrust engine is scheduled for 1990. A McDonnell Douglas MD-80 will also be modified with a UDF engine, and testing will begin next spring.

★ Both the US space program and

SENIOR STAFF CHANGES

PROMOTIONS: To be **General:** Jack I. Gregory.

To be **Lieutenant General:** Craven C. Rogers, Jr.

RETIREMENTS: M/G William J. Breckner, Jr.; William M. Charles, Jr.; M/G William J. Mall, Jr.; M/G Joseph D. Moore; M/G Thomas S. Swalm.

CHANGES: L/G (Gen. selectee) Jack I. Gregory, from Dep. CINC, UN Command Korea; Dep. Cmdr., US Forces Korea; and C/S, Combined Forces Command, to CINCPACAF, Hq. PACAF, Hickam AFB, Hawaii, replacing retiring Gen. Robert W. Bazley . . . M/G Jerry D. Holmes, from DCS/Log., Hq. TAC, Langley AFB, Va., to C/S, 4th ATAF, SHAPE, Heidelberg, Germany, replacing retired M/G William M. Charles, Jr. . . . M/G Michael A. Nelson, from Dep. IG, Hq. USAF, Washington, D. C., to C/S, Hq. USAFE, Ramstein AB, Germany, replacing M/G Richard M. Pascoe . . . M/G Rich-

ard M. Pascoe, from C/S, Hq. USAFE, Ramstein AB, Germany, to Cmdr., 17th AF, USAFE, Sembach AB, Germany, replacing retired M/G William J. Breckner, Jr.

M/G (L/G selectee) Craven C. Rogers, Jr., from Vice CINCPACAF, Hq. PACAF, Hickam AFB, Hawaii, to Dep. CINC, UN Command Korea, and C/S, Combined Forces Command, replacing L/G (Gen. selectee) Jack I. Gregory . . . B/G Horace L. Russell, from Dir., Joint Analysis, OJCS, Washington, D. C., to Dep. Dir., Nat'l Strategic Target List Div., JSTPS, Hq. SAC, Offutt AFB, Neb., replacing B/G Frank B. Horton III . . . B/G W. John Soper, from Cmdr., 47th AD, SAC, Fairchild AFB, Wash., to Vice Cmdr., San Antonio ALC, AFLC, Kelly AFB, Tex., replacing B/G Henry Viccellio, Jr. . . . B/G Henry Viccellio, Jr., from Vice Cmdr., San Antonio ALC, AFLC, Kelly AFB, Tex., to DCS/Log., Hq. TAC, Langley AFB, Va., replacing M/G Jerry D. Holmes. ■

"Without the Osprey, the hostages might still have been with the hijackers."

"First word of the hijacking set a fast chain of events into motion . . .

"Although the airport was many miles away, the Air Force CV-22s slipped up on them quickly, quietly. In fact, we were on top of them before they could react. The Ospreys gave us clandestine precision and surgical accuracy. There was not one casualty among the hostages.

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gram is producing an aircraft that streaks forward at turboprop speeds, providing unmatched rapid-response capability at very long ranges. Yet, it takes off, hovers and maneuvers like a helicopter.

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The Strategic Defense Initiative Organization (SDIO) got a needed boost on September 5 when a Delta rocket carrying an SDI experiment was successfully launched from Cape Canaveral AFS, Fla. It was the first successful US spacelaunch since the *Challenger* Space Shuttle disaster in January.

The SDI experiment consisted of two vehicles that separated from the Delta fifteen minutes after insertion into low-earth orbit. Roughly ninety minutes into the flight, the satellites were trained to observe an Aries sounding rocket launched from White Sands Missile Range, N. M.

AEROSPACE WORLD

After that, the two vehicles, which carried a variety of sensors, tracked each other for a short time. Less than three hours into the flight, the two satellites were aimed at each other, their liquid-fueled engines were fired, and the two vehicles were propelled into a collision with each other.

One of the major objectives of the experiment was to obtain data on rocket signatures during the close-in phase of a space intercept.

★ **AWARDS**—Lt. Col. John P. Miller, Commander of the 552d Aircraft Generation Squadron at Tinker AFB, Okla., and CMSgt. John T. Grady, Jr., a maintenance superintendent with the 432d Aircraft Generation Squadron at Misawa AB, Japan, have been named as the 1986 winners of the **Gen. Lew Allen, Jr., Trophy**.

The Allen Trophy is awarded annually to an officer (second lieutenant to lieutenant colonel) and an enlisted person (sergeant to chief master sergeant) for excellence in base- or wing-level activities directly relating to daily aircraft sortie generation.

Colonel Miller was recognized for his instrumental role in streamlining support equipment processing for his maintenance squadron, which is responsible for the upkeep of thirty-three E-3E Sentry Airborne Warning and Control System (AWACS) aircraft. Chief Grady was cited for his professionalism in preparing, mobilizing, and deploying twenty F-16 aircraft last January for the Cope Thunder 86-3 exercise in the Philippines.

Second Lt. Daniel B. Jensen, a scientist at the Air Force's Armament Laboratory at AFSC's Armament Division at Eglin AFB, Fla., was recently presented the **Harold Brown Award** for 1985 in Pentagon ceremonies.

As a result of Lieutenant Jensen's expertise in the design, fabrication, and testing of a new concept in electromagnetic guns, significant advancements have been made in the Kinetic Energy Weapon department of the Strategic Defense Initiative.

★ **NEWS NOTES**—The **Society of British Aerospace Companies (SBAC)**, the sponsors of the biennial Farnborough Air Show, announced **record orders and agreements of more than \$1.5 billion** during the show. The total will be much higher when orders turn into real business. (See also "Competition and Collaboration at Farnborough" on p. 106 of this issue.)

The Air National Guard's **125th Fighter Interceptor Group** at Jacksonville International Airport, Fla., became on September 6 the **first air defense unit to receive the General Dynamics F-16** fighter. The unit will eventually be assigned eighteen F-16As to replace its aging F-106 Delta Darts. Three other ANG air defense units will convert to the F-16 in 1987 and 1988.

William H. Dana, a research pilot

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since 1958, was recently named as **chief pilot at NASA's Ames-Dryden Flight Research Facility** at Edwards AFB, Calif. Mr. Dana is currently pilot for the F-15 Highly Integrated Digital Electronic Control (HIDEC) program, and he has previously flown the X-15, YF-12, and M2-F2 lifting-body research vehicle. A graduate of the US Military Academy, Mr. Dana is a past winner of NASA's Exceptional Service Medal and the American Institute of Aeronautics and Astronautics' Haley Space Flight Award. He replaces Fitzhugh L. Fulton, who retired.

Secretary of Transportation Elizabeth H. Dole announced in late August that the **Federal Aviation Agency will begin drug tests for its employees in safety-related jobs.** The tests will cover the 24,000 FAA employees who are required to take annual medical examinations as a condition of employment. These employees include air traffic controllers, flight service station specialists, pilots, safety inspectors, federal air marshals, and certain employees at the FAA-run airports in Washington, D. C.

In late August, the **Navy issued a letter contract** worth \$22.7 million to Israel Aircraft Industries (IAI) for a **second squadron of F-21A Kfirs.** The

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thirteen aircraft will be stationed at MCAS Yuma, Ariz., as adversary trainers for Marine aviators. While IAI will provide the aircraft at no cost, the contract will cover maintenance, support, and spare parts. The first Kfir squadron was formed at NAS Oceana, near Norfolk, Va., in 1984. ■



Not your usual formation training flight. The F/A-18 Hornet is being flown by Maj. D. R. "Doc" Zoerb, an Air Force exchange pilot with VFA-131 of the USS Coral Sea. He is escorting a Libyan MiG-23 during recent operations near the Gulf of Sidra. (Photo courtesy of Naval Aviation News)

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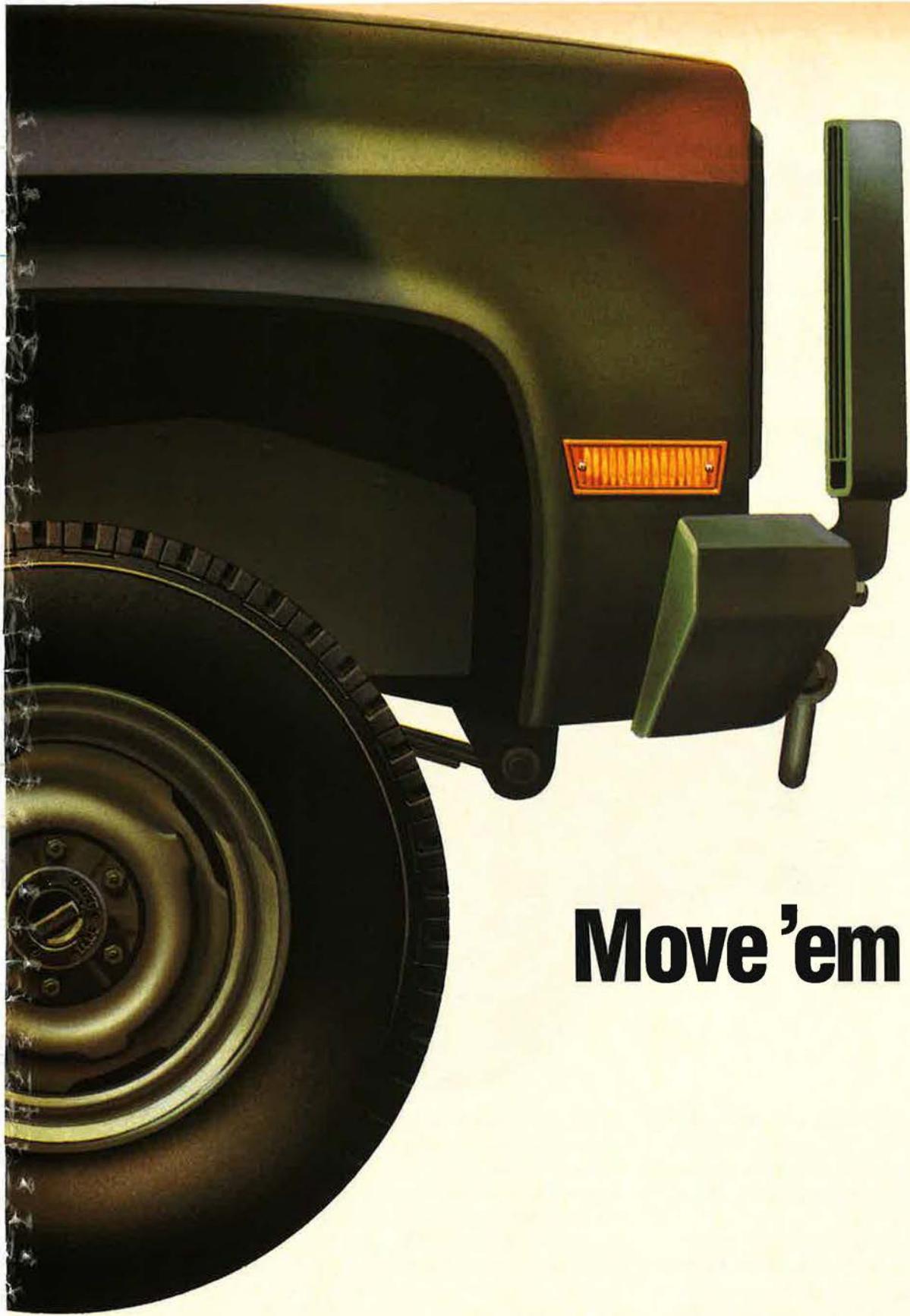
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Our Tactical Vehicles Group is taking the same long view in the area of medium and heavy trucks, but as non-developmental items (NDI). We are actually at work producing a Family of Medium Tactical Trucks. We have formed a teaming arrangement to compete for the Army's Family of Heavy Tactical Trucks. And we can fulfill the Army's requirement for a proven Palletized Loading System.

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THE ULTIMATE ALLY



GENERAL MOTORS DEFENSE

Air superiority is the prestige mission. Sooner or later, though, the war usually gets down to putting bombs on targets.

Improving the Odds In Ground Attack

BY JEFFREY P. RHODES, DEFENSE EDITOR

"You can shoot down every MiG the Soviets employ, but if you return to base and the lead Soviet tank commander is eating breakfast in your snack bar—you've lost the war, Jack."

—A-10 pilots' axiom

THE prestige mission for fighter pilots is air superiority. It always has been, and it will likely stay that way. If the enemy controls the air, he controls the battle on the ground, too. Besides, fighters pitted against fighters in aerial combat is the stuff of classic adventure.

But important as it is, air superiority alone is not enough. Sooner or later, aerial warfare gets down to putting bombs on a target. It's difficult and dangerous, flying on the deck and into the teeth of defenses to attack armor, airfields, troop concentrations, and command and control centers. But it can keep the enemy tank commander out of your snack bar.

Consequently—and regardless of where the prestige lies—a great deal of the serious work for tactical squadrons today is in the air-to-ground mission. Throughout history, most "pure fighter" aircraft—including P-51s, F-86s, and even F-15s—have come with structural provisions to take on an air-to-ground configuration. Nearly all eventually acquire the mission as well.

Any of USAF's first-line fighters—the F-15, the F-16, the F-111, and the F-4—can carry at least 16,000 pounds of air-to-surface munitions. That's nearly twice the bomb load of a B-24 in World War II. Even the F-5 can carry 1,000 more

pounds of ordnance than could a B-17G in its internal bomb bay.

The A-10 and the Air National Guard's A-7 exist to fight the air-to-ground war. Ordnance delivery is so crucial that Strategic Air Command, even though its main concern is delivery of nuclear weapons, dedicates several of its bombardment wings to conventional and theater roles.

For all of these aircraft and aviators, the air-to-ground job is getting tougher all the time.

"We fought a low-threat war in South Vietnam," said Lt. Col. Stephen O. Hammond, a former A-10 pilot and Forward Air Controller (FAC) who now works in Air Force Systems Command's Tactical Aircraft Division's Plans and Programs Directorate. "We could orbit at 1,500 feet, stay above the small-arms fire, and come in and hit the target.

"There is *no* low-threat scenario in Europe," continued Colonel Hammond. "There won't be too many targets that we will just roll in on. We are outnumbered and outgunned, and there are too many targets to kill. Even with one kill per pass, there are not enough passes in the world to do the job."

To improve the odds, the Air Force is counting on superior planning, the quality of its aircrews, and a familiar ally—technology.

Precision-Guided Munitions

The first generation of responses to the growing threat came in the form of precision-guided munitions.

Shortly after the Linebacker I operations began over North Vietnam in 1972, four aircraft carrying Paveway I laser-guided "smart" bombs knocked out the 540-foot-long railroad and highway bridge at Thanh Hoa. The previous 871 sorties, with losses of eleven aircraft, had produced no more than superficial damage to the "Dragon's Jaw." Although Paveway I (officially designated GBU-10) had been introduced in 1968, the destruction of this bridge is regarded as a watershed event in weapons evolution.

The laser designator of Paveway I and later munitions introduced weapons delivery of far greater accuracy than was possible with the radio guidance previously used. The significance of laser-guided weapons was shown by both the British in the Falklands War and by US forces in the April 1986 raid on Libya. Both countries effectively employed the much-improved Paveway II bombs, which can make midcourse corrections to destroy specific critical targets.

As US technology improved, so did that of the enemy. The Soviet SA-2 of the Vietnam era gave way to the SA-6 that was so devastating to the Israeli Air Force early in the

A view no enemy tank driver wants to see—an A-10 rolling in with its 30-mm gun blazing. With up to 16,000 pounds of ordnance on eleven hardpoints and the GAU-8/A cannon firing up to 4,200 rounds of armor-piercing shells per minute, the A-10 will be devastating in its close air support role.



1973 Yom Kippur War, and that led to the SA-10, which is said to be capable of intercepting cruise missiles. As the threat evolved, the need grew for standoff weapons that could be employed outside the target area and then guided in by lasers or TV for the kill.

"We are standing on the threshold of a major change in the performance capability of our tactical aircraft by the addition of a standoff capability," said Col. Richard K. Koehnke, Chief of the Tactical Weapons Division of the Air Force's Directorate of Operational Requirements. "The standoff weapon today is as revolutionary to the warfighting concept as the introduction of the Sidewinder [missile] was to air-to-air combat.

"Standoff weapons are needed in the early critical days of a war to attack airfields and command and control centers before our forces have had [enough time] to roll back their front lines," Colonel Koehnke added.

Limited Standoff Capability

Currently, the US has only a limited standoff capability with the Rockwell GBU-15 electro-optical glide bomb. Utilizing the 2,000-pound Mk 84 general-purpose warhead, the GBU-15 has a standoff range of roughly five miles, and the weapon is capable of destroying a

variety of heavily defended targets. More and different types of standoff weapons are in development.

The advantages of standoff weapons are great. Munitions can be delivered from farther away, thus minimizing the time the launching aircraft has to stay in the target area. This, in turn, lessens the chance of the airplane becoming a target for surface-to-air missiles (SAMs) or anti-aircraft guns. Sortie generation, or the ability to launch the same aircraft again and again, will improve, while attrition rates will fall. Furthermore, increased accuracy reduces the number of shots needed to "take out" a target.

The main disadvantage of standoff weapons—and laser-guided munitions as well—is that these sophisticated and capable weapons are very expensive.

"We can't afford to use standoff weapons for everything," said Col. Patrick R. Craig, Chief of the Avionics and Armament Development Division of the Directorate of Development at the Pentagon. "We have a large inventory of iron, or 'dumb,' bombs, and we will have to use them. The two types of weapons complement each other."

"The Air Force went down two avenues—precision munitions and precision airplanes," added Lt. Col. Stephen R. Pingel, who works in the Fighter Division of the Directorate

of Operations at the Pentagon. "With precision airplanes—such as the F-16, with its advanced electronics and computer-aided delivery systems—go the iron bombs." He went on to note that some targets can be destroyed more "economically" with inexpensive iron bombs than with costly precision-guided munitions.

Precision-guided munitions are too expensive to use in large quantities, and it would be impractical to use iron bombs alone against heavily defended targets far behind the battle lines. Overall effectiveness depends on finding the right mix of weapons to carry out the mission.

How the Mission Divides Up

In simplest terms, the air-to-ground arena can be broken up into three relatively distinct areas, but as with any battle, these distinctions can easily become blurred. Each of the areas—deep interdiction, battlefield air interdiction (BAI), and close air support (CAS)—have unique characteristics and associated problems.

"Air interdiction sorties are preplanned, and a pilot will take off, won't talk to anybody along the way, and just go out and do his thing," said Colonel Hammond. "His thing" will include flying as deep as 800 kilometers behind the Forward Edge of the Battle Area

(FEBA) through radars, SAMs, and enemy fighters to attack targets that do not have a near-term effect on the battle, such as airfields, or critical chokepoints, such as bridges and POL (petroleum, oil, and lubricants) storage areas.

Currently, the responsibility for carrying out this segment of the mission falls to Air Force F-111s and, to a lesser extent, the multinational Tornados. "A typical mission in this area would consist of F-111s with either Durandal for cratering run-

behind the FLOT [Forward Line of Troops], your actions will have a relatively near-term effect on the battle," Colonel Hammond explained.

This intermediate area is best taken care of by F-16s, F-4s, and, to a much lesser extent, F-15s. Other players in this arena would be the Tornados and British Harriers. Destruction of targets in this second echelon—or Follow-On Forces Attack (FOFA)—is a cornerstone of current NATO strategy.

"In Europe, the primary role of

Close air support of ground troops in contact with the enemy is the most complicated segment of the air-to-ground mission. There must be coordinated attacks by Air Force A-10s and Army AH-1 Cobras and the soon-to-come AH-64 Apaches. These attacks will be over the heads of the infantry, and the pace of the battle will be fast. Additionally, tanks, troops, shoulder-fired and track-mounted SAMs, and Soviet Hokum and Havoc helicopters firing air-to-air missiles will intensify an already busy battlefield.

"The advent of the A-10 was a milestone in air-to-ground," Colonel Hammond said. "For the first time, there was an airplane specifically designed for the close air support mission." The A-10, officially dubbed Thunderbolt II but commonly referred to as the "Warthog" because of its ungainly appearance, will be particularly important in the first days of a war.

The A-10 has long loiter time, can carry up to 16,000 pounds of ordnance, and features the GAU-8/A 30-mm Gatling gun for attacking armor. Some sixty percent of its mission will be to destroy enemy tanks. To do this, the A-10 will employ its gun and up to six AGM-65D imaging infrared (IR) Maverick missiles. It can also carry the Combined Effects Munition (CEM) dispenser with its variety of submunitions for antipersonnel/antivehicle attack.

Air National Guard A-7 Corsair II aircraft will also be called on to play a vital part in any future large-scale air-to-ground war environment.

"In close air support, there are specific rules of engagement, and certain criteria have to be met before the release of any weapons," Colonel Pingel said. "The targets become a function of where the friendly troops are on the ground."

Colonel Hammond added that "close air support is extremely complicated because of the coordination required. People have to talk to one another. There are things the Army has to understand about working with the Air Force, and there are certain things pilots have to understand about working with the Army. There are also certain restrictions you have to put up with when delivering lethal ordnance next to your own troops."



An F-111F from the 48th TFW at RAF Lakenheath, UK, banks away. This F-111 is carrying four Paveway II laser-guided weapons and has its Pave Tack laser designator deployed under the forward fuselage. F-111s with precision-guided weapons will be used for knocking out critical enemy targets far behind enemy lines.

ways and Mk 82 High Drags [iron bombs with either folding fins or 'ballutes' to slow the bomb's descent] to take out targets on airfields or precision munitions for small point targets, such as a railroad bridge," Colonel Pingel noted. These precision weapons could include GBU-15 or the BLU-109/B, a 2,000-pound weapon for use against such hard targets as bunkers.

"An F-111 mission in bad-guy country will have to be a one-pass thing," said Lt. Col. David B. Cecil, Chief of the Wargaming Branch of the Combat Operations and Exercises Division at the Pentagon. "In interdiction, the pilot's job, as it has been in every [air-to-ground] war, will be to engage, kill, and survive."

"BAI comes in the area between close air support and where what you do no longer has an immediate effect on the battle. Because you are attacking forty to eighty kilometers

the F-16 is air-to-ground warfare," Colonel Pingel noted. "The F-16 is a digital airplane, [relying on digital rather than analog computers], and it can accurately drop dumb bombs on the targets that need to be hit." The Gator mine system can also be used in this segment of the battle for area denial.

Still a Role for the F-4

Although the venerable F-4 Phantom II has largely been replaced in the active force inventory, it would be used for air-to-ground missions by Reserve and Air National Guard augmentation units. However, the Wild Weasel variant of the Phantom II, the F-4G, will be vitally important to the NATO effort. It uses advanced electronic equipment and the AGM-88 HARM (High-speed Antiradiation Missile) or the older AGM-45 Shrike missile to destroy or suppress enemy radar sites.

This coordination is accomplished by the use of a FAC or some other means, such as an Airborne Battlefield Command and Control Center (ABCCC). The FAC will be flying in an OA-37 or an OV-10 and generally will serve as the "traffic cop" over the battlefield, directing aircraft to targets.

An A-10 pilot, for example, will show up over the target area and get a briefing from the FAC that includes initial point, heading, and distance. The FAC will then clear the attack pilot to release ordnance.

It would be convenient for planners and participants if the air-to-ground war stayed in well-defined categories, but the battle will be in a constant state of flux.

"There is no set sequence or scenario once the war starts," Colonel Pingel summed up. "Daily planning is a long, involved process that is flexible. The Joint Forces Commander will divvy up the forces to what he sees as his biggest threat that day. The F-111s will go to interdiction, and the A-10s will be divvied off for CAS. That leaves the swing airplanes—F-16s and F-4s—that are going to fly and do what they can, but initially they'll be used to help F-15s gain and maintain air superiority. If we have the air battle under control, then we'll be able to use F-16s and F-4s for bombing. The A-10s will not sit on the ground until the skies are clear, though. They will have to support the Army."

"The assets will go where they are most needed," added Colonel Hammond. "And the others will have to fend for themselves."

Not as Easy as It Sounds

There is ample evidence that coordination of the AirLand Battle isn't all that it should be.

The main bone of contention is coordination. "Like others, I read the media accounts of poor communications coordination in Grenada," noted Colonel Hammond. "It was certainly a matter of concern then, and it is now."

Things have improved a great deal since Grenada, but the Air Force's primary radios are UHF (ultrahigh frequency), for communicating in the air, while the Army still primarily uses VHF (very high frequency) radios, which work bet-

ter on the ground. Thus, each service must carry two sets of radios. A positive side effect of this is that the enemy has more channels to jam.

Even though the US has such radios as Have Quick, which hops frequencies every few milliseconds, operators still worry about jamming. The communications network is a complicated system. It has to work, or there can be no coordination.

A-10 pilots regularly go to Fort Irwin, Calif., to practice Joint Air Attack Team (JAAT) operations with their Army counterparts. JAAT operations feature the use of an Air Battle Captain (ABC) flying in an OH-58 Kiowa helicopter to observe the ground battle, control the Cobra gunships, and direct the FAC, who, in turn, controls the A-10s. To eliminate the possibility of collisions at low altitudes, A-10s are required to stay at least 100 feet above the ground, and the Army helicopters will operate from the ground to the tops of the trees.

"The idea is that when a war kicks off, there will be enough Army chopper pilots and A-10 pilots who have played JAAT, so everything will fall into place," said Colonel Hammond. "It works out that the coordination is almost intuitive."

So far as other joint operations are concerned, Colonel Hammond said that "there shouldn't be any inherent conflict between the Air Force and the Navy, Marines, or allies that we can't overcome. We just haven't done [extensive joint operations with them]. Unless you practice, you could have problems."

A Different Set of Problems

A different set of problems involves aircraft.

The last O-2 was retired recently (*see p. 36*), leaving USAF with only the OA-37 (which has a relatively short loiter time over the target) and the OV-10 as the primary FAC aircraft. The aging OA-37 fleet is being depleted, because the US is selling off the airframes to allied countries through the Foreign Military Sales (FMS) program. The Rockwell OV-10 Bronco, introduced in 1967, is also getting long of tooth. The Air Force has not set a requirement for a new FAC aircraft, although a Request for Information (RFI) was cir-

culated among manufacturers almost two years ago. It is conceivable that the Air Force could take some aircraft "off the shelf" for this role, as it did in 1966 when the Cessna 337 Skymaster went military as the O-2.

An interim solution has been proposed that calls for the FAC pilot to fly with the Air Battle Captain in the OH-58. While this would be effective in some ways, it would seriously limit the FAC's perspective. He could not see over trees or beyond ridges, and if a distant platoon got in trouble, the FAC could not give effective relief.

The F-4G is aging, too. The Wild Weasels have had electronic upgrades and can still perform effectively, but the basic airframe is approaching the fifteen-year-old mark.

By 1995, the A-10 will be twenty years old, and USAF will have to think about providing for the next generation of close air support aircraft. It may decide to convert a fighter for this role rather than build a new aircraft specifically designed for long loiter and operation at low regimes.

Modernization of the Wild Weasel and close air support fleets will ultimately depend on budgets and the priorities they will allow.

"It is a touchy subject," Colonel Hammond observed. "When a need translates into actual bucks, it comes down to a question of whether we buy planes to fill an immediate need or a follow-on Wild Weasel. We have to stick by the priorities and do the best we can [in the other areas]."

Another area of concern is controlling the attrition that will take a heavy toll in any future war. Airplanes and crews will be lost to enemy action and to accidents. Sometimes, the resources just won't be available where and when they are needed.

"The key to an effective war is not to let attrition eat you alive," said Colonel Pingel, who flew F-4s in Vietnam. "Really simplified, you have to manage attrition by changing your tactics or changing your equipment. We have weapons and tactics officers, along with a squadron or wing electronic warfare officer (EWO), who are trained to do that. The intelligence community is

equally important in this process."

An additional area of concern is training. It requires roughly ten hours of academic work to learn to use the Pavé Spike laser designator on the F-4, and the Pavé Tack system requires a slightly longer time in the classroom.

"Your proficiency level drops off rather rapidly [if you don't continue to train]," said Colonel Cecil, who has seen time in the F-100 and F-111. "Not just anybody can sit down and use a radar [right away]. The image of a hill or a lake on a radar is not inherently obvious. Not only do we need to have trained people, we need to keep them proficient."

The Future of Air-to-Ground

The Air Force's Advanced Tactical Fighter (ATF) will certainly be a boon to the air-to-air community, and it will also be of great benefit to the AirLand Battle.

The combination of the ATF and the F-15 at the turn of the century should prove so lethal to the enemy that the swing-role F-16s will be freed up much sooner to begin air-to-ground operations. This will initiate a ripple effect on the rest of the conflict. For example, high-priority, second-echelon targets will be taken out much sooner. Close air support missions can then be carried out with more impunity. This, then, could end the conflict sooner.

One near-term improvement will appear this December with the rollout of the McDonnell Douglas F-15E. The dual-role Eagle will give the F-111s a new stablemate in the interdiction business while still retaining air-to-air capability. The tandem-seat F-15E will be capable of carrying 23,000 pounds of ordnance (almost as much as the F-111) and will have terrain-following radar and a wide-field-of-view, forward-looking infrared (FLIR) sensor. It, along with the F-16, will be outfitted early with Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system pods for night and under-the-weather operations. Current plans call for the production of 392 F-15Es, and initial operational capability (IOC) is set for calendar year 1989.

Eight Holes in the Runway

Several new weapons develop-

ment programs are under way, all of which will greatly enhance capability.

The Sensor Fuzed Weapon (SFW), with its ten submunitions and forty warheads, will provide multiple kills per pass against massed armor. The SFW started full-scale development in November of last year and should enter production in 1989.

The Direct Airfield Attack Combined Munition (DAACM), which should enter full-scale development next year, will consist of eight Boosted Kinetic Energy Penetrators (BKEPs) and twenty-four area denial mines. "The DAACM will replace the French-built Duran-

is the Air Force's first true standoff weapon. It has a range triple that of the GBU-15.

The most promising munition program currently under way is the Modular Standoff Weapon (MSOW). This seven-nation program will provide a standoff capability in a modular package that can be assembled in three different versions. "This is the first of the Nunn Initiatives [named for Sen. Sam Nunn (D-Ga.)], and it is a very exciting development," said Colonel Koehnke. "By using the same basic airframe and common flight controls, we can mix and match submunitions in the weapon, and with low-cost expendable engines, we



The F-16 will play a crucial role in any future conventional war because of its ability to carry out both the air-to-air and air-to-ground missions. Because it is a "smart" airplane (with advanced electronics), the F-16 will employ iron, or "dumb," bombs to their fullest advantage.

dal, and instead of one hole in a runway, we'll get eight," said Colonel Craig, an acquisition specialist for the past ten years. "The mines will disrupt or prevent runway repairs, too."

The Hypervelocity Missile (HVM) will provide a low-cost, multiple-kill-per-pass, tank-killing capability. The HVM—which is basically a solid steel rod—travels at speeds exceeding 5,000 feet per second and defeats the target by means of its kinetic energy. This small missile carries no warhead, and all avionics will be located on the carrier aircraft.

The Rockwell AGM-130 is now about to enter production, and the Texas Instruments GBU-24 Paveway III bomb (also called the Low-Level Laser-Guided Bomb) has just completed follow-on test and evaluation (FOT&E). The AGM-130, which is a rocket-boosted GBU-15,

can have one standoff weapon that can be used for both long and short ranges." The MSOW should be ready around 1993.

Should war break out today, the Air Force and its NATO allies stand in pretty good shape, but this condition is not a permanent one. The force must be modernized to meet the threat. The airplanes in the field are adequate to do the job, and the F-15E will be an extremely capable addition to the lineup. A more accurate and broader-based standoff capability is needed and is coming, but it will take time. The standoff cause must continue to withstand congressional budget fights. Battle coordination is critical, and more joint exercises are a major way to prepare for war.

If all of these steps are taken and improved on, that Russian tank commander just might have to go hungry. ■



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NATO's top military man is concerned by the growing prospect that the Soviets might dominate Europe without firing a shot.



SACEUR Gen. Bernard W. Rogers

The Potential Checkmate in Europe

BY EDGAR ULSAMER, SENIOR EDITOR (POLICY & TECHNOLOGY)

FIRST evidence of a fundamental change in the Warsaw Pact's order of battle came to light five years ago in "Zapad '81," a major exercise that tested the concept of operational maneuver groups. This concept "is really a restoration of the old mobile force concept of World War II," according to Gen. Bernard Rogers, the military head of NATO and CINC USEUCOM. The basic feature of this innovation in traditional Soviet operational concepts hinges on deep operations into an opponent's rear area early in the conflict.

By adapting their experiences with mobile forces in World War II, the Soviets have developed Operational Maneuver Groups (OMGs) to conduct mobile warfare in the enemy's rear area following a breakthrough of his forward defenses. The insertion of OMGs—consisting of "tank-heavy" formations supported by infantry fighting vehicles, mobile fire support, air defense, air assault units, and aviation—is designed to isolate NATO's front-line defending forces, disrupt rear-area logistics and reserves, threaten key command and control centers and economic and population centers, and neutralize nuclear attack systems.

But "they are finding that they have some problems" with this doctrine, General Rogers believes. "First, there is the question of resupply. Secondly, there is the question of command and control." Accompanying the doctrinal shift to OMGs, he said in response to questions by AIR FORCE Magazine, "has been a reorganization of the command and control system for their ground forces, [with the result that the Soviets now] have in operation during peacetime the same C³ structure that they would use in wartime." He added that there is also

evidence of adjustments in tactical air warfare doctrine that "we interpret as giving them greater flexibility and utility of the aircraft [in their arsenal for both] the air-to-ground and air-to-air missions."

Here, too, the Soviets seem to have dusted off their World War II experiences and adjusted them to up-to-date requirements and equipment. Under conventional warfare conditions, according to their latest doctrine, massive air strikes would take the place of massive nuclear strikes. Such an operation would be performed simultaneously within the sectors of several fronts in an attempt to achieve air superiority and destroy or weaken NATO's air and nuclear resources. Clearly deemed critical to the outcome of theater campaigns, air strikes would be meant to destroy NATO's tactical nuclear capabilities and C³ facilities, to disrupt any coordinated defense, and to assure air superiority by neutralizing the main force of NATO's airpower at the outset of hostilities.

Soviet Edge in Chemical Capability

Soviet superiority in chemical warfare capabilities could come into play early and decisively in a NATO/Warsaw Pact conflict, in General Rogers's view. The reason, he explained, is the likelihood of initial successes by NATO forces that the Soviets might seek to counter by escalating to chemical warfare.

If, in the case of a Pact attack, the NATO forces—assuming appropriate and timely political decisions—can be emplaced at their general defensive positions with their defenses properly organized—"which takes some time—then our troops will fight quite well [for so

long as their limited war reserves last]. I am talking about capable leaders and a sound doctrine that we are sure of, good soldiers, and good equipment. The trouble is that we can't sustain long enough. But during that initial period, we [would] be fighting very well and be [quite] successful in keeping [the Soviets] from achieving their initial objectives."

I can't think of anything that will move the Soviets more quickly toward their objectives in Europe than the withdrawal of US forces.

The SACEUR's resultant concern stems from the major advantage that accrues to Warsaw Pact forces from the early use of chemical weapons if their conventional attack stalls. Just by forcing the US and other NATO forces into the cumbersome protective gear—meaning those “that have [it]—we estimate that we would lose about eighty percent of our air sorties and about sixty percent of the efficiency of the people wearing those suits.” The Soviets, on the other hand, “could fight fairly freely” if the US and the other NATO countries “remain unprepared and don't have sufficient [CW] weapons to retaliate.” The reason the Soviet troops would not be correspondingly handicapped, General Rogers pointed out, is that “they use nonpersistent gas. We won't know when they are going to drop [CW weapons] again, [yet] prudent [NATO] commanders—once the first weapon goes off—will want to keep their troops in protective garments.”

General Rogers argued that “the purpose of having adequate and appropriate types of modern CW weapons [in NATO's arsenal] is to deter the Soviets from using [theirs]. That's why some of us are struggling so hard to get Congress to authorize the production of [modern

CW weapons]. I believe that [initiating US production of the modern CW] binary round will send a message to the Soviets that says if you start CW, we will be able to retaliate.” This action could thus possibly deter the Warsaw Pact's use of these weapons. Development of an offensive US CW capability might also represent effective leverage with the Soviets in negotiations that seek the ban of all such weapons, in General Rogers's view.

NATO's scorecard in CW capabilities ranges from “quite good to almost nonexistent,” he added. The Soviets, on the other hand, “have the full panoply of what you need for chemical warfare, starting with detection and running through all the way to decontamination. . . . NATO does not have that.”

Proposed US Pullout Spells Disaster

“I can't think of anything that will move the Soviets more quickly down that road toward the objectives [they have set for themselves] than the withdrawal of US forces” that is being sought by some elements in Congress as well as by former Secretary of State Henry Kissinger and former Carter Administration National Security Advisor Zbigniew Brzezinski, the SACEUR asserted with visible frustration.

These proposals to remove 100,000 US troops from Europe and assign them to an expanded rapid deployment force situated in the US were born of two complementary notions. For one, the use of US forces assigned to NATO to strike Libya last April suggested to some people that the US presence is greater than needed for legitimate NATO support. Secondly, these analysts argue that by bringing 100,000 of these forces back to the US, the European NATO members could be coaxed to up their own military contributions to the Alliance. In lacerating this reasoning, the SACEUR suggested that bringing these forces back to the CONUS is tantamount to “taking them out of the structure. We have played that game before.”

But the truly “disastrous” consequence of such moves—one was sponsored by Rep. Pat Schroeder (D-Colo.) in an amendment that the House subsequently defeated—is the signal it sends to Moscow. According to General Rogers: “The objective of the Soviets in Western Europe is to reach a point where the military situation—even for a defensive alliance—is beyond restoration.” From the Soviet perspective, this condition obtains when “what they term the ‘correlation of forces’ is [so tilted in the USSR's favor] that she would have the opportunity to intimidate and blackmail Western Europe without having to fire a shot.”

Such a potential checkmate, he said, is his “major concern as SACEUR. That is the direction [in which] we are heading, because every year that goes by—even though we get stronger because of the commitment by our [member nations]—the gap widens [because of the excessive military growth by the Warsaw Pact]. The day will come when [this imbalance] is beyond restoration.” The Soviet Union, he warned, will know when that point is reached “the minute we know, if we operate under the assumption that everything we know about ourselves, she knows—and that is valid.”

It follows, he asserted, that “if the US withdraws 100,000 troops from Europe, this won't make the West Europeans do more [in terms of their contributions to

NATO; rather, such an action] is going to send the kind of message that will lead [the European NATO members] to start to accommodate to the East. It will be an excuse for the UK to pull some of its forces back" and will cause similar reactions among the other member nations.

The military head of NATO acknowledged that this country's decision to use US forces assigned to the Alliance to stage the April 15, 1986, raid against Libya caused concern among the European members "that have authorized the stationing of those forces on their soil for NATO purposes. . . ." This concern, he said, stemmed in part from the fact that the US forces were detailed to the Libyan operation without a prescribed "NATO alert" stage being reached. Also, there was a tendency within NATO to ascribe "unilateral" purposes to the US action, even though this country was motivated by "multinational purposes [that served] the interest of all [NATO] nations," according to General Rogers.

The ATBM Imperative

For a variety of reasons that includes the need to counteract the Soviet Union's SS-21, SS-22, and SS-23 theater ballistic missiles equipped with conventional warheads, General Rogers told *AIR FORCE Magazine* during a recent press breakfast, his interest in developing and fielding antiballistic missile defenses within NATO is "very high." Stressing the importance of deterring both the nuclear and conventional capabilities that reside in these Soviet weapons, he pointed out that even when these missiles carry conventional warheads, "they can cause us a lot of problems with our nuclear assets, with our [seaports], and with our command and control facilities." This would be doubly true, he added, if these Soviet weapons can't be "captured at the negotiating table and assuming that we will not deploy additional weapons on our own soil to counteract them on the nuclear side."

NATO Europe is also interested in the fielding of an antitactical ballistic missile (ATBM) system, with Dr. Manfred Woerner, the German Defense Minister, taking the lead in efforts to commit the Alliance to its development. In describing the somewhat tortuous approval process by which NATO's weapon systems requirements are hatched, he pointed out that ATBM has been in "our highest priority band" for some time now. Among the crosscurrents that are affecting the so-called Mission Need Requirement associated with the ATBM project are questions about how and by whom the system is to be developed, the SACEUR pointed out.

This involves competitive factors—such as the interests of the aerospace industries of various member nations—that need to be resolved collectively by the NATO Armament Directors, according to General Rogers. But this impasse was seemingly resolved in May of this year when the German Defense Minister convinced his opposite numbers that the NATO Defense Committee should resolve the issue in the context of "extended air defense to take care of ground-launched cruise missiles as well as tactical ballistic missiles," General Rogers said.

The fate and progress of NATO's ATBM project are also affected by the US Strategic Defense Initiative, especially by the fact that SDIO "is moving around

Europe, dropping little piles of money on the desks [of NATO member countries, offering, for instance, \$14 million to the British], and saying, 'Would you please develop an ATBM architecture for Western Europe?' " Claiming that he did not mean to be critical of SDI's managers, he suggested this approach was "fine, because the [NATO] nations have to get their industries involved, which is a key to getting the West Europeans to think about it." At the same time, he expressed reservations about the SDIO's policies on grounds that they encourage various parochial solutions by NATO members and their industries, "which have gotten quite powerful."

The SACEUR would instead like to see SDIO "take a big sack of money and plunk it down [in front of] the Conference of NATO Armament Directors and say, 'Now here is the contribution the US is willing to make as you decide how to fulfill these mission-need documents for an ATBM.' " He added that the US ought to insist that the system should be built in Europe by the NATO member countries in close technical cooperation with the Strategic Defense Initiative office. With SDI as well as West European ATBM efforts relying on similar technical advances—from boost-phase interception to killing hostile ballistic missile warheads in their terminal target area—"we ought to be exchanging this information across the Atlantic," General Rogers suggested.

Most importantly, the SACEUR pointed out, this country "can't put itself into the position where it intimates to the West Europeans that [the US] is going to deploy an ATBM in Western Europe at its own expense, manned by US personnel. We must not do that. We must encourage the West European development of an ATBM architecture" and then be very supportive as it "is being deployed."

Cooperative Approach to CDI

Although he underscored that there is no "correlation" between SDI and the Conventional Defense Initiative (CDI)—a concept that is gaining major momentum on both sides of the Atlantic—General Rogers hinted that here, too, the joint, cooperative aspects need to be dealt with gingerly. The primary catalyst for the Conventional Defense Initiative is the US Congress, which urged that CDI "be established [in FY '87] to provide emphasis on improving conventional weaponry for the armed forces and enhancing cooperation with NATO allies with the objective of improving the fighting power and survivability of US combat forces and raising the threshold of nuclear war."

Some \$462 million have been earmarked for CDI next year, with the recommendation that this initiative be treated with the same priority as SDI. But, as the House Committee on Armed Services emphasized, "unlike SDI, [this initiative] is not intended as a technology exploitation program. The technology for Conventional Defense Initiative exists in America and overseas. In many instances, the technology is not expensive and need not take a decade to translate into operationally useful weapon systems and subsystems."

The "sense-of-the-Congress" resolution on CDI enumerated a range of weapon systems developed by allied nations that should be adapted for use by the US armed forces. These recommendations run the gamut from the

British Sprite remotely piloted vehicle and the German *Panzerfaust III* antitank weapon to various standoff weapons. Congress, for instance, urged the Air Force "to evaluate conventional attack standoff weapons developed by US allies that are more capable and/or less costly than the AGM-130 [standoff munition]." Specifically, Congress cited the "Israeli long-range air-to-

We must encourage the West European development of an antitactical ballistic missile architecture and support its deployment.

ground guided bomb for high-value targets," which was defined as an electro-optical standoff weapon of "greater" range, operational flexibility, and target-acquisition capability than the AGM-130.

The House Armed Services Committee, stressing the importance of cooperative R&D with NATO, recommended that, as part of CDI, the three services spend some \$90 million among them for this purpose: "This is one of the most significant elements of the Conventional Defense Initiative, because it will greatly improve . . . return on investment by avoiding needless duplication of effort."

On the European side, General Rogers pointed out, NATO's "Secretary General is pushing CDI very hard" as a key to conventional force improvement and force sustainability. While collaborative weapons programs between the US and the European NATO members in the past often failed to proceed on a two-way-street basis, "important progress is being made, which is very encouraging," he pointed out. In this context, he singled out the so-called Nunn (for Sen. Sam Nunn of Georgia) Amendment that allocates \$200 million annually for US R&D investments in NATO Europe.

On the other hand, the SACEUR was critical of such congressional actions as the recent reopening of bids for a contract let with an Italian handgun manufacturer, Beretta, that leaves "the Europeans wondering what the hell is going on." After finding out that a contract has been let to a West European nation following rigorous competition—in consonance with Congress's mandate to increase cooperative arrangements—Congress then "tries to overturn the procedures that [it] insisted the Defense Department establish." He added with feeling that "I think it's wrong for parochial interests in Congress to have sufficient influence" to engineer such an about-face.

NATO's Achilles' Heel

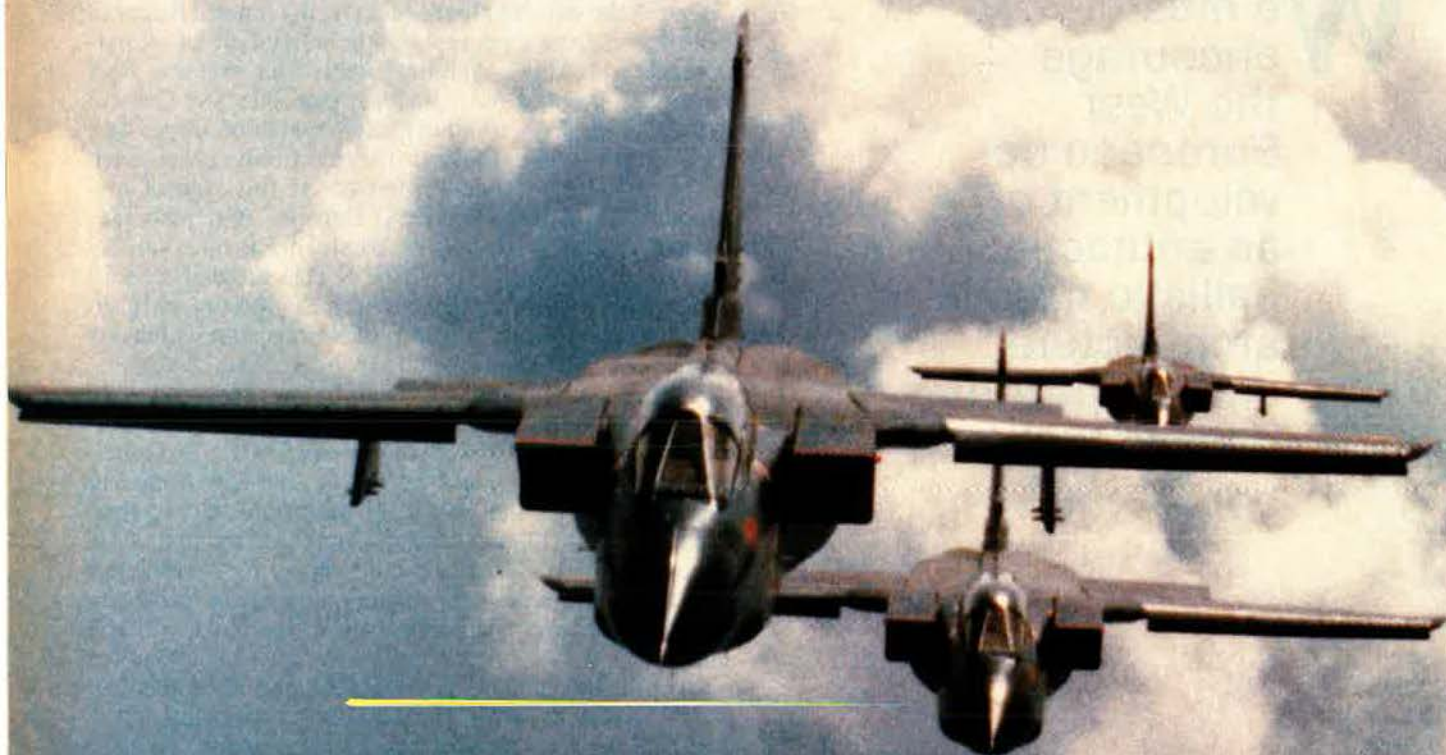
One of the central pluses of CDI, in General Rogers's view, stems from its potentially beneficial effect on sustainability, NATO's Achilles' heel. The Warsaw Pact forces, he pointed out, "at least opposite our Central Region, have sixty to ninety days' worth of spares and supplies forward-deployed. This certainly gives them the advantage, because we don't have this kind of sustainability in Allied Command Europe." For instance, the US forces stationed in Western Europe, he explained, are in general above the NATO standard of only thirty-days' sustainability, which "is attributable, in part, to the long lines of communications over which our equipment must move."

Nevertheless, even the US falls below that standard in the case of some "preferred munitions," such as air-to-air missiles. From his point of view as SACEUR, General Rogers said, it would be better that US forces in Europe increase the preferred munitions stores than expand existing regular stocks. Compared to most of the European allies, US sustainability is good. "I would not have a great problem with sustainability if the European forces could work their stores up to the US level," he said.

Overall, the quality of the forces and equipment in NATO as well as in the Warsaw Pact is improving, in the SACEUR's view. Ironically, the Soviets seem to be gaining more from advances in "our technology [than does NATO because] they can exploit [them] more quickly than we can." He added that "if you take a snapshot today—that is from the standpoint of equipment [and] the training of our troops—we in Western Europe [probably are ahead]. The things that are tough [to gauge] are quality of leadership [and] adequacy of doctrine."

In this context, General Rogers pointed out that in case of war in Western Europe, "we would fight under the doctrine of Allied Command Europe [ACE]," meaning a purely defensive strategy. Contrary to such US concepts as AirLand Battle (ALB) 2000, "We will not preempt, even when we see them coming. We will wait until they fire the first shot, because that's the rule of engagement with NATO." The Alliance's Follow-on Forces Attack (FOFA) concept, which is predicated on this defensive strategy, occasionally has been confused with the AirLand Battle doctrine of the US and thus caused consternation within NATO: "We now have pretty well dampened down these concerns of the West Europeans with regard to what we are trying to do with FOFA and their relating it to ALB." ■

Those Bombing



RAF Tornados from 27 Squadron en route to the 1985 SAC Bombing and Navigation Competition. The RAF crews had to adjust to high-level bombing since their normal bombing height is only 150 feet.

This Tornado squadron trained to peak at the right time and went on to win two trophies at the SAC bombing competition.

Champs From Britain

BY WING COMMANDER JOHN GROGAN, RAF

THE phone rang. It was the base commander. "Your squadron has been chosen to compete in the 1985 Strategic Air Command Bombing and Navigation Competition."

It is difficult to know at a moment like that whether to laugh or cry. On the one hand, it is a great challenge to take on the might of SAC and TAC. But other squadrons on the base had competed last year and had been quite successful. Truth to tell, they had won two trophies.

During the 1950s and '60s, the Royal Air Force was very keen on competition flying, but in the early 1970s, this enthusiasm waned. Aircraft were becoming more sophisticated and more expensive, and flying became considerably more serious. Competitions were acknowledged to be a "good thing," but nobody could justify the preparation time or the expense. By the 1980s, competition flying had all but disappeared. Happily for me and my squadron, this lack of interest did not extend to the SAC Bombing Competition. Over many years, the Royal Air Force had participated in the competition with its Vulcan bomber with varying success.

Once the Vulcan had been phased out of service, it was expected that our participation in the SAC Bombing Competition would die with it.

However, the SAC Bombing Competition remains the most prestigious military flying competition in the world. When we were invited to take on America's best with our shiny new aircraft in 1984, it seemed churlish to refuse.

At this point, for those of you who are unfamiliar with the type, I will mention a few words about the Tornado. One thing that should perhaps be cleared up at the outset is that it is pronounced Tor-nay-do, not Tornah-do. But then the Brits could never speak English, could they?

The Tornado is an all-weather fighter-bomber built by three nations in collaboration. A total of 809 was ordered for the three nations: 385 for the UK, 324 for Germany, and 100 for Italy. In addition, Saudi Arabia has ordered seventy-two, and Oman has ordered eight. It is a little smaller than an F-4 and slightly bigger than an F-16. It has two seats—one pilot and one navigator.

About the Aircraft

It is powered by two Rolls-Royce (Turbo-Union) RB.199 engines developing 9,000 pounds of thrust each in military power and 16,000 pounds of thrust each in afterburner. It has swingwings, which allow landing speeds of around 120 knots and a maximum speed of 800 knots, or Mach 2.2. The maximum

weight of stores that can be carried is more than 20,000 pounds. Normal peacetime sortie length with two 1,500-liter fuel tanks is around one hour and fifty minutes at low level and at 450–480 knots.

It is also fitted with a number of unusual features for this type of aircraft. For instance, it has thrust-reverser buckets on both engines that are augmented by lift dump via wing spoilers fully deployed on the upper wing surface. This facilitates landing distances of around 1,500 feet ground roll.

It has a most comprehensive avionics fit. To enable the aircraft to fulfill its all-weather role, it is fitted with two radars, one for ground mapping and air-to-air work and the other for terrain-following. Doppler, a radar altimeter, TACAN, ILS, and a Laser Ranger and Marked Target Seeker (LRMTS) are also fitted. (The use of the laser was prohibited during the competition.) The heart of the navigation system is an inertial platform that is backed up by a twin-gyro platform.

Navigation and weapon functions are derived from a Kalman filter, which takes inputs off of the IN and Doppler to give a continuous "best position" for navigation and the best available data for weapon aiming. The whole system is presently run from a 64K computer (all aircraft

are in the process of being fitted with 128K computers). The combination gives excellent navigation and weapon-aiming performance. Many would say this performance is unparalleled, and I would not disagree.

The pilot has a wide-field-of-view HUD, all the normal instrumentation, and a moving-map display. He also has an E-scope presentation for IMC terrain-following work. The navigator has control of the inertial system and computer. He has two TV screens and a combined moving-map and radar display. This allows him to superimpose his radar display on the moving map—a useful aid that makes updating, radar weapon aiming, and navigation much easier.

It is also fitted with RWR, a Sky-shadow ECM pod, and a BOZ chaff and flare dispenser. Finally, standard fit includes two 27-mm Mauser cannons integral to the fuselage and two Sidewinder missiles for self-defense.

The controls are quadruplex fly-by-wire, which is computer-controlled in all three axes; this system has the capability to revert to manual controls should it be necessary. Part of the control system incorporates a sophisticated autopilot that allows navigation and bombing completely automatically at 200 feet and at Mach 0.9 with pilot "hands off."

This brief overview of the aircraft may give the impression of a capable, state-of-the-art fighter-bomber, which indeed it is. However, there is not much that could be described as "strategic," and there is not much about the aircraft that would suggest high-level bombing.

Thus, we approached the Strategic Bombing Competition with caution. Given some training and practice and sensible husbandry of aircraft systems, the low-level-bombing ECM aspects, timing, and navigation were all areas well within our grasp. However, there were two areas that did cause concern. First, high-level bombing (from 17,000 feet) was not an event that we had ever practiced—our normal bombing height is 150 feet! Second, the six-and-a-half-hour sortie lengths dictated that we would have to refuel in the air twice during the competition. This would clearly be a

major disadvantage, particularly since all the other competitors (who flew "strategic" aircraft) could complete the competition route without refueling.

Preparation of Three Kinds

It was with some of these thoughts that we started our preparation. After the previous year's success with the Tornado, we could expect no quarter. I was keen that the form of training would be progressive, aiming to peak at the right time. Therefore, the program was split into three basic areas.

First we would have to learn the various techniques and procedures required for the competition, many of which were unfamiliar to us—particularly the techniques involved during high-level bombing. Similarly, we had to evolve procedures that would guarantee that the tanker and the fighter would join up and refuel regardless of the weather conditions. Second, crew practice and selection would be required. Lastly, the aircraft would have to be modified to take part in the competition, and then their serviceability status and their individual idiosyncrasies would have to be monitored.

High-level bombing proved to be absolutely straightforward with our inertial system. Although we felt odd up there, our soulless but very efficient computer had no such hangups.

So long as the navigator held the radar on the right target, in the bombs would go. But we did learn about D factors—that essential knowledge that is in the back pocket of every high-level bomber. This was the difference between the actual change of pressure due to height against the aircraft system change—which, of course, was ICAN-based. Never did I think I would see the day a bunch of aggressive fighter-bomber crews sat and avidly listened to the meteorology officer as he read off the figures for every sortie—somehow it did not seem so important at our normal operating height!

As guests at the SACBC, we were invited to compete with two teams. Each team had two crews.

To achieve the final four crews, I chose an initial eight crews. This would be reduced to six, on a continuous competition basis, by the

time we left the shores of England. The final four were chosen two weeks before the competition. Every score of every crew was entered into a computer. In addition to straight score, we were looking for consistency, accuracy, big-match temperament, and luck. Since most of the competition route was flown on autopilot and autothrottle, the major concentration of choice fell to the navigator, for it would be on his ability that the competition would be won or lost.

When the time for choice came, there was little to choose among the crews in their personal attributes or their determination to win. They were all determined! It, therefore,

Having to refuel in midair was a major disadvantage for the Tornados since other competitors with their larger aircraft could complete the scoring runs without tanker support.

fell on scores and the assessment of their ability to handle the radar. I led the selection committee, and the scores were presented in a number of different ways. We all know how statistics can lie and show whatever the presenter wants to portray.

In this case, for example, we had straight averages of scores, then first bomb averages (a better pointer to competition work), an average of the last fifty percent (a pointer to improvement), and so on.

In concert with our evaluation of procedures, techniques, and crew selection, close attention was paid to aircraft performance. No modifications were fitted to the aircraft to improve system performance. It was considered that the aircraft systems performance was well within what was necessary to provide win-

ning scores. Accordingly, the approach to aircraft preparation concentrated in two main areas.

First, we ensured that the various systems in the aircraft were operating to their best capability, and second, much attention was paid to reliability of both the avionics and airframe systems. The Tornado is a highly sophisticated aircraft, but its general reliability in squadron service is very good. Nevertheless, we could not afford—for some obscure undercarriage fault, for example—to stop the aircraft from getting airborne. Thus, those areas that had shown a tendency to fail were either carefully serviced or renewed. To aid the management of this, all air-

Ellsworth AFB and Rapid City, S. D., we settled into work only to be met by the first of what I can only describe as culture shocks. All of our range slots, which we had so carefully planned and booked, had been canceled because of a computer error. Also, despite carefully following, word for word, USAF's book on "How to Fill Out a Flight Plan," we somehow missed a dot or added a zero, and the clearance was unavailable. Finally, what soon became clear was that although we often speak the same words, we are not always speaking the same language. Suffice to say that our way of operating is totally different.

The major operating difference is



craft systems were marked on a scale of one to nine for every sortie. This was fed into a computer, and as the data built up, the "personality" of each aircraft became clear.

Thus, by the time we crossed "the pond" to the USA, we were down to the final six crews. All the modifications that were necessary for the competition—tone release equipment, extra IFF equipment for the Nellis ranges, and so on—had been fitted. Also, all the new procedures had been validated and practiced. In particular, we had to become familiar with flying six-and-a-half-hour missions (which is a bit long for the average fighter-bomber).

Culture Shock

After a most pleasant couple of days of rest, tasting the delights of

that, in Europe, the air traffic control agencies for military aircraft are run by military personnel. Flight plans are only required for controlled airspace flying and are barely ever used for day-to-day flying. Within some limitations, you can fly at will at low level in the UK. I only mention this as a means of comparison and to illustrate that what appears initially as a relatively mundane problem, in fact, caused us major grief and took up a wholly disproportionate amount of time—quite apart from the beers that it took to calm ruffled feathers! Luckily, the penny soon began to drop as we became used to the situation.

We were cleared to practice on various routes, and this was straightforward. It was merely a matter of becoming familiar with the

type of terrain from a radar point of view, familiarizing the crews with the procedures, and validating our offset calculations.

In our normal day-to-day training, each crew will plan its own sortie from beginning to end and then go and fly that mission. However, for this competition, we set up a planning team, which took over all the planning aspects for the competition.

Clearly, it was in the crews' interest to scrutinize the planning, and there was constant dialogue between the flying and planning crews. The planning crews also briefed and debriefed every mission and analyzed the radar film after each sortie. All the available data was fed into a combat-mission folder, which included every conceivable piece of information that might be required for the route. Once these had been produced, each crew member would then include personal information that he found useful.

Calculating a Victory

By this time, we had carefully analyzed every aspect of the competition and had identified where we needed to concentrate our efforts. In particular, we emphasized those areas in which we would lose most, if not all, of the points. General navigation, timing, and live bombing were all well within the capability of the aircraft. So far as ECM was concerned, our main aim was to identify the most reliable pods, because performance, per se, was not the problem; what was needed was the best consistency and reliability.

The majority of the points awarded was for bombing from either high or low level. All targets were "no-show targets," and, therefore, offset bombing techniques were used. Over the various training sorties we had flown, it became clear that the aircraft radar definition and accuracy were very good. Thus, operator errors or offset calculation would be the deciding factor. It was in the latter area that most of our concentration was focused.

The calculation methods and the constants in the main computer were carefully analyzed to ensure that the calculations that were being made to produce the offsets were compatible with the main computer



The man behind the win—Wing Commander John Grogan. His expertise and knowledge of the Tornado's aerodynamic and avionics systems helped his crews put the bombs on target.

calculations. For example, for short distances, the main computer ignores the convergence of the meridians. Since offsets are calculated by "X" feet north or south and "Y" feet east or west of the target and since the main computer will assume these lines to be straight, there will be an error induced. Moreover, this error will change depending on whether the offset is north or south of the target. Thus, programs were calculated for the desktop computer, which took these factors into account and presented them as an amendment to the offset values. Such errors were very small, about ten to twenty feet, but the principle was that nothing was to be left to chance.

Similarly, the main computer, when accepting data for present position insertion at the beginning of a sortie, only accepts inputs to one decimal place, whereas all its subsequent data is to two decimal places.

Traditionally, when parking the aircraft, we work out the aircraft position to two decimal places of latitude and longitude, round it up or down to the nearest single decimal place, and use that for initial present position. This again can produce a very minor error—normally not worth considering. How-

ever, we addressed this problem by calculating the present position on the aircraft pan to a single decimal point and then parking the aircraft over that position. This meant that aircraft were no longer in a nice neat line, as military tradition normally demands. So to all those who thought our aircraft parking was untidy—we had a good reason!

I have illustrated these points as an example of some of the details that were covered. In addition to all this detailed theoretical work, each crew flew once a day on the practice routes, gaining valuable experience with the terrain and validating the offset calculations on the training targets.

By the time the final team selection arrived, scores were coming on nicely, with averages around the 100-foot mark for both high- and low-level bombs, and our many other flying and engineering preparations were well under way.

Peak at Right Time

By this time, we were deep into "what if" conversations—what if the radar fails, what if an engine blows out on takeoff, and so on. The general consensus was that with major system failures during the day during VMC, we could still make a good effort; at night in good weather, we could make a fair effort; and in poor weather, we needed all systems working.

Thus, by the time of the start of the competition, we were apprehensive—keyed up but fairly confident. Our biggest worry was a major system failure. This lead-up to the competition had not been without its trials and tribulations. Even the odd temper was occasionally seen to flare. However, overall, it had been sure and steady, and the crews were peaking at the right time.

After all this buildup, the competition sorties were something of an anticlimax. The day sorties went well. The night sorties were not without some minor equipment problems. These were not serious, but caused much speculation at the

time. The Nellis range sorties appeared to go well until we heard that on one mission a bomb had hung up—no points for score or timing. This was a very low moment. The feeling was apparently that all that work had been wasted for a system failure that we had checked and double-checked so carefully.

However, a wise man went away into a corner, made a comparison with the previous year's scores, and predicted that we could still pull off what was really wanted—to win all the three major prizes for which we were eligible. (In the event, his predicted scores were very close.) With that more cheerful news, it seemed the best thing to do was to have quite a few quiet drinks.

Our efforts were finally rewarded: We came in first and second for the LeMay Trophy, first and second for the Meyer Trophy, and second for the Mathis Trophy. The Award Ceremony was a fantastic affair—beautifully managed in a way that only the US can achieve.

We made many friends on our visit to the USA. This was not my first visit, but for many in our group it was, and we all gained a greater insight into this great and powerful nation, its people, its aspirations, and its culture.

There are many in the USA who, for obvious reasons of distance, do not understand Europe and its fears. There is much press speculation about how Europe does not pull its weight on a number of issues, both political and military. I hope that by our presence in the competition, we convinced some people, at least, that we, who are all NATO partners, have the will, the dedication, and the means to defend ourselves and to be more than worthy partners in the NATO Alliance.

We have demonstrated to friend and foe alike that in the Tornado, which is now the backbone of three nations' air forces, we have an aircraft and weapon system that is second to none. I hope that gives comfort to our friends and fear to our enemy. ■

Wing Commander John Grogan joined the RAF in 1964. During his flying career, he has piloted Hunter, Harrier, and Jaguar aircraft as well as the Tornado. In addition to various operational assignments, he has served with the RAF Headquarters Staff and is a graduate of the RAF Staff College. He presently serves in the Tornado Role Office in the Ministry of Defence in London.



TI radar guides Tornado to victory in USAF bombing competition, again!

For the second consecutive year, the Royal Air Force, flying Panavia Tornado all-weather aircraft, emerged as winners in the prestigious U.S. Air Force Bombing Competition 1985. In a repeat of the 1984 victories, the RAF crews were guided to and from multiple targets by the Texas Instruments nose radar system.

Using the terrain-following radar

to hug the ground during high-speed, low-level bombing runs and the ground map radar for high-resolution mapping and target identifications, the Tornado placed first and second during intense competition for both the highly coveted Curtis LeMay and John C. Meyer trophies. Never before has an aircraft or Air Force from outside the United States achieved

such spectacular results.

Panavia's Tornado and TI's nose radar system. Proven again in international competition. That's international teamwork, with results.

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TEXAS 
INSTRUMENTS

Convention speakers say there's a lot of misinformation loose in the land.

Some Words For The Critics

BY JAMES W. CANAN
SENIOR EDITOR

SOME critics charge that the billions spent for defense over the past five and a half years have been wasted—that we have not achieved any improvements. I say, garbage! They have short memories.”

In these words of dismissal, Secretary of the Air Force Edward C. (Pete) Aldridge, Jr., struck a countervailing, positive theme of great gains in US military modernization and capability that was also sounded by his fellow featured speakers at the Air Force Association's fortieth national convention last September in Washington.

The other convention speakers, all of whom expressed pride in the advances of the 1980s but warned their AFA audiences of major problems and challenges ahead, were Chairman of the Joint Chiefs of Staff Adm. William J. Crowe, Jr., Air Force Chief of Staff Gen. Larry D.



Addressing AFA's fortieth annual convention, Secretary of the Air Force Edward C. (Pete) Aldridge, Jr., rebukes defense-spending critics.

Welch, and Deputy Secretary of Defense William H. Taft IV.

“Let us recall,” Secretary Aldridge said, “that nearly six years ago, the atmosphere of our nation was one of anxiety. We seemed to be in a decline internationally. Our enemies were on the march. And the Pentagon ‘horror stories’ were about airplanes that couldn't fly because there weren't enough parts.”

All this has been turned around, Secretary Aldridge claimed. Today, he said, “our Air Force is better manned, better equipped, and better prepared to perform its mission than at any time in its history.”

As evidence, Secretary Aldridge cited the upgrading of aircraft and ordnance all across USAF's strategic and tactical forces. He pointed out that, since 1980, strategic bomber hard-target capability has increased by ninety percent, that the Peacekeeper ICBM and the B-1B



Air Force Chief of Staff Gen. Larry D. Welch tells his AFA convention audience about USAF's progress and the challenges to be met.

bomber have become realities, that tactical-weapon accuracies have improved by one-third, that nearly 950 F-15 and F-16 fighters have been deployed, and that "we have 400 more aircraft mission-capable today than five years ago."

However, all such advances are now "threatened by a major reversal of budget patterns and additional demands placed on Air Force resources that will clearly affect future capabilities," Secretary Aldridge said. He defined USAF's major challenges in this context as maintaining the quality of personnel and equipment, continuing to improve management practices, strengthening ties with allies, and making maximum use of space.

Recent setbacks in space are serious, he acknowledged. "However," he added, "I take strong exception to the conclusion of some observers that . . . the United

States trails the Soviet Union in space activity and experience by ten years. That clearly is not the case."

Emphasizing that the US is increasingly dependent on space systems for support of airborne and surface forces, Secretary Aldridge gave "high priority" to cutting space-launch costs. He expressed hopes for USAF's "space-launch recovery plan, including the adaptation of existing launchers and the development of a new medium-launch vehicle." But he declared that "we must look further to the future—to technologies suggested by the National Aerospace Plane—for truly economic access to space and near-space regions."

General Welch noted that the AFA convention was appropriately conceived as a tribute to the late Gen. Henry H. (Hap) Arnold for "his unique place as the father of the modern US Air Force."

"Arnold's legacy is today's strength," General Welch declared. "His vision of the future had—and still has—much to do with the growth and direction of airpower. Today's systems are newer, the threat is more sophisticated, and the technology continues to expand. But his framework of principles and objectives still serves us well."

General Welch described "the key aspects of that framework" as "a viable military strategy, Air Force combat-capable forces to support that strategy, and the never-ending need for public support to build and operate those forces."

USAF's Chief of Staff countered critics who claim that defense spending increases have been wasted in a strategic vacuum.

"The fact is that we have a coherent national military strategy in support of coherent national objectives and a well-conceived set of programs to build and maintain the military forces to support that strategy," General Welch maintained.

USAF's main purposes, he said, are "to be ready with what we have, to upgrade existing equipment where that makes sense, and, where



Chairman of the Joint Chiefs of Staff Adm. William J. Crowe, Jr., reminds conventioners that public support is crucial to military strength.

needed, to exploit technology to field the most effective and affordable new systems."

In this vein, General Welch noted that such older systems as the B-52 have been greatly upgraded, that the B-1B, Peacekeeper, KC-10, F-15, and F-16 weapon systems are modernizing the force by leaps and bounds, and that "tomorrow's capability is also well planned" with the Advanced Technology Bomber, the Advanced Tactical Fighter, the F-15E, the C-17, and the C-22 special operations aircraft.

Reminding his audience that "strategic modernization is necessarily our first priority for quality systems, since the price of inadequacy is too great to contemplate," General Welch explained that USAF is "stressing reasonably attainable capabilities, reliability and maintainability, and modern munitions to bring together all the ele-



Deputy Secretary of Defense William H. Taft IV makes the AFA convention a forum for criticizing congressional cuts of defense spending.

ments for the most ready force ever—now and in the future.”

General Welch emphasized USAF's urgent need for such high-leverage programs as the Advanced Medium-Range Air-to-Air Missile (AMRAAM) and the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) systems.

“AMRAAM doubles the effectiveness of an F-15 at about four percent of the cost of an F-15 and will raise F-16 effectiveness in air-to-air combat by six times,” General Welch explained.

In fulfilling Air Force aspirations, “public support” will be “the critical element,” the Chief of Staff asserted.

Admiral Crowe fully agreed. “Our military is not separate from the state, but an integral element of the society it serves,” the JCS Chairman declared. “In the end, our armed forces will only be as good as

the American public wants them to be. We need, above all, strong and patient and continuing support from all Americans.”

Defining what is at stake in enlisting and maintaining such support, Admiral Crowe said that “it is imperative for American citizens to recognize that our military strength underwrites those [national] policies and is an indispensable pillar of our liberty, that the threat is real, diverse, and part of the everyday world, that the Kremlin and its surrogates are working diligently to upset the balance, and that we have some way to go in improving our armed forces before we can face the future with genuine confidence.

“For example,” he said, “only one-third of our armor units have the newest tank, only one-fourth of our battalions have the Bradley Fighting Vehicle, one-third of our Air Force has yet to receive F-16s

and F-15s, more than half of our carriers do not yet field F/A-18s, and only one-third of our submarine force is made up of the latest attack units. I could go on and on.”

Admiral Crowe also noted “the pressures on us to do more, to do better, in the realm of Special Operations Forces, limited intensity conflict, and in counterterrorism and drug enforcement.”

In view of what yet needs to be done in behalf of US military strength, congressional attacks on the Reagan Administration's defense budget were excoriated at the AFA convention by Deputy Secretary of Defense Taft.

In particular, Mr. Taft assailed the House of Representatives defense authorization bill, which was “some \$35 billion below our estimate of what is needed to give the American people the high-confidence defense that they deserve.”

Calling that bill “a travesty, arising from a deplorable display of cynical partisan politics and a re-emergence of antimilitary emotions that have been soundly and consistently rejected by the American people,” Mr. Taft also sharply criticized the House position that the US must continue to honor “this discredited [SALT II] treaty” and the House-passed restrictions on testing nuclear weapons and anti-satellite (ASAT) systems.

Mr. Taft described the House's cuts of Strategic Defense Initiative (SDI) funding as “draconian” and “appalling.”

“I am particularly concerned about retarding SDI, because polling data suggests that eighty percent of Americans mistakenly believe we *already* have missile defenses, which they rate as fair to excellent,” Mr. Taft declared.

Overall, “the cuts demanded by the House not only threaten our defense strength, they also affect our defense priorities in a most unhealthy manner,” Mr. Taft asserted. “We cannot remain silent while Congress forces a premature end to our defense rebuilding program.” ■



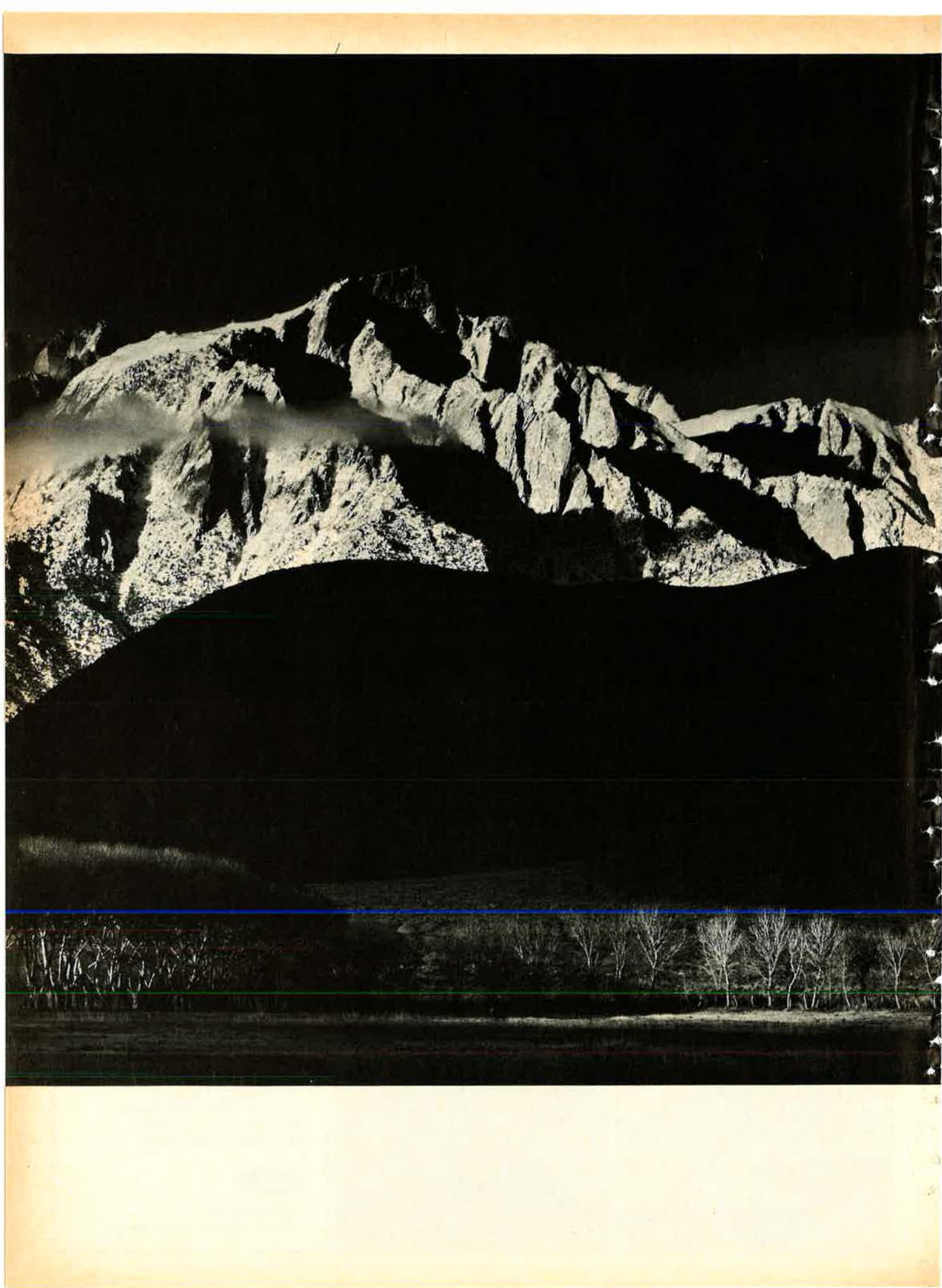
**Pointing the way
to the right decisions—
before you can say
Command, Control
and Communications.**

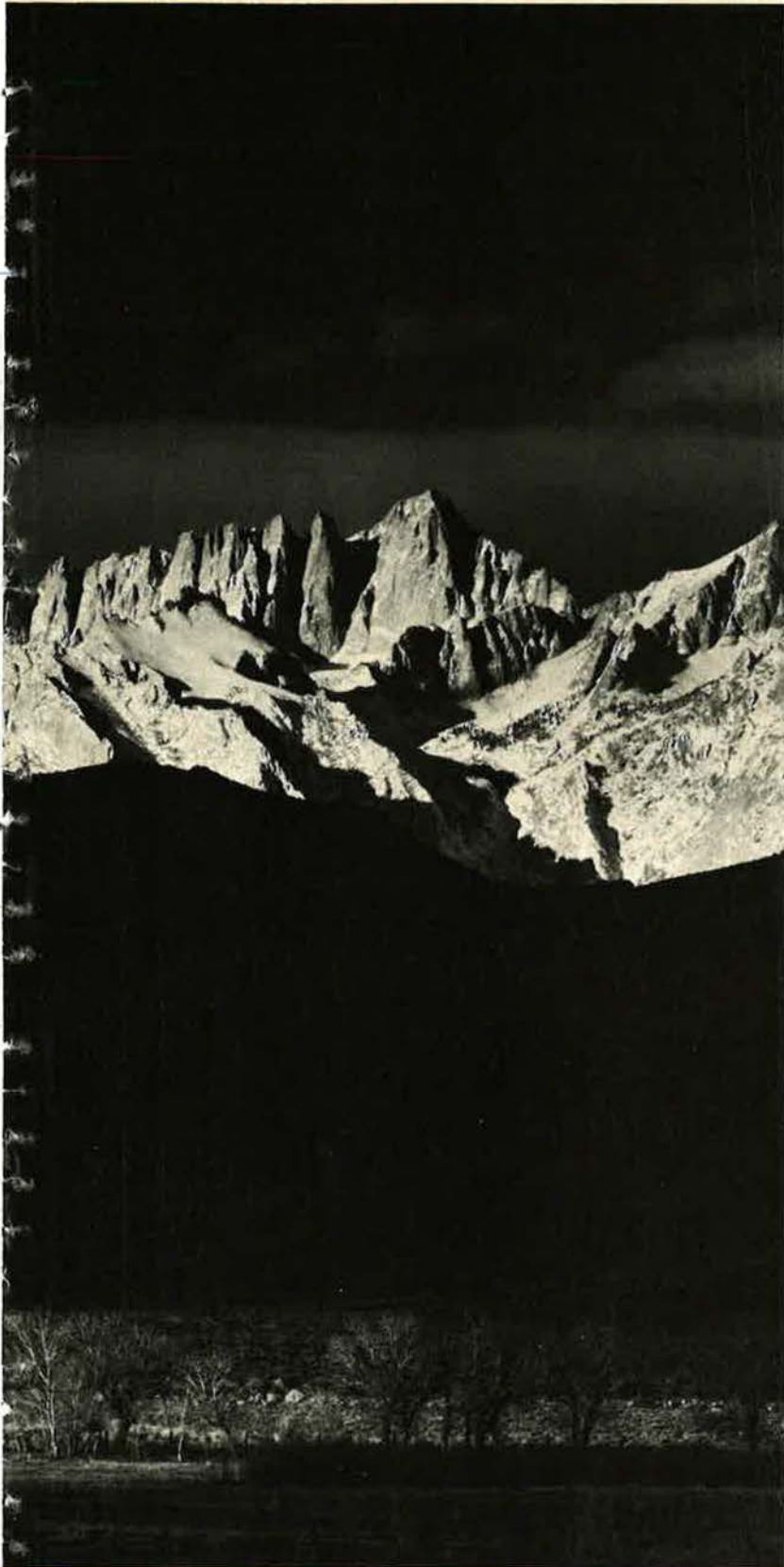
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Winter Sunrise, The Sierra Nevada, From Lone Pine, California. Photograph by Ansel Adams. Courtesy of The Trustees of The Ansel Adams Publishing Rights Trust. All Rights Reserved.

**Like the Sierra Nevada,
the U.S. Air Force B-1B
Long-Range Combat
Aircraft is a
national resource.**

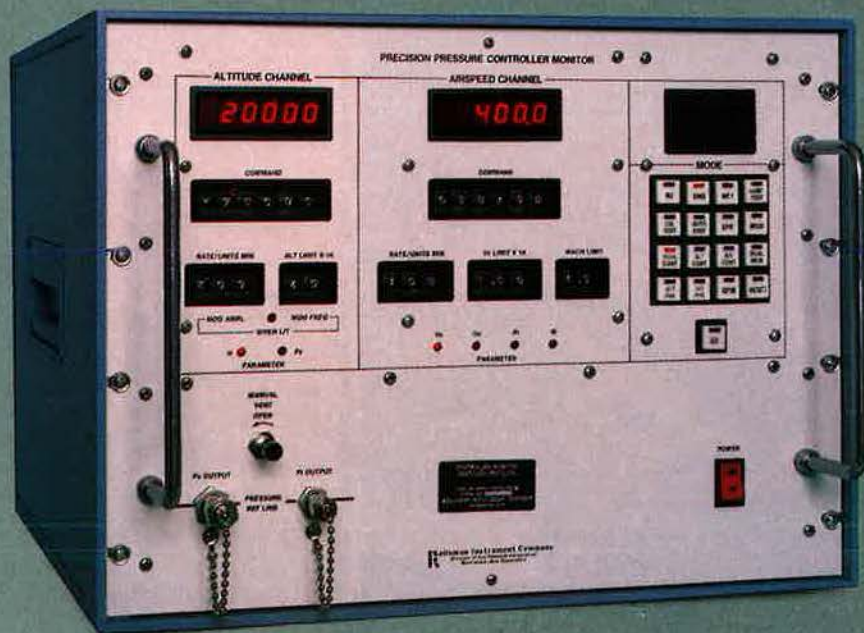


Rockwell International

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**Aerospace / Electronics / Automotive
General Industries / A-B Industrial Automation**

Kollsman Benchmarks



This Precision Pressure Controller-Monitor (PPC-M) from Kollsman sets a new standard for testing air-data instruments. Solid-state transducers combined with a microprocessor-based design make possible levels of accuracy, repeatability and reliability not previously available.

Altitude range is from -2000 to +90,000 ft; accuracy to ± 0.004 in. Hg. Airspeed range is from 20 to 1050 kt. The PPC-M can control or monitor pressures, and its IEEE-488 interface permits remote programming. Read-outs in either English or metric units can be selected.

For a complete description of the PPC-M, or other Kollsman pneumatic test units, write or call, Marketing Manager, Kollsman Avionics Group.

Kollsman

Division of Sun Chemical Corporation

THIS year's Aerospace Development Briefings and Displays, organized by the Air Force Association during its annual National Convention here in Washington on September 16-18, highlighted the aerospace industry's drive to develop new and highly sophisticated technologies for the twenty-first century.

More than 100 aerospace companies or divisions of companies from the United States and allied nations were on hand at the Sheraton-Washington Hotel to display new and exciting technological developments ranging from space-based lasers to high-speed computers and tiny microprocessing chips.

The nearly 8,000 people who passed through the some 53,000 square feet of exhibits were dazzled by films and mural-sized diagrams depicting the intricate and highly sophisticated workings of the Strategic Defense Initiative, models of the new Advanced Tactical Fighter, and futuristic cockpits designed to lessen a pilot's work load.

There were even glimpses of the first fruits of the Air Force's Project Forecast II, which has identified some seventy emerging technologies that USAF wants to promote to enhance the service's capabilities well into the next century.

Phased-array systems, which combine large numbers of small, inexpensive components spread into a single system, are just one of the Project Forecast II technologies avidly being pursued by the aerospace industry.

General Electric Co. displayed its use of gallium arsenide technology to reduce these systems to a practical size and cost and its Monolithic Microwave Integrated Circuits (MMICs) to control them.

Texas Instruments portrayed the various applications for very-high-speed integrated circuits (VHSICs), including high-speed processors and computers and artificial intelligence machines. Along with McDonnell Douglas, the firm is involved in the Pilot's Associate program that aims to create an advanced cockpit of the future in which a pilot's work load is lessened with the aid of artificial intelligence.

At its exhibition booth, Rockwell International briefed convention-goers on its work on the National

In the packed AFA exhibit halls, the defense industry briefed the crowds on systems and technologies for tomorrow.

A Glimpse of Things to Come

BY JOHN MORROCCO



At Martin Marietta's booth, Brig. Gen. Charles F. Stebbins, AFSC Deputy Chief of Staff for Science and Technology, examines a model of an F-15E outfitted with Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) pods.

Aerospace Plane (NASP), another concept given high priority by Project Forecast II. Rockwell is one of five firms, including Boeing, General Dynamics, Lockheed, and McDonnell Douglas, that are currently under contract to work on the preliminary airframe design for the National Aerospace Plane, which can operate in the earth's atmosphere as well as in space. Next June, the Air Force will select two of the five firms to demonstrate and validate their design concepts. GE and United Technologies have received propulsion contracts for the NASP.

General Dynamics displayed a large-scale model of its boost-glide vehicle, which is to demonstrate the technologies needed for future hypersonic vehicles.

Strategic Defense Initiative

Despite the threats of congressional budget cuts, the Strategic Defense Initiative was one of the top topics of conversation at the exhibition. The SDI program, which is investigating a plethora of emerging

and futuristic technologies that would be used in space and on the ground to defend against incoming ballistic missiles, is expected to be worth more than \$500 billion over the next ten years.

The TRW exhibit was one of the many geared toward the various technologies involved in the SDI program. TRW, which boasts nearly fifty SDI contracts, displayed its work on ground- and space-based lasers and C³I battle management architectures to manage the complex missile defense system.

Along with Boeing Aerospace, TRW is one of the leaders in free-electron laser technology, one of the leading candidates for a ground-based directed-energy weapon system to counter ballistic missiles. TRW's display also emphasized its work on chemical and excimer lasers being conducted at its 2,700-acre Capistrano Test Site facility.

Westinghouse Defense and Electronics also boasted of its involvement in the SDI program, offering briefings on its terminal imaging ra-

dar program, large aperture radar sensor study, space surveillance and tracking system, and Sagittar kinetic weapon program. General Electric Co. and General Dynamics both exhibited visual renderings of their electromagnetic gun designs.

McDonnell Douglas, along with Boeing and TRW as major subcontractors, highlighted its neutral particle-beam device, which is competing against a similar device developed by Lockheed for a space test scheduled in late 1987. The firm is also developing a high endoatmospheric defense interceptor jointly with Hughes Aircraft and Aerojet General.

United Technologies Corp. officials took the opportunity to brief visitors to their exhibit on their newly created Space and Defense Systems Group, consisting of Space Transportation Systems, Strategic Defense Initiative Programs, and Space Station Programs units.

McDonnell Douglas, Lockheed, and Hughes Aircraft were major contractors on the recent SDI experiment that saw two space vehicles track each other in space for more than two hours before one homed in on and destroyed the other. The September 5 test was the most ambitious SDI experiment to date, involving thirty-eight radars and thirty-one satellite links to orchestrate the space ballet more than 100 miles above the earth's surface.

Creating a sophisticated computerized system to control the entire SDI project is one of the most difficult tasks ahead. TRW, Martin Marietta, and Rockwell International, which are among the competitors to design a national test-bed project that will simulate major portions of the SDI program, displayed schematics of their concepts for such a system.

Strategic Modernization

Offensive strategic weapon systems were also prominent at the exhibition. Among the companies at the show making presentations on the MX Peacekeeper ICBM were Boeing, Rockwell International, Martin Marietta, and GTE. While the show was taking place in Washington, the Air Force conducted its fourteenth successful test launch of a ten-warhead MX missile. The first ten MXs are expected to become

operational at F. E. Warren AFB, Wyo., by the end of the year.

Boeing presented video summaries of the work it is doing to modernize existing Minuteman silos to accommodate the fifty Peacekeepers authorized by Congress as well as to provide basing and operational support services and equipment. Rockwell International, which builds the fourth stage of the Peacekeeper, proudly touted its recent selection by the Air Force as second-source producer of the MX guidance system.

Martin Marietta displayed models of the new Small ICBM, which is scheduled to enter the full-scale engineering development phase next year. Initial operating capability for the missile is expected in 1992.

The contract to build a Hard Mobile Launcher (HML) for the mobile SICBM is being hotly contested between Boeing and Martin Marietta. Both firms screened films depicting their respective candidates churning up dust in the western desert during tests.

Rockwell International's North American Aircraft Operations group provided an update on its B-1B program. To date, eighteen operational B-1B strategic bombers have been delivered to the 96th Bomb Wing at Dyess AFB, Tex., and a total of fifty is to be delivered to the Air Force next year. The firm was expected to reach peak production of four aircraft per month at its Palmdale, Calif., facilities in October.

Boeing and McDonnell Douglas were both promoting their versions of the SRAM II short-range attack missile. The rocket-powered SRAM II will replace the aging AGM-69A SRAM and will be carried by the B-1B and the new Advanced Technology Bomber for use against targets at standoff ranges. One of the two firms will receive an initial development contract in January of next year. The Air Force plans to begin flight-testing the nuclear strike missile in 1989 and is aiming for a 1992 operational date.

Tactical Aircraft

Exhibits at the show by General Dynamics and Northrop spotlighted one of the hottest competitions between aerospace companies. GD's F-16 Fighting Falcon and

Northrop's F-20 Tigershark are both candidates in the Air Force's air defense fighter competition, which is scheduled to be decided by the end of this month.

The two firms are engaged in a head-to-head competition for the multimillion-dollar contract to buy 270 new fighters to replace the aging F-4 Phantoms and F-106 Delta Darts in the Air National Guard inventory.

Officials from General Dynamics staged a multimedia slide show highlighting the advantages of the F-16. The company also had on hand full-size cockpit mockups of the F-16C/D as well as a reconnaissance version of the F-16B, into which visitors could crawl and operate the controls there.

On the other side of the exhibition hall, Northrop officials were equally busy drumming up business for the F-20, inviting visitors for the first time to experience the hands-on feel of the Tigershark's avionics system in a full-size cockpit. Early in the week, Northrop representatives were scrambling to get the exhibit in place in time for the show's opening since the cockpit display was late in arriving from its debut at the Farnborough Air Show in early September.

McDonnell Douglas touted its F-15 Eagle air-superiority fighter and offered a glimpse of its new dual-role F-15E modified for ground attack missions.

Representatives from the St. Louis-based firm's aircraft division were also on hand to talk about the short takeoff and landing (STOL) version of the F-15. Equipped with movable canards and a digital fly-by-wire system, a prototype STOL F-15 will be powered by Pratt & Whitney F100 engines fitted with two-dimensional exhaust nozzles. The first engines are to be assembled next year, and flight tests are scheduled for early 1988.

The reverse-thrust engines will reduce landing distances by up to fifty percent on dry runways and eighty percent on icy ones. By vectoring the engine exhaust upward during takeoff, the engine will reduce takeoff requirements by almost thirty-five percent.

Officials from the Vought Aero Products Division of LTV Corp. displayed presentations of their new

Strikefighter, a modernized version of the A-7 Corsair II developed specifically for the Close Air Support/Battlefield Air Interdiction (CAS/BAI) role.

LTV proposes refurbishing 337 Air National Guard A-7s with afterburning turbofan engines and updated avionics to fulfill the air service's CAS/BAI role well into the next century. A Low-Altitude Night Attack (LANA) system developed by LTV that includes a forward-looking infrared and automatic terrain-following system would allow the Strikefighter to fly day or night at low altitudes. LTV has already equipped two Air National Guard squadrons with the LANA system and expects to win a contract to equip a third squadron in the near future.

Martin Marietta, which is building a more sophisticated Low-Altitude Navigation and Targeting Infrared Night (LANTIRN) system for the F-15E and F-16C/Ds, said it is working on a lower-cost version that it is offering for use on the A-7 Strikefighter. The firm also hopes to market the modified LANTIRN system abroad for use on export versions of the F-16 and on the Tornado strike fighter.

LTV officials say the cost of modifying each A-7 would be about \$6.2 million, half the price of a new aircraft. The idea has won the backing of the Senate Armed Services Committee, which added \$35 million to the 1987 defense budget for the program.

Air Force officials have expressed a keen interest in the Strikefighter and are putting together a technology package in order to begin competitive bidding for the project within the next few months. LTV officials say they expect a contract award to be made by December to build a Strikefighter prototype.

McDonnell Douglas offered convention-goers a status report on its C-17 airlifter, which is scheduled to enter production next year, pending congressional approval.

In June and July, Douglas Aircraft signed contracts worth more than \$200 million with several subcontracting firms to begin work on the avionics, major assemblies, and landing gear for the aircraft.

A building expansion program is

under way at Douglas Aircraft's facilities in Long Beach, Calif., where the firm expects to increase its work force from 2,600 to 3,800 by the end of the year. In June, the firm broke ground for an eighteen-acre site in Salt Lake City, Utah. The company will produce C-17 fuselage panels at the new plant.

The Air Force, which wants to acquire 210 C-17s between 1988 and 1998 at a total cost of about \$35.8 billion, has made the new airlifter one of its highest priorities. A joint Air Force and Douglas Aircraft technology modernization program aimed at reducing manufacturing costs by upgrading and automating production processes recently entered its second phase. Officials say the \$147.6 million program could save more than \$400 million on the C-17 program.

Both the House and Senate Armed Services Committees have approved production of the \$180 million transport, but the Senate Appropriations Committee would defer production for another year.

Fairchild Republic, which is also awaiting Congress's verdict on the future of its T-46 trainer, did not display the aircraft at the exhibition. Instead, company officials took the opportunity to display the firm's other products, which include a low-altitude warning ground collision avoidance system for tactical aircraft.

The system's computer, which updates the aircraft's predicted flight path fifty times per second, provides a pilot with a verbal warning when within less than ninety feet of the ground. Fairchild Republic recently won an Air Force contract to put the system on all its A-10s and hopes to win further orders to place the system aboard F-16s and A-7s.

The Singer Co.'s Link Flight Simulation Division provided briefings on its current flight simulation and training systems programs for the F-4, F-111, B-52, and C-130.

The Advanced Tactical Fighter

Prominent among the tactical fighter displays on the exhibition

floor were the seven candidates for the Advanced Tactical Fighter program. The ATF will supersede the F-15 as the Air Force's front-line tactical fighter in the mid-1990s. While details of the highly sophisticated aircraft were scarce because of security restrictions, all seven companies in the running—Boeing, General Dynamics, Grumman, Lockheed, McDonnell Douglas, Northrop, and Rockwell International—prominently displayed models and artist's conceptions of their ATF candidates.

By the time this article appears, the Air Force should have whittled down its list of candidates to two companies or contracting teams that will receive contracts to build two prototypes by November 1989.

Several displays focused on subsystems being developed for the ATF. At the Westinghouse booth, an actor dressed as a USAF tactical fighter pilot gave mock air battle briefings to visitors while company officials promoted a number of systems the firm is developing to enhance ATF capabilities, such as a new Ultra Reliable Radar (URR) and the Integrated Electronic Warfare System (INEWS) that it is jointly developing with TRW.

Meanwhile, British Aerospace officials proudly displayed video footage of their Experimental Aircraft Program prototype, which flew for the first time in late July. The EAP aircraft is designed to demonstrate the technologies and systems that will go into the new EuroFighter being built jointly by Britain, West Germany, Italy, and Spain.

The EAP aircraft and the Rafale, built by the French firm of Dassault-Breguet, were the star attractions at the Farnborough Air Show held during the first week in September. Both the EuroFighter and the Rafale are slated to become operational in the mid-1990s.

Israel Aircraft Industries was also on hand with films of the rollout of its new Lavi fighter earlier this summer. During the exhibition, IAI officials were in Bethpage, N. Y.,

John Morrocco is a defense writer for Investor's Daily. The author of two books on the air war in Vietnam, he was previously a staff writer for Defense News. Mr. Morrocco is a graduate of Boston College and holds a master's degree in international history from the London School of Economics and Political Science.

negotiating a joint production agreement for the new fighter with Grumman officials.

Propulsion Plants

The world's leading engine-makers were also on hand to boost their latest propulsion plants to power these new aircraft.

A full-size PW1129 engine, a 29,000-pound-thrust derivative of the F100 turbofan fighter engine broken down into its component parts, highlighted the Pratt & Whitney display. The F100 IPE will compete with an advanced version of GE's F110 to power the Air Force's front-line fighters in the 1990s.

Also on display was a model of Pratt & Whitney's PW5000, a contender along with the GE37 being built by General Electric to power the ATF. Prototypes of both engines, which will be in the 30,000- to 33,000-pound-thrust category, are expected to be ready by mid-1989.

Pratt & Whitney also had on hand a model of the PW2037, whose

37,600 pounds of thrust will be used to power the C-17 airlifter. With its unique thrust reverser that can direct the engine's exhaust, the PW2037 (officially designated F117-PW-100) will let the C-17 operate from runways as short as 3,000 feet.

The PW2037 is already used to power Boeing 757s in service with several major carriers around the globe. Pratt & Whitney is also developing a 41,700-pound-thrust version of the engine for commercial application, which is scheduled for FAA certification in January 1987.

British engine-maker Rolls-Royce displayed its designs for an advanced version of the Pegasus engine to power the Harrier. Designated XP-15, it features a new high pressure ratio fan, a new combustor, and an improved cooling system and would provide 3,000 more pounds of thrust than the current Pegasus engine.

Both Rolls-Royce and Pratt & Whitney underscored their recent joint initiative to study a supersonic vertical/short takeoff and landing

engine. The endeavor is part of a joint US/UK agreement signed earlier this year to investigate the technologies necessary for a supersonic V/STOL aircraft.

Missiles and RPVs

In the missile arena, LTV briefed visitors on its new Hypervelocity Missile (HVM), which relies on its kinetic energy to achieve its destructive power. The Air Force has expressed a great deal of interest in the missile, which LTV claims is cheaper and safer to handle than missiles with sensitive warheads. USAF has contracted with LTV to build six HVMs for testing at Eglin AFB, Fla., next fall.

Uniformed personnel lined up to try their hand at LTV's computerized simulation of a new laser guidance system that the company is developing to deliver HVMs from tactical aircraft.

McDonnell Douglas Astronautics Co. was on hand to try to interest the Air Force in its new Standoff Land-Attack Missile (SLAM), an

Aerospace Industry in Review

Companies Represented at the 1986 Aerospace Development Briefings and Displays

Avco Systems Textron

"On Target"—Strategic and Tactical USAF Programs

Boeing Co., The

Boeing's Work on the Air Force's Strategic Ballistic Missile Modernization Program

British Aerospace

Hawk to EuroFighter—Technology Leadership

Brunswick Corp.

NATO LOCPD and Modular Standoff Weapon System

Canadair Limited

Canadair's Subcontracting Capabilities and Current Military Programs

Control Data Corp.

Signal Processing Systems and Ruggedized and Militarized Advanced Disk Systems

Delco Electronics/Allison Gas Turbine

Advanced Engine Technology and Integrated Digital Systems

Eaton Corp.

F-111, FB-111, and EF-111 Self-Protect Update—"Intelligent Work Station"

EDO Corp.

Meeting Bomb-Rack and Missile-Launcher Future Mission Requirements

E-Systems Inc.

The Electronic Edge

Ferranti

Ring-Laser Gyros, Advanced Electronic Displays, and Air-Delivered Weaponry

Ford Aerospace & Communications Corp.

Defense, Space, and Communications Systems

Garrett Corp.

High-Technology Products for the US Air Force

Gates Learjet Corp.

Learjet: Turning Concepts into Reality

General Dynamics Corp.

Advanced Systems from General Dynamics: Proven Performance for the US Air Force

General Electric Co.

Aerospace Business Group

Aviation Gunnery—"Its Past, Present, and Future"

Aircraft Engine Business Group

Meeting USAF Missions

GTE Government Systems Corp.

Recent Milestones and Achievements for ICBM Modernization Programs

Gulfstream Aerospace Corp.

The Gulfstream C-20: Helping the United States Meet Its Global Responsibilities

IBM Corp.

IBM's Involvement in Space Systems, Avionics, and Strategic Programs

Israel Aircraft Industries Ltd.

IAI Defense Service Technology Today and Tomorrow

Itek Optical Systems, A Division of Litton Industries

Electro-Optics in Action

ITT Corp.

ITT Avionics Electronic Defense

Lear Siegler, Inc.

Flight Management, Weapons Management, and Data Collection and Control

Lockheed Corp.

Giving Shape to Imagination: ATF Enhanced Capability Test and the C-5

Loral Corp.

Loral Defense Electronics

LTV Aerospace and Defense Co.

The A-7 Strikefighter—An Update

Martin Marietta

Martin Marietta—Supporting the ICBM Modernization Program

McDonnell Douglas Corp.

F-15 Eagle Fighter

Messerschmitt-Bölkow-Blohm GmbH

MBB's New Modular Dispenser System Tailored for All Fighter Aircraft

Northrop Corp.

F-20 Tigerhawk

PACCAR Inc.

Heavy-Duty Vehicles for Strategic and Tactical Forces

Raytheon Co.

Raytheon and the Air Force

Rockwell International

Collins Government Avionics Div.

Collins Automatic Target Handoff System—The Mission Enhancer

Electronics Operations

Guidance and Control, Tactical Weapons, Sensors, Space Electronics, Command Control Communications, and Avionics

North American Aircraft Operations

B-1B Aircraft Program

North American Space Operations

Space Shuttle, Shuttle Main Engines, Space Station, Peacekeeper Stage IV, and Navstar

Singer Co., The

Kearfott Div.

Joint Tactical Information Distribution System (JTIDS)

Link Flight Simulation Div.

Total Training Systems

Sperry Corp.

Information Management Systems for USAF

Sundstrand

Sundstrand Aerospace . . . And the US Air Force

Teledyne CAE

Turbine Engine Power for Today and Tomorrow

Texas Instruments Inc.

Diverse Technologies Meeting Diverging Threats

Thomson-CSF, Inc.

Thomson Avionics Activities

TRW Electronics & Defense

TRW and the Strategic Defense Initiative

United Technologies Corp.

Pratt & Whitney Government Products Div.

Update on Engine Programs for the US Air Force

Space and Defense Systems Group

Introduction to United Technologies Space and Defense Systems Group

Western Gear Corp.

Weapons Launching Systems

Westinghouse Electric Corp.

Westinghouse Defense and the ATF: A Design on the Future

Williams International

Small Gas-Turbine Engines

infrared-guided version of the Harpoon antiship weapon now used by the Navy. The Navy has already asked Congress for funds to acquire SLAM in 1987, and company officials say that Strategic Air Command has expressed interest as well. The missile, which has a range of fifty nautical miles, could be fitted on B-52 bombers to attack high-value targets.

Hughes Aircraft and Raytheon prominently displayed models of the AIM-120A Advanced Medium-Range Air-to-Air Missile (AMRAAM), a fire-and-forget, radar-guided missile that will replace the AIM-7 Sparrow. The Air Force wants to buy 17,000 of the missiles at a total cost of \$5.2 billion for use on its F-15s and F-16s. The Navy has weighed in with a request for an additional 7,000 for its own aircraft.

AMRAAM, which has had more than its share of developmental problems, faces tough opposition on Capitol Hill, where the Air Force is trying to obtain funding to begin initial production of the missile in

1987. A total of twelve of fourteen AMRAAM test launches had been successfully completed prior to the AFA exhibition.

British Aerospace was on hand to display its missile inventory, which includes the Advanced Short-Range Air-to-Air Missile (ASRAAM). The United Kingdom is developing ASRAAM jointly with West Germany, Norway, and Canada. Publicized as the successor to the Sidewinder, the fire-and-forget ASRAAM will eventually be produced in the US under license. AMRAAM will be similarly produced in Europe.

British Aerospace officials, however, voiced concern about recent setbacks in their Air-Launched Antiradar Missile (ALARM) program. Problems with the rocket motor caused the cancellation of live-fire tests at the US Navy's China Lake test center last spring and will delay the missile's scheduled 1987 delivery date.

The British government has reportedly asked the Pentagon to sup-

ply pricing and availability data for the High-Speed Antiradiation Missile (HARM) built by Texas Instruments.

Remotely piloted vehicles, currently experiencing a new surge of popularity, were also in evidence at the exhibition. Northrop displayed its NV-144 midrange RPV.

British Aerospace exhibited its Linescan 4000, a miniaturized airborne infrared surveillance system that can be used on tactical reconnaissance aircraft as well as on RPVs. The company has an agreement with Pacific Aerosystems of California and the Italian firm Meteor to develop a version of Linescan for the US Navy's midrange RPV requirement, which will also fulfill the Air Force's requirements.

Honeywell Aerospace and Defense is also in the running with its own miniature forward-looking infrared system. The firm's exhibit offered spectators a live demonstration of how the system's imagery can be made into hard copy in real time. ■

The following companies displayed, but did not hold briefings.

- Aerojet General Corp.**
Latest Advancements in Propulsion, Defense Electronics, and Ordnance Technologies
- Aérospatiale**
AS 30 Laser Missile, Epsilon Training Aircraft, and the ASMP Tactical Medium- to Long-Range Standoff Missile
- Allied Bendix Aerospace, Bendix Flight Systems Div.**
Bendix Digital Flight Control Computer
- American Cyanamid Co., Chemical Light Dept.**
Safety Flares
- Bell Helicopter Textron, Inc.**
V-22 Graphics Display and Helicopter Models
- Canadian Marconi Co., Avionics Div.**
Avionics Management Systems and Displays
- Chamberlain Manufacturing Corp.**
Contract Research and Development on a Variety of Ordnance Products
- Computer Sciences Corp.**
Computer and Communications Systems and Services
- Deere & Co., Government Products Operations**
Stratified Charge Omnivorous Rotary Engines (SCORE™)
- Eastman Kodak Co., Government Systems Div.**
Optics, Imaging Devices and Optical Communications, and Star Tracker Systems
- Electronic Data Systems Corp.**
Total Systems Integration in Implementing and Managing Information Systems
- Emerson Electric Co., Electronics & Space Div.**
Wide Range of Defense Systems, Including Electronic/Radar and EW Systems
- Fairchild Industries, Fairchild Republic Co.**
Full-Scale Mockup of the T-46A Multipurpose Trainer
- Fairchild Weston Systems Inc., Fairchild Systems**
Mini Electronic Countermeasures Jamming Equipment, Electro-Optical Camera Systems, and ECCM Training Systems
- GA Technologies, Inc., Defense Marketing**
Space Power Reactors, Space Weapons Systems, and Logistics Support Operations
- Aircraft Engine Business Group**
Meeting USAF Missions
- GEC Avionics**
Latest Developments in Avionics Systems and Related Ground-Support Equipment
- Goodyear Aerospace**
A Major Supplier to the US Air Force
- Gould Defense Systems**
Avionics, Communications, and Radar and Computer Systems
- Grumman Corp.**
Joint Surveillance and Target Attack Radar System (Joint STARS)
- Hazeltine Corp.**
C³I Systems and Products
- Honeywell Aerospace & Defense Div.**
Ring-Laser Gyro, GBU-15 Trainer, and Other Electronic Developments
- Hughes Aircraft Co.**
Guided Missile and Advanced Avionics Equipment
- Intermetrics, Inc.**
Intermetrics' Software for Aerospace
- Jane's Publishing, Inc.**
Jane's Yearbooks and Reviews
- Kilgore Corp., An Allegheny International Co.**
Search-and-Rescue Devices, Visual Distress Signals, Marine Location Markers, and Training Aids
- Litton Systems, Inc.**
Applied Technology Div.
Threat Warning Systems, Signal Processing, and Test, Training, and Simulation Systems
Data Systems Div. and Guidance & Control Systems Div.
Modular Control Equipment (MCE), Digital Communications Terminals (DCT) and Radar/IFF Signal Processing Equipment, Integrated Flight Control/Navigator, and Hi-Accuracy Rate Bias Systems for AINS and SRAM II
- Magnavox Government & Industrial Electronics Co.**
HF, VHF, and UHF Communications and Have Quick Electronic Warfare Equipments
- McDonnell Douglas Corp.**
Douglas Aircraft Co.
C-17 Airlifter and KC-10 Extender
McDonnell Douglas Astronautics Co.
Various Air Force Programs, Including Harpoon, SLAM, GLCM, SRAM II, and SDI Programs
McDonnell Douglas Health Information Systems Co.
MDHISC Provides Data Processing and Information Services to the Health-Care Industry
- Moog, Inc.**
Fly-By-Wire Flight-Control Technology
- Morton Thiokol Aerospace Group**
Solid-Rocket Propulsion Systems for Space and Defense Programs
- Perkin-Elmer Corp., Optical Group**
Electro-Optical Systems and Precision Optics
- Planning Research Corp.**
Software for Intelligence and C³I Systems
- RCA Corp., Aerospace and Defense**
Microelectronics, C³, and Artificial Intelligence
- Rediffusion Simulation, Evans & Sutherland**
Computer-Generated Imagery
- Rolls-Royce**
Military Aircraft Engines
- Roim Mil-Spec Computers, Lorai Corp.**
Hawk/32, the World's Most Powerful Military 32-Bit Superminicomputer
- Smiths Industries Aerospace & Defense Systems, Inc.**
Aircraft Flight Deck CRT Displays
- Standard Manufacturing Co., Inc.**
Trailing Arm Drive (TAD) All-Terrain Vehicles
- Stewart & Stevenson Services, Inc.**
Custom-Engineered Diesel and Gas-Turbine Power Equipment
- Syston Donner, Safety Systems Div.**
Engine Fire and Overheat Detectors for Any Aircraft
- Thomson-CSF, Inc., Thomson-Brandt Armements**
BAP 100 (Anti-Runway Cratering Bomb), BAT 120 (Tactical Support Bomb), and FEU 80 (Multi-Option Electric Fuze)
- 3M Stormscope® Weather Mapping Systems**
Passive Thunderstorm Detection Instrument
- United Airlines Services Corp.**
The Air Force's Prime Contractor for the C-5 Aircrew Training System (ATS)
- United Technologies Corp.**
Norden Systems
Radar Systems for the A-6, B-52, and Joint STARS
Sikorsky Aircraft
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- Varo Inc., Systems Div.**
Weapons Delivery Systems, Power Supplies, and Night-Vision Products
- Vega Precision Laboratories**
Radar Tracking Command and Control Systems for Reconnaissance RPVs and Target Drones
- Vitro Corp.**
Systems Engineering, Computer Software, and Related Technical Functions

AWARDS AT THE 1986 AIR FORCE ASSOCIATION NATIONAL CONVENTION

AFA'S NATIONAL AEROSPACE AWARDS

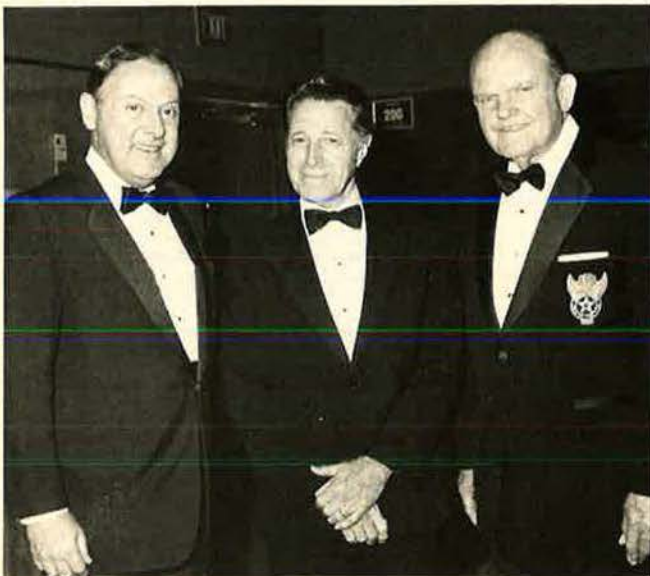
The H. H. Arnold Award (AFA's highest honor to a member of the armed forces in the field of National Security)—To **Gen. Charles A. Gabriel, USAF (Ret.)**, for his superb leadership as Chief of Staff of the United States Air Force and his lasting contributions to our national security as a member of the Joint Chiefs of Staff. His efforts have dramatically improved interservice cooperation, enhanced the effectiveness of joint operations, and vastly increased the combat capabilities of the United States Air Force, thus strengthening US deterrence across the board.

The W. Stuart Symington Award (AFA's highest honor to a civilian in the field of National Security)—To the **Hon. Caspar W. Weinberger**, Secretary of Defense, Washington, D. C., for his staunch and unceasing advocacy of the programs and budgets that restored United States military prestige at a crucial juncture in our nation's history and for his stewardship of revolutionary changes in defense management, armament, and doctrine that produced quantum leaps in the combat and deterrent power of US forces and in the efficiency of the Department of Defense.

The David C. Schilling Award ("The most outstanding contribution in the field of Flight")—To **USAF "Eldorado Canyon" Task Force**, for the heroism, superlative flying skills, and brilliant coordination and planning of the tactical air force crews, tanker crews, and ground support personnel in delivering a telling retaliatory blow against the nerve centers of Libyan-inspired terrorism during a mission of extraordinary complexity and daring. (Accepted by Lt. Col. Paul Fazackerly, 48th TFW [USAFE], RAF Lakenheath, and Col. Lynn T. Berringer, Commander, 306th Strategic Wing [SAC], RAF Mildenhall.)

The Theodore von Kármán Award ("The most outstanding contribution in the field of Science and Engineering")—To **Lt. Gen. Thomas H. McMullen, USAF (Ret.)**, Springfield, Va., for his far-sighted and dynamic leadership as commander of Air Force Systems Command's Aeronautical Systems Division. During his tenure, ASD spawned major advances in electronics, flight dynamics, and materials technology while saving millions of dollars through the ASD Technology Modernization Program.

The Gill Robb Wilson Award ("The most outstanding contribution



The first W. Stuart Symington Award went to Secretary of Defense Caspar W. Weinberger (center) for his defense management and leadership. At left is the outgoing AFA National President Martin H. Harris (now Board Chairman) and at right incoming AFA President Sam E. Keith, Jr.



The H. H. Arnold Award recipient, former Chief of Staff Gen. Charles A. Gabriel, USAF (Ret.), is congratulated by the new Chief, Gen. Larry D. Welch (right), before the awards ceremony.

in the field of Arts and Letters")—To **John F. McWethy**, National Security Correspondent, ABC News, Washington, D. C., for his penetrating, thoughtfully researched, and balanced reporting of military and foreign affairs as the national security correspondent of the ABC network and for his contributions to crucial public awareness and the standards of politico-military news coverage.

The Hoyt S. Vandenberg Award ("The most outstanding contribution in the field of Aerospace Education")—To **Harold R. Bacon**, Director, Aerospace Education, Hq. CAP-USAF, Maxwell AFB, Ala., for his innovative programming and organizational initiatives that furthered the spread of aerospace education information throughout all levels of the Civil Air Patrol. His knowledge, dedication, and skill as an educator and his creative use of teacher workshops have helped the nation's school systems at all levels to gain a substantial knowledge of the benefits and responsibilities of aerospace.

The Thomas P. Gerrity Award ("The most outstanding contribution in the field of Logistics")—To **Maj. James D. Herrick, USAF**, Chief of Supply, Deputy Commander for Resource Management, Goodfellow Technical Training Center, Goodfellow AFB, Tex., for his superior management and technical expertise. His systematic approach and detailed knowledge enabled him to advance a newly assigned supply account from a marginal status to the best in his command in only one year. His dynamic management techniques and sincere concern for people have restored confidence in the supply system, thus generating positive attitudes of Air Force-wide significance.

The Veterans Administration Employee of the Year Award—To **Ronald R. Boxmeyer**, Vocational Rehabilitation Specialist, VA Medical Center, Roseburg, Ore., for his keen interest, knowledge, and determination in working with disabled veterans. He has achieved dramatic successes in returning these individuals to a productive and contributing role in society.

The Juanita Redmond Award for Nursing—To **Capt. Glory Nightingale Gill, USAF**, Assistant Charge Nurse, Surgical Unit/SGHN3, USAF Hospital, Davis-Monthan AFB, Ariz., for sustained professional excellence in all aspects of her nursing duties. Whether in the USAF Hospital, as a volunteer teaching an AF-ROTC class, or as an active participant in the Tucson Wellness Council, her dedicated attention to detail and astute administra-

tive and management skills, especially in the area of good-health practices and physical wellness issues, have immeasurably benefited both the military and civilian communities.

The General Edwin W. Rawlings Award for Energy Conservation—To **Supervisor Bernard O. Deschanes**, Project Manager, ANGSC/DEE, Andrews AFB, Md., and **Technician MSgt. Jay L. Schultz, USAF**, Energy Conservation Manager, 836th Civil Engineering Squadron, Davis-Monthan AFB, Ariz., for outstanding achievements in energy conservation within the United States Air Force.

AFA CITATIONS OF HONOR

Armament Division, AFSC, Eglin AFB, Fla., for its extraordinary technical and managerial expertise in the cost-effective, timely development of new, more effective munitions, as exemplified by the highly successful I-2000 program. (Accepted by *Maj. Gen. Gordon E. Fornell, Commander.*)



The David C. Schilling Award for outstanding contributions in flight went to the USAF "Eldorado Canyon" Task Force. Here the plaques are presented by outgoing AFA Board Chairman Edward A. Stearn to USAFE's Lt. Col. Paul Fazackerly (left) and SAC's Col. Lynn Berringer. In the foreground is Chief of Staff General Welch.

ASAT Test Team, Vandenberg AFB, Calif., for its extraordinary precision and superb coordination of widely disparate team elements that led to continued brilliant technical successes in the ASAT test program, including a direct hit on a target in space. (Accepted by *Col. Brock T. Strom, USAF [Ret.]*, and *Lt. Col. W. Douglas Pearson, USAF.*)

Capt. Harry G. Bombardi, USAF, 4953d TS/DOCB, Wright-Patterson AFB, Ohio, for his unique and outstanding contribution to national defense by shepherding to successful implementation new safety procedures and equipment for MAC's C-141B flight operations. Spurred by a fatal accident, he single-handedly initiated an extensive operational study of the in-flight fire problem, conducted a high-risk flight test, and finally saw the adoption of new safety procedures that featured the use of a new quick-don mask with goggles.

Department of English, USAF Academy, Colo., for its superb performance in and outstanding contributions to editing, writing, and communication instruction, for producing dozens of books and articles on defense policy and leadership technology, and for creating instructional programs, most notably the Executive Writing Course, that have attracted national attention. (Accepted by *Lt. Col. Terry Bangs, Deputy for Core Courses, Department of English, Air Force Academy.*)

Sgt. William R. Harrison, USAF, Hq. SAC/PA, Offutt AFB, Neb., for his highly professional skill and unique achievement in effective communication through the written word. Named SAC Journalist of the Year for 1985 for his work as editor of the *Sentinel*,

the F. E. Warren AFB, Wyo., newspaper, Sergeant Harrison also served as NCOIC of media and community relations for the 90th Strategic Missile Wing and as manager of the Base Speakers Bureau, thus effectively promoting the Air Force mission both on base and in the community.

Capt. Matthew F. Martorano, USAF, Hq. US Space Command, Peterson AFB, Colo., for his sustained technical excellence, skill in managing complex space defense projects, and incisive identification of space defense requirements and priorities. Captain Martorano's efforts have improved this nation's ability to defend and control US space assets.

MSgt. Johnny L. Miller, USAF, 18th Security Police Squadron, Kadena AB, Okinawa, Japan, for his superb leadership and supervision of the Customs and Immigration Section at Kadena AB. Sergeant Miller's dedication led to an unprecedented award from the Japanese government for support of Japanese customs and immigration laws. His thoroughness, skill, and enthusiasm have led to significant accomplishments by his unit, including "the single most significant smuggling seizure" in a decade.

Maj. Roy J. Taylor, USAF, Chief of Test Resources, 3247th Test Squadron, Eglin AFB, Fla., for his innovative and highly skilled management of key test programs and his consistently superior airmanship while testing F-16 performance with vital new munitions, resulting in substantial increases in the readiness of the tactical air forces.

USAF Tactical Air Warfare Center, Eglin AFB, Fla., for its ingenious testing and training programs and imaginative modeling and analysis, which have led to significant enhancements in USAF's electronic combat capabilities, readiness, and aircraft survivability. (Accepted by *Maj. Gen. Thomas S. Swalm, Commander.*)

90th Strategic Missile Wing, F. E. Warren AFB, Wyo., for its significant achievement of excellence as the only strategic unit designated by the President of the United States to deploy the Peacekeeper ICBM. The high level of proficiency and success achieved by every mission element attests to this wing's international significance in the nation's defense posture. (Accepted by *Col. Gary L. Curtin, Commander.*)

96th Bombardment Wing, Dyess AFB, Tex., for its role in making the B-1B an operational reality. As the unit that received the first new heavy strategic aircraft integrated into the inventory since the mid-1950s, the 96th has provided a model for all follow-on units. Its enlightened self-evaluation has contributed immeasurably to the integration of new technology into the manned element of the strategic triad. (Accepted by *Col. Robert E. Dempsey, Commander.*)

1827th Electronics Installation Squadron, Kelly AFB, Tex., for its sustained technical excellence in support of Air Force major commands, DoD organizations, and other federal agencies. While maintaining a seventy-five percent temporary-duty deployment rate throughout the year, this unit ensured that our country's defense forces had the best C³I systems support worldwide. (Accepted by Lt. Col. Finch M. Jones, Commander.)

2952d Combat Logistics Support Squadron, Ogden Air Logistics Center, Hill AFB, Utah, for outstanding contributions to the combat readiness of USAF and its allies through its proficiency in performing aircraft battle-damage repairs and for its support of critical strategic and tactical programs and exercises worldwide. (Accepted by SMSgt. Thomas B. Greenwood.)

4315th Combat Crew Training Squadron, 1st STRAD, Vandenberg AFB, Calif., for providing consistently superior training, innovation, and forward-looking programs for the SAC ICBM force and for producing, for more than twenty-five years, thousands of highly qualified missile combat crews as well as "instructing the instructors" who carry this training into the operational ICBM wings. (Accepted by Col. James H. Ryan, Commander.)

AFA MANAGEMENT AWARDS FOR LOGISTICS

AFA Executive Management Award—To **Teddy N. Taylor**, Chief, Systems Management Division, Directorate of Programs and Resources, DCS/Distribution, Hq. AFLC, Wright-Patterson AFB, Ohio, for his outstanding contribution to management while assigned to Air Force Logistics Command.

AFA Middle Management Award—To **Lt. Col. James W. Miles**, USAF, Commander, 2952d Combat Logistics Support Squadron, Ogden Air Logistics Center, Hill AFB, Utah, for his outstanding contribution to management while assigned to Air Force Logistics Command.

AFA Junior Management Award—To **Capt. Lester H. Durham**, USAF, Deputy Program Manager, Combat Theater Communications Systems Directorate, Deputy Commander for Tactical Systems, Air Force Logistics Center, Hanscom AFB, Mass., for his outstanding contribution to management while assigned to Air Force Logistics Command.

AFA MANAGEMENT AWARDS FOR SYSTEMS

AFA Distinguished Award for Management—To **Maj. Gen. Ronald W. Yates**, USAF, Director, Development and Production, DCS/RD&A, Washington, D. C., for his outstanding contribution to management while assigned to Air Force Systems Command.

AFA Meritorious Award for Program Management—To **Col. Joseph G. Rutter**, USAF, Deputy, National Aerospace Plane Joint Program, Wright-Patterson AFB, Ohio, for his outstanding contribution to management while assigned to Air Force Systems Command.

Air Force Meritorious Award for Support Management—To **Col. David G. Kanter**, USAF, Comptroller, Electronic Systems Division, AFSC, Hanscom AFB, Mass., for his outstanding contribution to management while assigned to Air Force Systems Command.

AIR NATIONAL GUARD AND AIR FORCE RESERVE AWARDS

The Earl T. Ricks Award—To **Capt. John F. Painter**, USAF, 140th Tactical Fighter Wing, Buckley ANG Base, Aurora, Colo., for his outstanding airmanship and demonstration of the highest degree of flying skill and courage while flying an A-7 over Colorado. Despite an engine malfunction that made ejection appear imminent, he stayed with his aircraft, avoided a heavily populated area, and eventually landed safely. His calm response, coupled with his exemplary flying ability, saved a valuable aircraft and possibly averted fatalities.

The Air National Guard Outstanding Unit Award for 1986—To the **120th Fighter Interceptor Group**, Great Falls International Air-

port, Great Falls, Mont. (Accepted by Col. Gary G. Blair, Commander.)

The Air Force Reserve Outstanding Flying Wing Award for 1986—To the **419th Tactical Fighter Wing**, Hill AFB, Utah. (Accepted by Col. John J. Clossner, Commander.)

The President's Award for the Air Force Reserve—To an **HH-3E helicopter crew of the 305th Aerospace Rescue & Recovery Squadron**, Selfridge ANG Base, Mich. (Accepted by Maj. John H. Schramm, Aircraft Commander.)

SPECIAL CITATIONS AND OTHER AWARDS

Special Presidential Citation—To USAFE's **38th Tactical Missile Wing**, Wiesbaden AS, Germany, for the most outstanding unit contribution to the NATO Alliance. AFA salutes the men and women of the 38th who, despite late construction of permanent facilities and shortages of authorized equipment and personnel, maintained NATO's critical timetable for deployment of the ground-launched cruise missile in Germany. (Accepted by Col. Bruce M. Westbrook, Wing Commander.)

The Stuart R. Reichart Award for Lawyers—To **Lt. Col. Royle P. Carrington III**, USAF, 438th AFB/JA, McGuire AFB, N. J., for outstanding achievements in the field of law within the United States Air Force.

The Paul W. Myers Award for Physicians—To **Lt. Col. Thomas W. Davidson**, USAF, Chief Physician, Extender Branch, Department of Medicine, USAF School of Health Care Sciences, USAF/MSM, Sheppard AFB, Tex., for having a dramatic, lasting impact on quality assurance in Air Force health care, especially through his foresight and determination in envisioning and developing the highly successful Management for Chief of Hospital/Clinic Services Course and Emergency Medical Course.

The General Curtis E. LeMay Strategic Aircrew Award—To **Crew E-33**, 5th Bombardment Wing, Minot AFB, N. D., as the best overall aircrew in Strategic Air Command. (Accepted by Capt. Robert B. Bush, Aircraft Commander.)

The General Thomas S. Power Strategic Combat Missile Crew Award—To **Crew S-247**, 308th Strategic Missile Wing, Little Rock AFB, Ark., as the best overall combat missile crew in Strategic Air Command. (Accepted by Capt. Robert E. Servant, Missile Crew Commander.)

The Lieutenant General William H. Tunner Aircrew Award—To a crew of the **305th Aerospace Rescue & Recovery Squadron**, Selfridge ANG Base, Mich., as the best overall aircrew in Military Airlift Command. (Accepted by Maj. John H. Schramm, Aircraft Commander.)

The Lieutenant General Claire Lee Chennault Award—To **Maj. Jack J. Catton, Jr.**, USAF, Army Command & Staff College, Fort Leavenworth, Kan., as the outstanding aerial warfare tactician.

The Chief Master Sergeant Dick Red Award—To **CMSgt. Richard W. Cooper**, 150th Tactical Fighter Group, New Mexico ANG, Kirtland AFB, N. M., as the outstanding Air National Guard aerospace maintenance technician.

The General Jerome F. O'Malley Award—To an **RF-4C crew of the 16th Tactical Reconnaissance Squadron**, 363d Tactical Fighter Wing, Shaw AFB, S. C., as the best reconnaissance crew in the United States Air Force. (Accepted by Capt. Leland D. Lewis, Aircraft Commander.)

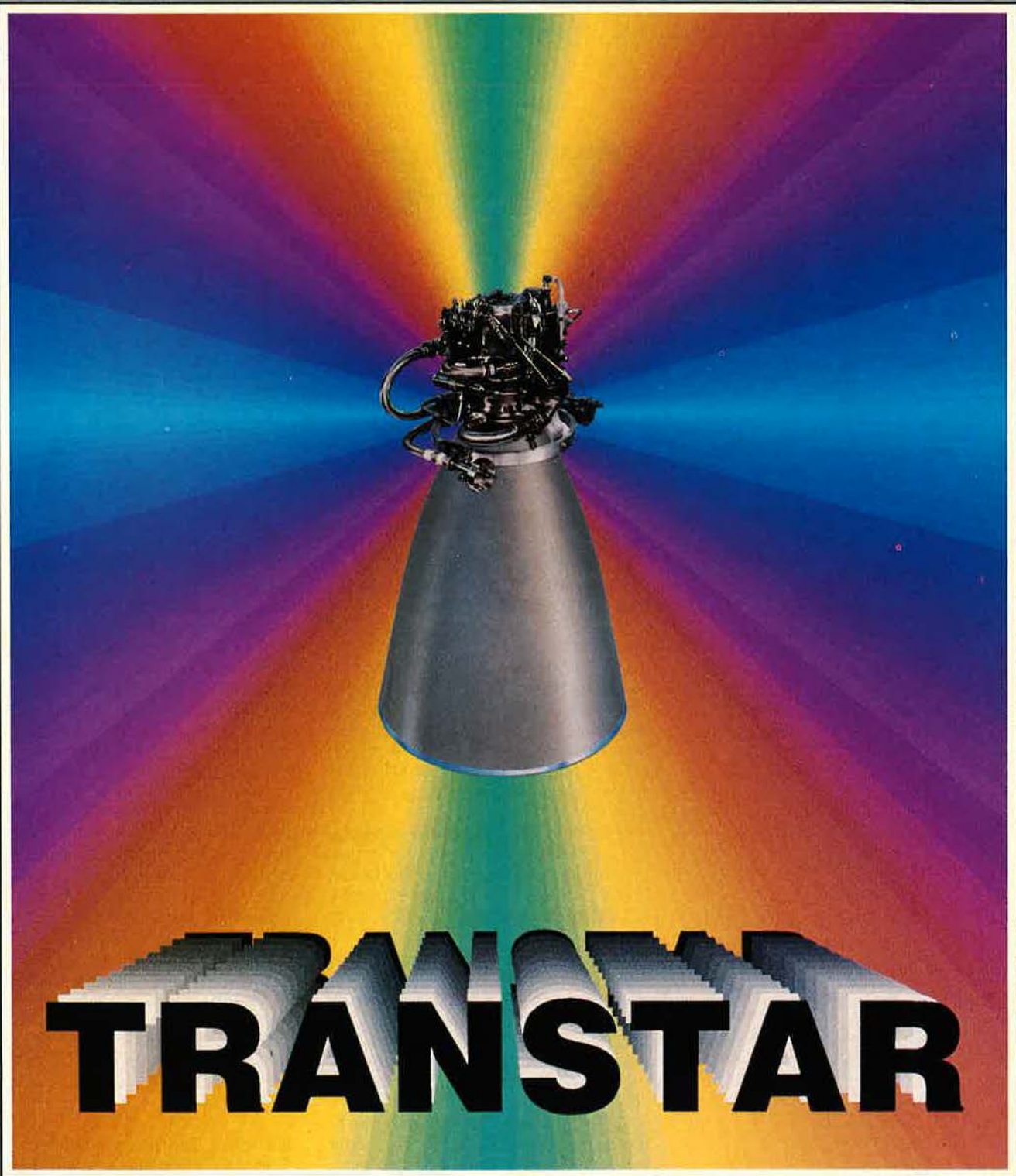
Outstanding USAF Personnel Manager of the Year Award—To **Lt. Col. Scott W. Madole**, USAF, Chief, Training Management Division, Director of Personnel Programs, Hq. TAC, Langley AFB, Va., for his outstanding knowledge, demonstration of professional skills, and especially his innovative initiatives that have greatly enhanced the management and operation of Air Force classification, training, and retraining programs.

The Verne Orr Award—To the **3380th Civil Engineering Squadron**, Keesler AFB, Miss., for the best utilization of human resources in the United States Air Force. (Accepted by Lt. Col. David M. Cannan, Commander.)

The Outstanding ROTC Cadet of the Year Award—To **Brian P. Hayes**, Homestead AFB, Fla.

The Outstanding CAP Cadet of the Year Award—To **John G. Bunnell**, USAF Academy, Colo.

The Diane O'Malley Memorial Award—To **Linda L. Shelton**, San Angelo, Tex., as the Angel of the Year.



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A policy paper titled "R&D and Force Modernization," adopted by delegates to AFA's annual National Convention on September 16, 1986.

Modernization in Midstride

The United States has made important military progress in response to mounting external threats and the popular mandate to meet these threats. Congressionally imposed budget cuts in FY '86 and FY '87—necessitated in part by the Gramm-Rudman-Hollings balanced budget act—have, however, led to the first real declines in defense expenditures in a decade. Continuing this downward trend could undo some or all of the progress that has been made over the past decade.

Moreover, as US defense expenditures are declining, the Soviet Union is continuing its steady and ambitious buildup of offensive military capability. Nations hostile to US interests have shown a brutal willingness to use military force. The Soviets are deploying new generations of ICBMs, a new generation of fighter aircraft nearly equal to top-of-the-line US fighters, and a new strategic bomber. They are expected to add 2,000–3,000 cruise missiles to their arsenal over the next several years.

Terrorism and low-intensity conflict, often supported by the Soviet Union, pose a new set of demands on US forces. Attacks on US citizens and interests can only be deterred by vigilance, continued commitment to equipping, manning, and fielding the most effective forces we can, and the will to prosecute terrorists to the maximum extent.

The American people need and deserve a defense budget that accommodates the politico-military realities of the world in which we live, not one that kowtows to the political fortunes

or budgetary compromises of their elected representatives. This Association remains convinced that a strong defense and a strong economy are not mutually exclusive. Today's defense budget accounts for a substantially smaller portion of the GNP and of overall federal outlays than it did in the 1950s and 1960s. In fact, over the past twenty years, defense spending has risen only twelve percent in real dollars, while nondefense spending has climbed 134 percent.

The Air Force Association believes that defense budgets must be based on a long-term national strategy for dealing with the threats we face and not randomly manipulated in response to short-run economic trends. The latter approach is not only ineffective fiscal policy but also increases defense costs and impairs our national security. This is true for the forces and weapons in being as well as the research and development programs that are the stepping-stones to America's security in the years and decades to come.

Building Tomorrow's Force: Research and Development

Tomorrow's military capabilities are the products of today's science and technology programs. Defense science and technology programs, including manufacturing and materials technology efforts to increase the productivity and vitality of the industrial base, have one primary objective—to provide a margin of excellence sufficiently broad to enable the United States to develop and field new military capabilities superior to

This nation's technological superiority is one of its most important advantages in the long-term political, economic, and military competition with the USSR. We can and must retain that lead. But the Soviet technological effort represents a significant challenge.



those of potential adversaries. The development and production of military equipment are fundamental for the long-term strength of the armed forces—along with such factors as the skills, training, and morale of military people. And the high visibility of these efforts makes them a crucial component of deterrence.

The Air Force Association continues to be seriously concerned about the health of this nation's science and technology base, on which our future military and economic strength directly depends. We are observing a relentless migration of high-technology production capability—especially that of electronic components and systems—out of the United States. The research and development activities undergirding those production capabilities are sure to follow. And as American industry struggles to maintain and, in some cases, regain its position in an increasingly competitive world market, it must pick with great care the technologies it chooses to pursue. We fear that the choices will exclude many that may be key to important new military capabilities. For these and other reasons, the military research and technology base program takes on increased importance.

The defense modernization program is obviously losing much of its momentum, thus creating intense competitive pressures among all of the associated projects and activities. Historically, the technology base programs have not fared well in such competition. Such programs have steadily declined as a fraction of the

overall defense budget since 1965 and are projected to continue to decline through FY '87. (The Air Force technology base program has declined from approximately two percent of its total obligation authority in the 1960s to approximately one percent today.) We are seriously concerned that increasing budget pressures will make matters worse. We urge congressional and defense leaders to weigh present and future needs carefully and to allocate adequate resources to these technology base programs so essential to the maintenance of our future security.

Integrated circuit technology is the keystone of modern military electronics. The very-high-speed integrated circuits (VHSIC) triservice program is imperative to provide the technology for major advances in integrated circuits. VHSIC technology will permit implementation of advanced avionics system architectures in future production F-15/F-16 aircraft and in the ATF that integrate subsystems for redundancy and sensor information. VHSIC also allows incorporation of artificial intelligence concepts. Payoffs will include enhanced performance and reliability and reduced life-cycle costs.

The same is true for solid-state radar that, with improved performance, higher reliability, and reduced size and weight, will provide aircraft and spacecraft with a significant avionics upgrade. Technology advancements in infrared-imaging sensors that increase the range and resolution over current sensors and provide significant improvement in the day/night/

adverse-weather reconnaissance and strike capability are essential R&D objectives.

The Conventional Weapons Technology Program and related efforts are essential to provide the capability to deliver submunitions to close runways, defeat armored columns, and accomplish defense-suppression missions.

In the area of propulsion, turbine-engine technology must be advanced to obtain improved durability, reliability, and maintainability. The complementary Advanced Turbine Engine Gas Generator and the Aircraft Propulsion Subsystem Integration Programs deserve highest R&D priority and promise engines that will be smaller, more powerful, more efficient, more durable, and lower in life-cycle costs. The variable-flow, ducted rocket must be developed and flight-demonstrated to provide a critical increase in range for air-to-air missiles. The Air Force Rocket Propulsion Program is needed for advanced air-launched tactical and strategic missiles, spacelaunch systems, satellites, and ballistic missiles.

An essential R&D goal is to improve aircraft performance. Short takeoff and landing technology is crucial to reduce dependence on conventional runways. Enhanced flight-control and weapons-delivery systems are vital to increased aircraft survivability and safety. New and improved materials are required to meet the increased performance and reliability demands of future aerospace systems.

US technology programs make

available a range of technical options to support the roles and systems national decision-makers choose for the military in space. Space systems must have a higher degree of autonomy on orbit and less dependence on ground control. Both aggressive development and demonstration of technologies needed for the next generation of space missions are critical.

Cooperative efforts with our allies in research and development should be continued when feasible. Judiciously applied, a technological advantage can be achieved through the combined superiority of the free world's industrial base. Such cooperative programs can benefit the force readiness, sustainability, and interoperability of US and allied forces, but must be continually weighed against the potential dangers of the transfer of sensitive technologies to hostile governments.

One of the key objectives in all military research and development efforts, in the view of this Association, must be to maximize the return on investment. Therefore, care must be taken that such efforts are logistically supportable and affordable. The most technically advanced system, unless supported by a sound logistics base, cannot take full advantage of the technology designed into it.

Overall, a robust technology base is an absolute requirement in this era of deterrence involving cycles of moves and countermoves. Simultaneously, a strong technology-development program must be in place to provide the essential demonstrations that provide the confidence to transition new technology quickly to operational hardware. The US must be able to understand and correctly forecast Soviet weapon developments and be prepared to start implementing a technological counter before Moscow has fielded new systems.

The Air Force Association remains convinced that this nation's technological superiority is one of its most important advantages in the long-term political, economic, and military competition with the USSR. We can and must retain that lead. But the scope, magnitude, and determination of the Soviet technological effort represent a significant challenge; we must meet this challenge by stepping up our own R&D efforts.

We are pleased to see the current Air Force focus on this area of concern. Project Forecast II served well to identify a number of technologies that may lead to dramatic and powerful new Air Force warfighting capabilities. The commitment to reallocate

financial and personnel resources to the aggressive pursuit of those technologies is essential. Such emphasis by Air Force leaders in the past has resulted in a capability second to none. Sustained investment growth in the technology base and its cost-effective management are the most immediate requirements facing us. We urge the Air Force to continue giving priority to science and technology in the next Five-Year Defense Plan.

Economies and Efficiencies

The value of R&D that results in modern, high-quality weapon systems is seriously diminished unless those systems are produced economically and effectively. The military's procurement process is frequently subjected to political pressures, especially ups and downs in terms of funding cuts by Congress. The post-Vietnam drawdown and subsequent underfunding of defense programs in the 1970s left us falling short of our military needs. Over the same period, the Soviets pursued a steady buildup of offensive forces, maintained a substantial quantitative edge over the US, and dramatically narrowed our qualitative advantage in forces. The Association believes that sustained, across-the-board force structure modernization is imperative; we must maintain the edge in weapons quality and technology to offset Soviet numerical advantages.

However, two aspects of the United States' efforts to rebuild military strength continue to receive a great deal of adverse media attention—the defense acquisition process and the price and dependability of the goods bought through that process. We applaud the Air Force's unwavering commitment to provide the best possible defense as economically as possible. The instances of abuse, overpricing, and poor product reliability are few and minor in comparison with the Air Force's remarkable and usually unheralded procurement successes.

The recently completed study by the President's Blue Ribbon Commission on Defense Management documents the need for sound business practices in defense acquisition. The Association commends the Air Force for being on the leading edge of many of these initiatives, such as competition, multiyear contracts, baselining, and development of quality acquisition personnel.

The Air Force has been tackling procurement inefficiencies on several fronts. With congressional support, the service has been able to imple-



The Air Force needs an aircraft for theater air defense, interdiction, and airfield attack.

ment multiyear procurement contracts for such major systems as the F-16, B-1B, and KC-10, saving more than \$3.2 billion to date. This approach also helps to lower the price of spare parts. On the B-1 contract alone, for example, the Air Force expects to save \$160 million as a result of acquiring selected spares on a multiyear companion contract. Competitive bidding and "dual-sourcing" for weapon systems and supplies are becoming the rule rather than the exception. This competitive atmosphere is paying off, as in some \$4.0 billion in projected savings over the life of the Alternate Fighter Engine program.

Spare parts and support equipment pricing problems are being corrected across the board by such procedures as developing "should-cost" prices for tens of thousands of parts. The Air Force also implemented a special incentive program to encourage military and civilian employees to challenge the price of the parts bought and to vigorously pursue refunds from contractors suspected of overcharging. The auditing of the acquisition process should itself be conducted cost effectively and not in a penny-wise and pound-foolish manner.

The Air Force Association endorses Air Force goals to enhance program stability, expand multiyear procurement, and achieve economic and stable production rates. These efforts offer significant potential for control-

ling the spiraling cost of modern weapon systems and deserve steadfast congressional support.

Nuclear Force Imperatives

The fundamental objective of our national security policy is to deter nuclear war. As such, modernization of our nuclear forces carries the highest priority, for they serve as the critical deterrent backstop for discouraging Soviet aggression—nuclear or otherwise—against the US or our allies.

Restraint and negotiations characterized the US approach to modernization efforts during the decade of the 1970s. The Soviets did not reciprocate and instead stepped up their force buildup. The strategic balance, therefore, started to swing in their favor. The security of our nation demands that this trend be reversed. Efforts to correct this crucial imbalance must continue.

ICBM Modernization: The Soviets understand the utility of a strong ICBM force and have devoted significant effort to increase both the capability and quantity of their missiles. Presently, their land-based force consists of approximately 1,400 launchers carrying nearly 6,400 warheads, three times that of the US ICBM force.

In spite of this significant quantitative advantage, modernization of the Soviet ICBM force continues unabated. Except for the scheduled deployment of ten Peacekeeper missiles, the US ICBM program has been static since the last Minuteman III was fielded in the mid-1970s. The Soviets, in contrast, have deployed some 850 of the world's most modern ICBMs since that time. Their missiles include the SS-17, SS-18, and SS-19. These weapons are equipped with multiple, independently targetable reentry vehicles (MIRVs). Each has excellent accuracy and payload potential, and about 800 are maintained in improved silos designed to reduce their vulnerability to our currently operational ICBMs.

The Soviets, in violation of SALT II, have added a new dimension to their strategic offensive capabilities with the deployment of more than seventy mobile SS-25s. An even larger rail-mobile missile, the SS-X-24, is expected to be operational in 1987. The pace of Soviet ICBM modernization shows no sign of slackening over the longer term. Three new ICBMs are expected to enter flight testing in the next four years. This trend toward proliferation, hardening, and mobility worsens the current imbalance in relative capability between the US and Soviet ICBM forces.

New missiles with improved capa-

bilities are needed to increase this nation's deterrent capability by diminishing the Soviet ICBM advantages and demonstrating that a strike against our land-based ballistic missile forces would not prevent us from retaliating effectively. In line with the recommendations of the President's Commission on Strategic Forces, the US, therefore, must complete expeditiously a three-step ICBM modernization program centered on (1) prompt deployment of 100 Peacekeepers, (2) development of a new Small ICBM, and (3) a basing technology-development program.

A force of 100 Peacekeepers is needed now to redress the significant and growing asymmetry in capability between US and Soviet strategic ICBM forces. The decision to deploy the Peacekeeper missile recognizes the importance of retaining the unique characteristics of the land-based ICBM: prompt, flexible response; high alert rate; dependable and proven command control and communications; high accuracy; and low operating cost.

This Association emphatically supports the development of a Small ICBM that could be deployed in a variety of basing modes, including mobile options. This missile, in conjunction with Peacekeeper and Minuteman forces, will provide a diversification of systems capable of checkmating Soviet war plans. Development of the Small ICBM should continue to ensure initial deployment in the early 1990s.

These programs must be linked to a vigorous research and development program exploring new hardening techniques for silos and shelters suitable for deployment of Peacekeeper or small missiles. Continued study of different types of mobile land-based vehicles and launchers, particularly those hardened for deployment of Small ICBMs, is necessary.

This comprehensive approach to ICBM modernization is needed to provide stability through improved deterrence. The Small ICBM's role is to permit the US—and to encourage the Soviet Union—to move toward a more balanced and therefore more stabilizing force structure. Peacekeeper provides the leverage in the near term needed to persuade the Soviet Union to negotiate arms control seriously while providing a critical counterbalance to growing Soviet capabilities. Negotiations aimed at arms reduction must not become a substitute for US military preparedness. Arms control must first and foremost serve our national security interests.

Although deployment of Peace-

keeper and developmental efforts on the Small ICBM must continue, they should not detract from the need to continue qualitative improvements to our Minuteman force. Steady improvements to propulsion, guidance, and reentry systems as well as silo-support systems are needed to maintain these older systems and to provide flexibility to counter continuing Soviet advances in strategic capability.

Bomber Modernization: Without improvements to existing forces, Soviet advances in air defense will make the current bomber force increasingly vulnerable. Soviet deployments of AWACS-type airplanes and look-down/shoot-down fighters and the deployment of nearly 14,000 modern surface-to-air missiles will, by the late 1980s, severely stress the ability of the B-52 force to penetrate the Soviet heartland and destroy critical targets.

Consequently, the Association supports the President's two-bomber modernization program. A pivotal part of this program, the deployment of 100 B-1B bombers, answers today's immediate needs. This bomber will achieve an initial operational capabil-



A force of 100 Peacekeepers is needed to redress the asymmetry in capability between US and Soviet strategic forces.

ity (IOC) in late 1986. The second critical step for continued bomber modernization is the prudently paced development of the Advanced Technology Bomber (ATB). Stealth technology is available and well defined, and an early-1990s IOC for this bomber is technologically and economically well within the Air Force's grasp.

The importance of the bomber force cannot be overstated. The manned bomber is the only element of the triad employable across the entire spectrum of conflict. As reusable, multipurpose delivery systems, long-range bombers can accurately deliver large nuclear or conventional payloads and do so in any foreseeable wartime scenario. They can be launched to ensure survivability, to signal national resolve during time of crisis, and to permit the National Command Authorities more time to evaluate strategic warning indications prior to a final weapons-employment decision. Bombers can be recalled or withheld at any time, and they provide the only capability for immediate, on-the-spot target-damage assessment. Also, they can re-strike or attack assigned alternate targets. Additionally, as the worldwide, long-range, conventional maritime support and land-attack roles grow in importance, the rapid response, global range, and large diversified payload characteristics of bombers provide a vital capability not available in any other existing weapon system.

The B-1B, which relies on a combination of reduced radar observability and highly effective reprogrammable electronic countermeasures, will be fully capable of penetrating the Soviet Union well into the 1990s. This will allow designated B-52s to be employed in a less demanding but no less critical standoff cruise-missile role. With the development of low-observables technology, the acquisition of ATBs is essential. The ATB, combined with the B-1B, represents the most effective force for long-range combat missions (nuclear or conventional) well into the twenty-first century.

In the meantime, the air-launched cruise missile (ALCM) and the offensive avionics modification program will help maintain the effectiveness of the B-52 force into the 1990s. The ALCM, which achieved an initial operational capability on the B-52 in 1982, provides a long-range standoff capability and stresses Soviet air defenses. Its follow-on, the advanced cruise missile (ACM), takes advantage of new developments in cruise-missile stealth technologies and is essential to ensure that our force of cruise missiles will maintain its flexibility and effectiveness well into the future.

Finally, the Association supports Air Force efforts to procure a replacement short-range attack missile (SRAM). For more than a decade—well beyond its expected service life—the SRAM's short-range, standoff capability has enhanced the ability of

the manned bomber to perform the penetration mission against important and highly defended targets. This unique operational capability can back up our modernized bomber force by neutralizing hostile defenses. The improved SRAM II missile is planned to replace the current SRAM in the 1990s and will maintain the maximum flexibility of the manned bomber force.

New bombers employing cruise missiles, SRAM IIs, and gravity weapons will improve the overall capability of the air-breathing leg of the strategic triad. This unique mix of weapons and weapon carriers will severely stress the Soviet defensive effort and significantly improve the deterrent aspects of our nuclear forces.

Strategic C³I

Nowhere is the need for modernization more critical than in the area of strategic command control communications and intelligence (C³I). During a conflict or crisis, C³I systems must give the national leadership a comprehensive, real-time picture of events and the ability to initiate necessary responses.

To enable our C³I network to operate in all phases of nuclear conflict, improvements are needed in ground-based radars. Also, the Air Force must continue developing space-based radars. Current deficiencies are such that survival of the C³I system after a first strike, let alone endurance through a prolonged nuclear conflict, is not assured. Congressional action to support the upgrading of our warning and communications network is essential. The triad's ability to perform its mission ultimately depends on reliable, maintainable, and survivable command and control, thereby justifying the costs of such upgrade programs.

Specific needs center on improving the survivability and performance of many critical control networks (1) through upgrades, (2) the use of nuclear-hardening techniques, (3) higher power transmitters, (4) redundancy and proliferation of critical C³ nodes, and (5) employment of new satellite, airborne, and ground-based communications systems. Key requirements include:

- Modernizing the Worldwide Airborne Command Post C³ systems and hardening them against nuclear effects.

- Upgrading aircraft alerting communications systems used by wing command posts by providing electromagnetic pulse (EMP) protection.

- Modifying the very-low-frequency/low-frequency (VLF/LF) systems

with a new processor to improve transmission in a stressed environment. VLF/LF receivers must be expeditiously installed in bombers to improve communications between them and their command centers.

- Fielding the Ground Wave Emergency Network (GWEN), a low-frequency, radio-relay network that supports critical two-way data communications in a nuclear environment.

- Fielding the Milstar Satellite Communications System, an extremely-high-frequency system to provide worldwide, antijam, survivable connectivity prior to, during, and after a nuclear attack.

- Improving, over the long term, satellite capabilities at frequency ranges that sustain communications in a nuclear-disturbed atmosphere. Milstar needs to be developed and deployed to provide highly jam-resistant and survivable satellite communications for the command and control of our strategic and tactical forces. Additionally, defense and national security activities will continue to need wideband satellite relay for their high-speed digital communications.

Strategic Defense

AFA supports modernization efforts that enable US strategic defense forces to provide timely, high-confidence threat warning and attack assessment information to the National Command Authorities (NCA). This modernization is necessary to posture forces for survival, to limit damage, and to respond appropriately to an enemy attack. Reliable, maintainable, and survivable strategic defense systems contribute to overall deterrence by reducing the prospect that the Soviet Union could successfully carry out a surprise attack. The US currently lacks adequate strategic air defenses primarily because of limitations in existing surveillance systems. Our detection systems cannot assure sufficient tactical warning to allow the NCA and military commanders to take appropriate survival measures. Furthermore, even with tactical warning, the current fighter force could not conduct effective, active defense against low-level penetrators, because the bulk of this force lacks the look-down/shoot-down capability necessary to defeat such a threat.

Atmospheric Defense: To provide radar surveillance of Arctic approaches, AFA supports deployment of the North Warning System—a network of fifty-two cost-effective, state-of-the-art radar stations that will upgrade the existing thirty-one 1950s-vintage Distant Early Warning Line radars. Upgrade of the air surveillance



As in the strategic area, C³I is vital for successful tactical operations.

network is also needed. Over-the-Horizon Backscatter (OTH-B) radars, which will provide coverage out to about 1,800 nautical miles, must be deployed on the east and west coasts, in Alaska, and in a south-looking site in order to provide coverage of these approaches.

Because most of the United States air defense fighter force is more than twenty years old and only marginally effective against Soviet capabilities, continued interceptor modernization with F-15s, F-16s, or other modern fighters determined by competition is essential. In addition, command and control capabilities must be expanded, possibly in conjunction with the E-3A Airborne Warning and Control System (AWACS), to provide a more robust wartime capability.

Ballistic Missile Warning: To detect modern missiles with multiple independently targetable reentry vehicles (MIRVs) and to solve the maintenance and supply support problems of an aging system, the ballistic missile early warning system (BMEWS) must be modernized expeditiously. Replacement of the missile-impact-predictor computers has already been completed, and upgrades to the detection and tracking radars is ongoing.

Also, the two additional phased-array SLBM warning radars (PAVE PAWS) being built in the southeast and southwest United States will provide a substantial improvement in SLBM tactical warning capability and will allow USAF to close two old sites that are becoming increasingly costly to maintain.

Space Defense: Space surveillance

systems, such as the ground-based electro-optical deep-space surveillance system, and improvements to ground-based radars must be completed to maintain a catalog of space objects. These systems support potential antisatellite (ASAT) targeting and satellite-attack warning.

An operational ASAT system is also needed to deny the Soviets a sanctuary in space, deter use of their deployed ASAT, and counter space-based threats to our terrestrial forces. AFA opposes restrictions that hamper development and flight testing against objects in space necessary to field this important system.

Strategic Defense Initiative: The Strategic Defense Initiative (SDI) is a research and technology program aimed at determining the feasibility of developing effective defenses against ballistic missiles. The Air Force Association strongly supports the SDI effort. The initiative is one of the most important technological programs the nation has ever undertaken. However, it is not a deployment program, nor is it a substitute for the modernization of our strategic nuclear, non-strategic nuclear, and conventional forces.

Defense against ballistic missiles offers new possibilities for security by limiting the effectiveness of a Soviet attack, increasing significantly Soviet uncertainties about the effectiveness of an attack, and reducing the potential dangers associated with the accidental release of nuclear weapons.

Full-scale engineering on SDI could begin in the early 1990s, followed by antiballistic missile system deployment in subsequent years, if warranted and approved by a future President and Congress.

The Air Force is managing the execution of nearly thirty-five percent (approximately \$900 million) of the SDI program in FY '86, including programs in directed energy, kinetic energy, surveillance and acquisition, battle management/command control and communications, and survivability and lethality. The Air Force is also the lead service for the SDI's National Test-Bed Joint Program Office. Many SDI technologies may provide important spinoffs for other Air Force mission areas and operations. This Association fully supports Air Force participation in this vital program.

Readiness and Sustainability

United States military forces must be able to reach full combat potential rapidly and under demanding circumstances. Should deterrence fail, warning time could be so short that peacetime readiness would be the de-

termining factor in determining success.

The Air Force investment in force structure and modern weapon production can be translated into a war-fighting capability only if readiness and sustainability programs are functioning well. The proper mix of modern equipment and well-trained, dedicated people who have at their disposal effective repair facilities, sufficient spare-parts inventories, and adequate munitions and fuel is essential. The Air Force has made readiness and sustainability the number-one priority for conventional forces.

Readiness is the ability of the Air Force to accomplish assigned missions at the beginning of a conflict. Realistic operational training, maintaining the elements of the force at a high proficiency level, and ensuring that each unit is equipped with sufficient trained personnel, spare parts, and consumables are essential for readiness. Sustainability is staying power—the ability of our forces to fight beyond the initial period of combat—and is achieved largely by having adequate stocks of spares, supplies, munitions, and fuel.

The allocation of resources to readiness and sustainability initiatives involving spares, maintenance, training, personnel, munitions, and fuel is paying off.

AFA applauds the fact that important progress has been made toward improving the quality and realism of operational training programs. Such initiatives as Red Flag and Dissimilar Air Combat Training continue to increase the readiness of our operational crews. Major exercises and numerous deployments of active, Guard, and Reserve units to overseas operating bases have given operations and maintenance people realistic experience in the environment in which they may fight. Improved training, additional flying hours, and more experience have produced the best safety record in Air Force history. The 1985 accident rate of 1.49 mishaps per 100,000 flying hours reflects the positive effects on combat forces when such readiness initiatives as flying-training hours, spare parts, and realistic training are properly funded. Funding for readiness and sustainability must continue to receive the highest priority. Efforts to increase operational flying, expand stocks of spare/repair parts and munitions, decrease the depot maintenance backlog, and provide near-term combat capability need to be sustained.

In the future, the nation's ability to field a viable, affordable fighting force may hinge on our efforts to im-

prove the reliability and maintainability (R&M) of equipment and weapon systems. The potential long-term payoff on the investment in reliability and maintainability is the increased effectiveness of combat sorties at reduced cost. We believe the technology is at hand to make significant improvements in this area, and AFA strongly supports Air Force efforts, such as R&M 2000, that are designed to ensure that these advances are realized.

The wartime performance of modern aircraft can be only as good as the munitions they carry. More modern precision and wide-area munitions increase the efficiency of each wartime sortie, allowing destruction of more targets with decreased attrition of aircraft and aircrews.

Sufficient quantities of more modern munitions and spares must be procured to provide the field commander the capability to defeat the enemy. Munitions shortfalls require more time to correct than spares, due to the limited production base available and the time required to phase in newly developed munitions.

Readiness and sustainability shortfalls cannot be corrected overnight. Maintaining a combat-ready force will require a steady, sustained, and balanced provision of significant resources.

Force Projection

The ability of the United States to deter aggression, to limit conflict, or to wage war depends on how effectively we deploy, employ, and sustain fighting units. To achieve national security goals, DoD has developed a deterrent strategy based on a mix of CONUS-based and forward deployed forces. Inherent in this strategy is the requirement to rapidly project, and then sustain, the required military fighting forces anywhere in the world. The visible means and national will to project military power by air can deter our adversaries from aggression. Further, force projection can keep small crises from escalating into large conflicts.

This force-projection mission is currently performed by a combination of general purpose, specialized, and dedicated mission aircraft. These resources are operated by active-duty, Associate Reserve, and air reserve force units (Air Force Reserve and Air National Guard) based around the world. These units are augmented by the Civil Reserve Air Fleet (CRAF), composed of passenger, cargo, and cargo-convertible aircraft operated by commercial airlines. CRAF assets can be called up in various stages dur-

ing contingency or emergency situations.

In 1983, the Air Force began to modernize and increase the capability of the airlift force structure. This included the C-5B procurement, CRAF enhancement, and the CT-39 and C-140 replacement programs. The Air Force expanded the KC-10 program and continued development of the C-17. In FY '86, three of these programs were completed. Most of the CT-39 fleet has been replaced with eighty C-21s and forty C-12s under a lease program. Eleven C-20s have been procured to replace the C-140 fleet, with final delivery scheduled for FY '87. The CRAF-enhancement procurement was also finished with the funding of nineteen Boeing 747 cargo-convertible modifications. FY '87 is to be the last year of KC-10 and C-5B procurement.

The airlift program for the future is composed of two parts. Over the near term, the Air Force will continue to improve current systems through upgrades or modifications. The cornerstone of the long-term program is development and procurement of the C-17. Vital wartime capabilities, manpower constraints, high reliability and maintainability, and affordability were primary considerations used in the competitive decision to buy the C-17. AFA believes the excellent operational characteristics and low life-cycle cost of the C-17 make it the best choice to meet established airlift requirements and provide a credible force-projection capability well into the twenty-first century.

Tanker modernization is the primary Air Force program to increase tanker capability. The modernized tanker (KC-135R) will be augmented by the KC-10 being procured to further improve our force-projection capabilities. These are complementary programs that increase tanker capacity and mobility. Reengining the KC-135s while procuring sufficient quantities of the KC-10 will provide a flexible tanker force, capable of meeting a wide range of competing strategic and general-purpose mission requirements.

Airlift Master Plan: The USAF Airlift Master Plan provides the Air Force with long-term goals for effectively managing and employing the airlift assets needed to sustain our military strategy. The plan defines an airlift force structure balancing validated requirements of military utility, operating costs, manpower constraints, force stabilization, and force modernization to achieve the most beneficial results.

The Air Force plans to attain the

66,000,000 ton-miles-per-day (MTM/D) of airlift capacity recommended by the Congressionally Mandated Mobility Study while maintaining a minimum of 9,000 tons per day intratheater capability. Obtaining additional KC-10s and C-5Bs and enhancing the CRAF will meet critical near-term need for additional airlift.

The vital intratheater airlift function includes movements of cargo and personnel from major theater airports and seaports, shifts of prepositioned stock, and meeting tactical requirements growing from the battlefield situation. The intratheater requirement for the insertion, repositioning, and resupply of combat forces is hard to measure because of the uncertainty of wartime events. At this time, the C-130 is the only aircraft capable of performing all aspects of the intratheater airlift mission. Modifications to its structure and equipment must continue, but a replacement for the capability lost as older C-130s retire will be needed in the 1990s.

C-17: The C-17 is the key to our nation's long-term program to reduce major airlift shortfalls, especially for outsize Army equipment. The C-17 will: (1) achieve increased inter-theater airlift capability recommended by the Congressionally Mandated Mobility Study, (2) provide the theater commander with outsize intratheater capability as well as flexible delivery modes, (3) offset the capability lost as older C-141s and C-130s begin leaving the inventory in the 1990s, and (4) reduce airfield congestion with direct delivery and efficient design characteristics. The air-refuelable C-17 will be able to carry all classes of cargo over intercontinental distances and operate directly into small airfields typical of contingency areas around the world. The C-17 will be capable of all delivery modes, *i.e.*, airland, airdrop (including outsize), and low-altitude parachute extraction (including outsize).

The key to reaching the 66 MTM/D goal within reasonable fiscal constraints is the C-17. Only the C-17 offers the flexibility and load capacity to deliver combat forces routinely to their final destination at affordable support and manpower costs. The C-17 will provide the greatest increase in airlift at the lowest life-cycle cost. The Air Force plans to procure 210 C-17s from FY '88 through FY '98 and to deploy the aircraft in active-duty, active/associate Reserve, and organic Reserve and Guard units based in the CONUS. Full funding of the C-17 program is imperative.

The European Distribution System: The European Distribution System

(EDS) is a logistics system designed to give greater combat readiness and sustainability to US Air Forces in Europe (USAFE). By using the EDS concept of support, critical spares can be transferred in twelve to thirty-six hours under intense combat conditions. The EDS consists of a dedicated command control and communications system supporting Air Force logistics, a squadron of small cargo aircraft, and the stockage of wholesale spares within the theater. With eighteen C-23A (Sherpa) aircraft in place at Zweibrücken AB, Germany, to move materiel within Europe, the transit time on delivery of parts has been reduced from as much as seven days to only one to four days.

CRAF: The Civil Reserve Air Fleet (CRAF) provides more than thirty-five percent of the intertheater airlift—personnel and cargo combined—that is available under crisis conditions. Further expansion of the CRAF wide-body fleet is planned. Even with implementation of the full FY '86 program, airlift shortfalls will still exist and require major future efforts.

Airlift C²: To compensate for limited airlift resources, it is imperative that MAC's command and control (C²) capability be modernized and expanded. Deployable VHF satellite terminals, improved data sets, and a local area network information-processing system are required to provide superior fleet operations management that will partially offset shortfalls in airlift resources.

Low-Intensity Conflict: "Low-intensity conflict" is a broad term used to characterize conflicts occurring below the threshold of theater warfare, ranging from regional conflicts to guerrilla action and terrorism. The Soviet Union and its surrogates have both encouraged and supported worldwide insurgency and terrorism as a way of achieving their objectives without direct confrontation with the free world. These conflicts will likely be the most pervasive threat to free world security for the remainder of this century.

The Center for Low-Intensity Conflict has been set up by the Air Force and the Army at Langley AFB, Va., to examine this form of warfare in an integrated way and to focus on how the armed services can make the best use of their resources, including those capabilities designed specifically for special operations. The Center is also the focal point to plan and program for the integration of future forces.

Special Operations: US Special Operations Forces provide unique capabilities for flexible response to low-intensity conflict threats and a wide



US Special Operations Forces provide unique capabilities for flexible response to low-intensity conflict threats.

range of crises. Air Force SOFs provide airlift and selective firepower support for Army Special Forces, Army Rangers, and Naval Special Warfare Units. In conjunction with those forces, Air Force SOFs conduct or support foreign internal defense, unconventional warfare, direct action/strike missions, psychological operations (PSYOP), and contingency missions. SOF units are composed of specially configured equipment and personnel trained to conduct unusual, short-notice, sensitive, and low-visibility operations. Although many types of aerospace forces have application in special operations, the Air Force organizes, trains, and equips specific units to conduct special operations as their primary mission. These units are equipped with MC-130, AC-130, EC-130, MH-53J, and H-3E aircraft.

The MC-130H Combat Talon II and AC-130 gunship programs are designed to reduce the shortfalls in the existing MC-130E and AC-130A/H fleets. These air-refuelable aircraft will be tailored to the special operations mission with the help of integrated avionics and defensive electronic suites. Eleven H-53s will also be upgraded to the MH-53J Pave Low III configuration to provide a total of nineteen MH-53s for worldwide SOF operations.

Joint Service Advanced Vertical Lift Aircraft: The CV-22A Osprey program is a joint DoD initiative that will provide the Air Force with an advanced-technology, fixed-wing, tilt-rotor aircraft with long-range, vertical-lift, night/adverse weather capabilities to

conduct SOF infiltration/exfiltration missions. The Air Force requires fifty-five CV-22A aircraft.

Aerial Refueling: USAF analyses show that additional aerial refueling capability is needed to optimize bomber-penetration routes in support of the Single Integrated Operational Plan (SIOP). In addition, the requirement for tanker support is increasing as more B-52Gs and B-52Hs begin to carry ALCMs. The requirement to refuel airlift and tactical aircraft for worldwide operations continues to grow as well. Present aerial refueling requirements for SIOP and other contingencies exceed current capabilities by a substantial amount. During major contingency operations, strategic capabilities and other missions would be seriously degraded because of tanker limitations.

The basic KC-135 airframe will last into the twenty-first century. The KC-135R Modernization Program makes more than twenty-five system improvements to match the airframe's long life and increases its offload capability by fifty percent over that of the KC-135A. The KC-135R's new engine provides sixty-three percent more thrust than the old J57, permitting takeoff with 14,000 pounds more fuel and 3,100 feet less runway. The new engine is also twenty-seven percent more fuel-efficient than the J57. The KC-135R will increase reliability, improve maintainability, reduce operational and support costs, and meet federal noise-pollution standards.

The KC-10 provides additional refueling support for conventional force deployments. In a tanker-only role (vs. a combined tanker-airlift mode), the KC-10 averages three times the offload capability of a KC-135A. Refuelable in flight, the KC-10's cargo-tanker capabilities greatly increase the range of tactical fighter units.

Each aircraft is tailored to a specific mission—the KC-10 to the long-range deployment of aircraft and cargo and the KC-135R to SIOP-related mid-range deployment or employment scenarios. A mixed force of KC-10s and KC-135Rs takes advantage of the capabilities of each aircraft.

Tactical Airpower

The Soviets are expanding their global influence comprehensively. They outproduce the US and its allies in virtually every category of weaponry and, at the same time, erode our qualitative edge by fielding technologically advanced systems. Modernization and expansion of USAF's tactical forces, therefore, take on a high priority.

Tight defense budgets make it difficult for the Air Force to accommodate both near-term readiness and sustainability requirements and the modernization and expansion of tactical forces. We must maintain the ability simultaneously to train personnel and stock adequate levels of war reserves, expand production of F-15s and F-16s, and develop new systems for the future, such as the Advanced Tactical Fighter. We must also improve the capabilities of our force. Toward this end, production of the F-15E and the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system increases our extremely limited night, adverse-weather, air-to-surface capability. Additionally, modernization of our defense suppression and tactical command control and communications (C³) systems, as well as acquisition of new sensor systems, is vital for continued combat effectiveness.

The Air Force has developed a Tactical Fighter Roadmap as a guide for building the tactical fighter force required in the 1990s. The roadmap defines the forces required in terms of quantity and quality to meet global commitments and also describes a procurement strategy to achieve growth from the current force of approximately thirty-seven tactical fighter wing equivalents to a level of forty wings by 1991. This strategy permits concurrent retirement of older,

less capable aircraft and sustains that force at an acceptable average age. Further, the roadmap defines the quality improvements and the mix of capabilities we must procure and field to maintain our qualitative edge and achieve the flexibility and effectiveness necessary to meet field commanders' requirements.

The Air Force must procure sufficient numbers of tactical fighters each year in order to grow to and maintain forty tactical fighter wings and keep the average aircraft age at approximately ten years. The roadmap prescribes a progressive increase to attain the required levels. The FY '87 request for 264 aircraft (216 F-16s and forty-eight F-15Es) represents the continued commitment to achieve required procure-



The ATF will be an air-superiority fighter capable of countering current and projected Soviet fighters.



The F-15E will be capable of around-the-clock, air-to-ground operations at long ranges with large weapon loads.

ment levels and should be fully funded by Congress.

F-15E Dual-Role Fighter: Tactical air force commanders examined worldwide challenges, analyzed Soviet defensive systems, and concluded that the Air Force requires additional fighter capabilities. Specifically, the Air Force needs an aircraft for theater air defense, interdiction, and airfield attack. Key here are greater range and payload capabilities to meet Pacific and Southwest Asia theater requirements. The aircraft must meet the deep interdiction requirements and have the capability to find and attack fixed and mobile targets at night and under the weather. The F-15E with LANTIRN will meet this need and augment the limited number of F-111s in the long-range interdiction role. In the theater air defense role, the F-15E will fight alongside the currently deployed models of the F-15.

The Air Force begins procurement of the F-15E dual-role fighter this year.

Forty-eight aircraft are requested in FY '87, with a total planned procurement of 392. The initial operational capability is planned for FY '89. The F-15E will be capable of around-the-clock, air-to-ground operations at long ranges with large weapon loads while retaining superior air-to-air capabilities. Integration of advanced avionics, controls, and displays will enable the F-15E to penetrate enemy defenses at low altitude and detect and destroy targets day or night and in adverse weather with a variety of air-to-surface munitions.

F-16: The US Air Force plans a total buy of 3,047 F-16s through FY '94 to replace aging F-4s and to modernize the air reserve forces. The aircraft procured in FY '87 will be F-16C/Ds, with numerous improvements over the original F-16A/B. The F-16C/D has a reconfigured cockpit, improved radar, and increased computer capacity. These improvements will facilitate the incorporation and employment of advanced subsystems, including the Advanced Medium-Range Air-to-Air Missile (AMRAAM) system, LANTIRN, the Airborne Self-Protection Jammer (ASPJ), a new radar-warning receiver, and Global Positioning System equipment.

In FY '87, the Air Force is requesting funds for the procurement of 216 F-16 aircraft plus initial spares in the second year of a four-year, multiyear procurement. This is a follow-on to the original F-16 multiyear procurement that spanned FY '82-85 and saved \$257 million. The follow-on multiyear program (FY '86-89) is projected to save \$360 million.

As part of the modernization of the reserve forces, the Air Force has converted two squadrons to the F-16. The first is an Air National Guard (ANG) unit at McEntire ANGB, S. C., and the second is an Air Force Reserve squadron at Hill AFB, Utah. Three additional ANG units will convert to F-16s in FY '86, followed by two more in FY '87, and the Air Force Reserve will convert its second unit to F-16s in FY '87.

Advanced Tactical Fighter: The Soviets are introducing a new generation of fighters with look-down capability along with an airborne warning and control aircraft (SUAWACS) to detect low-flying aircraft and direct attacks against them. If not countered, this new and growing threat will deny our aircraft the protection of the low-altitude sanctuary and reduce the effectiveness of our other tactics used to penetrate hostile airspace.

The Advanced Tactical Fighter (ATF) program will develop a new fighter aircraft for introduction in the mid-1990s. A follow-on to the F-15,

the ATF will be an air-superiority fighter, capable of performing operations in enemy airspace and countering current and projected Soviet fighters. It will have a first-look, first-kill capability and improved lethality and durability and will be survivable in a high-threat environment. Improved supportability features permitting high sortie rates are being designed into the aircraft from the beginning. The ATF will also have inherent air-to-surface capabilities without compromising air-superiority performance.

The ATF will be made survivable in a high-threat environment through a combination of higher (supersonic) speed and altitude, improved supersonic maneuverability and endurance, reduced observability, and integrated defensive systems. This high degree of survivability will allow the ATF to operate over hostile territory, hold high-value Soviet aircraft at risk, and conduct fighter sweeps in support of friendly air operations.

Advanced Medium-Range Air-to-Air Missile (AMRAAM): The Advanced Medium-Range Air-to-Air Missile (AMRAAM) is the next-generation missile being developed by the Air Force. AMRAAM will be used by the Air Force, Navy, and our NATO allies. Compared to the current Sparrow, AMRAAM is a major advance in missile capability. AMRAAM provides increased velocity, better maneuverability, a more lethal warhead, improved terminal guidance with an active radar seeker, and a greater employment envelope. These characteristics give pilots the capability for multiple-target engagements during a single pass, launch and maneuver options, and improved electronic counter-countermeasures. The missile will be compatible with all USAF and USN front-line fighters and will also meet NATO requirements for air superiority and air defense aircraft. The missile's performance as well as its compatibility with US fighters and those of our allies will help increase the Air Force's effectiveness against a numerically superior adversary, thereby acting as a "force multiplier." The Association urges Congress to fund this program on a sustained basis.

LANTIRN: The Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system enables the F-15E and F-16C/D to get in and out of target areas below enemy air defenses at night and in conditions of limited visibility. It also provides the capability to find and attack tactical targets with IIR Maverick missiles, laser-guided bombs, and other conventional ordnance. The develop-

ment and procurement funds requested in FY '87 are needed to support flight testing for LANTIRN/F-15E, F-16/Auto Terrain Avoidance (ATA), and continued development of support equipment. The procurement funds will purchase 143 navigation pods, initial production of targeting pods, six sets of support equipment, and initial spares as an essential first step toward fielding this weapon system.

Chemical Warfare: The Soviets maintain a considerable chemical warfare advantage over the US and the NATO alliance. Large quantities of chemical agents are stored in at least nine depots located throughout the USSR. Chemical warfare research and development continues, with several new facilities constructed at their chemical-agent proving grounds since the late 1970s. The Soviet advantage in chemical warfare is growing at an alarming rate.

The Air Force must be given the funds to defend against the effects of chemical warfare and also to achieve the capability to retaliate in kind. Current defensive protective gear is marginally adequate, but causes problems, such as induced heat stress, restricted movement, loss of vision, and loss of communications. Some tasks, such as weapon systems maintenance, already difficult under combat conditions, become impossible, and many simple tasks take longer. This would result in fewer sorties. It is imperative that adequate quantities of better protective systems be developed to allow our forces to operate efficiently during and after a chemical attack.

The FY '87 Chemical Warfare Defense Program request continues the development and procurement of masks, improved protective gloves and clothing, advanced chemical-agent detection and warning systems, survivable protection systems, and new decontamination equipment. However, the development of better defensive equipment alone cannot be considered an adequate deterrent. Even if we have improved equipment, the Soviets gain a significant advantage if we are forced to operate under protective conditions. Our present capability to retaliate in kind is extremely limited and can no longer be considered an effective deterrent. An effective retaliatory capability combined with a strong chemical defense will provide a credible deterrent. Both elements, defensive and retaliatory, are essential.

Air-to-Surface Weapons: The wide diversity of military threats facing the US around the world requires the Air



Forward basing and a rapid-reinforcement capability are the foundation of the US commitment to our allies.

Force to procure a mix of advanced air-to-surface munitions. The Air Force requires weapons capable of standoff or direct attack and multiple kills-per-pass to counter the large number of airfields, armor, and air defense systems facing the allied forces in the European theater. Such weapons as the improved 2,000-pound bomb (I-2000) and the alternate-warhead Maverick are imperative to counter the large number of hardened targets in the Pacific theater. It is essential to have a mix of weapons capable of responding to the most demanding scenario while satisfying the requirements in each theater. Furthermore, the Air Force must design, build, and procure weapons to give us the capability for around-the-clock employment. It is vital that these weapons are available in quantities to meet the requirement for initial surge and sustained battle.

Among the essential munitions are the French-built, runway-cratering Durandal that serves as an interim measure to attack airfield operating surfaces as well as the Boosted Kinetic Energy Penetrator, a cheaper and more effective next-generation airfield submunition.

The Air Force has developed an Antiarmor Master Plan that spells out near- and long-term requirements for weapons to destroy armor. Weapons are needed for standoff, area coverage, multiple kills-per-pass, and night and adverse-weather capability. The Air Force is procuring and developing a complementary mix of weapons to fulfill these needs.

USAF's current capability consists

of Rockeye and Maverick missiles and 30-mm ammunition. In the near term, the Combined Effects Munition provides the area multiple kills-per-pass capability to cope with follow-on forces, while Gator mines are designed to delay and disrupt armor. For the future, the Sensor Fuzed Weapon with the Skeet submunition is essential to provide a direct-attack, multiple-kills-per-pass, antiarmor capability.

The AGM-88 High-Speed Antiradiation Missile (HARM) is needed to augment the F-4G Wild Weasel. This weapon brings broad frequency coverage as well as high speed and maneuverability to the task of lethal defense suppression. The Air Force also sees a pressing need to employ HARM on the F-16.

Electronic Combat: The Air Force goal in electronic combat (EC) is to control the electromagnetic spectrum and deny its use to the enemy. Thus, EC can be a prime factor in reducing combat aircraft attrition. However, EC must keep pace with the threat. Today, practically every aspect of modern warfare depends on the use of electronics. Interdependence between electronic systems keeps growing as more systems are integrated and automated. The technological advantage we have enjoyed for decades is diminishing with the proliferation of sophisticated Soviet electronic systems. The Air Force must be able to counter Soviet advances as they continue to improve their integrated air defense system. Failure to keep pace with the constantly evolving threat could mean a severe loss of US effectiveness in future air battles.

In addition to electronic warfare, EC employs elements of command control and communications countermeasures and suppression of enemy air defenses. EC improves force survivability, exploits weaknesses in the enemy's ability to wage war, and applies force against his offensive, defensive, and supporting capabilities. Effective EC systems and tactics are needed to reduce enemy engagement opportunities, to increase time available to counter enemy offensive efforts, and to reduce attrition.

Electronic countermeasures (ECM) pods are essential to provide self-protection for USAF aircraft lacking internal countermeasures systems. While internal systems are preferable, retrofit costs are prohibitive for many aircraft. As a result, the Air Force needs ECM pods on such aircraft as the A-7, A-10, C-130, F-16, and F-4. Congress should appropriate the needed funds expeditiously.

Whenever possible, the Air Force

seeks to build internal electronic countermeasures systems to avoid the performance penalty imposed by external pods. Pods, besides using weapons stations, produce drag and are limited in the coverage their antennae can provide. The new Airborne Self-Protection Jammer (ASPJ) is an internal aircraft self-protection program deemed essential by the Air Force. The ASPJ will provide self-protection against modern, diversified, radar-controlled weapon systems. This ECM system must be fielded without delay.

The Integrated Electronic Warfare System (INEWS) is an advanced self-protection suite for the 1990s and beyond. This system is tailored for the Advanced Tactical Fighter (ATF), the Navy's Advanced Tactical Aircraft (ATA), and other advanced technology aircraft. INEWS will provide quick and accurate threat warning as well as make possible automatic application of effective countermeasures. This system must be developed and funded at a cost-effective pace.

Tactical Reconnaissance and Engagement Systems: Advances in Soviet tactics and the sheer size of the threat require the Air Force to upgrade tactical surveillance and reconnaissance to provide a near real-time capability to identify and attack targets. There is an urgent need for improved interlinked standoff and penetration capabilities, including the Advanced Synthetic Aperture Radar System (ASARS II) to detect fixed targets and the Joint Surveillance and Target Attack Radar System (Joint STARS) for detecting moving targets. In addition, the Tactical Air Reconnaissance System (TARS) is essential to provide tactical commanders with information from beyond the range of standoff systems.

These Air Force systems are mutually reinforcing. Without Joint STARS, there is no real-time engagement of moving targets. Without ASARS II, there is no high-resolution, fixed-target imagery capability. And without TARS, there is no penetrating information-collection capability. All three programs warrant full funding by Congress.

Tactical Command Control Communications and Intelligence: As in the strategic area, command control communications and intelligence (C³I) is vital for successful tactical operations. The Air Force relies heavily on C³ to disseminate intelligence and sensor information, to coordinate and mass forces, and to direct actions against the enemy. The Libyan retaliatory strike and Air Force and NATO exercises demonstrated that

jam-resistant, air-to-air, and air-to-surface voice communications are essential for effective command and control. To support this requirement, funds for development and procurement of improved HAVE QUICK (jam-resistant UHF) and SINGARS-V (jam-resistant VHF) are being requested in FY '87. It is essential that Congress appropriate these funds.

Data communications make it possible to distribute detailed information throughout the battlefield. The Joint Tactical Information Distribution System (JTIDS) provides jam-resistant, secure communications using a digital data link.

Data received from C³I systems must be processed and displayed by upgraded, automated, data processing display equipment to permit real-time battle management and force-employment decisions. Such programs as the Computer-Assisted Force Management System, Constant Watch, and EIFEL Follow-On must be implemented to permit effective planning, decision-making, force generation, and mission execution. Communications equipment also must be modernized to provide the dedicated, secure, survivable, and reliable information flow needed for centralized control, decentralized execution, and joint/allied coordination by modern military forces.

The Air Force requires TRI-TAC communications equipment for reliable voice and digital-data exchange. The Communications Nodal Control Element (CNCE), now entering service, functions as the command center of the communications equipments, managing the communications system, monitoring quality, reporting system status, and providing alternative alternate routing to restore service. Tactical command and control (C²) forces also require the capability to receive, process, and generate JINTACCS (Joint Tactical Air Command and Control Systems) messages to assure successful communications during joint and combined operations. These communications upgrades, when used in conjunction with new fiber-optics networks, will help ensure survivability and mission effectiveness.

Modular Control Equipment (MCE) must be fielded as a replacement for USAF's antiquated and failure-prone command and control (C²) facilities. MCE automates tactical C² capabilities, provides interoperability with allied and joint tactical air operations participants, and is capable of receiving, processing, and displaying data from selected intelligence systems. In addition, MCE provides hardware for

the Ground Attack Control Center (GACC).

GACC, in turn, provides command and control for interdiction missions, to include air attacks against time-sensitive, mobile-ground targets. When GACC is implemented, it will be the prime command and control system with a direct capability to receive and process data from selected intelligence-gathering systems, including such new intelligence sensors as the TR-1 Senior Ruby System, the Advanced Synthetic Aperture Radar System, and Joint STARS. The GACC will process this data and then use it to pair friendly air assets against selected ground targets.

Theater Requirements

Forward basing of forces in peacetime and a rapid-reinforcement capability in wartime are the foundation of the US commitment to the security of our friends and allies. Within this context, US presence reflects a firm commitment and a substantial combat capability designed to deter the Soviet aggression or to employ military force sufficient to contain the hostilities and bring the conflict to an end on terms favorable to the US and its allies.

Congress continues to curtail the level of US military manpower stationed in NATO Europe. The limit on manpower was imposed for two principal reasons: First, many members of Congress felt that the Department of Defense was not properly managing military personnel growth in Europe; second, the increase in US forces was taking the place of the contribution expected of our NATO European allies. Congress established a permanent troop level of 326,414 in FY '85. Although a permanent limit, it does contain provisions for an increase if the Secretary of Defense certifies our NATO allies are improving their conventional capability. Initially, Congress demonstrated some flexibility in reducing constraints to allow vital, high-visibility programs, such as Intermediate-range Nuclear Forces (INF), to proceed. However, Congress did not extend the INF exclusion when the FY '85 troop level was established.

This creates a major dilemma for the Air Force. As the ground-launched cruise-missile system is fielded with a manning requirement of some 9,000 slots and some conventional units are returned to CONUS, our allies fear that we are trading conventional for nuclear forces. By decreasing conventional capability while building up our theater nuclear forces, we undermine NATO's doc-

trine of flexible response and lower the nuclear threshold. In addition, by focusing on ways to influence allied contributions, we overlook the real issue of ensuring that our force-level growth is tied to countering a growing Soviet and Warsaw Pact conventional capability.

The Air Force Association does not support US unilateral troop ceilings because they disregard the threat, discount the improvements our allies have made, place a NATO penalty on CONUS air defense improvements (Iceland, Greenland, etc.), and create the impression we are trading conventional forces for nuclear capability. Furthermore, ceilings in Europe can undermine the Mutual and Balanced Force Reduction negotiations and exacerbate the large shortfall existing in strategic airlift and sealift.

Withdrawal of US forces to the CONUS will require the services to purchase additional equipment sets for storage in Europe, procure additional airlift and rapid sealift capability, or carry out a combination of both. If we return units without retiring them from the active inventory, we must have adequate and appropriate basing available for them in the CONUS. If we assume that these units will be needed for wartime missions, they must continue to train and exercise either in the CONUS or in their assigned overseas areas. In either case, the additional resources required to base these units away from where they are needed would have to be diverted from other programs. Finally, if we withdraw conventional forces while we bring in INF, there can be no doubt the US would be fielding nuclear forces at the expense of conventional capability. The far-reaching effects of this reality on the political sensitivities of our allies may cause serious damage to the alliance.

The great distances and corresponding high number of possible attack axes involved make the Pacific theater a unique strategic challenge. Distance places increased burdens on C³ networks, logistics, and early-warning capabilities. Although significant improvements have been made, modernization of Pacific C³ facilities, including integration of long-range surveillance radars with air defense command and control capabilities, remains a high priority that warrants full congressional support.

An urgent concern of US Central Command is the need to establish a theater-communications infrastructure composed of a transportable, secure, C³ system to support joint combat operations in Southwest Asia. A joint Army/Air Force effort is under

way to provide secure voice and message capabilities via satellite.

Ground-Launched Cruise Missile (GLCM): GLCM provides a deep-strike capability that improves flexibility by allowing dual-capable fighter aircraft to be used in the conventional role for a longer period before committing them to nuclear roles during high states of readiness. As a result of its mobility, low-altitude flight profile, and small radar cross section, the GLCM possesses high prelaunch and en route survivability while compounding the enemy's targeting and defense problems.

Space Operations

US national security interests depend heavily on space-based assets. This dependence is growing. Space systems provide communications, surveillance and warning, navigation, and weather-observation capabilities vital to various military operations with accuracies and at costs impossible to attain with ground-based systems. In addition, the US relies on space-based assets to detect strategic missile launches.

US space operations must ensure our ability to enhance the capabilities of land, sea, and air forces while protecting the United States and its allies from threats in and from space.

To meet the growing Soviet threat—and the challenges of our growing dependence on space—the Air Force activated the Air Force Space Command (AFSPACECOM) in September 1982 and supported the establishment of the US Space Command (USSPACECOM) in September 1985. AFA believes the transition from the fragmented command arrangements of the past to the centralized direction provided by these organizations is a significant improvement in military space utilization. We're confident this will lead to a stronger working relationship among space-related research, development, and acquisition agencies and the operational users. We also believe this centralization will lead to more efficient and effective employment of space-based assets in all operations.

The Air Force is charged with organizing, training, and equipping space forces to support the USSPACECOM missions of space control, space support, and warning of aerospace attack on the continental United States. Air Force objectives in space include pursuing a vigorous research and development program to give the US future options in space, expanding to space those functions best accomplished there, developing an effective anti-satellite system to deter Soviet at-



US space operations must ensure our ability to enhance the capabilities of land, sea, and air forces.

tacks against our satellites in orbit, and assuring our free access to space.

The tragic loss of the Shuttle *Challenger* highlighted the need to assure access to space by diversifying launch systems. We applaud the continued commitment of the Air Force to use the National Space Transportation System and for supporting a replacement Orbiter. We also commend the Air Force's vision and diligence in pursuing a diverse fleet of launch vehicles to complement the Shuttle: Complementary Expendable Launch Vehicles (CELVs) for Shuttle-size payloads, Space Launch Vehicles (refurbished Titan IIs) for smaller payloads, and competitively developed medium-size launch vehicles for delivering Global Positioning System satellites into orbit. In our view, development of a viable commercialized ELV industry is also essential. In addition, measures must be taken to protect the development of this crucial, private-sector, high-tech industry from foreign government-subsidized competition.

These unmanned systems will provide the robust launch capability and flexibility the nation needs to assure its access to space. To complement the increased flexibility provided by a mixed fleet of launch vehicles, we support Air Force proposals to modify the Defense Satellite Communication System, Global Positioning System, Milstar, and Defense Support Program satellite systems for launch by both the Shuttle and unmanned launch vehicles.

Continued development of a high-

energy upper stage for the Space Shuttle is essential because of increases in payload weight. Much of this increase stems from modifications to extend the life span of each satellite and the accommodation of Shuttle on-orbit expendables to prolong the duration of each mission.

The Air Force should continue to monitor NASA's development of a permanently manned space station for future military applications. There are many potential missions, such as C³, surveillance, on-orbit service and repair of satellites, and research and development that could only be performed from a space station.

At the same time, the Air Force must continue to pursue programs with the potential for revolutionary rather than evolutionary technological progress. The National Aerospace Plane (NASP) is an example of this type of program. The NASP offers the hope of placing payloads in space more flexibly, more efficiently, and less expensively than is now possible with either manned or unmanned launch systems.

The Soviet ASAT and other developing technologies pose a serious threat to US space assets. Therefore, we must emphasize programs to make US space systems—the satellites, the ground stations, and the communications links among them—more capable and survivable in hostile environments. Full funding of a vigorous program to enhance the survivability of our current and future space systems is essential. Steps must be taken to improve the survivability of such critical space systems as the Defense Support Program. Equally essential are a satellite-based relay system, the Survivable Control System, and a mobile telemetry tracking-and-control capability to provide survivable satellite command and control. The goal must be to make our space systems as survivable across the full range of conflict as the forces they support.

In short, the US must continue to do everything possible to use space to enhance its national security policies. To do this, the nation must dedicate itself to developing and deploying the strongest, most viable space systems that technology will allow.

Total Force

The Air National Guard and the Air Force Reserve carry a large and important part of the day-to-day mission for the strategic defense, general-purpose, and mobility forces and maintain a continuous high state of readiness to respond in crisis situations

with highly experienced, proficient, and professional personnel. The Air Force continues to pursue vigorously a Total Force policy that incorporates the Air National Guard and the Air Force Reserve in wartime planning and peacetime operations and that provides them with newer, more capable equipment. For certain missions and under certain circumstances, the reserve components are the best means to expand force capabilities.

The Air Force and the Department of Defense rely heavily on the Air National Guard and Air Force Reserve contributions to national security. In wartime roles, they provide thirty-three percent of the tactical fighter capability, fifty-nine percent of the tactical airlift capability, and twenty-one percent of the strategic aerial refueling capability. In addition, the Air National Guard provides seventy-three percent of the air defense mission and twenty-eight percent of the tactical air support capability. The Air Force Reserve provides fifty percent of the strategic airlift and KC-10 tanker/cargo aircrew capability.

Because the contribution of the Air Guard and Reserve to the Total Force is so significant, continuing modernization becomes increasingly important. Our air defense capability should not be allowed to diminish because of increasing equipment obsolescence and budget restrictions. Aircraft of the Guard are being upgraded to improve US air defense capabilities by replacing F-106 aircraft with F-16s. Older Guard and Reserve aircraft and mission-support equipment should be replaced or modernized on a timely schedule. The transfer of C-141 and C-5 aircraft to the Reserve and the Guard is the first step in the Air Force plan to upgrade strategic mobility forces. Long-range plans include additional C-141/C-5 transfers and acquisition of the C-17 for the Air Guard and Reserve. Acquisition of first-line aircraft that are more economical and incorporate advanced technology also adds to the efficiencies of the Reserve and Guard. The equipment must continue to be upgraded to be logistically and operationally compatible with that of the active force.

Summary

The Air Force Association urges Congress not to halt the vital modernization of our defenses in midstride. Such false economy would do more than shortchange national security now; it would mortgage America's future as well as disproportionately raise the cost of defense preparedness for years to come. ■



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A policy paper titled "Defense Manpower Issues," adopted by delegates to AFA's annual National Convention on September 16, 1986.

Commitment Is a Two-Way Street

Total commitment—to duty, to country—is the indispensable virtue that the military man and woman bring to military service. It is exactly such total commitment that led to the precision and success of the recent complex bombing raid on Libya.

The Air Force Association believes that commitment is a two-way street and is deeply concerned that the quality people who serve in today's military perceive that the commitment to them—from Congress, from the American people, from the Department of Defense—is less than total.

Stated quite simply, the Air Force Association believes that a quality force of dedicated people is the critical element of a military posture that can deter and, if necessary, fight and win. We support equitable and consistent compensation to the force for its dedication, its acceptance of hardships, and the possibility of total sacrifice. Underpinning all of this must be the service member's unshakable faith that the commitment of the nation is also total. Embodied in that faith is the belief that changes in benefits will not be made in a capricious or arbitrary fashion. AFA sees disturbing evidence that this is not so.

We find it unsettling that long-established programs—such as the military retirement system—have been changed for those newly coming into the service. We see other programs, treated in detail elsewhere in this paper, changed arbitrarily or drastically reduced. All of this leads to a pervasive uneasiness among the troops. And such uneasiness is the enemy of commitment.

Many elements intertwine to create a combination of incentives that will attract, retain, and—equally important—recognize the contributions of a quality military force. AFA believes that the following three needs are the most essential today to maintain the trust of the nation's dedicated military men and women:

- Stop picking away at the current retirement system.
- Establish and maintain pay comparability.
- Improve the availability of quality medical care for members and their families.

The Air Force Association is concerned about the following issues.

Military Retirement

Every available measure of military people's attitudes and perceptions bears out that the single most important institutional benefit and career incentive the Air Force offers is the military retirement system. In a survey conducted in 1984 for the fifth quadrennial review of military compensation, fifty-five percent of the respondents indicated that a significant change to the retirement system would be the one thing most likely to cause them to leave—a higher percentage than for all other potential resignation reasons combined. Air Force people and their families view the threat of further change as a breach of faith, a lessening of institutional support, and an indication that their sacrifice and contributions are not appropriately recognized by policymakers.

The Air Force Association strongly opposes any further change to the

military retirement system. Changes imposed in 1980 and again in 1986 have already reduced the value of life-stream earnings for future retirees by twenty-five percent. The long-term impact of this cap on future retirement earnings is as yet unknown. Further reductions could certainly have a disastrous impact on the Air Force's ability to maintain a quality force.

Civilian Personnel Retirement

The current Civil Service retirement system has suffered reduced benefits in recent years. An Air Force priority objective is to retain the ability to recruit and keep top-quality civilian employees, particularly those in high-technology occupations critical to the Air Force mission. Any further legislation that would harm this objective must be carefully considered.

The recent Gramm-Rudman-Hollings Act could lead to possible arbitrary manpower cuts. As one means of avoiding this, legislation has been introduced to provide for early optional retirement for civilians. While the use of early retirement is certainly preferable to arbitrary cuts, AFA supports the position that any early optional retirement proposal must provide more discretionary authority to agencies.

Also critical to civilian retirement is the provision in the Tax Reform Bill changing the procedures on recovery of employee contribution to the pension annuity. Civilian retirees could lose thousands of dollars if this legislation is enacted. AFA strongly opposes this provision and supports the Senate Resolution.

Compensation

The most basic element of individual and family support is pay. Adequate levels of pay have been achieved through annual pay raises. However, according to the Bureau of Labor Statistics' Employment Cost Index, continued pay caps and delayed raises have caused military personnel to fall approximately eight percent—and civilian personnel nineteen percent—behind in comparison with the private sector. A continuation of these gaps will seriously impair the Air Force's efforts to attract and keep high-quality people. AFA urges a prompt return to pay comparability.

AFA believes that the current practice of capping the pay of senior military and civilian leaders makes little sense and is poor personnel policy. The allowable compensation of the Air Force Chief of Staff, for example, bears no logical relationship to his responsibilities. While private industry may not be a realistic standard

against which military pay should be judged, it makes no sense to pay all two-, three-, and four-star officers the same when their responsibilities vary widely. This provides little incentive to senior officers to pay the heavy physical and mental price of seeking the most responsible position of leadership. AFA urges that the practice of capping general officer pay be abandoned and that consideration be given to raising the authorized pay to a level more accurately reflecting the responsibilities of these senior leaders.

Aviation Career Incentive Pay

A key factor influencing the retention of rated personnel is Aviation Career Incentive Pay (ACIP). Preserving and enhancing ACIP in the future is vital. If it helps keep just 200 pilots per year, it more than pays for itself through savings in accession and training costs.

The ACIP system is visible, provides compensation stability, is cost-effective, and is experience-proven. But inflation has decreased the purchasing power and incentive value of the current ACIP rates. This incentive value must be restored if ACIP is to continue as an effective aviator retention tool.

Allowances

AFA supports a fair and equitable system of allowances to cover various costs that traditionally have been borne by the government in conjunction with military or civil service.

The Variable Housing Allowance (VHA) was created in 1980 to help members afford an acceptable standard of housing in the United States and to eliminate disparities in standards of living among various geographical locations. However, the continuous VHA caps, freezes, and modifications have seriously jeopardized the intended purposes. The enactment of VHA-offset legislation in FY '86 is an example of this ongoing turbulence, which has had its most pronounced effect on junior enlisted personnel and company grade officers. In addition, the administrative costs (approximately \$25 million annually DoD-wide) associated with this legislation call into question the cost-effectiveness of the offset. AFA urges repeal of the VHA-offset legislation and restoration of the full VHA entitlement for all military members.

AFA opposes the Internal Revenue Service's ruling 83-3, which attempts to reduce the tax deductions that military personnel are allowed to take for housing expenses by an amount proportional to nontaxable income. Such a ruling would have a significant

impact on military families. More than 300,000 military homeowners would incur an additional tax liability equivalent to a two to four percent pay cut. The Treasury proposal ignores the fact that the "tax-exempt" nature of housing allowances is an integral part of military compensation and has been accounted for since 1965 in establishing military pay levels. Further taxation of military allowances would be contrary to congressional intent and legal precedent.

Another allowance of specific concern to AFA includes the Basic Allowance for Subsistence (BAS). Denial of BAS for single NCOs in the grades of staff sergeant and above is a continuing irritant to our mid-level enlisted managers. AFA supports providing BAS for all career personnel.

Health Care

The quality and availability of adequate health care for members and families rank high among the concerns of Air Force people. It is an important factor in daily performance and in career decisions. AFA strongly supports those measures that will help in this regard. The most important is the continued availability of quality care in military hospitals that are properly and competently staffed. Also critical are funding for the dependent dental-care insurance program and a cap on catastrophic expenses incurred under CHAMPUS.

Military personnel and their families are well aware that the range of benefits available to dependents through the Uniformed Services Health Benefits Program is substan-



Preserving and enhancing Aviation Career Incentive Pay is vital to ensure retention of rated personnel.

tially less than that available to family members through major private sector employers.

AFA concurs with the intent of the Office of the Secretary of Defense/Health Affairs CHAMPUS Reform Initiative proposal. We urge, however, that the program be tested on a smaller regional scale prior to implementation, that there be no reduction in the current CHAMPUS benefit, that the beneficiaries' freedom of choice is preserved, that the quality of medical care is maintained, that access to care is maintained, and that cost to the beneficiary is kept to a minimum.

Permanent Change of Station

Despite the significant improvements in permanent change of station (PCS) reimbursements in FY '86, studies show that military members are still not adequately reimbursed for government-directed PCS. The average career member is directed to move seven to eight times in the course of a career. While Congress has provided funds for four days of temporary lodging, increased junior enlisted household goods weight allowances, and authorized dependent per diem, further support is necessary to reduce the out-of-pocket expenses military members incur with each move.

Of particular concern is the inadequate household goods weight allowances for career enlisted and officer personnel. The allowances have not kept pace with the contemporary needs of the military—the last major increase for career members was in 1966. As a result, fourteen percent of military members with families incur excess costs for shipping their household goods. AFA urges prompt enactment of appropriate legislation to increase household goods weight allowances.

Family Support

AFA fully agrees with Air Force leaders that "career decisions are a family matter." The degree to which family members are satisfied with the quality of their individual lives has a tremendous influence on the productivity of the individual service member and on his or her decision to stay with the Air Force. If the family as a social unit is not properly served, if their basic needs are not effectively met, then the most probable result will be the loss to the Air Force of a skilled professional.

Today's family environment is unprecedented. Today, more than half of all Air Force married members have a spouse working outside the home—and more than half of those are doing

so to make financial ends meet. In addition, there are nearly 24,000 couples in which both partners are military personnel. These sociological changes have great implications for the kind of institutional supports required.

The availability of discount shopping at base commissaries and exchanges is essential. Continued support of morale, welfare, and recreation (MWR) programs is highly important. The club systems, youth centers, child-care support, and activities geared for the young married couples



Fierce competition for scarce fiscal resources points to a continued gap in needed manpower resources.

are musts for Air Force families and their quality of life.

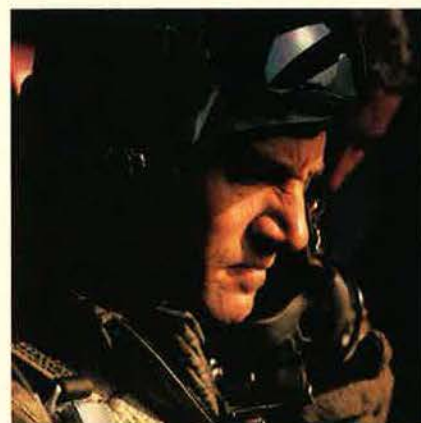
In this regard, AFA fully supports the continued funding of Family Support Centers, with a target date of FY '91 for establishing one center at every major Air Force installation. The Family Support Center acts as a focal point for a full range of Air Force and civilian resources, services, and programs that can support and assist Air Force members and their families with their special needs.

Manpower

In recent years, the Air Force has had only partial success in getting the manpower authorizations needed to support concurrent approved growth in its force structure. The realities of a growing national budget deficit and the resulting fierce competition for scarce fiscal resources point to a continued gap in needed manpower resources through the early 1990s. Extraordinary measures have been and must continue to be taken in an effort

to effectively fill that "gap." AFA applauds the Air Force's innovations to enhance productivity through contract-cost comparisons, productivity-enhancing capital investments, functional reviews, improved reliability and maintainability in systems development, and other innovative methods.

Indeed, the Air Force has worked hard and pursued every opportunity to look within itself to fill the manpower needs of its growing programs. More than eighty percent of its additional manpower requirements for FY '87 were realigned from existing resources. These higher priorities included additional weapon systems, such as the B-1B, F-16, and ground-launched cruise missiles, and special operations forces, modernization of the Air National Guard and Air Force Reserve, and readiness and sustainability initiatives.



The key to meeting the people challenge is keeping the right number and quality of trained, experienced people.

Military Recruiting and Retention

Recruiting requirements are being met with record quality. The Air Force continues to lead the way. It brings in the most enlistees per recruiter with the lowest average cost of any service. But if the Air Force is to continue its remarkable success in today's competitive market, it is essential that it have the right mix of incentives to attract the numbers and kinds of people needed.

Further, the key to meeting the people challenge is keeping the right number and quality of trained, experienced people beyond their initial ser-

vice obligations in order to manage and lead an effective career force. Healthy retention levels mean a significant savings in accession, recruiting, commissioning, and training costs. This level of retention will be attainable only if the proper measure of congressional and institutional support continues.

Currently, there is reason for cautious concern. Retention rates in most categories continued downward in FY '86. We are particularly concerned that pilot retention continues to decline. The cumulative continuation rate, the Air Force measure of retention for pilots with six to eleven years of service, has fallen from seventy-eight percent in FY '83 to below sixty percent today. With airlines and other commercial aviation agencies continuing to hire, it will be difficult to curb this downward trend. We must prevent a repeat of the pay caps and other factors that drove qualified people out of the Air Force in the late 1970s to the extent that readiness was threatened. We can't afford to face a similar situation again—a possibility if we lose sight of the importance of the many factors affecting the willingness of Air Force people to stay in service.

Civilian Recruiting and Retention

Civilian employees continue to function as a highly effective and stable segment of the total force. Working side by side with officers and NCOs, they provide not only a much-needed experience base but also a training cadre for the Air Force's young men and women. Without their dedication and hard work, the Air Force would not be able to achieve and maintain its high state of readiness.

While exploring ways to manage its civilian force in a more cost-effective manner, the Air Force is also concerned about its ability to recruit and retain this force. Many of the Air Force's most highly skilled and experienced civilian employees, especially in high-tech positions, are sensitive to opportunities in the private sector or are close to retirement. Therefore, the Air Force has undertaken an ambitious intern program designed to attract recent college graduates. The initiative has become even more significant, considering recent restraints on federal pay. AFA salutes such innovative personnel policies.

Although the Air Force has been able to attract young, professional talent, concern about civilian retention mounts. To ensure work force stability, the issues of federal pay bene-

fits and retirement systems need long-term solutions. The time is past due to work toward the goal of adjusting white-collar pay by occupation and locality. Current initiatives to improve management of civilian personnel by the use of alternative personnel management systems have been proposed in various pieces of legislation and by the Administration. AFA supports those concepts that provide needed management and pay flexibility by simplifying position classification, establishing broad pay bands, and linking employee pay to qualifications and performance. AFA believes these improvements will further enhance the Air Force's ability to recruit and retain a quality civilian work force.

Other Retention Factors

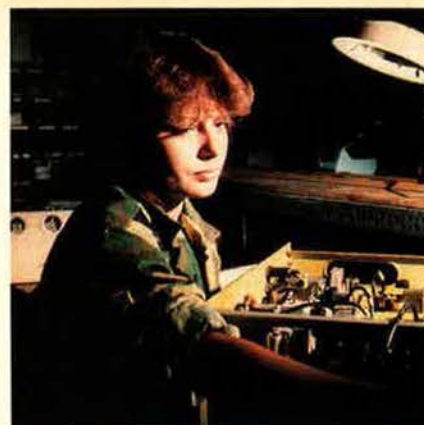
A variety of other factors bears on the Air Force's continuing ability to get and keep the kind of military and civilian people it needs. These include the lure of high-technology training, the certainty of equal opportunity and treatment, and decent living and working conditions. Air Force people and their families expect a fair measure of support in return for their extraordinary service. Quality people deserve a decent quality of life.

Readiness, as always, is the bottom line. And people are the key to readiness. AFA believes nothing should have a higher priority than Air Force people. In this regard, the following are specific people initiatives AFA supports or opposes.

Retirement and Estate Programs

AFA Supports:

- Sustaining the present military and civilian retirement systems.
- Removing dual-compensation limitations for retired officers.
- Retaining lifetime coverage under CHAMPUS for military retirees, without regard to Social Security, Medicare, or service-connected disability treatment by the VA.
- Retaining lifetime commissary and exchange privileges for military retirees.
- Increasing the emphasis on pre-retirement counseling for both military and civilian employees.
- Having retirees become active in Air Force retiree programs, including the involvement of retirees in pre-retirement preparation and/or briefing programs.
- The Air Force Enlisted Men's Widows and Dependents Home Foundation and the Air Force Village.
- Basing the Death Gratuity on three months' regular military com-



Readiness, as always, is the bottom line. And quality people are the key to readiness.

pensation, with a minimum payment of \$3,000 and a maximum of \$9,000.

- Providing for a three-year grace period for government-paid moves to home of choice upon retirement vs. the present one-year period.

- Continuation of Federal Employee Group Life Insurance (FEGLI) benefits during periods of active-duty military service.

AFA Opposes:

- Any proposal permanently modifying the Cost of Living Adjustment (COLA) mechanism or any other proposal that would further erode the real purchasing power of retiree pay, including caps and freezes.
- Any offsetting of military retired pay by Social Security.

Pay

AFA Supports:

- Using a phased approach, beginning in FY '88, to restore military and federal civilian pay to reasonable comparability with the private sector.
- Eliminating the pay ceiling for senior Air Force military and civilian personnel.
- Retaining the pay and allowance system as the fundamental form of military compensation.
- Permanently authorizing enlisted flight pay.
- Establishing a permanent system of flight pay for flight nurses, similar to that authorized for flight surgeons.

Flying Incentive Pay

AFA Supports:

- Increasing the ACIP rates, targeted to the flying-intensive year groups, to reestablish ACIP's incentive value and offset the effects of inflation.

AFA Opposes:

- A "fly-for-pay" system or payment of ACIP only to operational flyers.

Health Care

AFA Supports:

- Programs that improve military hospitals' ability to meet wartime and peacetime health-care needs.

- Health-care cost containment initiatives that preserve the quality of the medical benefit.

- Funding for the active-duty dependent dental-care program authorized in FY '87.

- Enacting legislation and funding providing a dental-care insurance program for all nonactive-duty beneficiaries.

- Cost-sharing of eye exams by CHAMPUS for retirees and their dependents.

- Continuing CHAMPUS coverage after age sixty-five as a second payer to Medicare, rather than termination at age sixty-five.

- Enacting legislation providing a catastrophic cap of \$1,000 per year for CHAMPUS liability of an active-

duty family and \$3,000 per year for a retired family.

- Legislation to increase health-care coverage for civilian personnel while lowering premium cost.

AFA Opposes:

- Charging copayment fees in military treatment facilities.

- Creating a Defense Health Agency and/or the centralizing of the functions historically reserved for the service Surgeons General.

- Restricting beneficiaries from seeking care at military facilities of their choice.

- Increasing CHAMPUS copayments and deductions.



AFA supports management of force levels within overall end-strengths and without theater-specific ceiling limits.



Adequate resources must be made available to ensure attainment of reserve forces' manpower objectives.

Enlistment/Reenlistment Bonus Authority

AFA Supports:

- Legislation giving the services permanent authority to pay Enlistment Bonuses and Selective Reenlistment Bonuses (SRB).

- Congressional approval and funding to implement that portion of the SRB law that allows the services to include up to twenty-four months of an unserved service-directed extension of enlistment when calculating all SRB entitlements.

- Legislation allowing the services to pay SRBs in lump sum at the time of reenlistment.

Allowances

AFA Supports:

- Repealing the VHA-offset legislation and restoring the full VHA entitlement.

- Permanently exempting military

personnel from a possible tax ruling similar to IRS 83-3 or any other action that would limit military members' tax deductions by requiring them to offset a proportional amount of mortgage interest and tax deductions by the amount they receive in BAQ and VHA and/or Overseas Housing Allowance.

- Granting authority to pay BAS to E-5s and above as an initial step and then, as an ultimate goal, expanding the criteria to all careerists (E-4 with more than four years of service).

- Increasing maximum weight allowance on shipment of household goods for military members not included in the FY '86 increases.

- Increasing the number of funded days for Temporary Lodging Expense from the current four days to ten days.

- Funding the increased dislocation allowance for military members.

- Implementing a Lodgings-Plus Per Diem System for military travelers.

- Providing one funded round trip per year for dependents of members assigned to Alaska and Hawaii who attend secondary schools or undergraduate colleges in the continental United States.

- Eliminating the restrictive language that creates differences between officer and enlisted per diem payments and returning to per diem equity.

The Family

AFA Supports:

- Expanding support functions and developing new programs responsive to the changing needs of the Air Force family of the 1980s.

- Establishing fully funded, installation-level Family Support Centers throughout the Air Force.

- Expanding relocation programs to address the needs of the entire family and providing help in obtaining temporary lodging before departure and at the new station, in locating new housing, and in settling at the new location.

- Improving the quality and quantity of existing military family housing units.

- Appropriating funds for the construction and operation of child-care facilities.

- Providing employment and education programs to assist family members in locating and preparing for employment.

Military Family Housing

AFA Supports:

- The Air Force policy to rely first on the private sector for family housing, but when needs dictate, to pro-

vide either new construction or build-lease projects. Housing units, both new and old, play a big role in the family decision to make the Air Force a career.

- The concept that Air Force housing must provide the same living conditions, amenities, and quality-of-family-life features found in the private sector.

- Improving overseas incentives programs, such as environmental morale leave programs for members with families, creation of home leave provisions, higher priority dependent travel and emergency travel payments for members and families, upgraded overseas foreign duty pay provisions, and an increase in family separation allowance.

GI Bill

AFA Supports:

- Establishing a permanent educational assistance program developed to meet quality manpower needs over the long term, including Air National Guard and Reserve components.

- Repealing the Vietnam-era GI Bill expiration date (December 31, 1989), with eligible service members being entitled to such benefits up to ten years after their last discharge or separation.

Commissaries

AFA Supports:

- Continuing the current commissary system.

AFA Opposes:

- Contracting out the management and control of commissary operations.



AFA supports maintaining aggressive and realistic training, such as the Red Flag exercises.



Continued emphasis on improved effectiveness and enhanced productivity of manpower resources is imperative.

Manpower/End-Strength

AFA Supports:

- Continued emphasis on improved effectiveness and enhanced productivity of manpower resources.

- Full funding of required active-duty and reserve manpower strength levels to support force structure and readiness programs.

- Management of civilian employment levels within fiscal constraints, not civilian end-strength ceiling controls.

- Management of force levels within overall end-strengths and without theater-specific ceiling limits.

Morale, Welfare, and Recreation

AFA Supports:

- Authorizing use of appropriated funds to construct, maintain, and operate people and MWR support facilities, such as child-care centers, libraries, recreation centers, gymnasiums, arts and crafts centers, and youth centers.

- Retaining Fort DeRussy, the Hale Koe Armed Forces Recreation Center, for continued use by active-duty and retired military personnel.

Air Force Engineers and Scientists

AFA Supports:

- Continuing to fund for payment of an engineering and scientific continuation bonus and the AFIT Scientific and Engineering Continuing Education Program.

Recruiting

AFA Supports:

- Retaining for each service Secretary the prerogative to manage each

service's recruiting policies and procedures, within statutory limitations.

- Providing adequate recruiting resources based on each service's mission.

AFA Opposes:

- Arbitrary constraints on one service's recruiting efforts for the alleged benefit of another service.

Air Force Junior ROTC (AFJROTC)

AFA Supports:

- Increasing the number of funded AFJROTC units to the authorized level of 335 units.

- Funding to provide for field trips, for encampments, and for leadership schools in support of AFJROTC curriculum.

Commissioned Officer Accessions

AFA Supports:

- Increasing the ROTC subsistence allowance for contract cadets.

- Taking action to assure accreditation for AFROTC courses toward degree requirements at those colleges and universities that do not grant such credit or that grant limited credit.

- Continuing funding at a minimum for 150 selectees per year for the Airman Education and Commissioning Program through the Five-Year Defense Program (FYDP).

- Continuing the opportunities for highly qualified enlisted members to become commissioned officers.

Training

AFA Supports:

- Increased emphasis on the "Project Warrior" program.

- Retaining the "Project Technology 2000" program as a low-cost program to motivate America's youth to aspire to math and science careers.

- Maintaining "exchange programs" between the private and military sectors to capitalize on the engineering and technical expertise in these areas.

- Maintaining aggressive and realistic training, such as the Red Flag exercises.

- Enhancing manpower, personnel, and training involvement in the system acquisition process.

Air National Guard and Air Force Reserve

AFA Supports:

- Enacting a Reserve Officer Personnel Management Act (ROPMA) that will enhance readiness.

- Congressional initiative to amend Title 10, USC, to separately account for Air Guard Technicians and Air Re-



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serve Technicians from total civilian end-strength as a means of recognizing the primary peacetime management cadre for the Air National Guard and Air Force Reserve.

- Providing adequate recruiting and retention resources and incentive programs to ensure attainment of Air Guard and Air Force Reserve manpower objectives.

- Studying the feasibility of allowing payment of an actuarially reduced annuity for reservists with twenty creditable years' service who are under age sixty.

- Amending the Internal Revenue code to provide tax credit to employers who hire members of the Guard/Reserve.

- Providing incentives for recruitment and retention of health professionals in the Selected Reserve.

- Retaining current military leave policies for federal employees who are also members of the Air Guard and Air Force Reserve.

- Supporting the President's National Committee for Employer Support of the Guard and Reserve.

- Raising the ceiling of sixty creditable inactive-duty retirement points for Air Guardsmen and Air Reservists.

- Legislation permitting totally service-disabled Reservists who have otherwise qualified for Reserve retirement to receive immediate retirement pay.

- Providing commissary shopping privileges to Air Guardsmen and Reservists on the basis of one shopping day for each day of active duty for training, but not more than fourteen days per year, to be used at the option of the individual concerned.

Civil Air Patrol

AFA Supports:

- Providing continued federal funding of Air Force-authorized missions, to include actual emergency services activities as well as training.

- The cadet and aerospace education programs.

- Providing continued federal funding for aircraft, vehicles, equipment, and uniforms for CAP.

- Legislation authorizing the Secretary of the Air Force to allow CAP to acquire excess items of equipment and supplies from all federal departments and agencies.

Religious Accommodation

AFA Supports:

- Established guidance and objective standards that promote accommodation of religious practices to the extent consistent with fundamental military requirements and universal application.

AFA Opposes:

- Legislation allowing the wearing of religious symbols with the uniform that would identify specific faith groups.

Veterans

AFA Supports:

- Continuing medical treatment for veterans with nonservice-connected disabilities.

- The construction and provision of resources needed to treat the non-service-connected disabled veteran.

AFA Opposes:

- Reducing, in any way, benefits associated with veterans' compensation, pension programs, and/or the VA medical care system.



A quality force of dedicated people is the critical element of a strong military posture.

- Reducing VA medical care facilities, hospitals, domiciliary care, or reimbursable travel funds for disabled veterans.

- Capping the cost-of-living increases for disabled veterans.

POWs/MIAs

AFA Supports:

- The President, who has placed this issue in the category of highest national priority; his initiatives concerning our unaccounted-for prisoners of war and missing in action (POW/MIA); and continuation of direct Presidential interest in a complete accounting for all POW/MIA from Vietnam or any other past or future hostile actions in which US military or civilian personnel are detained against their will.

- The intent of the President's July 19, 1986, statement to the nation, as highlighted by his comment: "This is . . . a difficult and emotional issue . . . but we have made progress, and the

truth is that we will continue to make progress as long as we stick with the facts and keep the faith with each other."

- The Secretary of Defense's initiatives, as exemplified by his letter of June 24, 1985, emphasizing the DoD Public Awareness Program, which includes discussion of this issue in all appropriate forums and publicity by service media, establishment and/or displays of memorials for MIA/POW on appropriate occasions, availability of legitimate awareness materials, and availability of military facilities for official, legal family meetings.

Former POWs

Former POWs are a small population of approximately 86,000 and represent only three-tenths of one percent of the total living war veterans. Most of this group have a unique profile characterized by the latent after-effects of their experience and an identified higher morbidity and mortality rate, differing by locations and length of captivity and the nature of the treatment received from their captors. Many of their diseases were not documented since they were not known or identifiable at release and/or not recognized as residuals of captivity at that time.

Congress has recognized this situation, and several bills are pending that affect this group. The intent of this legislation is to acknowledge that there should be a presumption of service connection for a number of diseases that have now been identified as stemming from long-term stressful imprisonment.

AFA Supports:

- Recognition of the dedicated efforts of the Advisory Committee on Prisoners of War to the Veterans Administration that has developed a significant report now being studied and acted upon by Congress.

- The Advisory Committee's position on pending bills that call for presumptions of service-connected disorders if the individual was a POW and that also waive the necessity of requiring medical records to show history of diseases during the time the POW was in prison.

Espionage

The Air Force Association urges DoD to tighten security and Congress to enact and the President to sign into law legislation to deal promptly and stringently with those convicted of injurious acts and espionage against the United States, to include authorization for the death penalty when such convictions concern directly the national security of the US. ■



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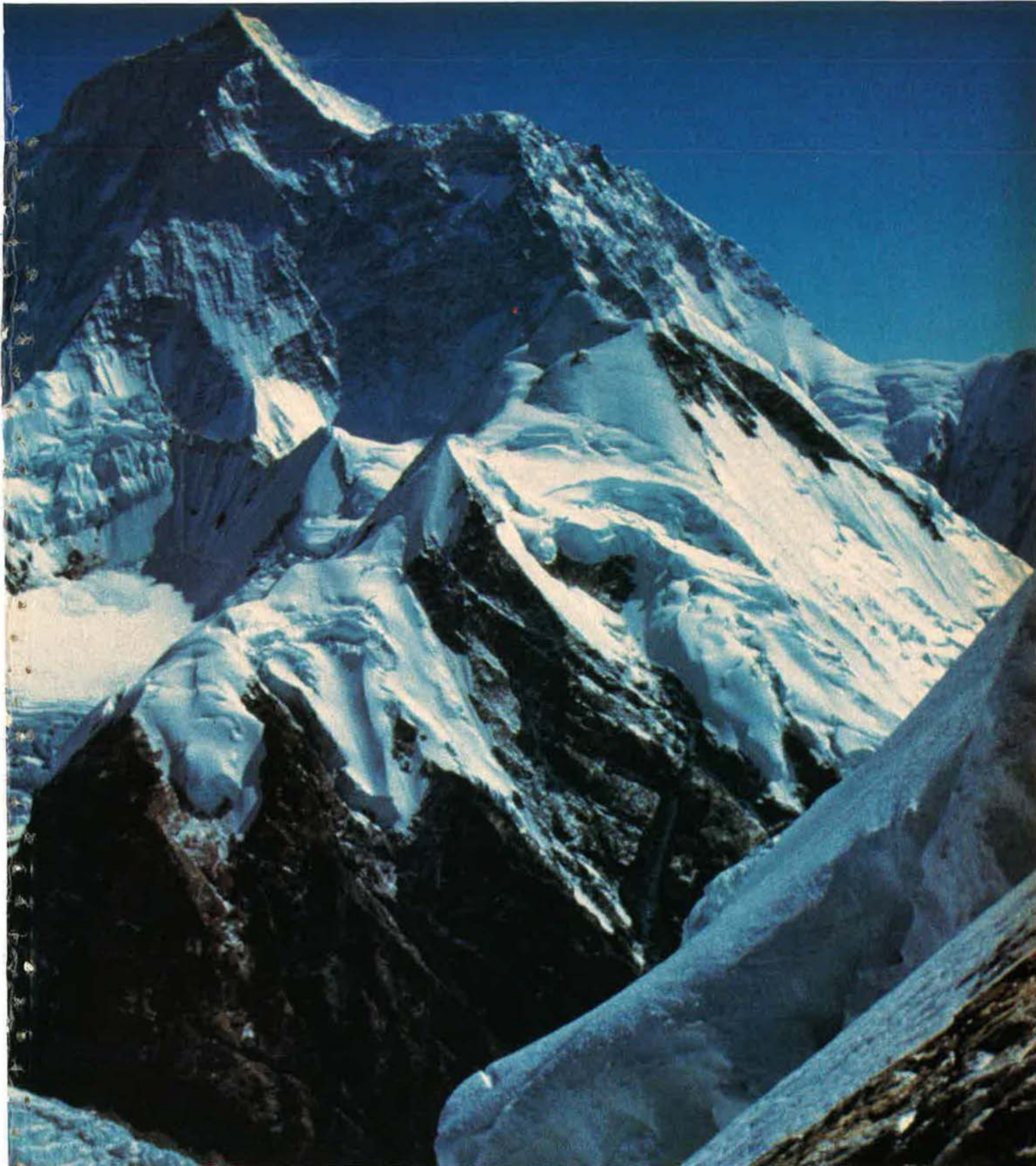
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European industries mount a strong challenge in the world market—but there's new opportunity for US aerospace, too.

Competition & Collaboration at Farnborough

BY F. CLIFTON BERRY, JR.
Photography by Tom Radcliffe

STRATEGIC Air Command's SR-71 Blackbird aircraft dazzled the British public and the world's aerospace industry in September when it flew again over the Farnborough Air Show. In 1974, a SAC SR-71 treated the Farnborough crowds and the world to the finish of a speedy flight from New York to the show that took only one hour, fifty-one minutes, and 56.4 seconds.

This year, as before, the SR-71 caught the crowd's fancy. Its flights over the historic site of the Royal Aircraft Establishment were visible reminders of the US Air Force's ability to project airpower anywhere over the globe.

By contrast, the US aerospace industry at Farnborough '86 faced increasing competition from its European counterparts. This poses a dilemma for US industry—how to meet an increasing need to compete with European collaborative projects and at the same time collaborate with European and other foreign aerospace industries in order to retain its preeminent position in the business. Also, for the first time at Farnborough, the Chinese government made a strong pitch for customers for its own aerospace and electronics industries.

The SR-71 held the crowd's eye and dominated the British public's views of Farnborough. But other

USAF aircraft were conspicuously absent. None of its best fighters, bombers, or attack aircraft was present. From the A-10 through the F-15, F-16, and B-1, all had appeared at the show in earlier years.

Duel of the Fighters

This time, two European aircraft dominated the show. They flew daily to impress the crowds in what onlookers called the "duel of the fighters." The aircraft were the British EAP (for Experimental Aircraft Program) and the French Rafale. The EAP was built by British Aerospace as a technology demonstrator in cooperation with teammates from Italian, German, and Spanish industry. The Rafale is a product of the French company Dassault-Breguet and French industry teammates. The roar of their afterburners and their airborne maneuvers were audible and visible evidence of both groups' determination to win new fighter business.

The Rafale flew first, on July 4. It was a fitting day for a first flight, coinciding with French President Francois Mitterrand's visit to the Statue of Liberty ceremonies. Guy Mitau-Maurouard was pilot for the Rafale's first flight, into the flight-test program, and for the demonstrations at Farnborough. He is Dassault-Breguet's chief test pilot.

The British EAP flew first on Au-

The present met the future at this year's Farnborough Air Show as the Red Arrows—RAF's counterpart to USAF's Thunderbirds—flying in these BAe Hawks, dazzled the spectators with their aerobatic displays, while on the ground the huge crowds (inset) glimpsed the future in the form of a wooden mockup of the new EuroFighter. Designed to compete for export markets in the 1990s, the EuroFighter represents a continuation of the trend toward collaborative efforts on the part of NATO nations (in this case Britain, Italy, Spain, and Germany) in developing new aircraft.





This updated Tornado, proudly displayed by the Royal Saudi Air Force, is evidence of strides taken by such collaborative European consortiums as Panavia. The British version of the aircraft has done well in recent competition with USAF.

gust 8, after a delay because of a work stoppage at the factory. John David Eagles, British Aerospace's executive director of flight operations, made the first flight. He took the aircraft to above 30,000 feet and exceeded Mach 1.1 in its first time in the air. Chris Yeo, the BAe chief test pilot at its Warton factory, flew the EAP in the Farnborough demonstration routine.

Both the Rafale A and the EAP flying at Farnborough were billed as "technology demonstrators." Neither team has the orders, support, and collaboration necessary to commit to production. Also, neither aircraft represents the production version, both being heavier and larger than the final expected result.

Rafale began as a purely French project, typical of Marcel Dassault, who for so long led the company bearing his name. The Mitterrand government and Dassault were willing to admit partners in the venture only if they yielded team leadership to Dassault-Breguet. Marcel Dassault is dead now, and the Mitterrand government has changed its policy. Now it seeks partners to share in the heavy costs of research and development and production buildup. It is courting Belgian and Dutch partners, among others.

Consortium Effort

The British teamed early with

Italy, West Germany, and Spain on the EuroFighter program. After France opted out of the consortium to pursue the Rafale demonstrator alone, Britain and the other three pressed ahead with the EAP demonstrator. Then, in early 1986, a joint company was formed to design and build the European Fighter Aircraft. Called EuroFighter/Jagdflugzeug GmbH, the company set up shop on Arabellastrasse in Munich, next to the offices of Panavia, the consortium that built the Tornado aircraft for Germany, Italy, and the UK. Company teams in the EuroFighter project are British Aerospace, AIT of Italy, MBB of West Germany, and CASA of Spain.

The basic EuroFighter (EFA) design was "frozen" in May by the team. A full-size wooden mockup stood in the Farnborough static display area.

A parallel company to build the engine for the EFA has been set up with partners from the four nations. The company is named Eurojet Engines. It is also Munich-based. Team members are Rolls-Royce from the UK, MTU of Germany, Fiat of Italy, and SENER of Spain.

Similar teaming arrangements are expected in competition for the avionics for the EFA. Already the issue is whether a totally new radar should be developed or existing radar systems should be improved for

the EFA. Battle lines are forming, involving US companies.

One team comprises AEG of Germany and GEC of the UK, joined with Hughes Aircraft. It offers an improvement on the Hughes APG-65 radar now in the F/A-18 and selected by the Luftwaffe for its F-4 upgrade program. Another team, comprising Ferranti of the UK, Fiat of Italy, and Inisel of Spain, is offering a new development called the ECR 90. Westinghouse was to link up with Thorn EMI of the UK on an improvement of its F-16 radar, the APG-68, but decided to remain on the sidelines for a time.

The EAP and Rafale have much in common: Both are Mach 2 aircraft, and both rely on fly-by-wire systems for control. Both also use the Garrett (US) emergency power unit. Moreover, both represent expensive betting on success to capture the biggest non-US fighter prize for the next couple of decades. The teams backing the EAP and Rafale hope that their perceived four-year lead on USAF's Advanced Tactical Fighter will ensure that they, not the US, win export markets in the late 1990s.

Aiming at the US Market

Panavia, the trinational consortium that builds the Tornado aircraft, served as a model for setting up the EuroFighter company. Now Panavia is looking to the US Air Force market to extend its production run. At the Farnborough show, Panavia officers said that the consortium is offering the Tornado as a successor to the F-4G Phantom "Wild Weasel" aircraft. The company is negotiating with US firms to build a partnership that would convince USAF of the merits of the system and of the virtues of building fifty of them for use by US Air Forces in Europe.

The West German Luftwaffe recently toured US Air Force bases in the States, showing off the Tornado. The visits included briefings on the Luftwaffe Tornado electronic countermeasures and reconnaissance variant, due in service early in the next decade. Panavia also took pains to point out that the Tornado, in the hands of Royal Air Force crews, won trophies at SAC's bombing competition for the past two years, outscoring F-111s and B-52s.

Thus, it already has a quality reputation with USAF, Panavia believes.

The French aerospace industry is also aiming at the US market. Its association of companies is called GIFAS. GIFAS officials said at Farnborough that their companies will be exhibiting in Washington in early January 1987. Sponsored by the French Ambassador, the exhibition will be held at the large exposition area of the embassy. GIFAS said the primary purpose of the show is to exhibit its wares to US government and military officials who do not attend the air shows at Farnborough or Paris.

Foreign Trainer Aircraft for USAF?

Because uncertainties are clouding the T-46 trainer program, foreign aircraft have been touring US Air

contender to meet the Air Force's requirement for a new trainer aircraft.

Pilatus recognized that ATC wanted side-by-side seating and jet power for its new trainer, but when the T-46 program became vulnerable, the Swiss pressed ahead. They now believe that USAF is "wide open to turboprops" and willing to consider the tandem seating. According to Pilatus officials at Farnborough, the PC-9 can be sold to USAF at about \$2 million per copy. If chosen by USAF, the PC-9 would be built in the US through production agreements with a US airframe manufacturer. Pilatus officials told AIR FORCE Magazine that discussions have been held with Beech, Boeing, Grumman, LTV, and McDonnell Douglas on potential teaming for the PC-9 production.



The French originally sought to buck the trend toward increased collaboration by producing the Rafale as a purely French project. They have since reversed this policy and now actively seek partners to share the costs of development and production.

Force bases, seeking to supplant it as USAF's new trainer aircraft.

The Pilatus PC-9 trainer flew daily at Farnborough, and Pilatus officials reminded USAF officers on the scene that the turboprop trainer visited Air Training Command early in 1986. The purpose: to brief ATC commanders and staff officers on the trainer. Also, the visit gave ATC leaders the opportunity to fly the PC-9 and to consider it as a

After Farnborough, McDonnell Douglas and British Aerospace brought the Hawk jet trainer/fighter to the US for a three-week tour of bases. The itinerary began at Andrews AFB, Md., where military officers (both Air Force and Navy), DoD officials, and members of Congress and staffers were briefed and some got to fly the aircraft. It also included stops at Langley AFB, Va., headquarters of Tactical Air

Command, and Randolph AFB, Tex., home of Air Training Command.

A variant of the Hawk, the T-45 Goshawk, is the centerpiece of the US Navy's new trainer system. McDonnell Douglas, British Aerospace, and Sperry Flight Systems are teamed to provide a complete training package for the Navy.

Another trainer flown daily at Farnborough was the Shorts Tucano. That is a Garrett-powered version of the Brazilian Embraer Tucano turboprop trainer. The Shorts Tucano will join the RAF inventory as its new jet trainer and is in production at the Shorts factory in Belfast, Northern Ireland. USAF officers have visited the Embraer factory in Brazil and flown the standard Tucano. It is in service with the Brazilian Air Force, replacing the T-37 in the training program there. The Egyptian Air Force also chose the Tucano as its new trainer, under a coproduction agreement with Embraer.

Soviets Quiet, Chinese Surging

Soviet aircraft participation at Farnborough was limited to its huge Antonov An-124 transport. The Kamov Ka-32 helicopter and Yak-42 transport were booked for the show, but were scratched in midsummer. The Soviet showing in 1986 was miniature by comparison with Farnborough 1984. On that occasion, their export organization had an entertainment chalet and passed out bales of promotional literature.

This time it was the People's Republic of China that made a big splash, reserving several thousand square feet of space in an exhibition hall (an area, incidentally, more than twenty times the space taken by the Department of Commerce to promote US industry). Models of aircraft and missiles were spotlighted at the stand. Marketing persons fluent in English and French took questions and distributed full-color brochures from stacks at hand.

China Promotion Ltd. booked an entertainment chalet for private business talks and promoted exhibitions in China for the rest of 1986 and for 1987 and 1988. They include Asiandex '86 (November 4-11), the Defense Electronic & Telecommunications Expo/China '87 (April

7-13), Aviation Expo/China '87 (October 14-20), and Defense Expo/China '88 (mid-1988).

Three military aircraft offered for export by the Chinese were noteworthy at Farnborough. The F-8II is the hottest. It is a Mach 2.2 multi-role fighter that represents a great leap forward from its Shenyang J-8 Finback heritage. The Chinese claim it can perform the missions of intercept, air-to-air combat, battle-field interdiction, and close air support. It is still under development, and the Chinese are seeking Western partners for such equipment as the radar and missiles.

The F-7M Airguard is an advanced version of the F-7 air defense interceptor, with a top speed of Mach 2.05. It was developed by the Chinese from the MiG-21 fighter. The F-7M now has a head-up display and can be armed with missiles, cannons, and bombs for roles from intercept to ground support, said the Chinese at Farnborough.

The A-5M is a single-seat, supersonic, attack aircraft powered by twin WP6A turbojet engines. It is under development by China National Aero-Technology Import and Export Corp. (CATIC). CATIC is teaming with Aeritalia of Italy to incorporate advanced navigation and attack systems into the A-5M. Top speed is projected at Mach 1.2.

Air-to-air and surface-to-air missiles were shown by the Chinese and offered for export. The PL-2A is an infrared seeker like the US AIM-9 Sidewinder. In fact, the Chinese made a point of stressing that the PL-2A can be fitted to any fighter that can carry the Sidewinder.

The Feilong FL-1 is a surface-to-surface or air-to-surface radar-guided missile with a very heavy warhead of 513 kg. One photo displayed at Farnborough showed a hole ten meters in diameter blown in the side armor of a naval vessel of destroyer size.

Other aircraft components offered for export included head-up displays, pulse laser rangefinders, optical gunsights, and a range of bombs. The bombs included 100-kg high-temperature marking bombs for night operations, five-kg fragmentation bombs for use against personnel and light vehicles, and two-kg antitank bomblets.

In electronics, the Chinese

International Team-Ups

A Sampling of Collaborations Evident at Farnborough

- Boeing (US) with Fokker (Netherlands), MBB (Germany), and Nurtanio (Indonesia): Joint-venture study of advanced technology 100-seat regional airliner.
- Boeing-owned de Havilland of Canada with Shorts (UK): Joint production of a new commuter airliner.
- Garrett (US) with Rolls-Royce (UK): Provide the TPE331-12B turboprop engine for the RAF's new basic trainer, the Shorts Tucano.
- Garrett (US) with British Aerospace (UK) and Dassault-Breguet (France): Emergency power units for the EAP and Rafale aircraft and exploratory talks on further collaboration on the EFA.
- General Dynamics (US) with IPTN (Indonesia): Offset contract for IPTN to perform subcontract and assembly work on twelve F-16 fighters (option for ten more).
- General Electric (US) with Alfa Romeo Avio (Italy) and Fiat Aviazione (Italy): Develop CT7-6 commercial growth derivative of GE's T700 engine family as an optional powerplant for the Sikorsky S-70 helicopter and such others as the EH101, Westland 30, A-129, and NH-90.
- LTV Aerospace & Defense (US) with the European Program Group (Diehl of Germany, Hunting Engineering of the UK, Aérospatiale of France, and SNIA-BPD of Italy): Joint company to market the Multiple Launch Rocket System (MLRS) worldwide.
- Marconi Radar (UK) with Selenia (Italy) and Thomson-CSF (France): Develop next-generation multifunction radar for their respective navies' follow-on frigates.
- McDonnell Douglas (US) and Airbus (European consortium): Continue discussions on collaboration for large commercial transport aircraft.
- MEL Philips Electronics (UK) and Sabreliner (US): Joint development of the C-140 Sabreliner into Sabre Super Searcher for maritime reconnaissance, command and control, and search-and-rescue missions.
- Rockwell (US) with Promavia (Belgium) and Garrett (US): Joint development of new jet trainer called "Squalus" to compete for USAF trainer business and to sell worldwide. Squalus engine is the Garrett F109, which powers the Fairchild T-46.
- Rolls-Royce (UK) and Turbomeca (France), joined during show by Piacqio (Italy): Power the Blackhawk helicopter with jointly developed RTM322 engine and offer the RTM322 for European EH101 helicopter.
- Rolls-Royce (UK) with Pratt & Whitney (US): Joint study of requirement for advanced V/STOL engine for Harrier successor.
- Sikorsky (US) with Westland (UK): Sell Sikorsky Blackhawk helicopter in UK and Western Europe.
- United Technologies Corp. (US) with Standard Elektrik Lorenz (SEL) (Germany): Joint work on European theater defense programs related to SDI.

showed an array of radar systems, from long-range air warning types to antenna tracking and mobile tactical 3-D systems. They also displayed VHF airborne radio sets and small manpack UHF/FM radio receiver/transmitters.

According to Western industry officials who discussed export arrangements or teaming with the Chinese at Farnborough, three main points emerged. First, the Chinese have been very busy in their laboratories and research centers over the past decade and have built a surprising range of defense industry capabilities.

Second, they are aggressively seeking export customers and are willing to enter into partnership arrangements to do so. (An example is the possible upgrading of MiG-21s for Pakistan and other users in cooperation with a US airframe company.)

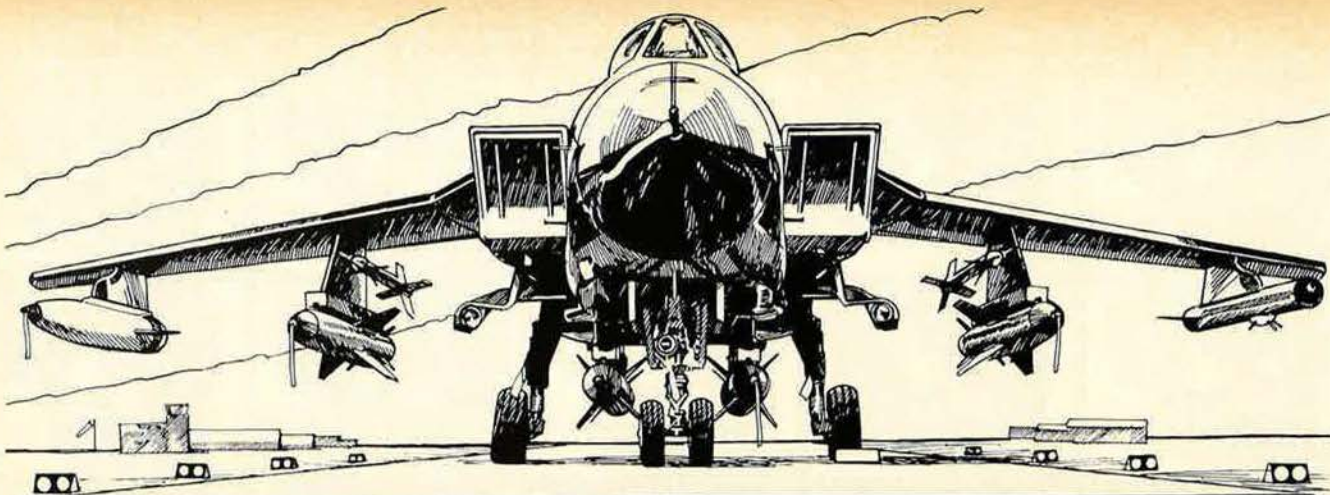
Third, the Chinese want to exploit any teaming arrangement by gaining the technology provided by the teammate. Because of this, Western companies in general and US aerospace companies in particular are advised by experts to be wary of entering into a lopsided deal with the Chinese. ■

F. Clifton Berry, Jr., is a former Editor in Chief of AIR FORCE Magazine. After serving during the Berlin Airlift in 1948-49, he became a paratrooper in the 82d Airborne Division. In 1955, he received a direct commission in the Infantry and later commanded Infantry and airborne units in Southeast Asia. He earned a B.A. degree in mathematics from George Washington University and an M.A. in communications at Stanford. Now a principal at FCB Associates, he has been a writer on national security issues for nearly twenty years.



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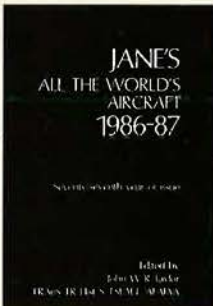
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ALL THE WORLD'S AIRCRAFT 1986-87

VIEWPOINT

Patton Would Approve

By Gen. T. R. Milton, USAF (Ret.), CONTRIBUTING EDITOR

Doctrine didn't require the fighters to cover Patton's flank during the Normandy breakout. Professionalism and understanding did. In training today at Fort Irwin, the services are building the right relationship.



Right in the middle of its palace revolution, or perhaps because of that distraction, CBS put on a splendid show. George C. Scott portrayed George S. Patton in his last

days with a sensitivity and an accuracy scarcely ever granted a military figure by the moguls of television. It was Patton true to life, barring a midriff bulge inconceivable on that athletic soldier.

I would be exaggerating to claim an intimate association with George Patton, but as a Cavalry brat, I did know him slightly. And so, on the basis of that acquaintance, a Military Academy cadet friend and I wangled space in the Fort Myer bachelor officers' quarters at Christmastime, 1939, from Colonel Patton, who was then the Post Commander. That, in turn, involved a call on the Colonel and, not incidentally, his daughter. Patton was resplendent in his Cavalry blues, jodhpur boots, and spurs. He treated us to a few stories and invited us to dinner. As he carved the leg of lamb, a sudden spurt of juice landed on his beautiful blue trousers. The oaths that followed were spectacular.

Oaths notwithstanding, the important thing about George Patton is that he was, in the truest sense of the phrase, an officer and a gentleman, an elitist who believed there could be no higher calling than that of the military officer. The profanity was simply a mannerism, a cover for a sensitive scholar and warrior.

Elitism has somehow drifted into disfavor in these liberated and egalitarian times. Admittedly, it was far easier to be an elitist in the tiny prewar Army than it is today when the officer corps in the Air Force alone approaches the total strength of the regular Army of the 1930s. Nevertheless, the belief that they belonged to a very special, although dimly underpaid, profession provided the stimulus for the remarkable group of leaders who emerged during the 1940s. MacArthur, Bradley, Spaatz, Eaker, and Arnold were all, after their own fashion, elitists. They were our leaders, not our pals.

Curtis LeMay was the personification of the elitist in the manner in which he set the example and then drove his people to match it. There were better-loved group commanders in the Eighth Air Force than Curtis LeMay, but they weren't around long after the missions got rough. Affection ranks well below respect and the instinct for survival, for men in combat prefer to serve under tough drivers like Patton and LeMay who not only win but suffer the fewest casualties. "I fought with Patton" is the way veterans of the Third Army recall those days in Europe. Meanwhile, his opposite numbers in that campaign have faded from memory.

Patton had the gift of inspiration on the battlefield. When he rode to the front in his jeep, flags flying, he was not only a picturesque figure, he was a galvanizing leader. Fully aware of the value of his entrance, he returned to the rear incognito, by means of a light plane.

The television program, besides being a faithful depiction of the man, brought out the manners, the little military courtesies, and the dress-up occasions that were so much a part of George Patton's Army. What he would have thought of our modern Army's predilection for combat fatigues is anyone's guess.

The services, at least the Army and its Air Corps, were not so doctrinaire in Patton's day, more inclined to perform *ad hoc*. Thus, Ninth Air Force

P-47s protected Patton's right flank during the breakout from Normandy. A corps commander on that flank asked General Patton if he should worry about his apparent exposure. Patton reportedly told him it depended on how nervous he was. In any case, there was nothing in anyone's doctrine that called for fighters to cover a flank. Instead, a lot of trust went along with that decision, trust engendered by the close association of soldiers and airmen and the resultant mutual understanding of each other's problems and capabilities.

Close support of the Army is a mission that has not always generated Air Force enthusiasm, and it, more than any other task, has been the source of Army-Air Force friction over the years.

There will never be enough tactical air to satisfy the soldier's desire for close support, but the two services came a long way toward repairing past differences during Gen. Charles A. Gabriel's tenure as USAF Chief of Staff. He and his friend and counterpart, Army Gen. John A. Wickham, Jr., have put the Army and the Air Force on the same track.

A visitor to Fort Irwin, the Army's National Training Center in the Mojave Desert, can see for himself just how far the two services have advanced in the business of working together. A few years ago, the Army's war games at Irwin almost ignored air forces, either as a threat or in support. I remember a moment when the headquarters I was tagging along with was attacked by a flight of F-105s. The attack, coming in at low level from behind a nearby hill, was perfectly executed, and we would have been badly hurt, if not put out of action. Scarcely anyone looked up as the headquarters continued its preoccupation with the tank exercise then in progress.

These days, the soldiers at Fort Irwin are fully conscious of the air, and young Air Force pilots are valued members of Army staffs down to the brigade level. George Patton, with memories of his P-47 flankers, would approve. ■

Rep. Jim Courter keeps his affiliation with the military reform caucus, but is often a strong supporter of Pentagon programs. He reflects a strong streak of independent thought that defies easy categorization.

The Reformer With a Difference

BY BRIAN GREEN
AFA DIRECTOR OF LEGISLATIVE RESEARCH

REP. Jim Courter (R-N. J.) believes the nation's defense is on the wrong track. The reason: In spite of the prominence of the Strategic Defense Initiative (SDI) in current defense debates, the nation is "not moving in real terms toward a strategic defense."

Representative Courter's views as an influential member of the House Armed Services Committee (HASC) reflect a strong streak of independent thought that often defies simple categorization. While his support of SDI is based on a long-term desire to eliminate the nuclear threat, he also firmly favors strategic offensive modernization. He strongly supports the Peacekeeper (MX) program and a larger, more capable—and cheaper—Small ICBM. He also backs both the Advanced Technology Bomber (ATB) as part of the two-bomber program and a halt to the B-1B at 100 planes.

Representative Courter is one of the seminal military reformers in Congress, with clear ideas on how to improve the way the Pentagon does business. But he betrays some suspicion of the motives of fellow military reformers, and he wants to *reduce* the oversight that many

believe keeps the Pentagon in line.

And even while he is one of the staunchest supporters of a strong defense, he refuses to accept the priorities of the services if he is convinced different programs can fulfill military needs more cheaply. Thus he opposes the C-17 airlifter—a top priority of the Air Force and the Army—because he believes a combination of C-5s, C-141s, and C-130s can provide the same capabilities at lower cost.

SDI Seen as the Key

The key to Representative Courter's strategic view is the development and deployment of viable strategic defenses. He strongly favors early deployment of workable defenses, not only for defense of the US strategic arsenal but for population defense as well. He points to the early successes of HEDI (High Endoatmospheric Defense Interceptor) and ERIS (Exoatmospheric Reentry-Vehicle Intercept Subsystem) and the potentially large "footprints" (or areas of the US that could be protected by a single defense site) of the systems that might result from these technological developments as evidence

that the continental US could be defended against Soviet attack.

Development and deployment of antitactical ballistic missile defenses also appeal to Representative Courter as a way of dealing with the theater nuclear threat, convincing US allies that their populations will be defended also, and getting US allies and trading partners to contribute their own substantial technical expertise to the task of developing defenses.

Even though SDI was initiated by President Reagan, Representative Courter is critical of how the Administration has handled the program thus far. One criticism is timing—he is concerned that the US may never deploy any defense while waiting for a perfect one. He notes also that SDI opponents have shifted tactics with some success. The opponents, he says, "were losing the ideological, doctrinal, and moral argument—and the American people." By instead challenging funding levels and technical feasibility, they have for the time being succeeded in slowing the growth rate of the program.

To sustain a long-term consensus, Representative Courter believes a

strong rallying call is required. Comparing President Reagan's treatment of SDI and an earlier successful technology program, he suggests, "If Kennedy got on the tube after Sputnik and said, 'We're going to do a basic research program that the next President will look at to see if it's achievable and affordable to go to the moon,' that's just milque-toast. No one would get behind that program."

Representative Courter believes that the recent rumors of an arms-control compromise in Geneva involving restrictions on the SDI program have unwittingly blurred the vision behind the program, and he fears that SDI might become hostage to lengthy negotiations with the Soviets.

Arms Control

That is not to say that Representative Courter opposes arms control with the Soviets. But arms control in the absence of strategic defenses is "the cart before the horse," according to the Congressman. Rendering offensive weapons less potent by dint of effective defenses will make arms-control agreements easier to reach, he believes.

"Certainly the prospect of reducing nuclear weapons to . . . mere handfuls on both sides is a pipe dream, unless you have defensive capabilities. . . . I can see where we could have enough confidence in verification, enough confidence in the reliability of deployed defenses that the United States could enter an agreement where no ICBMs and SLBMs . . . would be permitted on either side. But we would never do so unless we had robust defenses as a hedge against cheating," he says.

Without those capabilities, significant arms reductions can only be achieved if future agreements have built into them much higher-confidence verification measures and provisions permitting corrective action should treaty violations be verified. That, according to Representative Courter, would involve on-site monitors, on-site inspection, and on-demand inspection of suspicious events. National technical means, used to verify past agreements, have been inadequate, he believes. Further, "We should make it totally clear in the document itself that if there is a violation, the other

side is exempt from all or any part of the agreement they want to be exempt from," he says.

His hardheaded view is reflected in his opinions on current arms-control agreements. The US, Representative Courter believes, should pursue military measures that will rectify the military imbalances resulting from Soviet violations of SALT II. He does not share the concern of Rep. Les Aspin (D-Wis.), HASC Chairman, that the Soviets will build large numbers of new offensive nuclear weapons in response to US breaches of the unratified, expired treaty. In Representative Courter's view, such a Soviet expansion would be militarily unimportant and very expensive.

Further, while he would support ratification of the never-approved 1974 Threshold Test-Ban Treaty—which limits underground nuclear tests to 150 kilotons—if adequate verification could be assured, he is absolutely opposed to the House-approved ban on tests over one kiloton. The one-kiloton limit, he believes, is inherently unverifiable, and overriding US military interests dictate that testing at higher yields continue.

Strategic Modernization A High Priority

In the absence of viable arms-control agreements and US strategic defenses—and given the intense effort the Soviets devote to deploying their own strategic defenses—the Congressman sees strategic offensive modernization as the best means of assuring US security for the time being. While he would like, in the long term, to reduce reliance on retaliatory threats to deter nuclear attack, he does not see deployment of defenses as a political certainty, and "we don't want to give up strategic modernization in the hope of getting something we may not get." He favors the ATB, which he sees as a fundamentally new plane that will maximally complicate the task facing Soviet defenses, and sees no benefit in buying more than 100 B-1Bs. He also strongly favors the 100 MX ICBMs recommended by the Scowcroft Commission, though he sees little chance—given the current political climate in the House—that the second fifty be-

yond those already authorized by Congress will be approved.

He disagrees with his House colleagues in his support for the Small ICBM as well. While he believes that mobility, in addition to active defense, is an important means of assuring the survivability of strategic forces, he also believes that the additional weight of extra warheads and penetration aids would not impair the small missile's mobility. According to information the Congressman has received from a senior defense official, it appears that a 52,000-pound, two-warhead missile with penaids would be as mobile, and thus as survivable, as the congressionally mandated one-warhead, 37,000-pound missile.

"It all comes down to a matter of dollars and cents," says Representative Courter, who believes a multi-warhead missile could deliver the same military capability for \$10 billion to \$30 billion less than its single-warhead cousin.

Defense Economy and Reform

This emphasis on economy is not at all alien to Representative Courter, who has built a large part of his reputation on efforts to improve the efficiency of the Pentagon. He believes that DoD is run better now than it was several years ago, thanks to key reforms, a fact that may explain his surprisingly sanguine view of the deep cuts being inflicted on the Administration defense request this year. While he would prefer a higher defense total, he avers that "there is a lot of money [in the defense budget], and, properly spent, it can do a heck of a lot."

The common theme that runs through Representative Courter's thoughts on military reform is a balance between oversight and accountability. In the past, he says, "we have erred on the side of treating everyone as children." What is needed, he believes, is more "freedom of action, freedom to make mistakes," with rewards for success and penalties for failure. He thus takes a dim view of many efforts to increase oversight of the Defense Department.

He introduced legislation to abolish the Defense Contract Auditing Agency and supports efforts to reduce congressional micromanagement. He generally favors a reduc-

tion of the role of defense agencies—he wants to abolish the Defense Logistics Agency and looks askance at a House measure to create a National Special Operations Agency—preferring to vest authority in the service Secretaries, “who are capable of being yelled at, screamed at, hired, and fired.”

Increased competition in defense procurement as one of the sound practices that have led to improved efficiency. He was one of the early, strong proponents of competition, though he now couches his advocacy in caution. He suggests that the bounds of desirable competition may have been exceeded in some

Representative Courter himself, however, is no rubber stamp for defense requests. His opposition to the C-17 is a case in point, illustrating his dedication to saving money when he believes it possible without compromising military capability.

The Air Force and the Army want the C-17 not only to boost inter-theater airlift but also for its unique capabilities on austere runways and its ability to deliver outsize cargo directly to the forward edge of the battle area. The Congressman remains convinced that, in the present budget climate, the plane is unaffordable and that a combination of C-5, C-141, and C-130 airlifters can achieve identical capabilities for less money. He also remains unconvinced that the Air Force would be willing to send an expensive C-17 into high-risk areas. Gen. Duane Cassidy, Commander in Chief of the Military Airlift Command, has argued that he would prefer not to risk the twenty or more C-130 crewmen required to deliver the same quantity of materiel as the C-17 when the three crewmen of a C-17 could do the same job.



Representative Courter's views on defense are driven by distrust of the Soviet Union and a desire for an efficient and economically run defense establishment. He is a strong supporter of the Strategic Defense Initiative.

Representative Courter recognizes the difficulty of steering the reform movement in the direction he wants, however. Congress, for example, spends too little time tackling big issues of strategy and doctrine and far too much time on detailed specifics of pieces of equipment and budget line items, he believes. And while he successfully sponsored an amendment to reduce the number of DoD reports required by Congress and favors a two-year defense budget cycle, he believes it will be virtually impossible to reduce the number of congressional committees that claim and exercise oversight responsibility of the Pentagon.

“I just can’t believe that John Dingell [D-Mich., who is Chairman of the Oversight and Investigations Subcommittee of the House Energy and Commerce Committee] is going to agree to stop talking about stealth and getting all those secret reports,” Representative Courter says.

The imbalance between oversight and accountability has led to a loss of “the dynamism that is natural in a market economy,” and he counts in-

areas, that it could improve in others, and that imposing further requirements for competition must be done carefully.

No Rubber Stamp

While he is a member of the Military Reform Caucus, which is a bipartisan group of congressmen dedicated to “fixing” the Defense Department, and the ranking minority member on the HASC Acquisition and Procurement Policy Panel, Representative Courter is not cut from the same cloth as other reformers, many of whom are much less disposed than he to support Pentagon programs. When questioned, he refuses to criticize others directly. But his suspicion of their motives is made clear when he states that some are “well-intentioned individuals [who] I think don’t recognize some of the real-world repercussions of their actions, votes, and amendments. . . . I would imagine there are some people around here who love military reform because they can beat up on the Pentagon. . . . There were bad bills that were purposely done very badly, but very few.”

The Russians and Congress

At the core of Representative Courter’s view of the need for military strength is his profound distrust of the Soviet Union. The relentless Soviet military buildup provides credibility to their political threat, and at the same time, their hostile ideology makes the military buildup much more threatening. “I don’t think [the Soviets] are going to behave unless there’s a revolution over there,” he says.

But this is a view that Representative Courter suspects is not shared by many of his colleagues in the House, some of whom he believes pay lip service to the Soviet threat while voting against needed military programs: “They seem to be saying that the real threat is a bad economy or inflation. Those things are debilitating, but not life-threatening. The Soviet threat can be.”

But while he may not walk in lockstep with his fellows in Congress, he wields considerable influence through his independence and articulate defense of his ideas. His accomplishments already assure that his influence will continue to be felt for years to come. ■

AIRMAN'S BOOKSHELF

Women of War

A Piece of My Heart, by Keith Walker. Presidio Press, Novato, Calif., 1986. 350 pages with photographs and appendix. \$18.95.

Like so many pieces of broken glass scattered across a landscape, the profound human suffering caused by the Vietnam War becomes more and more apparent as the nation retraces the steps of a bad experience, searching for lessons learned. Many of those lessons have been chronicled by the media. On an almost daily basis—or so it seems—books are published on heretofore little-known facets of the Southeast Asian conflict, which tore so sharply at the fabric of American society.

From the plight of Amerasian children to the still unresolved POW/MIA issue that haunts the lives of the families of those servicemen who are unaccounted for, the often unseen or unnoticed consequences of Vietnam are being recorded. Fortunately, though belatedly, more and more books that document the contributions of veterans are finally reaching bookstores. *A Piece of My Heart*, by painter and filmmaker Keith Walker, is another such work.

A Piece of My Heart is uncommon, however, in that it tells the stories of twenty-six American women who served in Vietnam. Although an accurate figure is impossible to determine because of incomplete records, the author states that 15,000 women—mostly military nurses, USO and Red Cross workers, and entertainers—went to Vietnam. Military nurses saw more death and injury than perhaps any other personnel, including field combatants. As one of the twenty-six women revealed, "For me, Vietnam was just a continuous flow of bodies, one after the other, from the day you got there until the day you left."

This book is undeniably a significant work, if for no other reasons than that it reveals the experiences of women in Vietnam and sheds some light on how they might perform in

future conflicts. If Vietnam is any indication, it is clear, based on the stories of these twenty-six women, that women veterans are just as likely as their male counterparts to suffer the severe depression, guilt, and alienation that are associated with what has come to be known as Post-Traumatic Stress Disorder (PTSD).

In the case of the nurses, author Walker found almost without exception that they were ill-prepared to deal with their first experience of treating disfigured soldiers or the large quantity of casualties handled by medical field units. As one nurse related, "We had too many bodies lying in those beds minus arms and legs, genitals, and faces, and things that can't be put back together again." Another nurse told of her shock: "I don't know how to describe it. I had worked a year in the emergency room on the jail ward, but nothing could prepare you for the horrible things you saw."

Perhaps the most striking thread running through all twenty-six accounts is that each woman felt that she was needed by the American troops stationed in Vietnam. These women not only cared for the wounded, entertained the troops during USO shows, and performed a myriad of noncombatant duties—they also reminded GIs of wives, girl friends, sisters, and family back home. American women serving in Vietnam gave GIs reason to smile, hope, and survive. Speaking of the patients for whom she cared, one Army nurse said, "I see my role probably the best as having felt a lot of compassion for these kids and trying to let them know that we really cared about them."

Even though Walker has compiled an impressive collection of narratives about the experiences of twenty-six women who served in Southeast Asia, it somehow leaves readers feeling shortchanged. For instance, if he had concentrated on the experiences of military women only, readers would have been afforded an in-depth examination of how service women performed near—and in some instances in—combat situations. As things

stand, the focus of the book is diffuse.

Regrettably, the book is also short on facts about military women who served in Vietnam—for instance, average age, time in service, education level, numbers injured and killed, etc. For a book that seeks to address the shortage of material concerning the women who served alongside American fighting men in Vietnam, this work comes up wanting in this respect.

Despite these shortcomings, the author is to be commended for focusing on another often forgotten aspect of this nation's Vietnam experience—the American women who were stationed there and who occasionally found themselves in a combat environment. From all accounts, they performed admirably.

—Reviewed by Capt. Napoleon B. Byars, USAF. Captain Byars is Chief of the Civil Affairs Branch, Community Relations Division, Secretary of the Air Force Office of Public Affairs.

View From a Tomcat

The Cutting Edge, by C. J. Heatley III. Thomasson-Grant, Inc., Charlottesville, Va., 1986. 152 pages. Foreword by Sen. Jake Garn. \$38.

"I wanted to create a special slide show, a visual diary of the cruise to show our families and friends when we returned," writes Navy fighter pilot C. J. "Heater" Heatley in his introduction to this photographic essay. "I wanted it to help them understand what each man went through and how important his contributions are to the overall effort."

That he succeeded in spectacular fashion is attested to by this handsome assortment of first-class color photos of naval aviators at work. Heatley, who majored in photojournalism at the University of Missouri, brings this expertise to bear in his action-packed "slide show" of carrier operations.

The author is well suited for such an

undertaking. Besides his ability behind the camera, he has to his credit 4,200 hours of flight experience and 620 carrier landings. A graduate of the Navy's famed TOPGUN Fighter Weapons School, Heatley imbues his photography with a palpable "you-are-there" immediacy.

The photographs, naturally, are the stars of this show. Readers can discover how the world appears from the perspective of a Tomcat's rear-view mirror, or they can ride close enough alongside a Soviet Bear bomber to catch a glimpse of a curious Soviet airman. One sequence of photos shows an F-14, minus a landing gear, hitting the deck and plowing into a barricade net made of nylon webbing straps.

My personal favorite depicts an F-14 going supersonic in humid air. The resulting shock wave encircles the aircraft, with just the nose of the plane poking clear. The overall impression is one of the Tomcat bursting into this world from some other cosmic dimension.

Scattered among the photos are short, anonymous interviews with pilots and deck crew. These interviews are informative, but, moreover, they convey the fierce pride that these men bring to their profession. A cocky statement by an F/A-18 pilot typifies this attitude: "We say there are only two types of pilots—those who fly the F/A-18 and those who wish they did."

The book concludes with a special section on "Aircraft and Carrier Facts." This reference appendix features three-view line drawings and information on aircraft designations and specifications. Each entry also indicates where in the book to find photographs of particular aircraft.

The Cutting Edge is a fitting commemoration of seventy-five years of naval aviation. If ever you have wanted to get a feel for what it's like to sit in the cockpit of a Navy fighter, waiting for the catstroke and launch out over the rolling seas, then get a copy of this book and strap yourself in.

—Reviewed by Hugh Winkler,
Assistant Managing Editor.

New Books in Brief

B-47 Stratojet, by Alwyn T. Lloyd. This entry in the "Detail & Scale" series follows true to form in its focus on the physical characteristics of the Air Force's first jet-powered, sweptwing bomber. Dimensions, color schemes, systems, variants, and even a listing of production blocks and serial numbers are featured. Along with a brief historical summary, this booklet also includes a color photo section, a

AIRMAN'S BOOKSHELF

compilation of B-47 bomb wing assignments, and a modeler's section on currently available Stratojet model kits. Anyone seeking basic, accurate information on the B-47 is likely to find it here. Tab/Aero Books, Inc., Blue Ridge Summit, Pa., 1986. 72 pages. \$7.95.

Below From Above, by Georg Gerster. Swiss photographer Gerster, whose aerial photographs have appeared in publications around the world, has here collected a stunning array of images of the earth as seen from above. Seemingly abstract designs, upon study, resolve themselves into city blocks, fields of grain, and traffic jams. Though the photographs are impressive, the viewer gains just enough perspective so as not to lose a sense of human scale—the photos are mostly taken from a relatively low altitude (Gerster practices the "poke-the-head-into-the-slipstream" method of aerial photography). He accompanies the 133 photos with short descriptions of the subjects. Abbeville Press, New York, N. Y., 1986. 192 pages. \$35.

Jane's Aerospace Dictionary, by Bill Gunston. One indication of the fecundity of aerospace technology is the fact that the new edition of this indispensable dictionary includes 6,000 more entries than the previous edition, which was issued in 1980. In addition to basic definitions, the inquisitive can here find listed acronyms, codes, basic equations, equipment designations, and more. Where appropriate, entries have been cross-referenced, and some entries cite sources for the definition. Any aerospace professional would find this lexicon a valuable addition to their collection. Jane's Publishing Inc., New York, N. Y., 1986. 565 pages. \$39.95.

Life in the Rank and File, edited by David R. Segal and H. Wallace Sinaiko. This collection of scholarly essays examines the role of today's enlisted in the armed forces of the US, Britain, Canada, and Australia. The authors, who include academics, social workers, and professional military officers, document changes occurring in enlisted forces: the increasing emphasis on technical abili-

ty, the greater role of women, the "professionalization" of the enlisted corps, and so on. Air Force readers will especially be interested in the essays on the Chief Master Sergeants of the Air Force and the experiences of young USAF enlisted women on overseas duty. With index. Pergamon Press, Elmsford, N. Y., 1986. 283 pages. \$30.

Pioneering the Space Frontier, by the National Commission on Space. The National Commission on Space, created by Congress and appointed by President Reagan, was charged with recommending an agenda for the nation's civilian space effort into the next century. This book is an attractive, well-illustrated reprint of the text of the Commission's report to Congress and the President. Compiled after almost a year of study and testimony, the Commission's report spells out the rationale for forging ahead in space exploration, proposes specific goals for the next two decades, discusses how the country should proceed in opening up the space frontier, and suggests long-range directions for American activity in space in the twenty-first century. The Commission's central recommendation is that the US should "lead the exploration and development of the space frontier, advancing science, technology, and enterprise, and building institutions and systems that make accessible vast new resources and support human settlements beyond Earth orbit. . . ." This report is a blueprint of how all that might come to pass. With appendices, glossary, and bibliography. Bantam Books, New York, N. Y., 1986. 213 pages. \$14.95.

Thunder Monsters Over Europe, by Reginald G. Nolte. This booklet is a unit history of the 405th Fighter Group during World War II. The 405th was activated in March 1943 as a bombardment unit, but by the turn of the next year was flying fighter sweeps from England. Equipped with P-47 Thunderbolt aircraft—known affectionately as "Thunder Monsters"—the pilots of the 405th compiled a solid record in supporting the D-Day landings and the drive across France into Germany. Author Nolte has scoured the primary sources in bringing together this account of the 405th's wartime activities. With photos, appendices, bibliography, and index. Sunflower University Press, Manhattan, Kan., 1986. 160 pages. \$23.50 hardcover; \$18.95 softcover.

—Reviewed by Hugh Winkler,
Assistant Managing Editor.

Valor in Three Wars

By extraordinary heroism in combat and as a POW, Col. James H. Kasler earned a distinction shared with no other airman.

BY JOHN L. FRISBEE
CONTRIBUTING EDITOR

THE Air Force Cross was created by Congress in 1960 as the equivalent of the Army's Distinguished Service Cross and the Navy Cross. It ranks just below the Medal of Honor as an award for extraordinary heroism in combat. Of the hundreds of thousands of aircrew members who flew against the enemy in Southeast Asia between 1960 and 1973, fewer than 300 officers and airmen earned the AFC. A mere handful was awarded that prestigious medal twice, but only one man—Col. James H. Kasler—has the distinction of winning the Air Force Cross three times.

Colonel Kasler's Air Force service spanning thirty-one years and three wars is a story of sustained valor. During World War II, he flew missions over Japan as a nineteen-year-old B-29 tail gunner. Following the war and college, Jim Kasler completed pilot training in 1951 and embarked on a career in tactical fighters that ended only with his retirement as Vice Commander of the F-111-equipped 366th Tactical Fighter Wing on May 1, 1975.

Less than a year after he pinned on his wings, Jim Kasler joined the renowned 4th Fighter Interceptor Wing in Korea. During the next eight months, flying with some of the top fighter veterans of World War II, the newly minted pilot logged 100 combat missions, earned the Silver Star and three DFCs, and shot down six MiGs to become one of USAF's few jet aces.

His next fourteen years in the fighter business netted Kasler more than 4,000 hours of fighter time at bases in the States, Canada, Italy,

and Germany. In February 1966, he reported to the 355th Tac Fighter Wing at Takhli Air Base, Thailand, as Operations Officer of the 354th Squadron. On June 29, then-Major Kasler earned his first Air Force Cross as F-105 mission commander of a perfect strike on the heavily defended Hanoi petroleum storage complex.

Five weeks later, for his ninety-first mission in Southeast Asia, Kasler was awarded a second AFC as leader of a formation that was evaluating low-level delivery against a priority target. When his wingman was hit and ejected, Major Kasler located the downed pilot, flew cover at low altitude until his fuel was almost gone, hit a tanker, and returned to direct rescue operations. Flying at treetop level in an attempt to relocate his wingman, Kasler's F-105 was disabled by ground fire. He ejected, was captured, and spent the next six and a half years as a POW, singled out for special attention by his captors.

Jim Kasler's third AFC was awarded for his almost inconceivable resistance to abuse by the North Vietnamese. In his first three and a half years as a POW, he was tortured dozens of times—continually from August 15 to September 20, 1967, during his captors' unsuccessful attempt to find the leaders of POW resistance. For all those days, his arms were clamped tightly

behind his back, and he was subjected repeatedly to the rope torture, resulting in severe injuries. In June and July of the following year, Colonel Kasler was again brutally abused in a failed attempt to force him to meet with visiting delegations who were sympathetic to the North and to appear before TV and news cameras. His extraordinary heroism and strength of character were an inspiration to his fellow POWs, none of whom was—or could have been—fully prepared for the inhuman treatment to which many were subjected, especially in the early years of the POW ordeal.

Readers of this column may have concluded that heroism has no common denominator of causation. In a few isolated instances, valor—never to be repeated—may have been motivated only by self-preservation. Men like Jim Kasler who faced determined and skillful enemies many times had to overcome that most basic of human instincts on virtually every mission. The motivation behind their victories over the survival instinct is another matter. It may have been personal pride, professionalism, *esprit de corps*, belief in a cause, patriotism, or any combination of those attitudes. Each man can speak only for himself on that score.

But it took a particular kind of valor to withstand torture, deprivation, solitude, and psychological incursions month after month, year after year, with no end in sight. It also demanded a belief in something more important than one's own life. The bravest suffered the most.

Tradition—the memory of great things done together in the past—also inspired and will continue to inspire airmen in combat and in resistance to barbarism if we again face an uncivilized foe. Col. Jim Kasler, through his heroism in the air and his unshakable determination never to yield to attacks on body and mind, is one of those in whom the Air Force tradition of valor resides. ■



Col. James H. Kasler—thrice winner of the Air Force Cross.

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INTERCOM

Special Reports Compiled by the Staff; Convention Photos by Eddie McCrossan

AFA Holds Fortieth National Convention

Sam E. Keith, Jr., was elected President of the Air Force Association at AFA's National Convention in Washington, D. C., September 15-18. Mr. Keith, a retired aerospace executive, is presently a businessman and consultant in Fort Worth, Tex.

He is a combat veteran of World War II and later served with occupational forces in Korea. He has served in chapter, state, regional, and national AFA positions and was the Association's Man of the Year in 1967.

Martin H. Harris of Winter Park, Fla., National President for the past two years, was elected Chairman of the Board. Reelected were National Secretary A. A. "Bud" West of Hayes, Va., and National Treasurer George H. Chabbott of Dover, Del.

More than 10,000 people took part in one or more of the Convention-related activities at the Sheraton-Washington Hotel. The 390 registered delegates—representing forty-six states, the District of Columbia, and Guam—were joined by a host of others, including senior military and government officials, for the Aerospace Development Briefings and Displays program, featured speeches, and social events. Reflecting the level of interest in the informational presentations, 218 reporters and news media representatives were on hand to cover the Convention.

Two new AFA state delegations—Montana and Hawaii—were welcomed to the Convention.

Evening highlights were a dinner honoring the Air Force's twelve Outstanding Airmen of the Year and the Air Force Anniversary Dinner Dance, during which singer Margaret Whiting performed with the USAF Band. The overall theme of the Convention was the centennial of the birth of General of the Air Force H. H. "Hap" Arnold, founding father of AFA.

Meeting concurrently with the Convention were trustees of the Aerospace Education Foundation, USAF's senior enlisted advisors, and AFA's Junior Officer Advisory Council and Enlisted Council.

• *Salute to Congress.* AFA's "Salute to Congress" reception on Tuesday of Convention week drew fifteen senators and ninety members of the House of Representatives. Among those attending were several ranking members of key committees and subcommittees, including Sen. Gordon

Humphrey (R-N. H.), Sen. Sam Nunn (D-Ga.), Sen. Strom Thurmond (R-S. C.), Sen. Ted Stevens (R-Alaska), Rep. Charles Bennett (D-Fla.), Rep. Dan Daniel (D-Va.), Rep. William Dickinson (R-Ala.), Rep. Bill Chappell, Jr. (D-Fla.), and Rep. G. V. "Sonny" Montgomery (D-Miss.).

THE WHITE HOUSE

WASHINGTON

Santa Barbara

August 28, 1986

It gives me great pleasure to welcome the members and guests of the Air Force Association to Washington for your 40th annual convention, honoring the centennial of General H. H. "Hap" Arnold's birth.

As a lifetime charter member, I remember Hap's dream of an organization that would be civilian in character and supportive of a strong defense. Hap would be deeply proud of the organization he founded. I join him in that pride, and I extend my thanks for all your past achievements and for what you are doing today to educate the American people about our national security needs.

Hap himself often said that it was his experience that winning the peace was much more difficult than winning even a global war. In the weeks and months ahead, I know I can count on the 245,000 members of the Air Force Association to make the message of peace through preparedness known and understood throughout America.

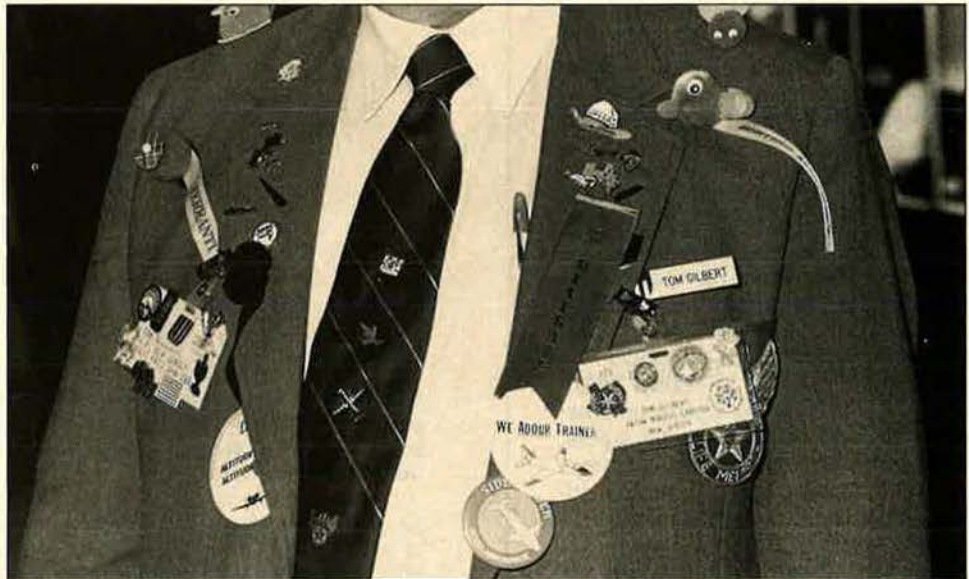
I send my warmest good wishes for a successful convention. God bless you.

Ronald Reagan



Senior Enlisted Advisors Robert H. Waldrup of Air University (left) and John R. McCauslin of USAFE (right) are among the several USAF Senior Enlisted Advisors who met to discuss the policies and issues affecting the Air Force today.

New Jerseyite Tom Gilbert transformed himself into a walking celebration of the diversity of information available to the delegates at the Briefings and Displays portion of the annual AFA Convention. His BAe and Ferranti souvenirs illustrate the international character typical of this assembly.



Martin H. Harris, outgoing AFA President and new Board Chairman, addresses delegates at the recent AFA Convention. Forty-six states, the District of Columbia, and the US territory of Guam were represented by 390 delegates at the Convention. The delegates passed legislation that will shape AFA today and into the future.

Air Force Association's 1986 Unit Activity Awards

Donald W. Steele, Sr., Memorial Award AFA Unit of the Year

Charles A. Lindbergh Chapter, Connecticut

Outstanding State Organization

Florida State Organization

Outstanding Chapters

Langley Chapter, Virginia (more than 900 members)
Union Morris Chapter, New Jersey (401-900 members)
Paul Revere Chapter, Massachusetts (151-400 members)

Exceptional Service Awards

Central Florida Chapter, Florida (Aerospace Education)
General Robert F. Travis Chapter, California (Best Single Program)
Cleveland Chapter, Ohio (Communications)
Front Range Chapter, Colorado (Community Relations)
Cape Canaveral Chapter, Florida (Overall Programming)

The Charles A. Lindbergh Chapter earned the Donald W. Steele, Sr., Memorial Award as the AFA Unit of the Year. Chapter President John Henry Griffin (right) receives words of congratulations from Martin H. Harris, the new AFA Board Chairman (left).



Air Force Association's 1986 Community Partner Membership Awards

These new awards were created to recognize those chapters that have recruited a total number of Community Partners equal to or greater than two percent of their overall chapter membership. Chapters must have a minimum of ten Community Partners to be eligible for these awards.

Exceptional Service Award

Tallahassee Chapter, Florida

Gold Awards

Enid Chapter, Oklahoma
Fairbanks Midnight Sun Chapter, Alaska
Inland Empire Chapter, Washington
Langley Chapter, Virginia
Roanoke Chapter, Virginia

• *Constitutional Changes.* The Convention voted several significant changes to the AFA constitution and bylaws.

US citizenship is no longer a requirement for membership in the Association, provided the applicant is serving or has served on extended active duty in the armed forces of the United States, is a spouse, widow, or widower of such an individual, or has been a member of US Guard or Reserve forces.

AFA organizations overseas now have full-fledged chapter status. Previously, overseas members kept their affiliations with Stateside chapters or were members at large.

The Long-Range Planning Committee, previously functioning as a temporary body, was established as a standing committee.

Lastly, three-year AFA membership dues were increased from \$42 to \$48, and life membership was increased from \$250 to \$300. Both changes in dues are effective January 1.

• *New in Office.* Four new National Vice Presidents were elected at regional meetings during the Convention. They are Joseph R. Falcone of
(Continued on p. 127)

Spouse Activity Program

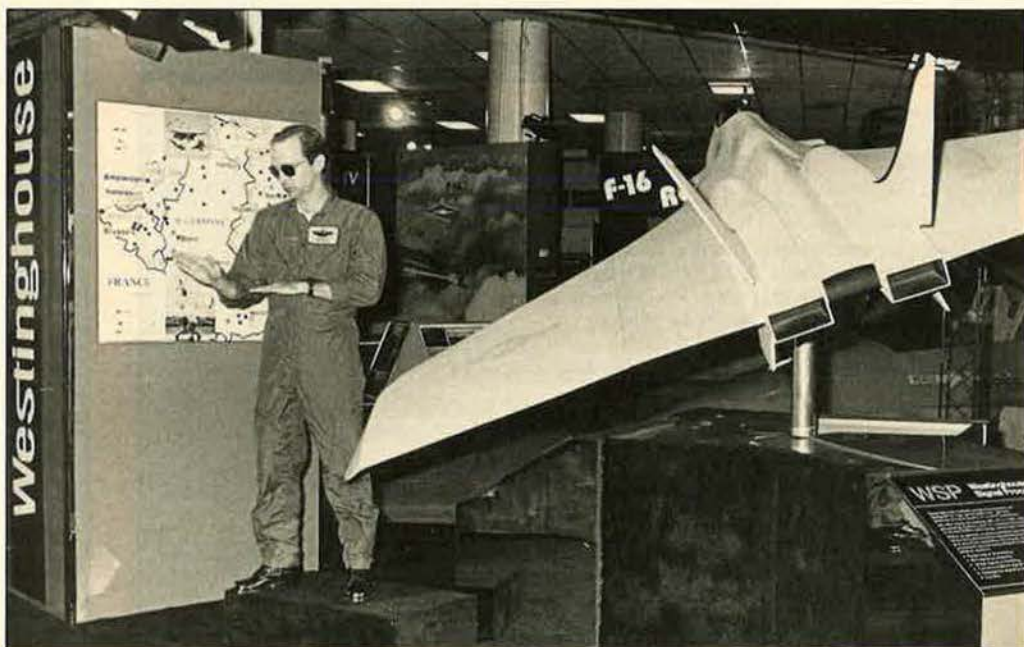
With deep gratitude, AFA acknowledges the support of the following companies that participated in the Spouse Activity Program.

Aerojet General
Avco Systems Textron
Canadair Ltd.
Douglas Aircraft Co.
Gould Inc.
Honeywell Inc.
Itek Optical Systems
ITT Avionics Div.
Lockheed Corp.
LTVUS Corp.
Martin Marietta Aerospace
Northrop Corp.
RCA Aerospace/Defense
Singer/Kearfott Div.
TRW Defense Systems Group
United Technologies Corp.

With the Air Force's primary trainer situation in the air, several companies at the Briefings and Displays showed their alternative solutions. Here two officers discuss an Air Force version of the Navy's T-45 Training System with a McDonnell Douglas representative.



Then-AFA President Martin H. Harris (right) presents the Theodore von Kármán Award for outstanding contributions in the field of science and engineering to the former Commander of AFSC's Aeronautical Systems Div., Lt. Gen. Thomas H. McMullen, USAF (Ret.), pictured at left.



Standing next to the Westinghouse Advanced Tactical Fighter concept model, an actor dressed as a fighter pilot describes a possible future air battle over Europe.



Permanent National Director John G. Brosky (left) receives the Special Award for his long-term contributions to the AFA mission and objectives from then-AFA President Martin H. Harris.

AFA Man of the Year John P. E. "Jack" Kruse (left) learns more about the AIM-9M Sidewinder from a Ford Aerospace representative (right) at AFA's annual Briefings and Displays. Mr. Kruse was honored at the Man of the Year Breakfast, at which thirteen former Men of the Year were present.



1986 AFA Membership Achievement Awards

AFA Membership Achievement Awards are presented to those AFA chapters, states, and regions that achieve certain new member goals as established by AFA's Membership Committee. The following units achieved these objectives for the year ending June 30, 1986. AFA salutes them as pacesetters in the important work to enlarge and strengthen the Association.

STATES

Arizona
Arkansas
Mississippi
Nevada
South Carolina
Texas

CHAPTERS

Airport Number One (Pennsylvania)
Alamo (Texas)
Alexandria (Louisiana)
Altus (Oklahoma)
Blytheville (Arkansas)
Carl Vinson Memorial (Georgia)
Central Connecticut (Connecticut)
Charleston (South Carolina)
Cheyenne (Wyoming)
Colin P. Kelly (New York)
David J. Price/Beale (California)
Delaware Galaxy (Delaware)
Fairbanks Midnight Sun (Alaska)
Florida Highlands (Florida)
Fort Wayne-Baer Field Area (Indiana)
Front Range (Colorado)
General George C. Kenney (Connecticut)
General Robert F. Travis (California)
Gold Card (Utah)

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Thomas P. Williams
R. E. Smith
Anthony Martinez
Harry E. Lavin
Ollie R. Crawford

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Carl A. Estes
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Roy P. Whitton
Chris Kellum
James F. Clark
Kenneth L. Weber
Betty Hazeleaf
Calvin E. Stuart

CHAPTERS

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Homestead (Florida)
Hudson (New Jersey)
Illini (Illinois)
Jacksonville (Florida)
Joe Walker (Pennsylvania)
John C. Stennis (Mississippi)
Ladewig-Shine Memorial (South Carolina)
Laurel Highlands (Pennsylvania)
Llano Estacado (New Mexico)
Longs Peak (Colorado)
Panama City (Florida)
Paul Revere (Massachusetts)
Richard D. Kising (Iowa)
Richard E. Carver (Illinois)
Roanoke (Virginia)
Robert H. Goddard (California)
Rocky Mountain (Utah)
Sedona (Arizona)
Spudland (Maine)
Southeast Georgia (Georgia)
Thomas B. McGuire, Jr. (New Jersey)
Thunderbird (Nevada)
Tucson (Arizona)
War Eagle (Alabama)
Wichita Falls (Texas)
Wings (New Jersey)

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Craig R. McKinley
Ron Chromulak
Henry W. Boardman
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Richard Streika
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Emery Wetzell, Jr.
John E. Devlyn
Robert E. Flynn
Robert D. Haley
Alfred D. Richards



This Is AFA

The Air Force Association is an independent, nonprofit, aerospace organization serving no personal, political, or commercial interests; established January 26, 1946; incorporated February 4, 1946.

OBJECTIVES: The Association provides an organization through which we as free people may unite to address the defense responsibilities of our nation imposed by the dramatic advance of aerospace technology; to educate the members and the public at large in what

that technology can contribute to the security of free people and the betterment of mankind; and to advocate military preparedness of the United States and its allies adequate to maintain the security of the United States and the free world.

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Arlington, Va.
Francis L. Jones
Wichita Falls, Tex.
Arthur F. Kelly
Los Angeles, Calif.

Victor R. Kregel
Dallas, Tex.
John P. E. Kruse
Cherry Hill, N. J.
Jan M. Laltos
Rapid City, S. D.
Thomas G. Lanphier, Jr.
San Diego, Calif.
Jess Larson
Washington, D. C.

J. P. McConnell
Fairfax, Va.
James M. McCoy
Bellevue, Neb.
Thomas J. McKee
Bethpage, N. Y.

Craig R. McKinley
Ponte Vedra Beach, Fla.
Arley McQueen, Jr.
Wells, Me.
J. B. Montgomery
Los Angeles, Calif.

Edward T. Nedder
Hyde Park, Mass.
J. Gilbert Nettleton, Jr.
San Diego, Calif.
Ellis T. Nottingham
Atlanta, Ga.

Sam E. Parish
Mount Airy, Md.
Jack C. Price
Clearfield, Utah
William C. Rapp
Buffalo, N. Y.

Julian B. Rosenthal
Sun City, Ariz.
Peter J. Schenk
Pinehurst, N. C.
Walter E. Scott
Dixon, Calif.

Mary Ann Seibel
St. Louis, Mo.
Joe L. Shosid
Fort Worth, Tex.
C. R. Smith
Annapolis, Md.

William W. Spruance
Marathon, Fla.
Thos. F. Stack
Hillsboro, Calif.
Edward A. Stearn
Redlands, Calif.

Howard C. Strand
Marshall, Mich.
James H. Straubel
Fairfax Station, Va.
Harold C. Stuart
Tulsa, Okla.

James M. Trail
Boise, Idaho
Herbert M. West
Tallahassee, Fla.
Edward I. Wexler
Savannah, Ga.

Sherman W. Wilkins
Bellevue, Wash.
David L. Gray
(ex officio)
Executive Director
Air Force Association
Arlington, Va.

Rev. Richard Carr
(ex officio)
National Chaplain
Springfield, Va.
M. Bruce McGehee
(ex officio)
National Commander
Arnold Air Society
Auburn, Ala.

the New England Region, Jack Flaig, Northeast Region, James P. LeBlanc, South Central Region, and Donald D. Adams, Midwest Region.

Eleven new National Directors—including several who had served in years past—will take their seats at the next meeting of the AFA board. They

INTERCOM

are John P. E. "Jack" Kruse of Cherry Hill, N. J., Charles H. Church, Jr., of Kansas City, Mo., E. F. "Sandy" Faust of San Antonio, Tex., Francis L. Jones of Wichita Falls, Tex., Arley McQueen, Jr., of Wells, Me., Ellis T. Nottingham of Atlanta, Ga., Sam E. Parish of Mount Airy, Md., Toby J. duCellier of

Air Force Association's 1986 Individual Activity Awards

AFA Man of the Year

John P. E. "Jack" Kruse, New Jersey

Special Award

John G. Brosky, Pennsylvania

Presidential Citations

C. Cliff Ball, Mississippi
H. Lake Hamrick, Florida
Betty Hazeleaf, California
Thomas W. Henderson, Arizona
James M. Keck, Nebraska
Robert T. Marsh, Virginia
Walter E. Scott, California
Sherman W. Wilkins, Washington

Exceptional Service Awards

Donald D. Adams, Nebraska
Donald T. Beck, Florida
Cecil G. Brendle, Alabama
CMSgt. Charles W. Brown, Ret., Maryland
Kenneth Brown, Maryland
Brig. Gen. Robert A. Buethe, Jr., Virginia
James F. Clark, Colorado
Horace W. Cook, Delaware
Maxine Donnelly, New York
Toby J. duCellier, Maryland
Charles G. Durazo, Virginia
E. F. Faust, Texas
James A. Flood, Sr., Delaware
CMSAF Robert D. Gaylor, Ret., Texas
John Henry Griffin, Connecticut
Robert D. Haley, Texas
Maj. Steve Hampton, Alabama
Edward R. Hicks, Texas
John Householder, New York
Wilbur H. Keck, Georgia
William J. Lewis, Massachusetts
Charlotte Loos, Texas
Anthony I. Mazzolini, Ohio
Capt. Charles G. Merlo, Virginia
Jerome L. Miller, California
Col. Charlie B. Moore, Alabama
Francis R. O'Clair, Maryland
Donna L. Pastor, Virginia
James F. Patterson, Alabama (*posthumous*)
Richard R. Price, Virginia
Robert J. Puglisi, Ohio
Bill Reslie, California
William Reynolds, Maryland
John P. Russell, Texas
William L. Ryon, Jr., Maryland
Leonard Schiff, New Jersey
Robert S. Seidel, Texas
Eldon Shoffner, Texas
R. E. Smith, Mississippi
Kerry Spears, California
Charles B. Spencer, Ohio
John E. Strickland, Delaware

Eldon K. Turner, Texas
L. B. Webber, Texas
Marcus C. Williams, Utah
Lt. Col. Ralph Williams,
New Hampshire
Thomas P. Williams, Arkansas
CMSgt. Richard E. Williamson, Texas
James E. Youngson, Jr., Texas
John E. Zipp, Colorado

Medals of Merit

Capt. Henry L. Andrews, Jr., Nebraska
Norman Aubuchon, Colorado
Clyde F. Autio, Ohio
Nancy Baker, Tennessee
Michael E. Bates, Idaho
Bennie M. Bauman, Virginia
Ted Beattie, Colorado
Cdt. Scott Bedrosian, Arizona
William A. Bingham, Jr., Florida
TSgt. Thomas D. Boggs, Louisiana
Ben Boshoven, Arizona
Capt. Karen A. Boyle, Arkansas
Jemima R. Brennen, Montana
David J. Brown, Texas
Capt. Napoleon Byars, Virginia
James M. Cain, Pennsylvania
Edith E. Calliham, South Carolina
Howard W. Cannon, Washington, D. C.
Crawford J. Carrol, Delaware
Arthur A. Castro, California
Homer N. Childs, Georgia
Ray Chuvala, Arizona
John Cloe, Alaska
Peter Colerico, Massachusetts
John H. Combs, Florida
Oscar Curtis, Oklahoma
Brig. Gen. Russell C. Davis, Virginia
John E. Devlyn, Arizona
Capt. Janet M. Dukes, Illinois
Maj. Dave E. Edwards, Illinois
Jim Farha, California
Col. James R. Faulkner, Mississippi
Edmund J. Gagliardi, Pennsylvania
Jack Gamble, Washington
Claire M. Garrecht, Texas
John R. Gilchrist, Texas
C. James Gleason, Virginia
J. Rudolph Gossman, Florida
Clayton K. Gross, Oregon
James H. Ground, Arizona
Thomas J. Hanlon, New York
Philip L. Holt, Georgia
Cecil H. Hopper, Ohio
Cdt. Anita Irizarry, California
Leo A. Johnson, Jr., Ohio
Paul J. Johnston, Louisiana
Kurt N. Judeich, Pennsylvania
Frank V. Juliano, Pennsylvania
Alexander Kadolka, New Jersey

Chris Kellum, Indiana
Walter Kross, Delaware
Kathleen L. Landis, California
Alwyn T. Lloyd, Washington
Lee B. Lilljedahl, New Hampshire
Capt. Stephanie Llovero, Massachusetts
Joseph Luceri, Massachusetts
Maj. Gen. William J. Mall, Jr.,
Washington, D. C.
Cdt. Steve Mas, California
Pattie Mason, Texas
George W. McKay, Virginia
Don McKellar, Indiana
Col. Ed McLaughlin, Texas
Michael Monaghan, Alaska (*posthumous*)
Allen H. Moore, Jr., Texas
Harold J. Norman, Nebraska
Marcus Oliphant, Indiana
SMSgt. Thomas L. Pacino, Maryland
CMSAF Sam E. Parish, Ret., Maryland
Charles B. Reynolds, Virginia
Robert P. Reynolds, Florida
Alfred Ritter, Tennessee
Richard O. Robinson, Georgia
Peter R. Schnabel, Illinois
Capt. Thomas D. Shearer, Nebraska
1st Lt. Alexander J. Shocky, Florida
Harvey B. Snively, Jr., Florida
Capt. George D. Stackman, Florida
Arthur L. Stevens, Jr., Florida
Donna Stewart, California
Bobby G. Suggs, North Carolina
William B. Taylor, Hawaii
Dennis Theriault, Connecticut
Janet F. Thompson, Georgia
Iver C. Vollmer, California
Rudolph F. Wacker, Arkansas
B. A. Walters, Arkansas
Spann Watson, Washington, D. C.
Donald O. Weckhorst, Illinois
H. Dean Wilkerson, Arkansas
James E. Young, New Jersey

Special Citations

Albert A. Eldridge, Massachusetts
Lt. Col. Jose L. Holguin, California
Lloyd P. Nolen, Texas
TSgt. Doris E. Tupyli, Idaho
Ghost Squadron of the Confederate
Air Force, Texas
Liberty Precision Tooling, Inc., Pennsylvania
Nation's Capital Chapter, Washington, D. C.
Soviet Technological Briefing Team,
Wright-Patterson AFB, Ohio
USAF Directorate of Soviet Affairs,
Washington, D. C.
USAF National Security Briefing Team,
Maxwell AFB, Ala.

Dunkirk, Md., Charles A. Gabriel of McLean, Va., Craig R. McKinley of Ponte Vedra Beach, Fla., and M. Bruce McGehee of Auburn, Ala. Outgoing Chairman Edward A. Stearn of Redlands, Calif., resumes his board status as permanent National Director.

INTERCOM

For a complete list of National Vice Presidents and Directors, including those reelected, see "This Is AFA" on page 126.

• *Membership Report.* AFA membership has reached a record high of 244,192, outgoing National President Martin H. Harris reported at a recep-

During the Aerospace Education Foundation Luncheon, Dr. James Schlesinger (center) was invested as an Individual Doolittle Fellow by outgoing AEF President George D. Hardy (left) and Col. William Bruce Arnold, USAF (Ret.) (right), the son of Gen. H. H. "Hap" Arnold, father of the modern US Air Force.



Then-AFA President Martin H. Harris congratulates Harold R. Bacon on receiving the Hoyt S. Vandenberg Award. AFA presents the award annually to the outstanding contributor in the field of aerospace education. As a director of aerospace education for the Civil Air Patrol, Mr. Bacon has increased the dissemination of knowledge about aerospace not only in Civil Air Patrol but throughout the nation's school systems by his innovative use of teacher workshops.

tion for delegates on Sunday of Convention week. He said that 24,888 new members and patrons were enrolled during the membership drive year that ended June 30. Forty-five chapters and six AFA state organizations achieved their membership goals in that drive.

• **Aerospace Education Foundation.** Dr. Eleanor P. Wynne of Irvine, Calif., was elected President of the Aerospace Education Foundation. Dr. Wynne is a physician and serves as an associate research psychiatrist and professor of child/adolescent psychiatry and human behavior at the Uni-

Aerospace Education Foundation Fellowships

(Presented at September 15 Luncheon)

Corporate Jimmy Doolittle Fellows

The Harry Frank Guggenheim Foundation

Gulfstream Aerospace Corp.

McDonnell Douglas Corp.

Recipients

George D. Hardy, President, AEF

E. Brown Pinkston, Senior Vice President

D. D. Clark, Corporate Vice President for the Eastern Region

Individual Jimmy Doolittle Fellows

Clyde F. Autio
C. Cliff Ball

Dorothea V. Barnes
Florence Borchert Bartling
Enrico M. Carnicelli

Jack R. Carnicelli
Charles H. Church
Henry Coffin III

Dr. Bonnie J. Dunbar
J. Presper Eckert, Jr.
Gen. Andrew Goodpaster, USA (Ret.)

James M. Keck
Hon. George Mahon
(in memoriam)

John Mauchly (in memoriam)
Mabel McCoy

Ronald E. McNair (in memoriam)
Nation's Capital Chapter
Lloyd G. Nelson (in memoriam)
Charles O'Neal (in memoriam)
Edwin Rawlings and Kathryn Fradkin
Dr. James Schlesinger
C. W. Scott
Charles B. Spencer
Margaret D. Strack

Sponsors

Wright Memorial Chapter
States and Chapters of AFA's South Central Region

William W. Spruance
Bill Borchert Larson
Personal

Enrico M. Carnicelli
AFA Midwest Region
AFA Northeast Region (Pennsylvania)
Arnold Air Society and Angel Flight
Gen. E. W. Rawlings, USAF (Ret.)
Aerospace Education Foundation

Nebraska State AFA
Gen. E. W. Rawlings, USAF (Ret.)

Gen. E. W. Rawlings, USAF (Ret.)
Ak-Sar-Ben Chapter and Russell E. Dougherty

Tuskegee Airmen, Inc.
Rockwell International Corp.—DEO
AFA Northeast Region (New Jersey)
Colorado State AFA
AFA/AEF Friends
Jack B. Gross
Langley Chapter
Wright Memorial Chapter
Brig. Gen. Hal Strack, USAF (Ret.)

Corporate Ira Eaker Fellows

Bendix Aerospace
Fairchild Industries

Hughes Aircraft Co.

Recipients

William Purple, President
Hal Howes, Vice President for Government Relations
Jack L. Winkel, Senior Vice President

Individual Ira Eaker Fellows

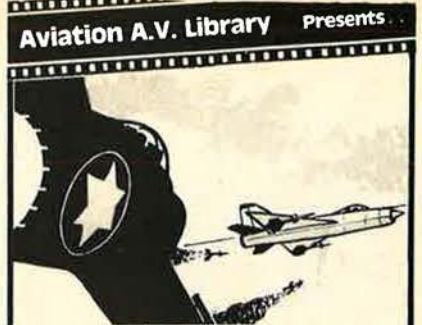
Florence Borchert Bartling
Charles F. Bolden
Lt. Gen. William E. Brown, Jr., USAF (Ret.)

Eric Doten
Dan C. Johnson
Cmdr. William K. Kaiser, USN (Ret.)
Nation's Capital Chapter
Salvador Ramos

Sponsors

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Tuskegee Airmen, Inc.
Lt. Col. Woodrow W. Crockett, USAF (Ret.)

William W. Spruance
Wright Memorial Chapter
Nassau-Mitchel Chapter
Rockwell International Corp.—DEO
Wright Memorial Chapter



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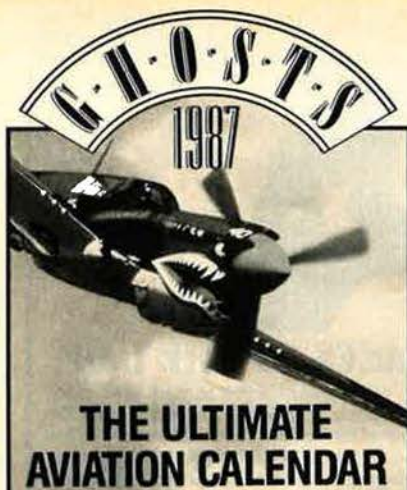
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INTERCOM

versity of California at Irvine. Her long list of honors includes recognition by the Los Angeles *Times* as Woman of the Year. She is a Presidential advisor on children and youth. Previously, she was Vice President of the Aerospace Education Foundation.

George D. Hardy, President of AEF since 1984, was elected Chairman of the Board, replacing Sen. Barry Goldwater, who now joins Gen. James H. Doolittle, USAF (Ret.), as Chairman Emeritus of the Foundation.

James M. Keck of Omaha, Neb., was elected Vice President, Earl D. Clark, Jr., of Shawnee Mission, Kan., was elected Treasurer, and Walter E. Scott of Dixon, Calif., was chosen as Secretary.

Enrollments for AEF's new Sustaining Member program continued apace during the Convention, and by week's end, the Foundation had 179

Named in Memorial Tribute

These are the names of the USAF and AFA leaders and supporters and aviation pioneers who died during the last year: Barbara **Abramson**; Hon. Joseph P. **Addabbo**; Sister Mary **Aquinas**; John **Badger, Jr.**; CMSgt. Thomas P. **Barton**; Francis X. **Battersby**; Robert D. **Benson**; Col. Robert P. **Bliss**; Peter **Brown**; Martin F. **Chen**; Col. Louis J. **Churchville**; John J. **Currie, Sr.**; Col. Roy W. **Dart**; CMSgt. Roosevelt **Dawson**; Dr. John W. **DeMilly**; Robert **Dougherty**; Gilbert **Dunn**; Flint O. **Dupre**; Ed J. **Dzlmiera**; Lt. Col. William J. **Emerick**; Brig. Gen. David **England**; Maj. Gen. George G. **Finch**; George J. **Flynn**; James L. **Ford**; Brig. Gen. Joseph E. **Gill**; Norma **Glasser**; Margaret **Goldwater**; John P. **Hickey**; Carolyn **Kling**; CMSAF Richard D. **Kisling**; Ward **Koons**; CMSgt. Thomas A. **Kramer**; Thomas J. **Law**; Maj. Gen. John L. **Locke**; Anthony J. **Luckerak**; Maj. Gen. Melvin F. **McNickle**; Timothy J. **Meyers**; Lloyd G. **Nelson**; Brig. Gen. James P. **Newberry**; Henry J. **Ogden**; James F. **Patterson**; Eugene Paul **Puglisi**; Col. Jackson V. **Rambeau**; Leslie M. **Reese**; Dorothy K. **Robbins**; Charles **Sewell**; CMSgt. Madison D. **Singleton**; Space Shuttle *Challenger* Crew (Gregory **Jarvis**, S. Christa **McAuliffe**, Dr. Ronald E. **McNair**, Lt. Col. Ellison S. **Onizuka**, Dr. Judith A. **Resnik**, Francis R. **Scobee**, and Cmdr. Michael J. **Smith**); LaRue **Patterson Steele**; Lt. Gen. Herbert B. **Thatcher**; Brig. Gen. James H. **Thompson**; Col. Barry C. **Trader**; Vincent L. **Vaccaro**; Maj. Gen. Don S. **Wenger**; Lt. Gen. Roscoe C. **Wilson**.



Outgoing Aerospace Education Foundation President George D. Hardy (right) presents AEF's first annual Christa McAuliffe Memorial Award to Allen T. King. Mr. King teaches biology at Snider High School in Fort Wayne, Ind.



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A-37	B-58	EC-135	F-100	P-47	YB-49
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Dr. Eleanor Wynne, the new President of the Aerospace Education Foundation, and George D. Hardy, the new AEF Chairman of the Board, study a model of General Electric's SP-100 Space Nuclear Reactor System that will provide electricity to satisfy the power needs of future spacecraft.

Arthur C. Storz, Sr., Membership Awards

AFA's most prestigious membership awards are named after Arthur C. Storz, Sr., a former permanent AFA National Director and principal founder of Omaha's Ak-Sar-Ben Chapter. The Storz Membership Awards, made possible through a generous endowment to the Association by his son, Art Storz, Jr., are awarded each year for membership excellence based on criteria approved by AFA's Board of Directors. These awards are for the year ending June 30, 1986.

Storz Individual Award

Lee W. Niehaus

Storz Chapter Award

Illini Chapter
Champaign, Ill.
President: Don Kruse

Storz State Award

Mississippi AFA
President: R. E. Smith

sustaining members and 180 sustaining life members.

A videotape program on "Aerospace Requirements for the Year 2000" won the Foundation's annual contest for presentations by Air Force Junior ROTC cadets. The winning en-

UNIT REUNIONS

Reunion Notices

Readers wishing to submit reunion notices to "Unit Reunions" should mail their 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.

Association of French Flying Personnel

The Association of French Flying Personnel, comprising Frenchmen who received flying training in the US, is extending an invitation to all Air Force people who were involved in the training of French cadets during and after World War II to attend the Salon du Bourget (Paris Air Show), which will be held on June 11-21, 1987. Those who served during World War I in the Lafayette Escadrille are also welcome. **Contact:** Maurice Y. Théanor, 50 Boulevard du Général Leclerc, 92200 Neuilly sur Seine, France. Phone: 46.37.36.30 (home) or 42.29.04.10 (office). Jean Paulin, 19 Boulevard Colbert, 92330 Sceaux, France. Phone: 46.60.09.77.

try was from Scotch Plains-Fanwood High School, Scotch Plains, N. J. The theme for next year's contest is "The Role and Significance of Women in Aerospace."

• **Acknowledgments.** Parliamentarian for the AFA National Convention was Edward J. Monaghan, Chairman of the Constitution Committee. Herbert M. West, Jr., was Sergeant at Arms. Inspectors of Elections were James P. Grazioso, Chairman, R. L. Devoucoux, and Thomas W. Henderson. Bryan L. Murphy, Jr., chaired the Credentials Committee, serving with H. Lake Hamrick and Philip G. Saxton.

The Association is particularly grateful to a corps of volunteers who assisted the staff in Convention support: Norm Aubuchon, Scott Bedrosian, Scott Borchers, Cecil Brendle, Mark Connolly, Evie Dunn, Barbara Hunter, Chuck and Mary Lucas, Paul McLaughlin, Ann Monti, Dana Spears, Kerry Spears, Jessica Spence, Wann Spence, Ken Wilson, and John Zipp.

The 1987 Convention will be held at the Sheraton-Washington Hotel on September 14-17. ■

Flight Test/Propeller Lab Alumni

Flight Test and Propeller Laboratory personnel who served at Wright Field, Ohio, during World War II will hold a reunion in May 1987 at Wright-Patterson AFB, Ohio. **Contact:** Ralph Monroe, 1210 Park Newport, #125, Newport Beach, Calif. 92660. Phone: (714) 759-0111 (Flight Test). Lum Pleshek, 438 Silverdale Terrace, Dayton, Ohio 45440. Phone: (513) 426-5976 (Propeller Lab). George J. Burrus, 21 Lake Eloise Lane S. E., Winter Haven, Fla. 33880. Phone: (813) 324-2089 (general information).

POWs in Germany

Former prisoners of war who were held at Stalags Luft One and Three in Germany during World War II will hold reunions in May 1987. **Contact:** Robert L. Weinberg, 2229 Rock Creek Dr., Kerrville, Tex. 78028. Phone: (512) 257-4643. Philip J. Gibbons, 549 N. E. Eighth Ave., Deerfield Beach, Fla. 33441. Phone: (305) 427-1023.

Pilot Class 43-D Ass'n

Pilot Class 43-D "Delta Eagles" will conduct "Operation Falcon Land" on April 30-May 3, 1987, at Colorado Springs, Colo. **Contact:** Col. Donald A. Conner, USA (Ret.), P. O. Box 14572, North Palm Beach, Fla. 33408-0572. Phone: (305) 622-6852.

62d TCW/MAW

Personnel assigned to the 62d Troop Carrier Wing/Military Airlift Wing at Larson and McChord AFBs will hold a reunion on May 14-17, 1987, in Phoenix, Ariz. **Contact:** William D. Mitchell, 11207 S. Iroquois Dr., Phoenix, Ariz. 85044. Phone: (602)



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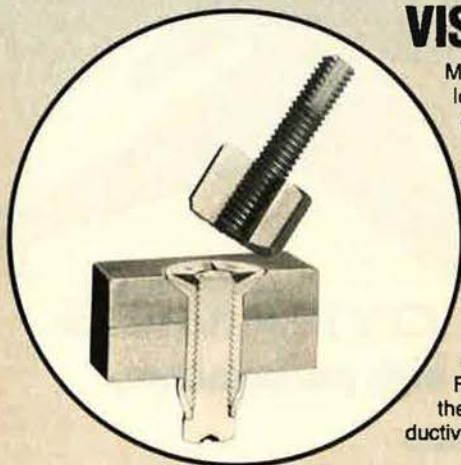
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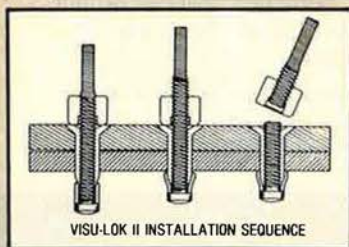
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63d Troop Carrier Squadron

Members of the 63d Troop Carrier Squadron, 403d Troop Carrier Group, will hold a reunion on April 21-23, 1987, at the Quality Inn in San Diego, Calif. **Contact:** Aron J. Tobiska, 31 S. Holland St., Lakewood, Colo. 80226. Phone: (303) 237-8995.

440th Troop Carrier Group

Members of the 440th Troop Carrier Group, which included the 95th, 96th, 97th, and 98th Troop Carrier Squadrons, will hold a reunion in September or October 1987. **Contact:** Lt. Col. William P. Asprey, USAF (Ret.), RD 1, Box 407, Newton, N. J. 07860. Phone: (201) 786-5975.

6901st Special Communications Group

Members of the 6901st Special Communications Group based at Zweibrücken, Germany, during 1957-61 will hold a reunion in the summer of 1987. Personnel from Electronic Security Command (formerly USAF Security Service) are also welcome. **Contact:** Ronald E. Howard, 508 Trenton Ave., Findlay, Ohio 45840. Phone: (419) 423-8017. Ron Gentile, 2412 Mohawk Ave., Woodridge, Ill. 60517. Phone: (312) 852-6213.

Class 42-D

Class 42-D members who attended primary training at LAMA, Avon Park, Fla., are planning to hold a reunion in the Washington, D. C., area in the summer of 1987.

Please contact the address below for additional information.

John Ferrara
6651 Little River Turnpike
Alexandria, Va. 22312

Phone: (703) 354-6724

Class 58-C

I would like to hear from members of Class 58-C, Bryan AFB, Tex., for the purpose of planning a summer 1987 reunion.

Please contact the address below.

John H. Cook
Rte. 1, Box 361
Charlotte Hall, Md. 20622

Phone: (301) 934-9202

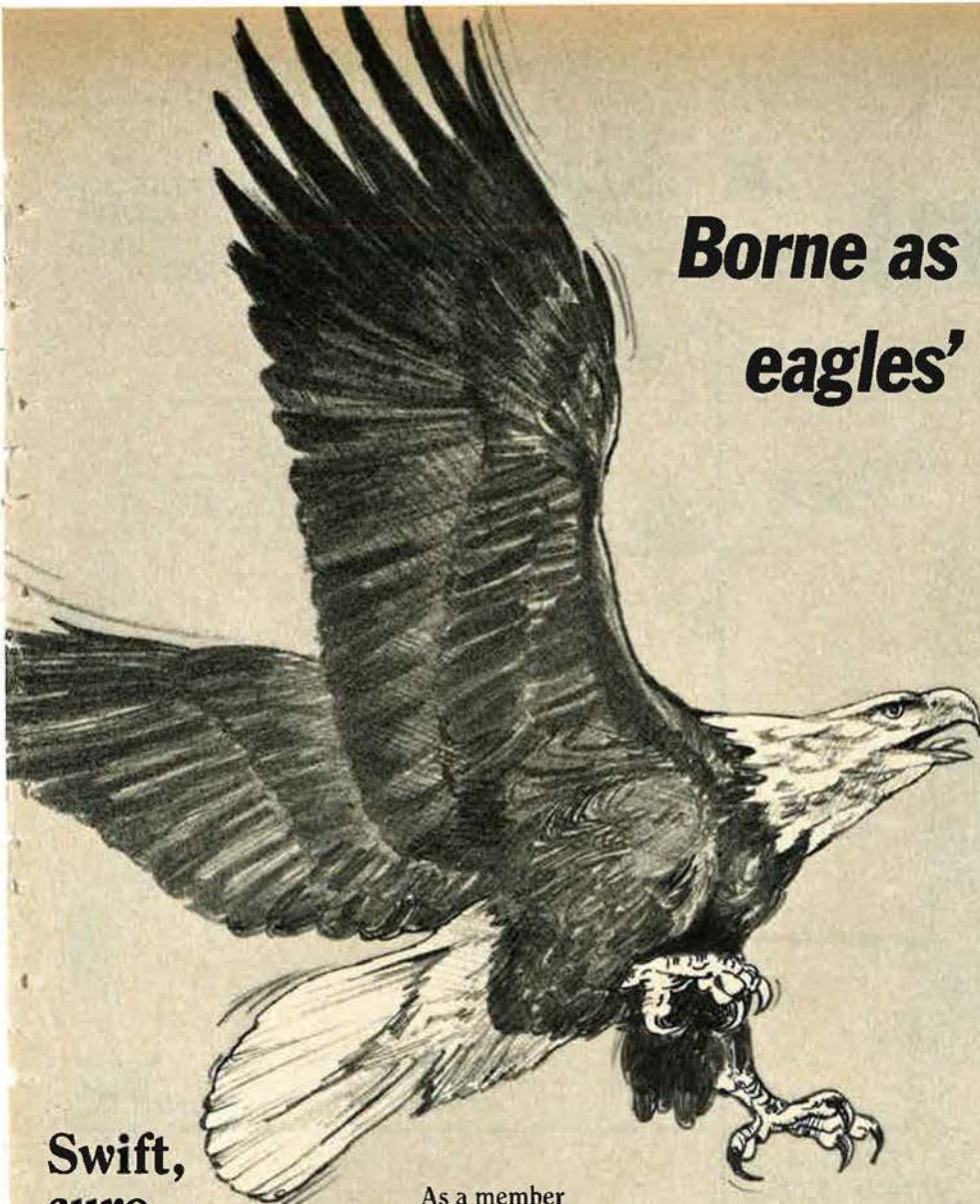
64th Airdrome Squadron

I am trying to obtain the names and addresses of former 64th Airdrome Squadron veterans for the purpose of organizing a reunion in 1987.

Please contact the address below.

William R. Pierson
3010 Greendale Dr.
Worthington, Ohio 43085

Phone: (614) 889-9507



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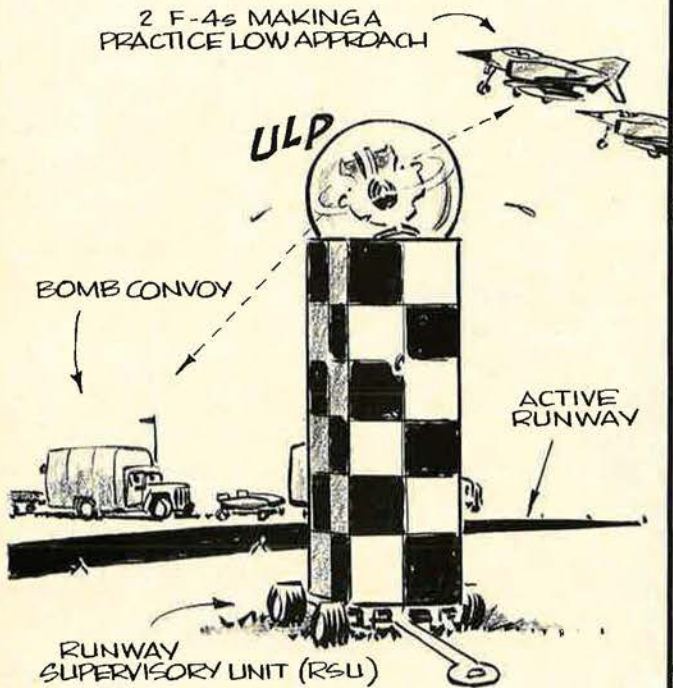
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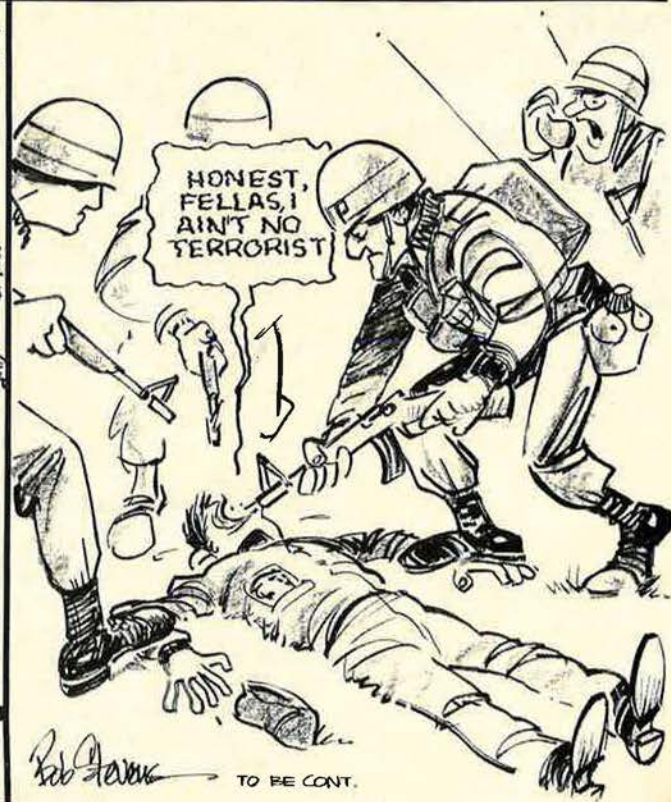
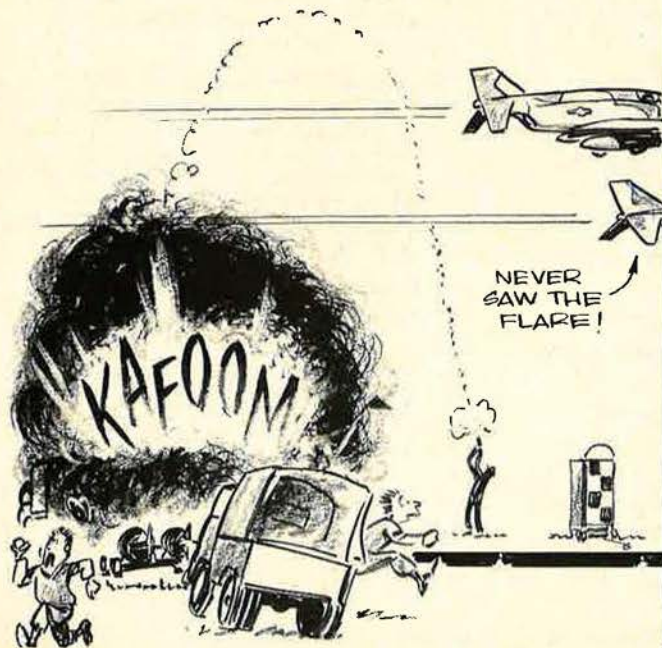
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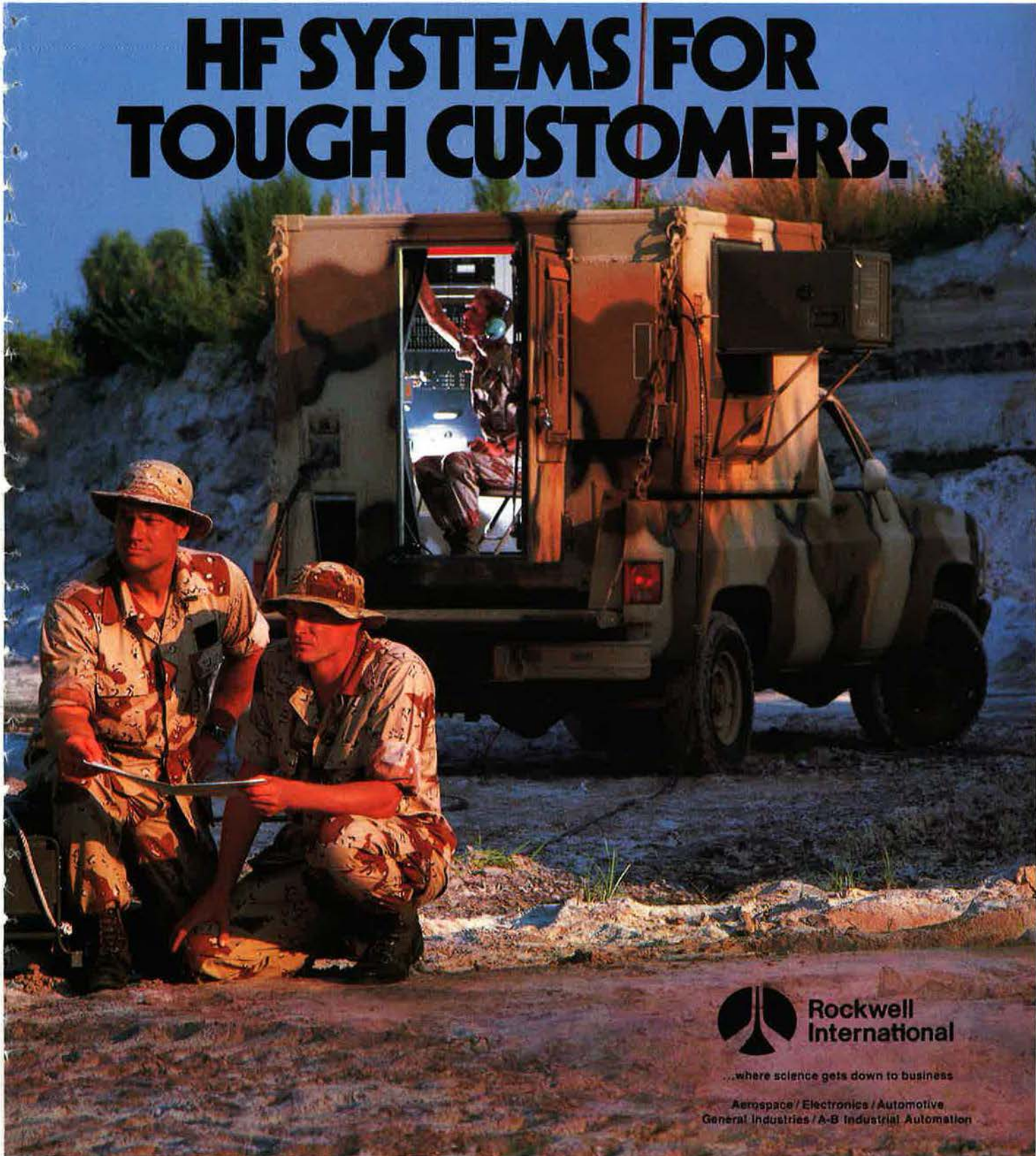
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