

AIR FORCE

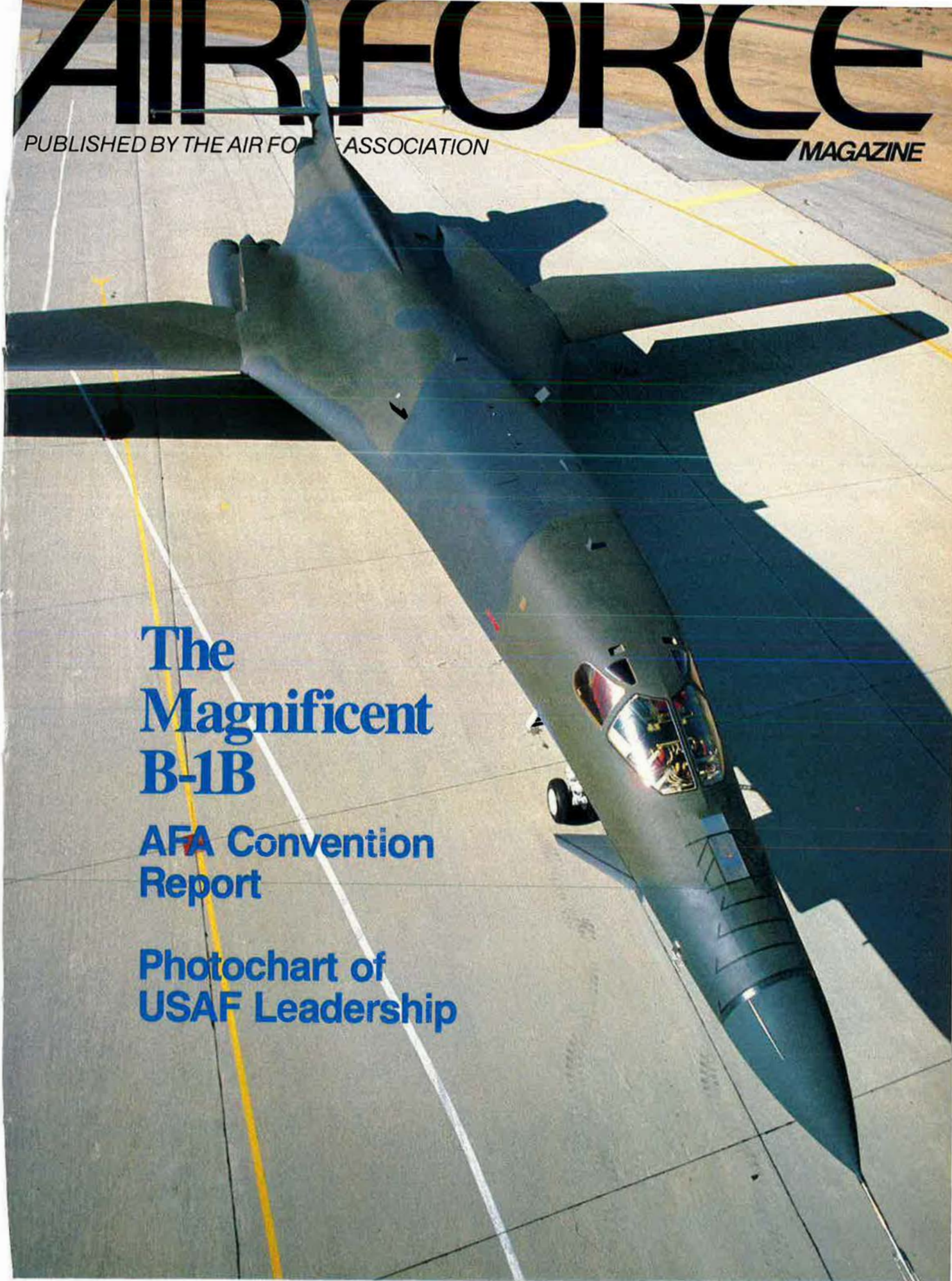
PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

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AFA Convention
Report

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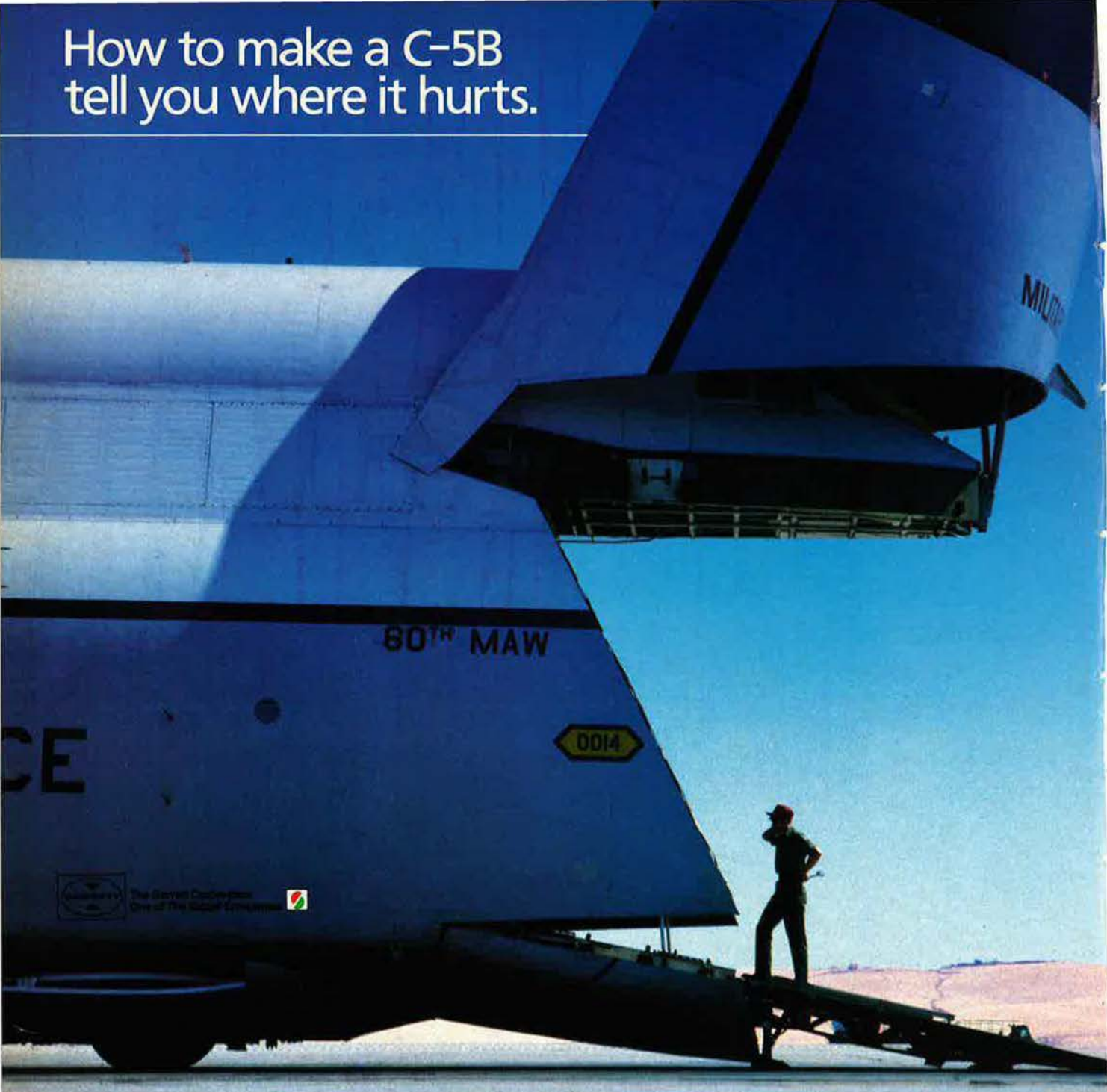
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About the cover: The Air Force's new strategic bomber—the B-1B—rolls out ahead of schedule. A special section on the "AFA Convention" begins on p. 86. (Photo by John C. Lewis)

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AN EDITORIAL

It Takes a Triad

IT is disturbing that the future of the strategic triad—a deterrent force composed of manned bombers, land-based ICBMs, and submarine-launched ballistic missiles—is in question just as a mutually reinforcing mix of forces has become more important than ever.

The rollout of the first B-1B bomber is a positive step, but the MX missile, central element in a modern strategic force, has been under heavy political and journalistic assault for many months, and congressional approval for its production is in some doubt. Those who oppose MX cite a variety of reasons for their opposition. These include perceptions of vulnerability and concern that it might annoy the Russians.

In September, this magazine reported that Soviet space stations and aircraft are using advanced synthetic aperture radar to detect and track submerged submarines. Translation of this technology into an operational antisubmarine capability is probably a decade or so away. But whether the breakthrough is by means of radar or from some other technology, the day of increased vulnerability for submarines at sea is coming, just as the ICBM force is unlikely ever again to be as invulnerable as our Minuteman ICBMs were through the 1960s and into the 1970s.

These developments make it timely to recall the rationale for the triad and to place some of the questions, including those about vulnerability of strategic systems, in proper perspective. The overall decrease that results from lowered survivability for individual systems is a cause for concern but not for alarm. A more relevant point is that it increases the requirement for a triad of forces.

A number of characteristics are desirable in a strategic deterrent force. Among these are fast response, flexibility, reliability, accuracy, effectiveness against hardened targets, mobility, high readiness rates, low operating costs, good command and control features, and survivability. No single component of the triad optimizes all of these, but each optimizes some of them.

Credibility of the US deterrent requires that hardened Soviet military assets be held at risk by our strategic force. Otherwise, the strategic balance becomes dangerously instable and the Soviet Union may be encouraged to exploit its advantage, most likely through power politics and attempts to intimidate other nations. As hardening technology advances, no component of the current triad, not even the MIRVed Minuteman III missiles, will put any significant share of the Soviet hard targets at risk. The MX would do so, however, and that is why its presence in the force mix is so important.

A greater degree of survivability for the ICBM force may be possible as US silo-hardening technology matures and as the small single-warhead ICBM, probably a mobile system, comes into service. A less vulnerable basing mode might be adopted for MX. It would be a mistake, though, to focus on survivability as the only significant characteristic of a strategic system, for that is not the case.

It is also a mistake to consider the individual components of the triad in isolation, because considerable mutual survivability accrues from the nature of the triad itself. It would be virtually impossible for the Soviets to attack all components of the triad simultaneously in an absolutely perfect first strike without triggering one or more of those components in time for them to react and retaliate.

Short of a modernized triad of strategic forces, the full range of characteristics and capabilities required for an adequate deterrent posture will not be available. And as comforting old realities give way to new realities and options, the synergism of deterrent forces can only increase in importance.

—JOHN T. CORRELL, EDITOR IN CHIEF



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THEODORE ROOSEVELT



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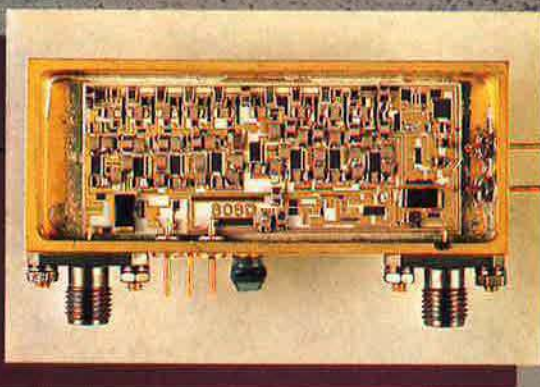
It is this vectored thrust capability that makes the

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.

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Survivable Submarines

With regular frequency, AIR FORCE Magazine and other Air Force-oriented publications cite the soon-to-come vulnerability of US strategic-missile submarines. These articles tend to appear whenever an Air Force strategic program encounters problems. By inference, the trouble-plagued Air Force program must be supported because the sea-based leg of the triad is "vulnerable."

Your "In Focus" column, "Penetrating the Sea Sanctuary," in the September '84 issue (p. 29) is published as the land-based MX continues to encounter delays and defeats in Congress. Citing "agreement" in the US intelligence community and a 1981 article in the Soviet press, the article builds the case that Soviet progress in synthetic aperture radar (SAR) and the new series of Soviet nuclear attack submarines (SSNs) threaten the US Navy's strategic-missile submarines.

While the US intelligence community is in agreement that the Soviet Union has carried out tests using SAR from Salyut manned spacecraft, there is *not* agreement that these tests are for tracking submerged submarines or that the Soviets are on the verge of an antisubmarine warfare (ASW) breakthrough.

Further, quoting the Soviet press can, at best, be misleading. For example, defense of the Soviet homeland against US SLBM attacks is the principal role of Soviet ASW efforts. Capt. 1st Rank A. Basov, a Soviet naval officer and doctor of historical sciences, wrote in *Voyenno-isto-licheskiy Zhurnal* in 1977, "The antisubmarine forces of the Soviet Navy are capable of solving the tasks facing them. They have the necessary systems for detecting and destroying them [US submarines]." A year later, Capt. 1st Rank B. Kiselev wrote in *Voyennyye Znaniya*, "Our ships are capable of successfully solving the most complicated tasks in combating submarines in any area of the world."

Are these statements any more or less credible than that cited from Dr. Nelepo about the possible effectiveness

of satellites in sighting submarines?

ASW is unquestionably the most difficult aspect of modern warfare. The ocean is a difficult medium for the transmission of energy. And the ocean is becoming more opaque as offshore oil drilling, recreational use, and other activities place more noise in the water. At the same time, submarines—US and Soviet—are becoming quieter and hence more difficult to detect in an increasingly difficult environment. These factors contributed to the recent Presidential Commission on Strategic Forces finding that sea-based strategic missiles score very high points for future effectiveness.

Soviet ASW is improving, and there is certainly the *potential* of improved Soviet ASW significantly threatening US missile submarines at some time in the future. The new Trident missile submarines will make Soviet ASW more difficult, as they are quieter than the missile subs they replace. Their missiles also have increased range, requiring the Soviets to search much greater ocean areas. And, of course, finding a submarine—like finding a bomber by radar—does not necessarily mean that you can kill it. The submarine may have active and passive defenses; an enemy weapon must still be brought rapidly to within some number of yards of the submarine.

As author Edgar Ulsamer stated

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after the provocative introduction to his article on how the Soviets are detecting and tracking nuclear submarines. "There is no indication that the Soviet Union is actually on the verge of deploying an operational system."

At this time, there is no known method—in development or deployed—for simultaneously locating and attacking a large number of missile submarines at sea. In contrast, we (and the Soviets) know how to detect and attack manned bombers, on their airfields and when they seek to penetrate airspace; we also know how to make a preemptive strike against fixed missiles (ICBMs).

Should the long-sought technological "breakthrough" come at some time in the future, it would probably take the Soviets on the order of a decade or more to deploy such a system. In that time, there are countermeasures that could be developed and deployed to enhance the survivability of American SSBNs.

The Soviets as well as the United States are placing a tremendous effort into ASW research and the deployment of ASW forces. But the Soviets appear to be sanguine regarding the continued viability of strategic-missile submarines, as they are placing an increasing portion of their own strategic striking power under the sea. They would be unlikely to do so if they saw an effective ASW system in the offing.

Today—and for the foreseeable future—the strategic-missile submarine provides the United States with the most survivable and, in several other respects, the most effective strategic deterrent force. Further, of the three strategic initiatives begun in the 1970s—the others being the B-1 and the MX—only the Trident survived the host of critics to come to fruition. The B-1 bomber, with reduced capability, is belatedly making its appearance, and the future of the MX is still far from being decided.

Significantly, improvement to the new Trident system is already under way, in the form of the more capable D-5 Trident II missile, while an effort to

identify future threats and requirements in this area has recently been initiated by the Department of Energy, with Navy support.

Norman Polmar
Alexandria, Va.

● *For more on US strategic force structure, see "It Takes a Triad" on p. 8 of this issue.*—THE EDITORS

Which Europe?

Jonathan Alford's "Which Europe Do You Mean?" in your September 1984 issue does an excellent job of defining the not-too-well understood concept of "Europe" and of putting it in simple, everyday terms. It is this lack of an identifiable European entity that forms the cornerstone of the lectures I deliver to various Air University and other PME institutions on NATO, the US, and Europe. There is, however, one aspect of Mr. Alford's article that is somewhat misleading, and I would like to make the following comment concerning it.

On page 157, Mr. Alford states that "it is high time that NATO looked again at force goals in light of the changing threat." He states further that NATO must determine its priorities and that a sense of *affordable* priorities was absent from the 1978 Long-Term Defense Plan (LTDP).

From 1978 to 1981, I was, together with a very personable and intelligent British Army colleague, Lt. Col. Christopher J. B. Nitsch, responsible for the formulation of the Allied Forces Central Region (AFCENT) Force Proposals. These proposals are the basis of and usually the verbatim beginnings of what becomes the NATO Force Goals.

The proposals Colonel Nitsch and I developed were very much "in light of the changing threat." Had they not been, they would not have been approved by Central Region Commander in Chief (CINCENT) General Ferdinand von Saenger und Etterlin. In fact, when it was decided by NATO that the individual LTDP measures would be defined by the applicable Force Goals, Colonel Nitsch and I sought and received permission from SHAPE to send our drafts to Central Region member nations and then to confer with them (a) to explain CINCENT's priorities and (b) to ensure that, whenever possible, these proposals were, indeed, affordable.

For the most part, the various national representatives were very cooperative, and many lent a hand in revising and reformulating some of the draft proposals. The one country that gave us the most difficult time was, unfortunately, the United States. For

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reasons unknown to me, the Pentagon seemed to have their own set of priorities for participation in the Alliance—regardless of what NATO's priorities were. This was graphically illustrated in my dealings with one Air Force staff officer who, having never been to Europe himself, smilingly told me, "We just don't see things that way over here!"

From my perspective as a former NATO staff officer and policy planner, I believe the NATO Force Planning process is an effective and viable system. The work that goes into it at all levels . . . is painstakingly thorough.

Unfortunately, there were Force Goals that dated from the early 1970s that had been pledged to by nations but that had remained unfulfilled as late as 1981. This is where the breakdown occurs. It is not the system that is at fault or that needs replacement. Rather, it is the attitudes and commitment of the member nations that participate in this process that need adjustment.

Lt. Col. Sheldon A. Goldberg,
USAF
Air War College
Maxwell AFB, Ala.

● *In fairness to Jonathan Alford, we believe that if Colonel Goldberg would reread Mr. Alford's article more closely he would discover that Mr. Alford is not "misleading." In fact, we believe that the Colonel would discover that they are largely in fundamental agreement. It should be pointed out that Mr. Alford was not discussing operational force planning for AFCENT; rather, he was addressing long-term strategic and political planning for the Alliance as a whole. For instance, Mr. Alford asserts that the Alliance should be able to decide whether Britain should devote more resources to the British Army of the Rhine or to the Royal Navy. This is surely force planning in a much broader—and less clear-cut—sense than that discussed by Colonel Goldberg. In fact, Mr. Alford's arguments share much with the sentiments expressed by Colonel Goldberg in his final paragraph.*—THE EDITORS

The Honor Code

After reading the "Viewpoint" column "Amnesty and the Code" in the September '84 issue of AIR FORCE

Magazine, I feel compelled to make a few comments on General Milton's article.

General Milton hit the nail on the head in his last paragraph, as far as this "old grad" is concerned. I, for one, am definitely "mad as hell" at both the suspension granted those who were determined to have cheated and at the amnesty offered those who would come forward and confess their sins.

The cheating took place on a Physics 411 exam, a senior-level course. The majority of those involved have spent four years under the Code. In my opinion, there was no excuse for their act.

In the early 1960s, administrative actions were taken that established "discretion" and "suspension" as ways to allow those whom a board of peers had determined had violated the Honor Code to remain in the Cadet Wing. These were initially set up to be used in only the most unusual circumstances. Through the years, it has gradually deteriorated to its present point, where those who violate the Code, directly and intentionally, by deliberately cheating on a senior final exam are being reinstated. And now "amnesty" is offered to any who may not have been caught.

Many fine young men with a real spirit of personal honor and an avowed dedication to the principles of our Honor Code have resigned from the Academy over the past twenty-eight years of their own volition as a result of violating the Honor Code. They, in turn, have honored the Cadet Wing by thusly showing their allegiance to the Code and their acceptance of its sanctions. Those who obviously do not share these values and this allegiance to the Code are being accepted into our ranks through suspension and amnesty actions.

In closing, I would like to leave some food for thought.

Isn't it a bit paradoxical that these administrative actions directly violate the toleration clause of the Code? After all, the administration is, in fact, telling the Cadet Wing, "You will tolerate those among you who cheat."

Is there any wonder that the Cadet Wing may doubt the seriousness with which the Honor Code should be taken?

With regard to the most recent administrative actions, does the end justify the means?

Lt. Col. James W. Brown III,
USAF (Ret.)
San Antonio, Tex.

I agree, down to the closing paragraphs, with General Milton's article

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in the September issue, "Amnesty and the Code." The concept of amnesty for Honor Code violators is outrageous, especially for cadets who have lived under the Code for almost four years. If integrity hasn't caught hold by that time, it surely never will.

Since when do we change the standards for people who no longer feel compelled to meet them? Have we given up strengthening the cadets to meet the standards, and must we now amend those standards to mollify the cadets?

Retaining the known violators because they repent or because they may represent only a fraction of the guilty parties smacks of lunacy. Would we turn loose three remorseful bank robbers because we failed to apprehend the other five? Next thing we know, we'll be asking the cadets who are granted amnesty or suspension to help modify the Honor Code so that it's "acceptable."

Yeats was right: "Things fall apart; the center cannot hold. . . ."

Jerry Garber
San Antonio, Tex.

In your AIR FORCE Magazine for September 1984, I read with considerable interest the article "Amnesty and the Code." It is disturbing that a cheating scandal occurred at the Air Force Academy and even more disturbing that the toleration clause was ignored by a very large number of cadets. . . .

First and foremost, it is obvious that the Air Force Academy has adopted a multiple-sanction system.

I once studied the honor system at the Virginia Military Institute and had the opportunity to look into other honor systems at some of the oldest and most prestigious educational institutions in the United States. In every instance that I can recall where the system had gone from a single sanction (expulsion) to a multiple-sanction system, it was very obvious that weaknesses had begun to develop in the system.

To the VMI cadet, it is ludicrous to think that one can lie, cheat, or steal "just a little bit." It is their experience—and it has been rather abundantly demonstrated—that a cadet who will lie, cheat, or steal on one occasion is very apt to do so on subsequent occasions. They do not believe that one can be "a little bit dishonorable" any more than one can be "a little bit pregnant."

Secondly, it appears that the Academy's honor system belongs, at least administratively, to General Scott or to the administration. This, in my opinion, is a fundamental shortcoming.

At VMI, the honor system belongs to the cadets, and their pride for it, their support of it, and their insistence upon adherence to it stems from this fact. . . . Even in as highly motivated an environment as the Air Force Academy, there is still a certain "we-they" relationship between the cadets and the administration. If the honor system is the property of the administration, then obviously it becomes a part of that "we-they" syndrome.

While this will sound harsh and unrealistic to many, I do not believe that an honor system really worth its salt can exist with multiple sanctions or if it is administered by other than those who are its subjects. I would strongly suggest, therefore, that the Academy either abandon the honor system or turn it over to the Corps of Cadets.

What, however, do you do with those tainted nineteen? My heart goes out to them, but when you can violate a system with only a slap on the wrist (and, yes, I feel that postponing graduation is only that), that system must lose its efficacy. I recognize that hundreds of thousands of dollars have been expended on the training given these cadets, but that should not compromise the concept of "honor." . . .

C. M. A. Rogers III
Mobile, Ala.

Code Overload?

The September 1984 issue of AIR FORCE Magazine was a welcome relief. It was the first time in seven years that I even partially agreed with General Milton in his "Amnesty and the Code."

Having said that, I must comment further. As one assigned to the USAF Academy for four years, I have defended the Honor Code and presently defend it. However, some of the graduates of the military academies, including General Milton, "overload" the function and value of the Honor Code. Despite its critical value, theoretically, a cadet can honor the Code and still graduate as an educated barbarian! Also, a few "ethical" cadets have been asked to resign for trivial reasons not necessarily indicative of their ethical orientation.

I hope General Scott and the leaders of the USAF Academy will not myopically center on the Honor Code but will use all the criteria of assess-

ing ethical integrity: conduct, attitudes toward mistakes, regulations, Honor Code, personal goals, aptitude, academics, sportsmanship, and total behavior—not just lying, stealing, cheating, and toleration.

The Honor Code has value, but let's not overload its function and value, as General Milton does.

Lt. Col. William J. Dendinger,
USAF
Montgomery, Ala.

Round the World

Re: The article "Round the World" in the September '84 issue of AIR FORCE Magazine.

We hadn't seen each other for two or three days, so my good friend and neighbor Henry Ogden phoned this morning to tell me that "it isn't so." Leigh Wade is not the last surviving member of the 1924 round-the-world crew, I am happy to report.

General Wade's crewman, Hank Ogden, may not be the picture of health, but he still gets around and is most assuredly our beloved local hero. So, it was a shock for him to read that he had been written off (p. 184).

An occasional reporter still gets to see Hank once in a while. He can be reached at 31516 Flying Cloud Dr., Laguna Niguel, Calif. 92677. He would love to hear from any members of AFA.

Richard S. Croker
Laguna Niguel, Calif.

● *Obviously, we should have reported that General Wade was the last surviving pilot of the 1924 round-the-world flight. Our most sincere apologies to Mr. Ogden!*

While we're on the subject of circumnavigation, we should point out that Brooke Knapp has broken her own world record twice since the February 1983 flight that we reported on in the September issue. Breaking the February 1983 record later that year, she went on to smash that record last February in a time of forty-five hours, thirty-two minutes, and fifty-three seconds, flying a Gulfstream III business jet named American Dream II.—THE EDITORS

Oops!

Just a few days ago, I received my copy of the September '84 issue of your very fine magazine, and I started to "dig in."

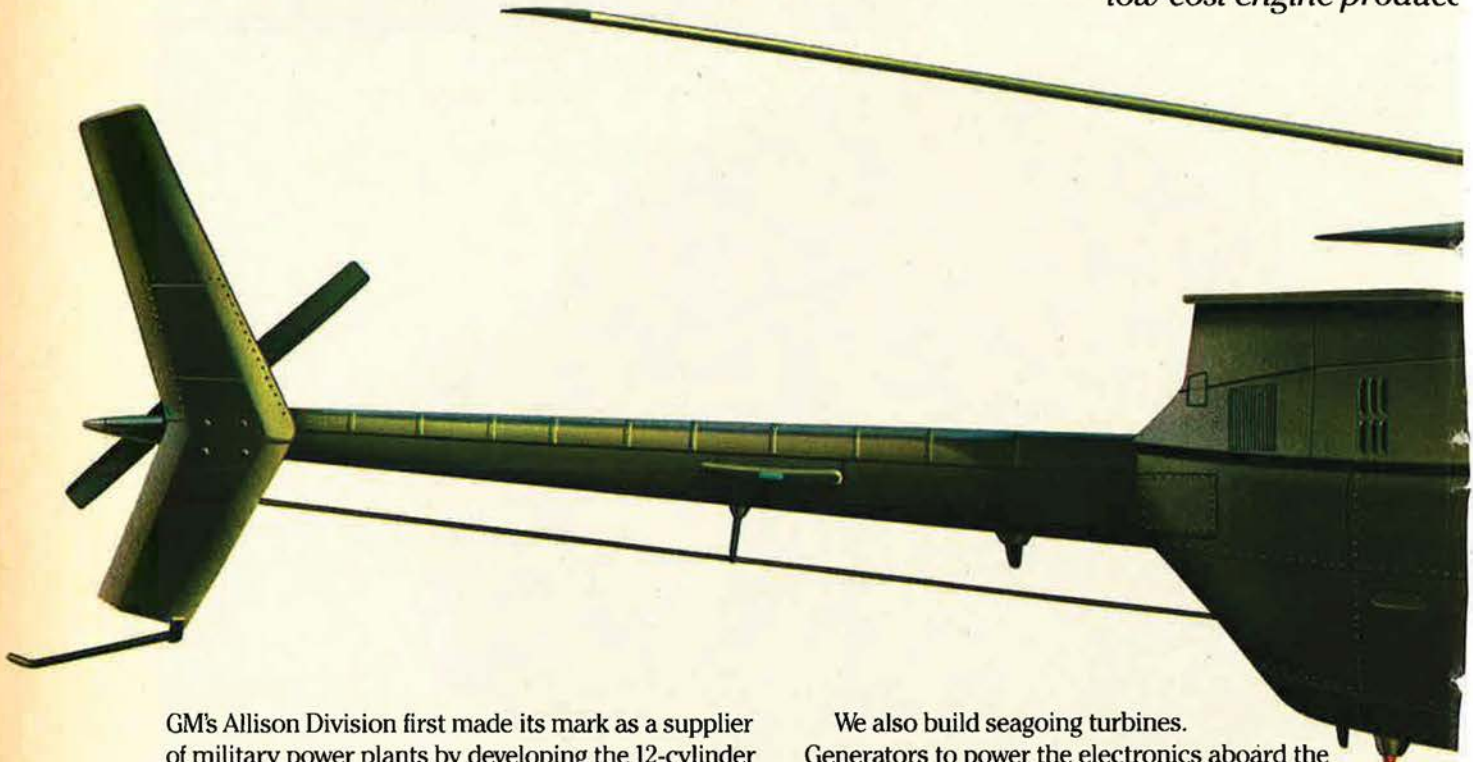
Although it might be considered insignificant, I found an error in your magazine in the article "Remounted and Ready" by Jon Donnelly. On pages 198 and 199, the interesting photo of the USAF Thunderbirds is printed upside down. If you look at the

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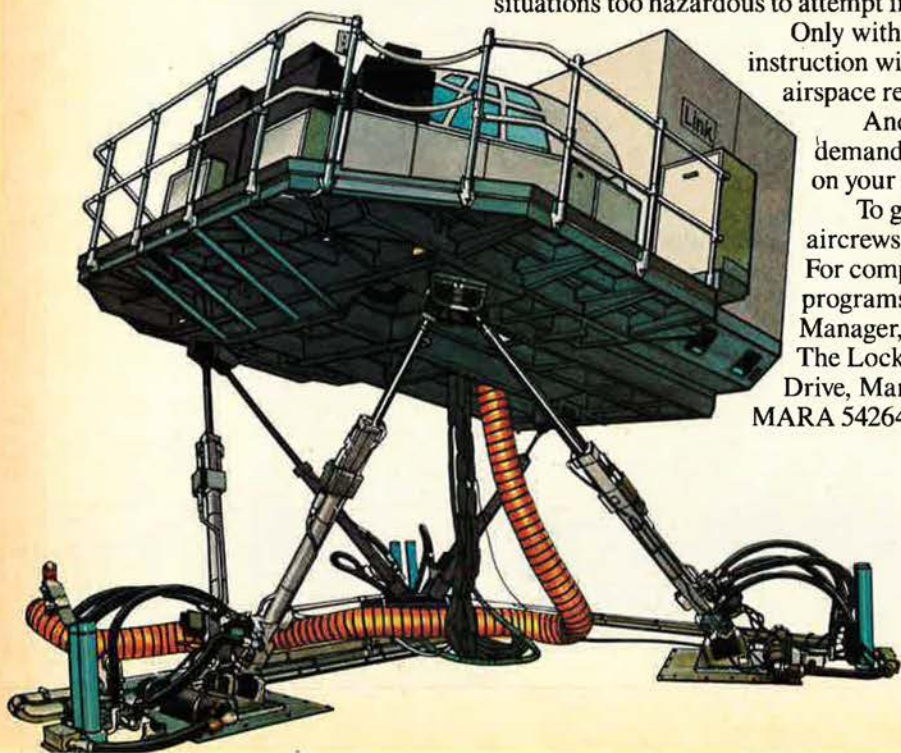
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aircraft, it's impossible for the aircraft that is flying "upside down" to have sunlight shining on its upper fuselage. Also, please note the hose of the oxygen mask hanging "up" in aircraft No. 5. I probably wouldn't have found that mistake if I hadn't seen a show by the famous Thunderbirds this year in Germany at the Ramstein Open House.

I would like a chance to say "thank you" for publishing such an interesting magazine and to the Thunderbirds for their shows here in Europe. I've been really impressed by their accurate flying and their interesting show.

Andreas Hunold
Northeim, West Germany

I thoroughly enjoyed reading Jon R. Donnelly's article, "Remounted and Ready," in the September 1984 issue but feel that a correction is necessary.

On pages 198 and 199, the photo depicts a very demanding maneuver, which the caption describes as "an opposing knife's edge pass." Here are the discrepancies.

One: The photo depicts a "Calypso pass," not an opposing knife's edge pass. Two: The photo is upside down. The current Calypso pass has aircraft No. 5 flying the lead solo, or upside down position, not the No. 6 aircraft.

As a member of the USAF Air Demonstration Squadron "Thunderbirds," I feel a correction is necessary. SSgt. Sheldon M. Fluke, USAF Nellis AFB, Nev.

Thunderbirds in Europe

I was one of the many thousands who witnessed the Thunderbirds F-16 display during their recent European tour (see "Remounted and Ready" in the September '84 issue).

The team had made a couple of alterations to their routine in light of the less restrictive regulations in Europe governing airshow flying. However, it was the opinion of many here that their show lacked the impact and polish of a Red Arrows, *Patrouille de France*, or *Frecce Tricolori* performance. The British, French, and Italian teams ensure that at least one aircraft is always presented to the crowd line, even when the main formation is "offstage" in a turn maneuver.

I'm sure that at least part of the problem for the Thunderbirds lies in the very strict FAA regulations for airshows, which govern such criteria as the minimum height of display passes and the distance that aircraft must be flown from the crowd line. For instance, I understand that these rules prohibit display aircraft from pointing toward the spectators during any part

of the routine. In Europe, it is generally permissible to perform such a maneuver as long as the aircraft's height and momentum are sufficient to clear the crowd in the event of engine or other malfunctions.

We have a great many airshows in Europe, and a number of display pilots have been killed over the years. But despite the less stringent rules, there have been remarkably few incidents involving the injury or death of spectators. Maybe the FAA is overcautious.

By the way, either the Thunderbirds have invented a new and most powerful form of artificial lighting for their display—or you printed the shot of the opposing pass upside down!

Chris Pocock
Uxbridge, Middlesex
UK

Ouch!

Reference the feature "Hot Wing" in your September 1984 issue (p. 126).

One picture is worth a thousand words, right?

Wrong!

The photo of the fifteen birds lined up at Kadena spells only one thing—ouch!

It's either a trick of the lens, or dispersal is passé. I hope it's not the latter.

Lt. Col. Jack Taylor,
USAF (Ret.)
Allentown, Pa.

Jimmy Castro

On page 216 of the September 1984 issue of AIR FORCE Magazine, you published a photograph of Air Force Association Executive Director Russ Dougherty giving a membership in AFA to Jimmy Castro, who has sold newspapers at the intersection of 17th Street and Pennsylvania Avenue for more than thirty years. The final sentence in the caption said, in part, "The photograph of General Doolittle . . . was immediately hung by Jimmy, who is a Coast Guard veteran."

Manuel "Jimmy" Castro was an ammunition passer on my team on the five-inch gun on the fantail of the USS *Aquarius* for most of World War II. The USS *Aquarius* was an attack transport that participated in the D-day invasions of the Marshall Islands, Guam, Saipan, Palau, Leyte, Iwo Jima, and Okinawa. The ship was manned by

Coast Guard personnel, with one Public Health Service surgeon aboard. . . .

The USS *Aquarius* was a "lucky" ship. During Castro's tour of duty, the USS *Aquarius* was commanded by Capt. R. V. Marron, now deceased, and Capt. (later rear admiral) Ira E. Eskridge, who now lives in Olympia, Wash.

I never saw Jimmy Castro after I left the USS *Aquarius* until 1971, when I was on two-weeks' active duty for training on General Lewis B. Hershey's Selective Service staff in Washington. I was then a Coast Guard Reserve captain and bought a newspaper from him, and he recognized me immediately. As he sold newspapers left and right, we renewed acquaintances and memories of days on the USS *Aquarius*.

I still go to Washington to the mid-winter meeting of the Reserve Officers Association. Invariably, I try to stop and say hello to a great sailor who, like me, developed as a member of the fighting team on the Coast Guard-manned USS *Aquarius* during World War II.

Capt. Russell E. Sullivan,
USCGR (Ret.)
Pensacola, Fla.

On the Way With JTIDS

As a former OSD program monitor for JTIDS, I was most pleased to read in TAC General Loh's letter (see "Air-mail," p. 8, September '84 issue) that the Air Force is the opposite of "cool to JTIDS" (as alleged in James W. Canan's article, "Fast Track for C³I," July '84 issue). General Loh's description of the Air Force's current deployment of Class 1 (command/TDMA) terminals aboard AWACS and ground C² centers and plans to upgrade to new Class 2 (tactical/TDMA) terminals for both AWACS and C² centers and F-15s shows an unfolding of plans that have long been advocated by OSD and Air Force JTIDS supporters.

On the other hand, when the Air Force's program actions during the years 1979 to 1983 are considered, then Mr. Canan's statements were not incorrect. However, I believe all parties can take satisfaction from the present Air Force position and from its implications for the future.

JTIDS, as it proves itself in more environments and on more platforms, should gain increasing acceptance as a routine way of conducting operations. It will distribute user-oriented information (rather than "data") from potentially all participating sensors and communications nodes in an area to those who need it, when they want it. As the Navy and United King-

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dom have long realized, this offers a manifold increase in general efficiency while reserving capacity and use of those vital AJ voice links for the "dynamic combat engagements in the teeth of jammers" to which General Loh refers.

Two further comments with respect to both articles. As the Army will be using the same Class 2 terminal as the Air Force, opportunities beckon for increased Air Force-Army interoperability via JTIDS during air defense and close support operations, in accordance with airland battle concepts.

Also, equipment or "hardware" interoperability with the Navy should indeed be possible via the basic TDMA channel that all Navy JTIDS terminals should have. However, message or "software" interoperability will prevail only when all the services are using the TADIL-J joint message standard, as referenced by the Navy's Hal Kitson in Mr. Canan's July article.

In the meantime, I trust that the Air Force and all other JTIDS participants are indeed on their way.

Col. Jonathan Myer,
USAF (Ret.)
Alexandria, Va.

The Warranty Law

Your sidebar "To Warrant or Not to Warrant?" (see p. 57, August '84 issue) contains a number of inaccurate or misleading statements about the recently enacted law requiring the Secretary of Defense to obtain warranties for the weapons our armed services buy.

There is little doubt that some action must be taken to eliminate unnecessary spending in the military budget. David Stockman, Director of the Office of Management and Budget, estimates that thirty percent of the Pentagon's budget is wasted. [Now-retired] Air Force Gen. James Mullins recently told Congress that at least twenty percent of the Air Force's budget could be used in more productive and meaningful ways if the reliability of its weapons were improved. Air Force analyst Ernest Fitzgerald recently told a Senate committee that he had "never seen a weapon whose cost could not be cut by thirty percent" through more efficient management. Finally, the Grace Commission said in its report that it believed that more than \$90 billion in waste could be cut over three years from the defense budget without harming readiness.

The language of the warranty law is simple and straightforward. It requires the Department of Defense to obtain a warranty from a defense con-

tractor that guarantees both the performance and workmanship of their product. Should a defect be found, the manufacturer must fix the problem at no charge to the taxpayer. The Secretary of Defense may waive this requirement in cases where he believes a warranty would not be cost-effective or in cases involving the national security.

Contrary to the assertion in your article, there are currently no exemptions in the law for weapons costing less than \$100,000 or with total procurement costs of less than \$10 million. That is one of a number of proposed revisions in the warranty law that was included in the Senate version of the FY '85 Defense Authorization bill. Another Senate change would exempt the first year or the first ten percent of production of any weapon, whichever is less. In addition, the Senate amendments would only require those aspects of a weapon system's performance that are judged by the Secretary of Defense to be "essential" to be warranted.

I strongly support the warranty law as it is currently written. It seems that each day's newspaper carries a new story about shoddy workmanship or substandard performance of a new weapon system. Most recently, questions have been raised about the performance and quality of the F-14 fighter, the F/A-18 fighter-bomber, the AMRAAM and Phoenix missiles, and the DIVAD anti-aircraft gun.

The brave men who serve in the armed forces have a right to expect their weapons to perform as promised. In addition, the American taxpayers have every reason to expect that their tax money is being spent in a responsible and cost-effective manner.

I am amazed that the warranty law has caused such a controversy: Why is it so unreasonable to require that a DIVAD gun will shoot at airplanes and helicopters rather than exhaust fans in nearby buildings, as the DIVAD has done in recent tests? Why is it so unreasonable for McDonnell Douglas to guarantee that they can build the F-18 so that the tail section does not crack under normal use conditions as a result of design deficiencies, as has happened in both American and Canadian F-18s? Obviously, it is not. If such performance and quality problems

arise, it should be up to the manufacturer, not the US taxpayer, to fix the problem.

The warranty law is designed to protect the interests of taxpayers and those in the military. Contrary to claims by the opponents of the law, it will not inhibit technological innovation, impact negatively on small businesses, and unreasonably slow the procurement process.

The degree of technological innovation built into a weapon is irrelevant if that weapon cannot perform adequately under real battlefield conditions. The warranty law requires only that defense contractors have enough faith in their product to back it in the same way that companies that build consumer products guarantee their products.

Small businesses will benefit from the warranty statute. Many small businessmen have contacted me to tell me that they believe the warranty statute will, for the first time, allow them to compete for defense contracts because they can now offer better, more comprehensive warranties than their larger competitors.

You are correct that warranties are not new. Most recently, the Air Force negotiated an agreement with General Electric to guarantee the performance of engines it will build for F-16 fighters. Air Force officials estimate that this warranty will save taxpayers between \$2 and \$3 billion over the life span of the engines. This is a clear indication of the benefits that can be derived from a strong warranty law.

Rep. Mel Levine (D-Calif.)
Washington, D. C.

● We reported incorrectly in our August issue that the warranty law exemptions discussed by Congressman Levine were incorporated in the FY '84 Authorization Act. These exemptions have been, however, incorporated in the FY '85 Defense Authorization bill, which was signed into law by President Reagan. The reasons for the warranty exemptions were discussed in detail in our article.—THE EDITORS

Two Words

Bob Stevens has done a lot of marvelous illustrations in his life, but with his "Thanks, Buddy," which appeared in the "There I Was . . ." in the August '84 issue of AIR FORCE Magazine, he has put himself in a class with Bill Mauldin. And that's a very exclusive club.

For readers who don't know Bob, let me say that Colonel Stevens was a P-47 driver during World War II. The cap in his hand is the P-47 Associa-

tion cap, and the bag hanging from his shoulder has the Association legend on it.

Poignant is the word for the panel. It touched me very deeply. And it said it all in two words.

Harvey Victor
Woodland Hills, Calif.

Military Retirement

For many years, I have read Air Force Magazine and have noticed that ninety percent of the writers in your "Airmail" section are apparently not interested in the proposals that are now being made in the halls of Congress as pertains to service retirement benefits. The officer corps feels that there is little danger in what Rep. [Les] Aspin is likely to hammer through Congress, the effect of which will be disastrous to enlisted personnel who have retired. The future of our entire defense posture could be damaged, especially in regards to recruiting.

Society is looking for a scapegoat, and what weaker link is there than an attack on the retirement system of the armed forces? The following quotation . . . fits the mood of our times: "In time of danger, God and soldiers are held in high esteem, but when danger passes, both God and soldiers are slighted."

Don't wait too long. There is nothing easier than putting aside a letter or decision and saying, "Let it answer itself." There is a time when each and every one of us has to face up to responsibility and to speak up and let our elected representatives know how we feel, by petition in each and every state. Whether or not you are articulate, now is the time to petition your government, stating your indignation—where it counts—in the halls of Congress. If enough ears are reached, the message will come through loud and clear.

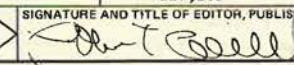
Remember, bills are passed by attaching them to other business and sneaking them through. Representative Aspin is no novice in his profession. Beware.

CMSgt. Alfred B. Arnold,
USAF (Ret.)
Massapequa, N. Y.

• For more on the military retirement system, see AFA's Policy Paper on defense manpower issues, "People Are the Priority," on p. 104 of this issue.—
THE EDITORS

B-29 and B-69

We are in the process of developing an Air Museum for Robins AFB, Ga., and recently acquired two aircraft for static display about which we have

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only limited historical information. If any readers can help us to trace the lineage of these two birds, we would greatly appreciate it.

A B-29B, s/n 44-84053, was recovered from Aberdeen Proving Ground in 1983. The Simpson Historical Center indicates that all service records were turned over to the Army in 1956. We are seeking any information regarding its assignments prior to that time. Photos would also be very helpful.

The second bird is an RB-69A, the Air Force version of the P2V. Eight were assigned to USAF, but their duties remain somewhat of a mystery. Again, we are interested in learning of their assignments and in obtaining

photos showing proper markings. The B-69 acquired by Robins is really a P2, but we hope to mark it correctly to represent the B-69.

We will promptly return any documents or photos lent to us.

Herbert E. Eschen
Museum Project Officer
WR-ALC/XRS
Robins AFB, Ga. 31098

1st Fighter Squadron

The 1st Fighter Squadron is back on line! It was activated on January 1, 1984, was redesignated the 1st Tactical Fighter Training Squadron, and is the first F-15 squadron at Tyndall AFB, Fla.

The squadron was originally con-

stituted as the 1st Fighter Squadron on October 5, 1944, and flew P-47s until inactivated in 1946. The squadron then became the 1st Fighter-Day Squadron, flying F-86s at George AFB, Calif., until 1956. Redesignated the 1st Tactical Fighter Squadron, the unit was equipped with F-100s until it was once again inactivated on March 15, 1959.

We would greatly appreciate any information, photos, memorabilia, etc., associated with this unit. A roster of former personnel is also being established. Please contact the address below.

Lt. Col. Stephen E. Nichols,
USAF
Commander, 1st TFTS
Tyndall AFB, Fla. 32403

Phone: (904) 283-3281
AUTOVON: 970-3281

Boeing WB-47E

I am gathering information regarding Boeing WB-47E, s/n 51-7066. Recently, in an effort to divide up the maintenance on outdoor displays at the Red Barn Museum of Flight, I became the crew chief of our WB-47. This aircraft has been on the Boeing field since the late 1960s, but I know next to nothing about her history.

I would like to communicate with former flight crews, ground personnel, or anyone who crossed paths with 066 during her active service life. Any photos would, with the owner's permission, be copied for the Red Barn Museum and returned with all possible haste. This aircraft was with the 321st and 70th Bomb Wings, but, beyond that, it's a large blank. What other groups gave her a home either before or after her conversion to WB status? . . .

Among the items I would like to find for "my" airplane is a serviceable sliding canopy. Fifteen-plus years of outdoor weather have crazed the glazing to the point that it detracts from the overall appearance of the airplane. Does anyone have a B-47 canopy out in the back under the grape arbor?

I invite anyone associated with this fine old gal to please feel free to come visit her at her new home in the Red Barn Museum of Flight in Seattle, Wash. I know she'd like to visit with you.

William R. Downing, Jr.
P. O. Box 513
Auburn, Wash. 98002

33d TFS

The 33d Tactical Fighter Squadron will activate soon at Shaw AFB, S. C., flying the F-16 Fighting Falcon. We would like to hear from former 33d members who could possibly help us

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recover and document the squadron's past history.

We are interested in aircraft photos (the older the better), original squadron emblems, and other historical items. All material sent will be photocopied and returned to its owner.

Please contact the address below.

Norm Taylor
114 Wildwood Dr.
Florence, S. C. 29501

Phone: (803) 665-2380

93d Bomb Group

Some of us veterans of the 93d Bomb Group of the wartime Eighth Air Force have been talking over a plan to set up a memorial at Hardwick, the old base. Recent visits show that there is not much left to remind anyone of "Ted's Flying Circus."

Right now, the only honor paid to the group is by David Woodrow, who farms the land on which the base stood and who keeps both the old base flag and a new American flag flying every day. John Archer, a local historian, has kept extensive records and mementos. David is very willing to help with the space for the memorial, and both men are enthusiastic about the project.

However, it takes money to do anything of this sort. Our plea is for donations from former 93d members or from anyone wishing to keep alive the memory of the historic bomb groups. We have a small fund started and wish to expand as soon as possible since we are attempting to emplace the memorial by June 1986.

Please send donations to the address below.

93d Bomb Group Memorial
Project
Charles Weiss, Treasurer
21 Moran Dr.
Waldorf, Md. 20601

Colonel Gabreski

I am seeking information on Col. Francis S. Gabreski from anyone who served with Colonel Gabreski during World War II or Korea or at any time during his military career.

If you served with Colonel Gabreski or know someone who did, I would like to hear from you. Please contact me at the address below.

Waller A. Hurtt
6099 S. Elati St.
Littleton, Colo. 80120

91st AREFS

The 91st Air Refueling Squadron is gathering photographs, stories, and any other memorabilia of its history.

We are seeking the assistance of former members of the 91st AREFS in developing a squadron history from activation with KB-29s in April 1950 at Barksdale AFB, La., to the present day at McConnell AFB, Kan., flying KC-135Rs.

We would greatly appreciate the use of any material and would gladly return it upon request. Please contact the address below.

Capt. Peter M. Wilson, USAF
91st Air Refueling Sqdn.
McConnell AFB, Kan. 67221

FACs at War

Our book on Forward Air Control is progressing nicely, assisted by responses to a letter published in *Air Force Magazine* last year. We need additional recollections, reminiscences, and photographs from FACs, especially accounts of your most interesting missions.

If there is any material that could be loaned on a temporary basis, we would copy it and return it immediately. Any items used, of course, would be fully credited.

We appreciate everyone's interest in this project and look forward to the publication of "Hit My Smoke." Please contact the address below.

Jan Churchill
727 Spenrock Ave.
Chesapeake City, Md. 21915

38th Bomb Group

I was a pilot with the 38th Bomb Group, Fifth Air Force, from 1947 to 1949 at Itami AB near Osaka, Japan. I need to know the tail markings, logo, colors, and other distinctive markings of the A-26 Invader in 38th BG livery.

Please contact me at the address below.

Henry W. Cherrington
The McLean House
6800 Fleetwood Dr., #1121
McLean, Va. 22101

Col. Jack Broughton

Ever since reading *Thud Ridge* by Col. Jack Broughton, I have developed a keen interest in the man.

Can anyone tell me where I can read more about him and his exploits, particularly his involvement in the "Turkistan Incident"?

I would also like to build a model of his "Thud." Any information regarding the markings of this aircraft would be deeply appreciated.

Thomas C. Robison
11246 N. 400 W.
Roanoke, Ind. 46783

35th TFS

The members of the 35th Tactical Fighter Squadron are attempting to upgrade our unit history program. We would appreciate any information or memorabilia pertaining to the 35th Squadron "Panthers."

The 35th originated in 1917 as the 35th Aero Squadron and was redesignated as the 35th Pursuit Squadron in 1923. During World War II, the 35th flew P-38s, P-34s, and P-40s as the 35th Pursuit Squadron and as the 35th Fighter Squadron after 1942. During the Korean conflict, the 35th flew F-80s and F-86s as the 35th Fighter-Bomber Squadron. The 35th is currently flying F-16s as members of the 8th Tactical Fighter Wing "Wolfpack" at Kunsan AB in Korea.

The squadron will return any borrowed items upon request. Please contact the address below.

Lt. Col. Ron Vraa, USAF
35th TFS/CC
APO San Francisco 96264

Air-to-Air in SEA

We are two aerospace engineers who are doing research for a book on air-to-air combat experiences in Southeast Asia. Specifically, we are interested in firsthand experiences of aerial engagements between F-4s and MiGs.

If you have such experiences that you wish to relate, we would like to hear from you. Please contact the address below.

William G. Holder
William D. Siuru, Jr.
3811 Berryleaf Ct.
Dayton, Ohio 45424

Phone: (513) 233-0924

AFROTC Det. 290

AFROTC Detachment 290 at the University of Kentucky and the Gen. Russell E. Dougherty Squadron of the Arnold Air Society are dedicating a plaque to commemorate graduates killed in action during the Korean and Vietnam Wars.

If you have friends or relatives who received their commission through the University of Kentucky and who were later killed in action in Vietnam or Korea, please let us know. Include full name, grade, and home town, if known. Any other information regarding these airmen would be greatly appreciated.

The remembrance of our fallen comrades must continue. Please send any information to the address below.

Cadet Col. G. T. Roberts
AFROTC Det. 290
University of Kentucky
Lexington, Ky. 40506

491st Bomb Group

I am attempting to find information concerning the 491st Bombardment Group and, specifically, the 854th Bomb Squadron of that group. This group was assigned from May 1944 to August 1944 to the 95th Bomb Wing and from August 1944 to April 1945 to the 14th Bomb Wing of the Eighth Air Force in England.

I am looking for the following specific information: 854th Squadron histories, especially for September and November 1944; 2d Bomb Division mission reports (Field Orders #464 for September 18, 1944, and #529 for November 26, 1944); and Eighth Air Force daily summaries for those two days. (The mission on September 18 was a supply drop to airborne troops in Holland; the November 26 mission was a raid on Misburg, Germany.)

Any information as to where, how, or who I may contact to secure this information would be appreciated.

Charles N. Haney
8292 E. Lehigh Dr.
Denver, Colo. 80237

Rose's Beau

The island of Makin in the Gilberts was home to the men of the Army Air Forces' 41st Bombardment Group during the spring and summer of 1944. Sometime during that period, W. Robert Moore, a correspondent for *National Geographic* magazine, photographed *Rose's Beau*. She was a B-25 Mitchell bomber with seventy missions to her credit. This incident is all that spares her the anonymity shared by thousands of those winged warriors of World War II.

In an attempt to learn more of her identity than can be found in Air Force records, I am trying to find former flyboys who were members of the 41st Bomb Group. The group was part of the Seventh Air Force and entered combat from Tarawa and Abemama. The group later made the move to Okinawa, but it isn't likely that *Rose's Beau* made the trip.

I would appreciate hearing from anyone associated with the group or otherwise familiar with this particular B-25.

Philip C. Marchese, Jr.
28 Gallant Fox Dr.
Media, Pa. 19063

Flight Gear

I am presently collecting information and photographs for a book on US military flight gear from World War II to the present. This is to include flight helmets, flight suits, oxygen masks, and other flight gear. Any old tech manuals or catalogs would also

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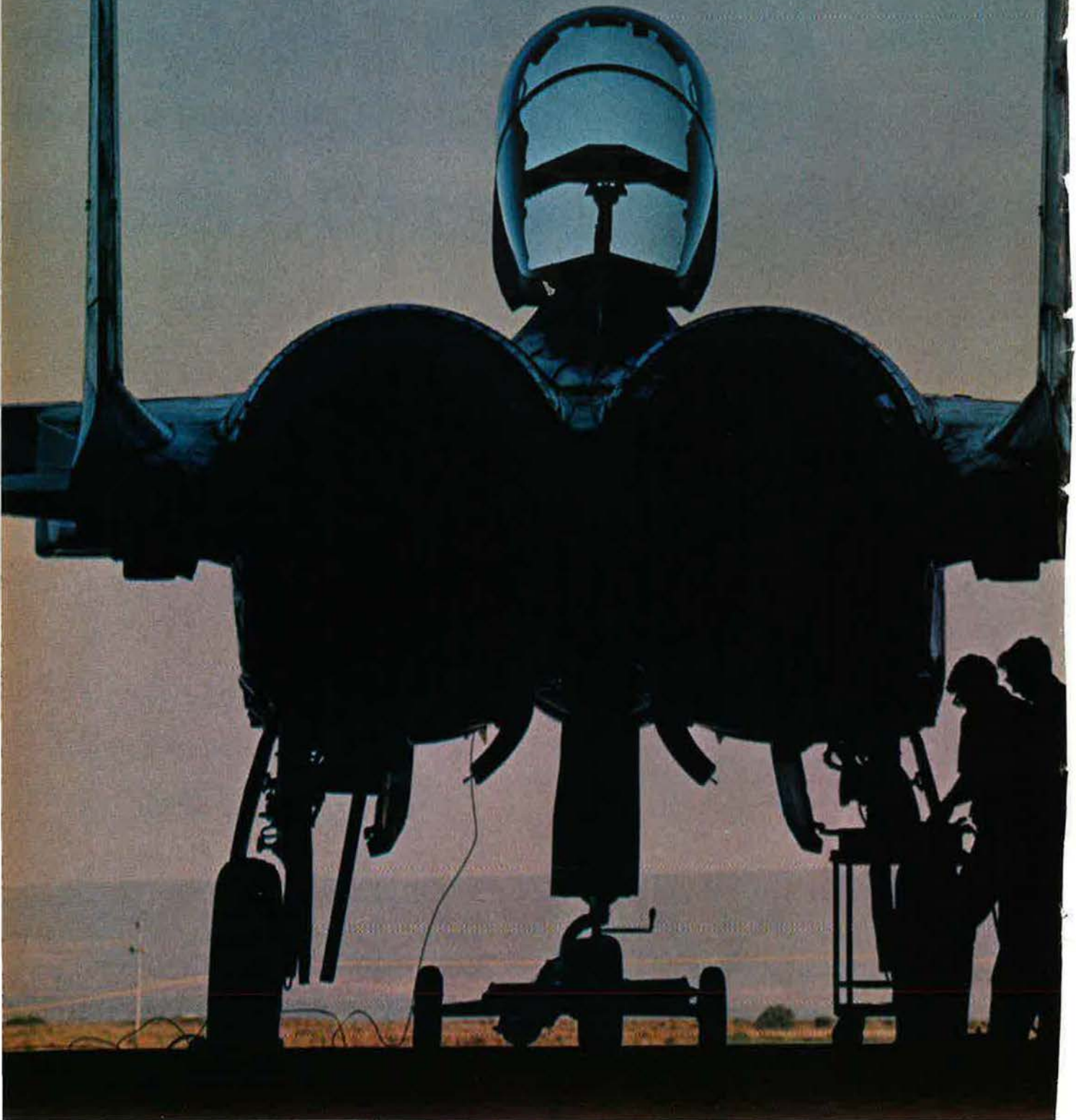


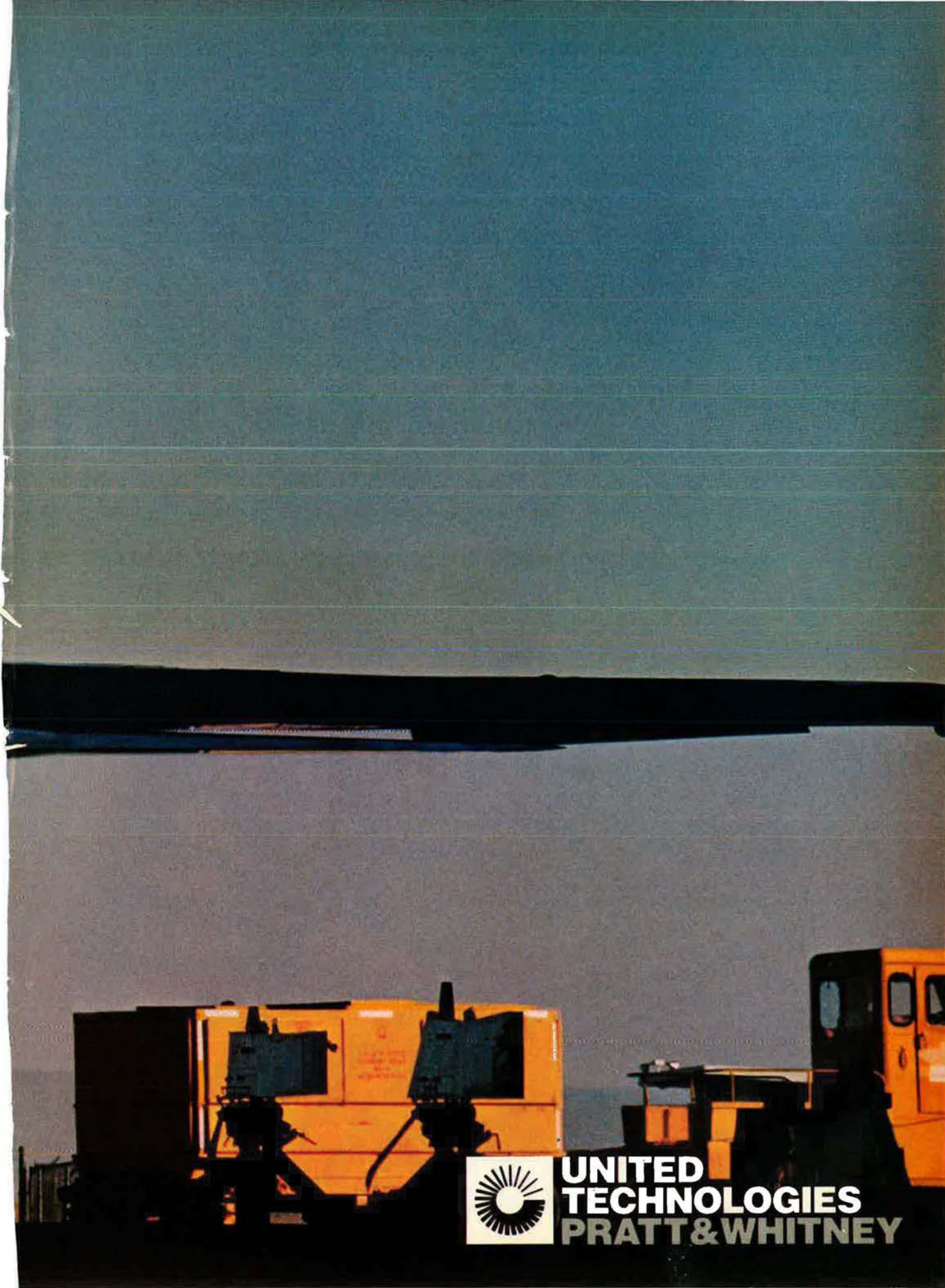
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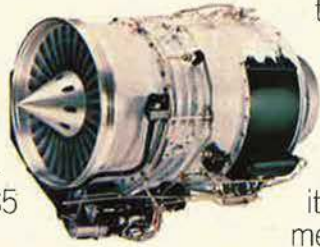
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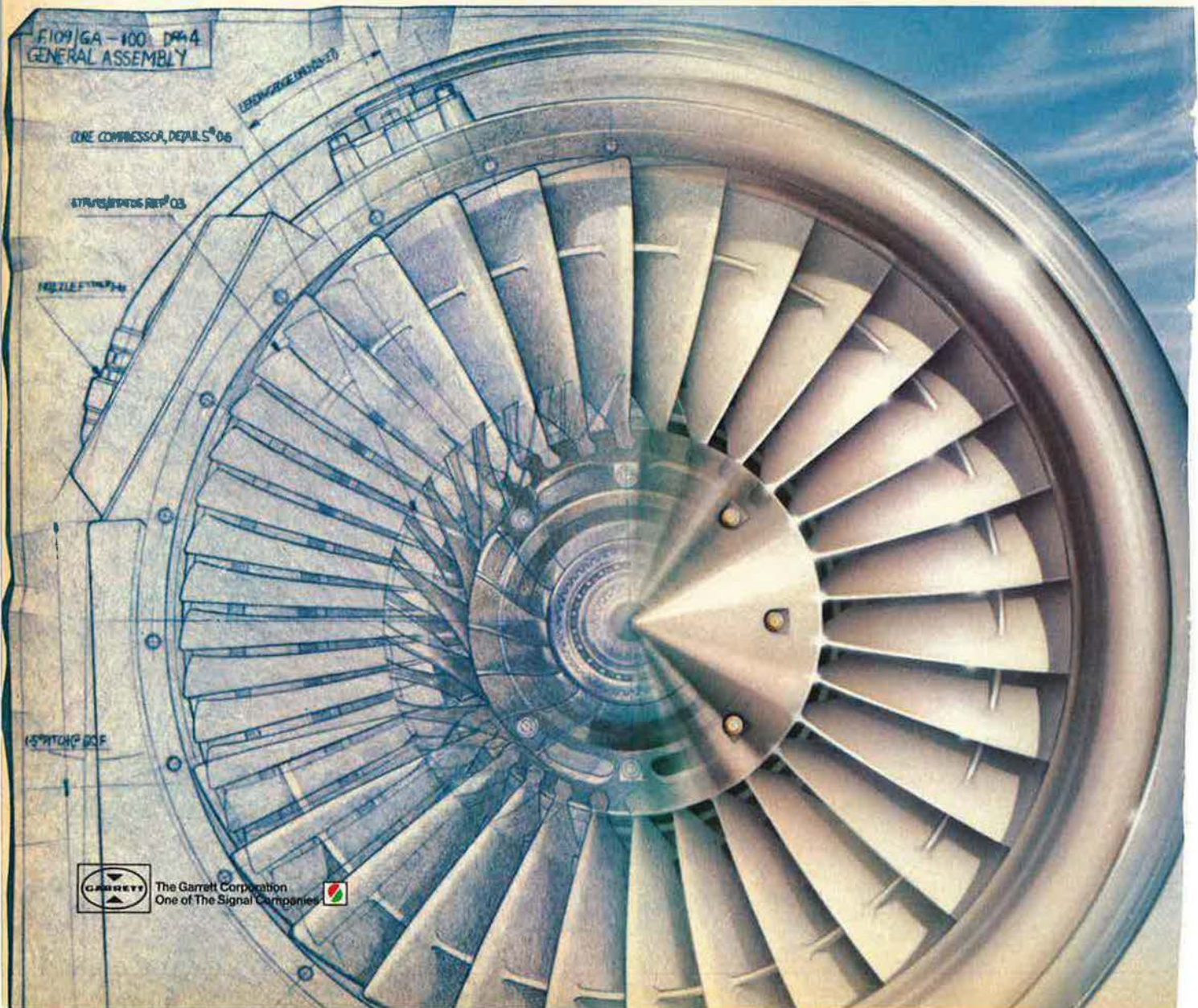
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be useful, and any information would be gratefully acknowledged.

Richard B. Daniell
P. O. Box 3216
Tuscaloosa, Ala. 35404

Looking for . . .

The pilot class of February 1934 from Kelly Field has been able to keep a record of all its graduates, save one. The missing class member is William W. Pannis.

After graduation, he was first at Brooks Field and later was transferred to Hamilton, where, in 1937, I last saw him. Soon after that he left the service and went to China. But he was reported to have returned to the Air Corps for duty in World War II, possibly at Mitchell Field. An unproven report has him now in Pennsylvania, his home state.

Can anyone tell us where he is now, or perhaps what happened to him?

C. R. Bullock
4917 Ravenswood Dr.
San Antonio, Tex. 78227

Collectors' Corner

I am attempting to restore my old leather A-2 flight jacket of World War II Army Air Corps vintage, and I desperately need to have the rust-colored knitted wrist and waist bands replaced.

I was a member of the 418th Night Fighter Squadron in the Pacific. Our squadron insignia—with the nickname "King of Sting"—was designed by the Walt Disney Studios, as were many others. I would appreciate information as to how and where I could get a four-color reproduction of that insignia so that I could have the authentic colors repainted on my jacket.

Please contact me at the address below.

Lt. Col. James A. Null,
USAF (Ret.)
271 Wakefield Dr.
Memphis, Tenn. 38117

I have AIR FORCE Magazines from 1951 through 1980 in good to excellent condition. Any collector, historian, writer, Air Force library, or anyone else who is interested can have the whole set if you pay for all the shipping charges.

Please contact me at the address below.

George Dzombak
4041 Spring Valley Rd.
Doylestown, Pa. 18901
Phone: (215) 794-7190

I am a collector looking for warbird artwork. I would like color prints or color slides of fuselage art from World War II and Korea, but I am more

AIRMAIL

interested in artwork from the Vietnam era. "Girl" art is OK, but I would prefer the stronger, more militant motifs.

I am especially interested in the artwork on Wild Weasel F-100Fs, Wild Weasel F-105s, and Iron Hand F-105Fs that flew against SAM sites. Does anyone have color prints or slides of Maj. Don Kutyna's F-105 Thunderchief, the *Polish Glider*?

I, of course, would pay for any cost or expense of any response to my appeal. Please contact me at the address below.

Robert F. Dorsey
1667 West Crone Ave.
Anaheim, Calif. 92802

I am an ex-USAF lieutenant who served in the Korean War. I am looking for any of the old plastic ID aircraft models—from World War II through the 1960s.

Can any readers help me?

James A. Dorst
115 Beach Rd.
Hampton, Va. 23664

I am an enthusiast of Air Force aviation, and I'm looking for some Air Force patches to add to my collection. Any help in obtaining squadron patches or any other tactical fighter unit emblems would be deeply appreciated. I'm particularly interested in World War II patches.

Please contact me at the address below.

Ludwig Cervantes
2390-A Arellano Ave.
Singalong, Manila 2802
The Philippines

I am looking for World War II USAAF flight gear and related items, particularly from the CBI theater. My father was in India with the Tenth Air Force, so I am trying to locate a patch for the 58th Fighter Squadron (Red Gorillas), as well as shoulder patches from that area.

Any letters will be answered immediately. Please contact me at the address below.

George E. Dively, Jr.
6208 Alamo St.
Springfield, Va. 22150
Phone: (703) 971-9299

I have a very good friend in Hagerstown, Md., who was with the

214th Troop Carrier Wing in Korea. His name is J. L. "Herb" Taylor, and he was a staff sergeant in the Korean theater from 1950 to 1952.

I am looking for any information about this group—messages from any old friends, pictures, and, especially, the squadron patch!

Any assistance would be appreciated.

Brian T. Ulrich
60-30 Regent Ave.
Hamilton, Ontario L9B 1B3
Canada

I am currently trying to assemble the correct insignia for an MA-1 jacket as worn by pilots of the 388th Tactical Fighter Wing (F-16) or 9th Strategic Reconnaissance Wing (SR-71). I would appreciate hearing from those with such patches and would also like to receive diagrams indicating proper placement for the insignia.

I don't have very much to trade, but I am willing to buy. Contact me at the address below.

J. J. Gertler
Apt. B-1239
3636 16th St., N. W.
Washington, D. C. 20010

A short time ago, I lost my 1943 Army Air Forces ring. Do any readers know of any sources where I might be able to buy a replacement?

Any information would be appreciated and should be sent to the address below.

Kirkwood G. Colvin
4817 Lennox Ave.
Sherman Oaks, Calif. 91423

I am trying to locate, for purchase, USAF navigator wings that were issued in the late 1950s and early 1960s. I am interested in the miniature size and standard size of the basic (without star) navigator wings.

Anyone with such wings for sale should contact me at the address below.

Louis J. Martucci
8224 Center Parkway #33
Sacramento, Calif. 95823

While going through a box I packed in 1946, I came across the following issues of AIR FORCE Magazine:

November and December 1943; January, February, June, July, October, and December 1944; and February and March 1945.

Does anyone need these for their library? They are in mint condition and should be preserved. I am willing to sell them for the best offer.

Thomas P. Wallace
226 Beckwith St.
Cranston, R. I. 02910

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 **SPERRY**

A Quarter Century of Contempt

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Leaked reports detail not only Soviet disregard for US complaints about arms-control violations but also a flagrant pattern of cheating and disinformation.



Washington, D. C., Oct. 4

The Administration, in January of this year, furnished Congress with the first phase of a classified report that spells out seven different matters of "serious concern" regarding

Soviet compliance with arms accords to which the USSR is obligated to adhere. The White House, at the time, announced publicly that all these concerns—ranging from clear-cut to probable violations—had been taken up with the Soviets. Moscow's representatives, however, proved unwilling "to meet our basic concerns, which were raised in the Standing Consultative Commission in Geneva and in several diplomatic demarches. Nor have they met our requests to cease these activities."

President Reagan pointed out in his letter accompanying the report that Soviet noncompliance with various treaties and accords "calls into question important security benefits from arms control and could create new security risks. It undermines the confidence essential to an effective arms-control process in the future."

The definite and probable violations cited by the White House indicated "noncompliance" with a range of accords, including the 1925 Geneva Protocol, the 1972 ABM Treaty, the Threshold Test Ban Treaty, and SALT II, and involved such weighty issues as the illegal development of new ICBMs, deployment of the banned SS-16, and deliberate deception and disinformation measures, such as massive and persistent encryption of ballistic missile flight-test data. Encryption of data needed by one side to

verify compliance with the terms of SALT II by the other is outlawed by that accord.

The US also charged that the Soviets "almost certainly violated the ABM Treaty" by building a huge phased-array radar near Krasnoyarsk. This new facility runs afoul of the accord by dint of its location and orientation. The Krasnoyarsk radar does not meet the criteria for ballistic missile early warning radar systems, which the "Treaty limits to locations along the national periphery of each party and that are required to be oriented outward."

Soviet actions since the release of the White House report not only disregarded US complaints but reflect a flagrant and contemptuous escalation of across-the-board violations and associated strategic deception and disinformation campaigns, according to senior government experts. Many of these violations, and various aspects of what Soviet dogma refers to as *maskirovka*, meaning camouflage, concealment, and deception with regard to strategic and other weapons, are spelled out in what is probably Washington's hottest and most selectively leaked document, the President's classified report from his General Advisory Committee (GAC) on Arms Control. The House and Senate stipulated in amendments to the FY '85 Defense Authorization Bill that the GAC report must be transmitted to Congress in its classified form and in an unclassified version suitable for public disclosure.

Congressional feathers were ruffled by the fact that Secretary of Defense Caspar Weinberger promised to have the GAC report delivered by September 15, 1984, a commitment the White House was apparently not willing to honor prior to the President's pending meeting with Soviet Foreign Minister Andrei A. Gromyko. Contending that release of the GAC report was essential to rebut the 1984 Democratic Party platform on arms control, a number of conservative Republican senators are trying to force its release by threatening to delay congressional action on defense funding if the White

House does not comply with their request.

In a spate of public letters to the President, conservative senators brought to light that the title of the GAC report is "A Quarter Century of Soviet Compliance Practices Under Arms-Control Commitments 1958-83" and that it cites seventeen Soviet violations in addition to the twelve instances listed in the originally mandated Presidential Report.

Significant portions of the unclassified version of the GAC report—which is expected to be released in full in the near future—have been reported in piecemeal fashion over the past few years by various news media, including this column. Defense analysts conversant with the full extent of the recurring pattern of Soviet treaty violations and their centralized and vaguely understood deception and disinformation program claim that this doling out of information concerning Soviet treaty violations to Congress and the public has diluted the impact and understanding of these breaches, which should be examined in their totality.

The GAC report, drawn up by a group of prestigious experts including former Defense Secretary Donald Rumsfeld, goes a long way toward providing a cohesive, fairly complete picture. Looking at the period from 1958 to 1983, the GAC analysis singled out ten specific Soviet breaches of binding arms-control obligations in areas other than SALT. The reliability of the undergirding evidence is rated as being in the "high-confidence" category.

The first violation of this type cited by the Committee is the Soviet breach of the nuclear test moratorium in 1961-62 that caused President Kennedy to avow on March 2, 1962, that "we now know enough about broken negotiations, secret preparations, and advantages gained from a long test series never to offer again an uninspected moratorium." In a related matter, also cited by the GAC report, Soviet violations of the Threshold Test Ban Treaty continue unabated, with recent underground tests "venting"

radiation by-products beyond the borders of the USSR and exceeding the 150-kiloton ceiling imposed by the accord.

The report also cites the stationing of Soviet offensive weapons in Cuba as a breach of another unilateral commitment by the Soviets. While the Soviets have so far not made good on ominous hints that they might station such weapons as SS-20 ballistic missiles or Backfire bombers in Cuba as "reprisals" for the deployment of US Pershing IIs and ground-launched cruise missiles in several NATO countries, there is strong evidence that they persistently violate the Kennedy-Khrushchev Agreement of 1962.

Negotiated in the aftermath of the Cuban Missile Crisis, this agreement obligates the USSR to keep nuclear and other "offensive" weapons out of Cuba. While the full extent of the Kennedy-Khrushchev accord—to which Cuba itself is not a party—remains shrouded in diplomatic confidentiality, the gist of the agreement, which revolves around ten letters that the two heads of state exchanged at the time, was summarized by President Kennedy.

The USSR, he said, had "agreed to remove from Cuba all weapon systems capable of offensive use, to halt the further introduction of such weapons in Cuba. . . . In addition, the Soviet government has stated that all nuclear weapons have been withdrawn and no offensive weapons will be reintroduced."

President Reagan complained last year that the Kennedy-Khrushchev "agreement has been abrogated many times by the Soviet Union and Cuba in the bringing of what can only be considered offensive weapons, not defensive, there." At the same time, hearings by the Senate Foreign Relations Committee showed that the following offensive nuclear-capable weapons have been observed in Cuba:

- A squadron of twelve Tu-95 Bear intercontinental bombers with bomb bays, which are counted as strategic offensive weapons under the SALT II Treaty.

- Four squadrons totaling more than forty MiG-23 or -27 nuclear-capable fighter-bombers with longer ranges than the light Il-28 bombers that the Soviets deployed to—and then removed from—Cuba in 1962.

- A strategic submarine base at Cienfuegos, complete with a nuclear warhead storage facility, that has been used to support *Golf* diesel submarines capable of carrying nuclear-tipped ballistic missiles counted in SALT I and *Echo* nuclear-powered

IN FOCUS...

submarines carrying nuclear-armed long-range cruise missiles.

- A combat brigade of ground forces, complete with artillery, tanks, and long-range air transports, that is reportedly guarding nuclear storage facilities.

At these hearings, Sen. Steven D. Symms (R-Idaho) warned the committee that compounding the danger of Soviet nuclear weapons in Cuba is the "highly significant but little-realized fact that the US has no capability to detect the presence of Soviet nuclear warheads or bombs in Cuba." The fundamental question that ensues is "why the Soviets would deploy to Cuba bomb-bay-equipped, long-range bombers, nuclear-capable fighter-bombers, and a nuclear storage facility for submarine-launched missiles if they did not already have nuclear warheads in Cuba," he suggested.

Other Soviet transgressions cited by the GAC report include consistent violations of the Biological Weapons Convention of 1972 in the form of facilities expansion and biological munitions production, storage, transfer, and use, as well as of the Geneva Protocol of 1925 through the transfer for first use of chemical weapons against countries that are not signatories of this agreement. Further, the report charges the Soviets with violating the Montreux Convention of 1936 by steaming aircraft carriers through the Turkish Straits, a practice the Soviets started in 1976 and have continued since then. Under the rubric of violations of customary international law as spelled out by the Conventional Weapons Convention of 1981, the GAC report finds that, from 1981 to 1982, the Soviets used booby-trap mines and incendiary devices against civilians in Afghanistan.

Soviet violations of the SALT I and SALT II accords that are cited by the GAC reaffirm and expand on a range of breaches brought to light previously in congressional hearings and by the media but, in so doing, put special focus on a poorly understood and widely understated element of Soviet negotiating philosophy—that of deliberate deception.

The GAC report, for instance, asserts that the Soviets falsified the SALT II data base. The full extent of these falsifications is so massive that

US experts, five years after the signing of the accord, probably still have not gotten to the bottom of this *maskirovka*. It was not until recently, for instance, that US intelligence recognized that the designations of Soviet SLBMs and ICBMs furnished by Moscow's negotiators were a complete hoax and bore no relationship to the definitions and nomenclature used by the armed forces of the Soviet Union.

Soviet strategic deception, thought to be formulated and executed by a special directorate of the Soviet General Staff, has managed to create Soviet military strengths when they were lacking—and when it was politically expedient to indicate otherwise—as well as to conceal Soviet capabilities whenever that proved desirable. Possibly the most flagrant case of faking "strength" for purposes of negotiating leverage came to light when a Soviet "submarine" under observation by US reconnaissance satellites doubled up, the reason being that it was an inflated rubber decoy. On the other side of the ledger, when a Soviet submarine of a certain class was trapped in Swedish waters, it was determined to be nuclear-powered by dint of its radioactive emissions. This came as a great shock to the intelligence community, since this class of submarine had been carried on the books as possessing only conventional capabilities.

As a highly qualified US intelligence expert told this writer recently, Soviet strategic deception is a long-term, top-priority game meant to hide the main goals of Soviet strategy and the means and milestones of its execution. Three principal factors underlie the effectiveness of Soviet deception. It is managed within a secretive societal structure with carefully honed tools and methods. It is predicated on a thorough understanding of Western predilections, preconceived notions, and gullibility. Lastly, Soviet strategic deception has worked so well because it tells the US what Americans are inclined to find credible, meaning that it capitalizes on the West's tendency to mirror-image.

At first blush, it may appear unimportant that the West is kept in the dark about whether a given ICBM or bomber is known by one name or another or about how its mission and capabilities are defined by the Soviets if the US national technical means of verification (NTM, in the main satellites and electronic listening devices), along with "back-engineering," can establish the weapon's basic features with relative accuracy. The hard real-

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any definitive, discrete information on the capabilities and intended function of Soviet weapon systems enables Moscow to circumvent key clauses of arms accords, impede detection of violations, and break out from various numerical and performance ceilings.

In this context, the intertwining of the SS-20—ostensibly an intermediate-range ballistic missile (IRBM) and hence not counted under SALT—with the SS-16, an ICBM outlawed by SALT II, and possibly the new SS-X-25 mobile ICBM that violates SALT II by its very existence, represents a brilliant shuffling of the strategic deck by Moscow's practitioners of *maskirovka*. The GAC report cited the continued deployment of SS-16 mobile ICBMs at Plesetsk, under way since the signing of SALT II in 1979, as a probable violation of that accord. The same is true for the SS-X-25.

There is a great deal more to these breaches than meets the eye. A long time ago, the Soviets recognized that the increasing accuracy of ICBMs would eventually make deceptively based and mobile ICBMs attractive, especially if they are not assigned exclusively to a first-strike task. The trick, as a prominent congressional

IN FOCUS...

intelligence expert pointed out, was how to build a fleet of mobile ICBM launchers that were outlawed by arms-control provisions without tipping off the US and thus impelling this country to follow suit.

The Soviet stratagem was to build two very closely related mobile missile systems, the SS-16 and the SS-20. Each of these missile types can be fired from the launcher that appeared to US intelligence to be associated with the other. In pulling off the stratagem, the Soviets took—and continue to take—full advantage of their thorough understanding of the existence, functions, orbits, and fundamental operating characteristics of this country's principal "overhead" collectors of imagery and signal intelligence.

(Soviet understanding of the weak spots of the US Defense Support Program (DSP) early warning satellites came across unambiguously last April when the Soviets fired a salvo of

six SS-20s on a northern azimuth toward the US as part of a comprehensive strategic exercise at precisely the time when the DSP system was blind in that direction. Many of the details of this exercise, including the precise purpose of the salvo launch, therefore, remain unclear to US intelligence.)

The fact that the SS-20, which carries three MIRVs, can function both in an intermediate and intercontinental fashion (by offloading one or two of the MIRVs) clearly facilitated the Soviet coup. In spite of persuasive evidence to the contrary, two different Administrations accepted the Soviet assertion that the SS-20—including its launchers and support equipment—is an IRBM and that production of the SS-16 had ceased. Only recently has recognition set in that, with more than 380 SS-20 launchers deployed at this time that can be used by one or two ICBM types as well as by SS-20s configured for purely strategic contingencies, the Soviet ICBM arsenal is in fact vastly larger than originally thought.

Another facet of Soviet concealment and deception that the GAC report reaffirmed involves the continued construction of submarine tunnels, encryption of telemetry data,

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and deceptive construction and decoys. The submarine tunnel construction is reportedly picking up tempo and is probably meant to hide submarines as well as protect them. There is evidence that at least one submarine tunnel system is being constructed in Vietnam. In the area of encryption, the Soviets have escalated their concealment effort by using low-power transmissions that can only be picked up by sensors in the immediate vicinity of the test vehicle. Not specifically mentioned by the report is the massive jamming effort by the Soviets against such sensors as the Rhyolite and other hush-hush satellites, as well as against Cobra Dane, Cobra Ball, and Cobra Judy, phased-array radars that are terrestrially based, shipborne, and airborne, respectively.

The unclassified version of the GAC report, in tantalizing fashion, poses the question of whether or not what is known to US intelligence about Soviet treaty violations represents merely the tip of the iceberg, with more extensive violations hidden below the waterline. The general answer to this rhetorical question is probably that—unless the intelligence community seeks to penetrate Soviet *maskirovka* with more vigor and enthusiasm than

in the past—the West is not likely to find the information that is so vital to US and free world security.

“Silent Sensors”

Two different approaches to providing the key component of the Strategic Defense Initiative's battle management/command and control function are being weighed at present. One is known as the Boost Phase Detection and Tracking System, a follow-on design to the upgraded DSP early warning satellites.

This design approach is in an initial study phase and would probably involve a so-called three-color infrared sensor technique. While the notion of a completely new system offers many advantages, there are concerns about the high cost and long leadtime involved.

The other approach involves a derivative design of the upgraded DSP satellites that, beginning with the fourteenth and extending to the twenty-third production article, incorporate a two-color IR feature.

The fundamental SDI battle-management challenge revolves around the ability to detect an ICBM or SLBM launch anywhere in the world and then to establish the missile's trajectory with sufficient speed and accuracy

to enable space-based interceptors to destroy the boost vehicle before it can disperse the individual MIRVs.

This translates into the requirement to acquire the target, plot its trajectory, and communicate the information to the interceptor within about sixty seconds from the time of launch. The interceptor then would have about 170 seconds to reacquire the target with its homing sensor and destroy it before separation of the MIRVs can occur.

While a single-color IR early warning satellite can detect a missile launch with the speed required for the SDI mission, it lacks the ability to measure the missile's plume characteristics accurately and quickly enough to plot trajectories. A two-color system would probably do considerably better, but SDI at this time is thought to require three-color IR sensors. A third-color capability can be grafted onto the two-color DSP satellites with relative ease.

Multicolored IR sensors represent a relatively new technology of interest also to tactical systems. Since these “staring” arrays emit no energy and hence don't increase the detectability of the platform, they are known as “silent sensors.” ■



AEROSPACE WORLD

News, Views & Comments

Washington, D. C., Oct. 5

★ Aircraft incidents, such as near midair collisions, and other factors, like excessive airliner delays and predicted air traffic growth, indicate that the nation's air traffic control system safety margin is wearing thin and that corrective actions must be taken now to maintain the safety of the skies, according to Capt. Henry Duffy, President of the Air Line Pilots Association (ALPA).

In testimony before the House Subcommittee on Investigations and Oversight, Captain Duffy said, "Corrective actions should focus on unburdening the existing controller work force from fatigue and overwork, on ensuring that the Federal Aviation Administration develops a more cooperative and less punitive approach toward controllers and pilots, and on instituting improvements that will provide long-term solutions and ensure the system can grow safely."

Among the specific improvements suggested by the ALPA were:

- Utilizing radar trainees more efficiently;
- Continuing the present waiver to mandatory controller retirement, thereby enabling the FAA to retain qualified personnel while trainees gain valuable experience;
- Allowing some of the experienced controllers who were fired to return to work;
- Developing a program of immunity for controllers who report incidents and problems;
- Ensuring positive results from the FAA's employee relations programs started after the 1981 strike;
- Appropriating the \$3 billion surplus in funding for airport and airways improvements;
- Increasing airport capacity while keeping the airport an attractive neighbor to surrounding communities; and
- Carrying out the FAA's ten-year plan for modernizing and improving the nation's airspace system.

★ Joe W. Kittinger, a recently retired US Air Force colonel, completed the

first solo balloon flight across the Atlantic and set a new solo distance record of 3,535 miles and eighty-four hours in the air. Kittinger rode his helium-filled balloon, the *Rosie O'Grady*, from Caribou, Me., to a landing near Savona in northern Italy on September 18.

Landing in strong winds among trees on a mountainside, he was thrown from the balloon's basket about ten feet to the ground, breaking an ankle. On September 25, Mr. Kittinger was congratulated on his feat by President Reagan at the White House.

In July 1982, Mr. Kittinger set a record for distance in a 1,000-cubic-foot helium balloon, traveling 1,348 miles in forty-eight hours from St. Louis, Mo., to Quebec.

Mr. Kittinger first attracted public attention on August 16, 1960, when he rode a balloon to 102,000 feet and then parachuted out of it, free-falling 84,700 feet.

He flew 281 missions during two tours in Southeast Asia and was a prisoner of war for eleven months.

★ A major step in enhancing the air traffic control system of the future came recently when two FAA design contracts totaling \$246.7 million went to IBM's Federal Systems Division, Gaithersburg, Md., and Hughes Aircraft Co.'s Ground Systems Group, Fullerton, Calif. IBM received a contract estimated at \$130.4 million and Hughes an estimated award of \$116.4 million.

Secretary of Transportation Elizabeth Hanford Dole announced that the contracts call for a three-year design competition for an Advanced Automation System to enhance the safety and efficiency of flight by exploiting increased automation. When the competition is completed, a production contract will be awarded to the company with the best design.

Secretary Dole said, "Our goal is to have the computer handle many routine tasks now performed manually and thus allow controllers to focus more of their energies on system management functions."

Secretary Dole noted that the Advanced Automation System, expected



The US Army/Sikorsky Advanced Composite Airframe Program (ACAP) helicopter made its first flight recently. The ACAP, the world's first composite-fuselage helicopter, is a revolutionary departure from aluminum helicopter airframes. (See item, p. 37.)

to come on line in the late 1980s and early 1990s, will help FAA handle the expected doubling in the demand for aviation services over the next two decades.

★ An all-composite-airframe helicopter, reportedly the world's first, has made its first public flight.

The United Technologies Sikorsky Aircraft helicopter, developed under the Army Applied Technology Laboratory's Advanced Composite Airframe Program (ACAP), flew for twenty minutes in late August.

"ACAP is a revolutionary departure from the aluminum helicopter airframes of the past—as significant as the move from wood-and-canvas to metal airframes some sixty years ago," said William F. Paul, Sikorsky President. "Most—if not all—future helicopters, such as the Army LHX, will be made of composites," he added.

The Army set an ACAP target weight savings of twenty-two percent, a cost savings of seventeen percent, and a reliability and maintainability (R&M) savings of twenty percent, all compared to an equivalent "baseline" metal airframe. According to Sikorsky officials, the ACAP helicopter bettered all of these—twenty-four percent in weight saving, twenty-three percent in cost, and more than twenty percent in R&M.

The ACAP has sixty-five percent fewer parts and seventy-five percent fewer fasteners than an equivalent metal airframe. "This greatly reduces the overall labor required for the aircraft and cuts the assembly time," said a Sikorsky official.

Beyond demonstrating the feasibility of a high-performance composite airframe, the ACAP is designed to meet stringent ballistic-tolerance criteria. Occupants should also be able to survive a forty-two-foot-per-second vertical impact and rollover because of a combination of impact-absorbing landing gear, long-stroke seat supports, and crushable fuselage structure.

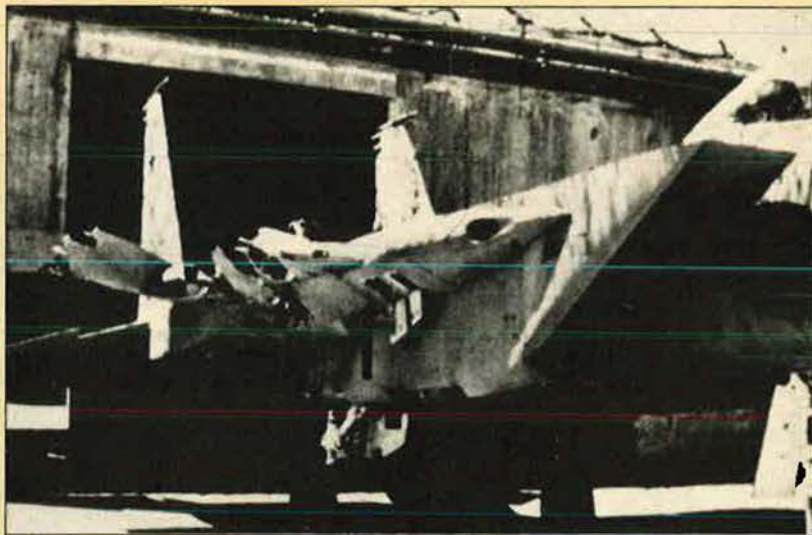
★ New radar sites across Alaska and Canada should be operational by 1992, according to current plans.

The North Warning System, as the program has been named, will use a mix of thirty-nine short-range unattended gapfiller and thirteen long-range minimally attended radars. The new radar system will replace Distant Early Warning (DEW) Line radars that have been deployed since the late 1950s.

The new radars will improve performance, close coverage gaps, and re-

The Case of the Missing Wing

Believe it or not, this one made it back! This F-15, with half its wing missing, is a good example of what is currently considered an "unflyable" aircraft. However, the pilot's success in bringing it home helped to inspire a new program at Aeronautical Systems Division's Flight Dynamics Laboratory aimed at enabling future fighter pilots to fly aircraft with severely damaged control surfaces. The pilot of this F-15 configured in unusual ways the control surfaces that were still working to compensate for the damaged wing. The FDL program will make this "survivor's" reaction automatic to the aircraft. Therefore, flying a damaged aircraft will be much easier on the pilot. Through a self-repairing flight control system nearing development, a computerized "brain" will automatically reconfigure such surfaces as rudders, flaperons, and ailerons to compensate for grave damage to essential flying surfaces, according to FDL.



Only smart work by the pilot and the unique combination of interworking control surfaces on the F-15 brought this one back alive. With old-fashioned conventional ailerons and horizontal stabilizer, it couldn't have happened.

duce operations and maintenance costs, according to Electronic Systems Division (ESD) officials. "Existing DEW Line radars are obsolete and expensive to operate and maintain," said an ESD official.

A \$79.7 million contract has been awarded by ESD to the Sperry Corp. of Great Neck, N. Y., to design and develop the new short-range radar and to perform overall system engineering for the improved surveillance system.

Short-range unattended radars and logistics support will be developed and a communications architecture will be planned under this full-scale development contract. Long-range radars, acquired under separate contract from General Electric of Syracuse, N. Y., will be tied into the system by the system contractor.

"Fifty-two radar sites will be deployed across Alaska and northern Canada," explains Lt. Col. Kary R. LaFors, the program manager. "We'll detect the high-flying bomber and the low-flying cruise missile," he says, "and cut operating costs in the Arctic by \$40 million a year."

The new communications links of

the revitalized network will tie into the Region Operations Control Centers of the Joint Surveillance System at Elmendorf AFB, Alaska, and North Bay, Ontario, Canada.

Deployment of new radars will start, according to ESD officials, in the summer of 1986.

★ Mission-capable rates of the Air Force F-16 Fighting Falcon have consistently been above eighty percent since March 22 of this year, a performance "unprecedented for a fleet of this size and complexity," according to Brig. Gen. Ronald W. Yates, Director of Aeronautical System Division's F-16 System Program Office.

The mission-capable rate is the percentage of aircraft in a wing that have operational all systems required to carry out a mission. In a modern tactical fighter, such as the F-16, these systems include the engine, airborne electronics, and navigation and weapons-delivery equipment.

In December 1983, the F-16 fleet reached the 80.1 percent mission-capable rate for the first time in its history. The achievement was noteworthy

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because mission-capable rates normally decline in the bad-weather months of winter. The high rate was the result of a program known as "Falcon 80," started in October 1983, to enhance Air Force combat capability by bringing the F-16 mission-capable rate to eighty percent or higher.

This is five percent greater than the Air Force norm for fighter aircraft. What it means to the defense of the country, in concrete terms, is that an additional thirty to thirty-five combat-ready aircraft are available without any increase in the number of aircraft procured by USAF.

During the first six months of 1984, more than 730 F-16s with Air Force units throughout the world flew more than 69,000 hours in training missions. In the same period, there were forty-two deployments of F-16s to other bases, ten combat training exercises, and three operational readiness inspections.

Also during that time, the 363d Tactical Fighter Wing at Shaw AFB, S. C., conducted seven scheduled deployments and still achieved a mission-capable rate of 92.7 percent, the best on record for a modern tactical fighter. The 388th TFW, Hill AFB, Utah, and the 8th TFW, Kunsan AB, Korea, were a few tenths of a percentage point behind the Shaw AFB unit. General Yates called these accomplishments "magnificent by any standard."

Air Force officials credit the impressive results to the cooperation between the Air Force and the contractor, General Dynamics; to the Centralized Data System, a computer tracking network connecting all F-16 organizations with real-time information on aircraft in-commission status and maintenance problems; and to hard work by maintenance people throughout the Air Force. "Our hats are off to every man and woman on the flight line and in the back shops for their high quality and sustained efforts," General Yates said.

★ The Air Force is developing an integrated electronic warfare system (INEWS) for future Air Force and Navy combat aircraft.

Contracts totaling nearly \$15 million to five teams of electronic firms should provide aircrew members with a timely attack warning and automatic countermeasures response capability in future combat aircraft.

The five teams of electronic firms include Hughes-Loral Joint Venture Team, Los Angeles; ITT-Litton Joint Venture Team, Nutley, N. J.; Raytheon-Northrop Joint Venture Team, Goleta, Calif.; TRW-Westinghouse Joint Venture Team, San Diego; and Sanders-

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General Electric Joint Venture Team, Nashua, N. H.

According to ASD's INEWS program manager, the INEWS joint venture teams are tasked with defining a generic, next-generation electronic warfare system to be integrated with other systems in future combat air-

craft. "Appropriate INEWS functions will include detection and countering, or confusion, of hostile weapons-associated emitters or sensors operating anywhere in the electromagnetic spectrum," an ASD official said.

One joint venture team will be selected for full-scale development, and members of this final team will compete with each other for production of the system. Full production is anticipated in 1993.

★ The F-16 will soon be used to bolster Japan's air defenses, according to Air Force officials.



Sikorsky Aircraft, now producing the SH-60B Seahawk for the US Navy and the HH-60A, the US Air Force's new land-based combat rescue aircraft, may soon produce an antisubmarine version, the S-70B, for the Royal Australian Navy.

The 432d Tactical Fighter Wing has been activated at Misawa AB, Japan, in preparation for arrival of the unit's first F-16 Fighting Falcons early next year. The unit replaces the 6112th Air Base Wing.

The first two F-16s are to arrive at the base, located on the northern tip of the main Japanese island of Honshu, in the spring of 1985. The wing is to be at full strength—two squadrons totaling fifty-three aircraft—by October 1987.

The base population is expected to increase by more than 3,500 people during the next three years. Air Force officials say nearly \$400 million is to be spent on existing and new facili-

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ties, including construction of 1,000 housing units.

The Navy currently manages Misawa's flight line, where five P-3 anti-submarine aircraft have been based since the mid-1970s. The Air Force will take control of the flight line in January. Two squadrons of Japanese fighters will continue to fly out of the base.

★ Testing has been successfully completed on the main landing gear and landing door actuation system for the giant Lockheed C-5B transport aircraft.

Testing of the new gear began in December 1983 using a C-5B landing gear simulator and involved a total of 6,130 extensions and retractions.

According to ASD officials, the current C-5A system requires forty gear boxes—ten for each landing gear—to raise and lower the wheels. The new system uses only two gear boxes per landing gear.

In addition, officials say the C-5B landing gear features easier maintenance and better reliability.

Delivery of the first of fifty C-5Bs to be built by the Lockheed-Georgia Co. is scheduled for December 1985. MAC currently operates seventy-seven C-5As.

★ Although B-52s are slowly becoming aircraft of the past, their parachutes may live on if a new aerial extraction and recovery system being tested by the Air Force Flight Test Center succeeds.

An extraction system tested recently at Edwards AFB, Calif., set a new low-level airdrop weight record by pulling a 42,000-pound, pallet-mounted load from a C-130 aircraft during a low-altitude test, thus providing a new use for B-52 parachutes.

The system, called the 60,000 Extraction System, is being developed for future large transports in the Air Force inventory, said Ken Cunningham, chief of the Parachute Test Branch at AFFTC's 6515th Test Support Squadron.

Testing began last year using 35,000-pound palletized loads to evaluate several parachutes. "We eventually modified the B-52 drag chute from a forty-four-foot diameter chute and then found out that two of the modified chutes would do the job," Mr. Cunningham said.

The new system, if adopted, will permit low-altitude airdrops of heavier equipment to forward combat areas to resupply troops in the field quicker and safer than by high-altitude parachute drops.

★ A research effort by ASD's Avionics Laboratory to develop an integrated avionics system for high-speed combat aircraft of the 1990s and beyond will begin soon.

The laboratory, at Wright-Patterson AFB, Ohio, is seeking research and development sources to design, develop, and flight-test an integrated, automatic terrain-following/terrain-



The US Marine Corps uses a tanker version of the C-130, the KC-130T, to refuel two of the world's largest helicopters simultaneously. The two Sikorsky CH-53E "Super Stallion" birds are drawing fuel from a 3,600-gallon refueling tank that could be easily removed from the propjet tanker to convert it back into a transport for cargo or troops.

Thirty Years and Going Strong

The world's most popular "flying truck"—the C-130/L-100 Hercules transport—marked its thirtieth birthday on August 23.

It was on the same day in 1954 that the prototype YC-130 made its maiden flight in Burbank, Calif. Since that time, the rugged four-engine propjet has been rolling out of Lockheed-Georgia Co.'s production line in Marietta, Ga., at a steady clip. The versatile airlifter is found in operation today in more than fifty-five countries in a variety of models and derivatives. Production continues at the rate of thirty-six airplanes per year.

Cruising at speeds in excess of 300 mph, the C-130's range with a 30,000-pound payload is more than 3,000 miles. Its high-flotation landing gear and low-speed controllability give it the ability to land on short and unsophisticated landing strips.

The 1,700th aircraft in the series to come from the Marietta plant was ferried earlier this year to Japan. The US Coast Guard Station at Kodiak, Alaska, which maintains a daily aerial vigil over America's rich Alaskan fishing zones, has now taken delivery of two of five new HC-130H-7 long-range surveillance aircraft.

The Lockheed Hercules aircraft is the third most popular transport in world aviation, trailing only the DC-3 (10,000-plus aircraft built before and during World War II) and the Boeing 727, which is going out of production this year after a production run of more than 1,800 aircraft.

Air Force plans for the C-130 indicate that the airplane will be used well beyond the year 2000. And with current and planned future improvements, Lockheed-Georgia Co. officials anticipate that their company will still be building the airplane into the next century.



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avoidance and threat-avoidance system that will enable high-performance aircraft to penetrate deep into enemy territory while avoiding increasingly sophisticated air defense systems.

According to David A. Zann, laboratory program manager, the integrated system will enable automatic low-altitude, high-speed maneuvering, penetration, and attack, with emphasis on reducing the aircraft's vulnerability to enemy defensive radar and other detection systems. At the same time, it will reduce pilot work load.

Mr. Zann said that the system "will simultaneously perform vertical terrain-following, lateral terrain-avoidance, and threat-avoidance maneuvers."

The threat-avoidance arena will have a full range of options, including

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evasion or suppression by lethal or nonlethal countermeasures.

The research will be a fifty-four-month effort. Laboratory officials anticipated issuing a draft request for proposals by the end of the year.

★ The air-launched cruise missile debuted at this year's Strategic Air Command Combat Weapons Loading Competition held in September at Ellsworth AFB, S. D.

A munitions load crew, aircraft crew chief, and security police squad from

each of eighteen bombardment wings competed for approximately twenty team and individual awards.

Teams from three SAC bases loaded air-launched cruise missiles instead of short-range attack missiles, SAC officials said. Also new this year was a tactical weapons firing course for security police, replacing M-16 marksmanship trials.

★ Wind shears, which are sudden changes in wind direction and speed, often occur during thunderstorms and can imperil aircraft by causing them to lose lift at low altitudes during the critical periods of landings and takeoffs.

The FAA, in cooperation with the National Center for Atmospheric Research (NCAR), last month completed an operational evaluation of a wind

AFLC technicians at the Ogden Air Logistics Center are finding innovative ways to repair weapon systems components.

Little things may often seem insignificant, but they can pose big challenges. For Air Force Logistics Command's first Technological Research of Advanced Concepts (TRAC) team at Ogden Air Logistics Center, Hill AFB, Utah, the "little" things—the inexpensively replaced, throwaway components of Air Force weapon systems—are the big challenge.

Things like printed circuit boards, flexible printed wire cables, and computer front panels—all coded as disposable items either because replacement parts were less costly than repair or because there were no authorized repair procedures—are vital parts of many Air Force front-line combat systems. However, some Air Force weapon systems have been in service for so many years that the manufacturers of those disposable parts have long since shut down those parts lines. As supplies of components are used up, there are no replacement components coming off the assembly lines.

To procure replacement items, the Air Force must either find new sources or ask manufacturers to interrupt their current production schedules to retool and produce relatively small numbers of what were once inexpensive components.

Warren F. Scully, deputy chief of the missile and aircraft systems production branch at the Ogden ALC, described the scope of the problem this way:

"When manufacturers do interrupt production and retool, the lead times are often long, and the costs are usually much higher than those for the original part. Sometimes the result is a multimillion-dollar weapon system grounded for lack of intrinsically inexpensive components."

That's where the TRAC team comes in. Ogden's TRAC team takes on the challenges presented when component supplies are exhausted and the Air Force faces the expensive prospect of having to contract for new components needed to keep a system operational.

Basically, TRAC team members at Ogden analyze the components and do extensive research into the technologies and techniques needed to repair them. Then, using their varied skills and backgrounds, they go to work designing a cost-effective repair procedure.

The Ogden team's first project involved the computer used in B-52 and FB-111 aircraft for the short-range attack missile (SRAM). The computer was experiencing problems due to corrosion of integrated circuit chips.

AFLC faced two options: Replace the computers at a total cost of \$39 million or find a way to replace each individual chip for a lower cost.

Ogden's TRAC team went to work. Using common dental and surgical tools and working with microscopes, they developed a repair procedure that was used to replace 500,000

chips at a cost of only \$9 million. The procedure solved the SRAM computer problem at a cost \$30 million below the complete computer replacement cost and eighteen months sooner than a new computer could have been ready.

Since that first effort, the TRAC team program has spread to the other ALCs and is now a formal program within AFLC. It has resulted in significant savings and development of truly innovative repair procedures that enhance the readiness of Air Force weapon systems.

Among the most significant success stories credited to the TRAC team is a procedure to repair multi-layer printed circuit boards that were previously discarded because no repair technique had been authorized.

The TRAC process entails excavating layers of the board to expose the burned or otherwise damaged circuit. Then, members splice the circuit or insert a new section and reapply the layers from above—fixing each layer in the same fashion.

This procedure has allowed them to repair boards up to ten layers deep. In fact, using the TRAC procedures, technicians at the Aerospace Guidance and Metrology Center have salvaged and repaired five so-called "motherboards" for a significant cost saving. Each of these cost \$52,000 and, without the TRAC-developed repair procedure, would have been discarded and replaced.

The Big Challenge of the Little Things

shear forecast and detection system based on the use of Doppler radar. Working in the Denver-Stapleton Airport area, NCAR meteorologists issued daily microburst forecasts and kept FAA controllers up-to-date on actual and potential microburst activity within a five-mile radius of Stapleton Airport. Air traffic controllers then issued necessary advisories to pilots.

A microburst is a violent downward rush of air that flattens out and spreads in all directions when it hits the ground, creating wind shear conditions. Aircraft caught in these conditions first encounter a headwind that causes extra lift as it moves over the wings. This is suddenly replaced by a tailwind that produces a sharp loss of lift that can cause aircraft at low altitude to descend too rapidly and possibly crash.

The evaluation in the Denver area will help to develop the procedures for using Doppler radar data and to validate microburst forecast techniques. Denver was selected because of the high incidence of microbursts in the area.

★ The Air National Guardsman is the modern-day counterpart of the colonial citizen-soldier who would drop his plow and pick up his rifle to defend the country. Therefore, the Air Guard anticipated no problem when it asked the town of Concord, Mass., if it could borrow the mold for the famous statue of the Concord "Minuteman" to make a reproduction to be placed before a new Air National Guard support center at Andrews AFB, Md. The Air Guard adopted the Minuteman as its symbol in 1960.

But the town's five selectmen voted unanimously on September 17 not to make the mold available to the ANG. "If you want to see the statue, come to Concord. That's what it was built for," said Selectman John Marabello. The decision was supported by more than twenty-five Concord citizens and three civic organizations.

Opposing the decision were others, like David Emerson, great-grandson of poet and essayist Ralph Waldo Emerson, one of those who commissioned the statue. He also wrote the famous lines on the statue's base: "Here once the embattled farmers stood, and fired the shot heard round the world." The statue, David Emerson said, belongs to the nation.

Col. Fred Helms, Deputy Director of the Air National Guard, who made the request at an open town meeting, has

The TRAC team also took on the problem of replenishing the supply of F-111 Navigational Computer Lighted Front Panels. These panels, which are precisely engineered to provide uniform illumination of the various switches and indicators required to operate the computer, were needed desperately to return eight F-111 aircraft to mission-capable status. The supply of replacement panels had been used up, so none were available. Further, no qualified manufacturer could be found to produce the required panels.

The combat capability of the F-111 fleet was being threatened for want of a few of those "little" things.

The TRAC team accepted the challenge. They began with research on the materials used to manufacture the original panels—plastics, inks, liquid epoxy resins, and others. Then, specifications were developed for application in the "remanufacture" of the thirty-seven "new" panels required to meet immediate needs. Using previously discarded panels, the TRAC team developed procedures to build new panels from the broken ones. As a result, the team estimates the Air Force saved about \$556 on each panel and has realized total savings to date of \$122,213.

Another significant accomplishment of the TRAC team was the creation of the first repair procedure for the flexible printed wiring cable used in a variety of systems, including the

F-15 gun camera system. These cables had been coded as "throwaway" items because no repair process had been developed or authorized for them. However, a work stoppage on the F-15 gun camera made it impossible to get replacement cables. The TRAC team was called in.

The team developed repair procedures to replace damaged cable plugs, splice damaged connector runs, and remove and replace insulation coverings using a new laminating process. While the effort saved an estimated \$700 per cable (total savings of more than \$174,000), the real significance is that this new laminating process can be applied to most of the flexible printed cables now in use throughout the Air Force.

Savings from implementation of the TRAC team program are proving much higher than anticipated. The program is such a success that Phil Bailey, TRAC program manager, noted, "Initially we projected a five-year cost savings of \$51 million, but I feel very comfortable with a cost savings figure in excess of \$100 million."

As the TRAC program branches out to other AFLC logistics centers, it is becoming better known and more widely used. The program encourages AFLC and other field organizations to nominate candidate components and support equipment for the TRAC treatment.

The TRAC team's job isn't finished when it discovers a way to repair a

component. Team members also provide training to the unit responsible for fixing the component, write a draft technical order for the repair procedure, and turn over any special tools or equipment they created for the repair procedure.

The people on the TRAC team, says TRAC technical advisor Robert E. Whitlock, are "the strength and foundation of this type of program." Members are skilled civilian Air Force technicians who bring special know-how to their jobs.

Among Ogden team members are George Woodruff, who applies his expertise in clock repair to develop new repair methods with precision instruments and components; Larry Fisher, who has extensive knowledge in layout and design; Val Adams, an electronics technician who does the troubleshooting and who develops testing methods for electrical equipment; Brent Dalton, who is the team's researcher on components and materials; Terry Morris, who has a creative flair for developing microminiature repair methods using a microscope; and Brent Aguirre, who is the team's technical writer.

These people and other TRAC team members have definitely proved themselves equal to the challenge of the "little" things. Their efforts have paid off handsomely—not only in savings to the Air Force, but also in enhanced capability of vital defense systems. ■



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AEROSPACE WORLD

indicated the Air Guard will look within its own ranks for a sculptor to make a copy.

★ Tactical fighters and other future aircraft may have their first taste of action in a \$53 million simulation center being constructed by Lockheed-California Co. that can duplicate a realistic flight environment, complete with enemy threats, engine noise, and storm fronts.

The new Weapons Systems Simulation Center (WSSC), designed to develop the next generation of tactical airborne weapon systems and other concepts, will be fully operational in early 1987, say Lockheed officials.

Lockheed pilots will electronically fly new aircraft concepts in the Center, eventually enabling engineers to design high-performance airborne weapon systems using information gained from manned simulations and evaluations.

At the heart of the WSSC will be a tactical mission simulator in which engineers can realistically simulate nearly any type of flight mission, from takeoff to landing, employing advanced electronic systems to create lifelike air combat situations.

The Center is being designed on a modular plan that will allow for expansion into technologies related to transport aircraft, antisubmarine warfare aircraft, and ground systems, as well as integrated tactical warfare systems.

The Center will be an addition to the Kelly Johnson Research and Development Center located at Rye Canyon near Valencia, Calif.

★ For five straight months, the Air Force/McDonnell Douglas KC-10 has maintained a launch reliability record of 100 percent based on logistics support criteria.

According to McDonnell Douglas officials, no advanced tanker/cargo aircraft missed taking off on any scheduled missions from February 1 to June 30. In that period, the KC-10s flew for 7,517 hours on 3,018 flights, including touch-and-go landings.

The Air Force set a goal of ninety-six percent for both launch reliability and mission completion when the KC-10 entered the SAC inventory in 1981. The cumulative record since then exceeds ninety-nine percent.

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Brig. Gen. William B. Cass, a transportation executive from Cedar Rapids, Iowa, has been elected the new National Commander of Civil Air Patrol, the 67,000-member, all-volunteer civilian auxiliary of the US Air Force. General Cass, a twenty-seven-year veteran of Civil Air Patrol, has served the past two years as National Vice Commander. Today, the CAP is a valuable USAF asset, especially in search and rescue work. During World War II, the CAP provided air patrols for both coasts of the United States.

THE AIR FORCE also set a goal of seventy percent for fully mission capable daily operations. The KC-10s have been available more than eighty-nine percent of the time. In a recent four-month period (ending in August), the availability exceeded ninety percent, far above the record of other aircraft in the SAC fleet.

The KC-10s are operated by the Eighth Air Force from Barksdale AFB, La., and the Fifteenth Air Force from March AFB, Calif. McDonnell Douglas provides logistics support through contractor-operated maintenance bases at each location.

AEROSPACE WORLD

★ The proficiency of Air Force crews in the use of electronic countermeasures to react to simulated threats will be evaluated with the aid of van-mounted training equipment now being tested.

Two vans, referred to as AN/MSR-T4 countermeasures signals training

sets, have been fielded for operational testing at La Junta, Colo., and Nevada's Nellis AFB. The training systems were designed, built, and tested at Denver by Martin Marietta Information & Communications Systems under a contract with the Air Force Armament Division at Eglin AFB, Fla.

The contract calls for production of seven AN/MSR-T4 sets to monitor and record radio frequency emissions as aircraft fly over SAC and TAC sites. Aircrews receiving signals indicating missile attacks or radar contacts must take appropriate electronic countermeasures to protect their aircraft. The AN/MSR-T4 system analyzes aircrew and electronic countermeasures equipment responses to simulated threats. Each mobile system is carried in a thirty-foot semitrailer with a small second trailer carrying tracking electronics for remote operations where on-site aircraft tracking is unavailable.

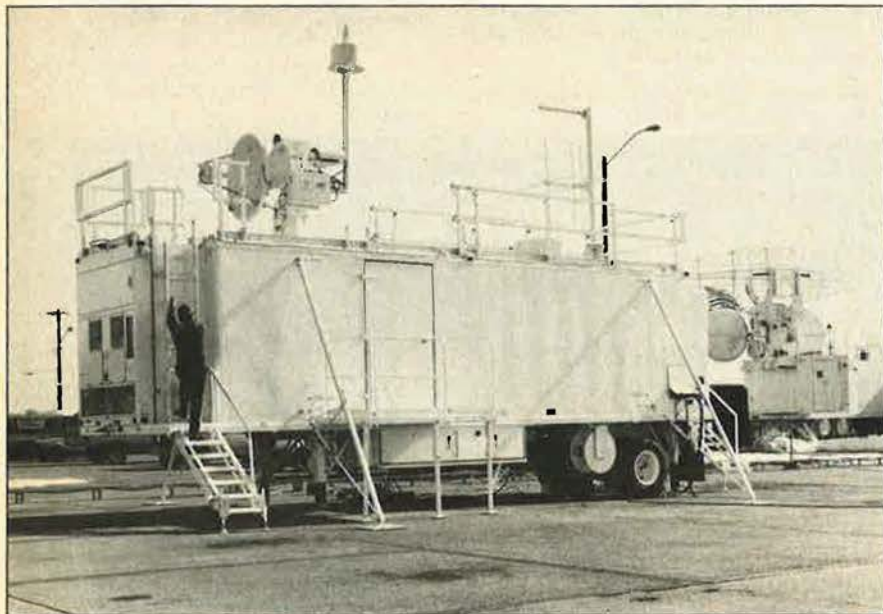
Only the first two van systems—at La Junta and Nellis—will undergo field testing. The other five will be accepted after further factory testing. The van system at La Junta is nearing completion of three months of formal field testing at a SAC Strategic Training Range site. The second van, which includes a tracking subsystem, has completed an over-the-road transportability test and is undergoing three months of formal field testing at Nellis.

★ The 32d Tactical Fighter Squadron will celebrate its thirtieth anniversary in the Netherlands on November 16, Col. Charles S. Price, 32d TFS Commander, has announced. The F-15-equipped unit, which is part of United States Air Forces in Europe (USAFE), is assigned to NATO's 2d Allied Tactical Air Force.

Planned anniversary activities include a formal ceremony, performances by the USAFE Band, static displays, a mini midway, receptions, and a dinner dance for officers and enlisted personnel. Active and retired former members of the 32d TFS are invited to attend, Colonel Price said.

★ Vern Haugland, 1955 recipient of AFA's Arts and Letters Award, one of the first war correspondents to fly on combat missions in World War II, and the first civilian recipient of the Silver Star, died in Reno, Nev., on September 15, 1984, of heart failure.

He was attending a meeting of the Eagle Squadron Association with his wife, Tess. Mr. Haugland published two books about the famed World War II Eagle Squadrons, which were manned by Americans who flew with



This van, one of two AN/MSR-T4 countermeasures signals training sets now being tested in the field, is designed to analyze aircrew and electronic countermeasures equipment responses to simulated enemy threats. See item.

Editorial Staff Changes at AIR FORCE Magazine

Two editorial staff changes have been announced for AIR FORCE Magazine. John T. Correll has been appointed Editor in Chief and James P. Coyne has joined the magazine staff as a Senior Editor.

Mr. Correll joined the magazine staff as a Senior Editor and had been Executive Editor since October 1983. Before coming to AIR FORCE Magazine, he was a career Air Force officer, retiring as a lieutenant colonel after twenty years of service. During his USAF career, he was editor of *Airman*, the official magazine of the Air Force, and later Editor in Chief of *Defense* magazine and other periodicals published by the American Forces Information Service.

Mr. Correll's articles have appeared often in defense-oriented publications, and, during his military career, he served regularly as speechwriter for senior Air Force officials. In 1971-72, he spent a year's internship on the AIR FORCE Magazine staff under USAF's "Education With Industry" program.

Mr. Coyne retired August 31 from the Air Force in the grade of colonel. He is a fighter pilot with wide operational experience in a variety of aircraft and flew 139 combat missions during two tours in Southeast Asia. He has served three Pentagon tours in the Air Force and joint plans arena.

Before entering the Air Force, Mr. Coyne edited *World Highways*, an internationally known magazine published in four languages. He is author of numerous magazine articles, including stories for *Airman* and AIR FORCE Magazine, and has written by-lined feature articles for daily newspapers. His military experience included assignment as special assistant and speechwriter for the Air Force Chief of Staff. His final active-duty tour was with the Joint Chiefs of Staff in the Pentagon.

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the British against the Germans, and he had been made an honorary member of the association. He was to have made a progress report to the members on his third Eagle book, *The Caged Eagles*, covering the adventures of Eagle pilots captured by the Germans. Mrs. Haugland will complete the final volume of the Eagle trilogy.

After the war, Mr. Haugland was Aviation Editor for the Associated Press for twenty-one years. Because of his space program coverage, he was once known as "the world's most experienced splashdown reporter." His earlier books include *Letter From New Guinea* and *The AAF Against Japan*.

Following memorial services, Mr. Haugland's ashes were strewn over the Pacific near his retirement home town of San Clemente, Calif., from a plane flown by an Eagle pilot. He is survived by his wife of forty years and two daughters.

★ Sgt. Maynard Harrison "Snuffy" Smith, first enlisted airman to be awarded the Medal of Honor, died May 11, 1984, in the Bay Pines VA Hospital near St. Petersburg, Fla.

"Snuffy" (see "Valor," p. 120, April '84 issue) was a ball-turret gunner on a B-17 that was critically damaged on a strike against German submarine pens at St. Nazaire, France. With in-

AEROSPACE WORLD

tercom out and intense fires in the waist and radio sections, both waist gunners and the radio operator bailed out. The tail gunner was seriously wounded and the aircraft was under attack by FW 190 fighters.

Sergeant Smith, at first not sure the pilots were still on board, manned the waist guns, fought the fire, and tried to help the tail gunner. At one point, he threw exploding belts of .50-caliber ammunition out of a hole burned in the fuselage. When the fighters stopped attacking, he turned full time to extinguishing the fire, finally smothering it with his hands wrapped in protective clothing. He then lightened the load by throwing out all remaining ammunition, equipment, and guns, enabling the pilots to nurse the crippled Fortress to a landing at Land's End, the extreme southwest tip of England.

Sergeant Smith was awarded the Medal of Honor by Secretary of War Henry L. Stimson. He is one of only five enlisted airmen to be so decorated. He is buried in Arlington Cemetery.

★ **NEWS NOTES**—The helicopter slated to become the Air Force's new combat rescue aircraft, the **HH-60A Night Hawk**, successfully carried out its first life-saving mission recently when it flew a young Bellflower, Calif., couple to safety after they were stranded overnight near the 10,000-foot level of the high Sierras near Bishop, Calif. The Night Hawk test program has been under way at Edwards AFB since last spring and is scheduled to conclude in early 1987.

By adopting a "moving line" for its KC-135 depot maintenance program, Air Force Logistics Command has cut five days off the aircraft's normal flow time through the depot. The change increases combat readiness by slashing the maintenance schedule by 2,000 man-hours per aircraft.

The **Aero Propulsion Systems Test Facility**, which is nearing completion at the Air Force's Arnold Engineering Development Center in Tullahoma, Tenn., will be able to evaluate the performance of large air-breathing aircraft engines with up to 75,000 pounds thrust under simulated flight conditions up to 100,000 feet altitude and speeds up to Mach 3.8. When it becomes operational in 1985, **this new facility will be the largest combined wind tunnel and propulsion test chamber** and will have double the test capacity of the best engine test facilities in the US. ■

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CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Sept. 24 Defense Spending Compromise

Democratic and Republican congressional leaders and the White House finally broke a two-month deadlock over defense spending and agreed to allot \$292.9 billion for defense in FY '85.

The compromise budget represents about five percent real growth over FY '84. The Senate's position had been \$299 billion for defense, with a 7.8 percent after-inflation increase, while the House had adopted a 3.5 percent real increase for \$285.7 billion.

The figure of \$292.9 billion is to be both a spending ceiling and floor under this compromise arrangement. According to Pentagon officials, the House Appropriations defense subcommittee completed action on its version of the FY '85 defense appropriations bill prior to the spending agreement. Thus, it was lower than that mandated by the new accord. This could be rectified later by the full committee or in conference with the Senate.

The House panel funded MX R&D in full but reduced the President's Strategic Defense Initiative (SDI) request by \$575 million and the antisatellite (ASAT) system by \$65 million. Some \$750 million was cut from the B-1B program. This cut was to come from contract cost savings and reportedly would not affect the program. Funds were also cut from F-15 and F-16 procurement as well as from B-52 modifications.

Whether or not these cuts will be sustained by the full committee is not known at this time. The panel's Senate counterpart expects to mark up an appropriations bill using \$299 billion as its guideline.

MX Compromise

A two-House affirmative vote next spring will be required before any funds can be released for production of twenty-one MX missiles in FY '85. The provision was included in the defense spending accord. Both supporters and opponents of the MX view the compromise as a victory, al-

though it almost mirrors House intentions.

Of \$2.5 billion in MX procurement funds, only \$1 billion may be spent after October 1 for the deployment of missiles produced in FY '84, long-lead items, and spares. The sum of \$1.5 billion is to be held in reserve until next spring. Before the Easter recess, the House and Senate must vote twice—once to authorize the MX production funds and once to appropriate the \$1.5 billion.

The votes in each House, however, must occur no more than one calendar day apart. The White House and the Defense Department believe that the time restriction benefits MX by allowing little time for Democratic House leaders to pressure Democratic MX supporters to vote no, should MX win in the first and most critical vote. Also, postponing votes until next year could benefit MX if President Reagan is reelected and if he brings in more GOP members of Congress on his coattails.

Other controversial issues included in the defense spending compromise were generally viewed as victories for the Administration. These include a reduction of only \$150 million in the SDI program, which was the Senate position; provision for two "successful" tests of ASAT against objects in space; deletion of the moratorium pushed by the House on production of sea-launched cruise missiles (SLCMs) and a call instead for the Administration to continue to pursue efforts to distinguish between nuclear-tipped SLCMs and conventional ones; and a nonbinding "sense of Congress" provision that the Administration should not introduce combat troops into Central America.

Republican Defense Plans

The Republican Party made peace through a strengthened deterrent the foundation of its national security platform. The plank commits the party to the continued modernization of nuclear and conventional forces begun four years ago. The GOP platform does not mention achieving military superiority, as it did in 1980, but

deems technological superiority essential to the future of the national defense.

Negotiating a verifiable arms agreement with the Soviets is seen as a twin goal, but the defense plank comes down hard on Soviet intransigence in the arms-control arena. The Soviets are accused of demanding US concessions before commencing negotiations. Further, the GOP charges the Soviets with trying to obtain a strategic advantage through "a sustained pattern" of arms-control treaty violations. Cited are violations of SALT, the ABM treaty of 1972, the Helsinki Accords, and the Biological and Toxic Weapons Convention of 1972.

Touting broad gains in defense forces made by the Administration, the platform wholeheartedly endorses continuation of the All-Volunteer Force, steady increases in the defense budget, SDI research, and greater economy and efficiency in defense procurement and management.

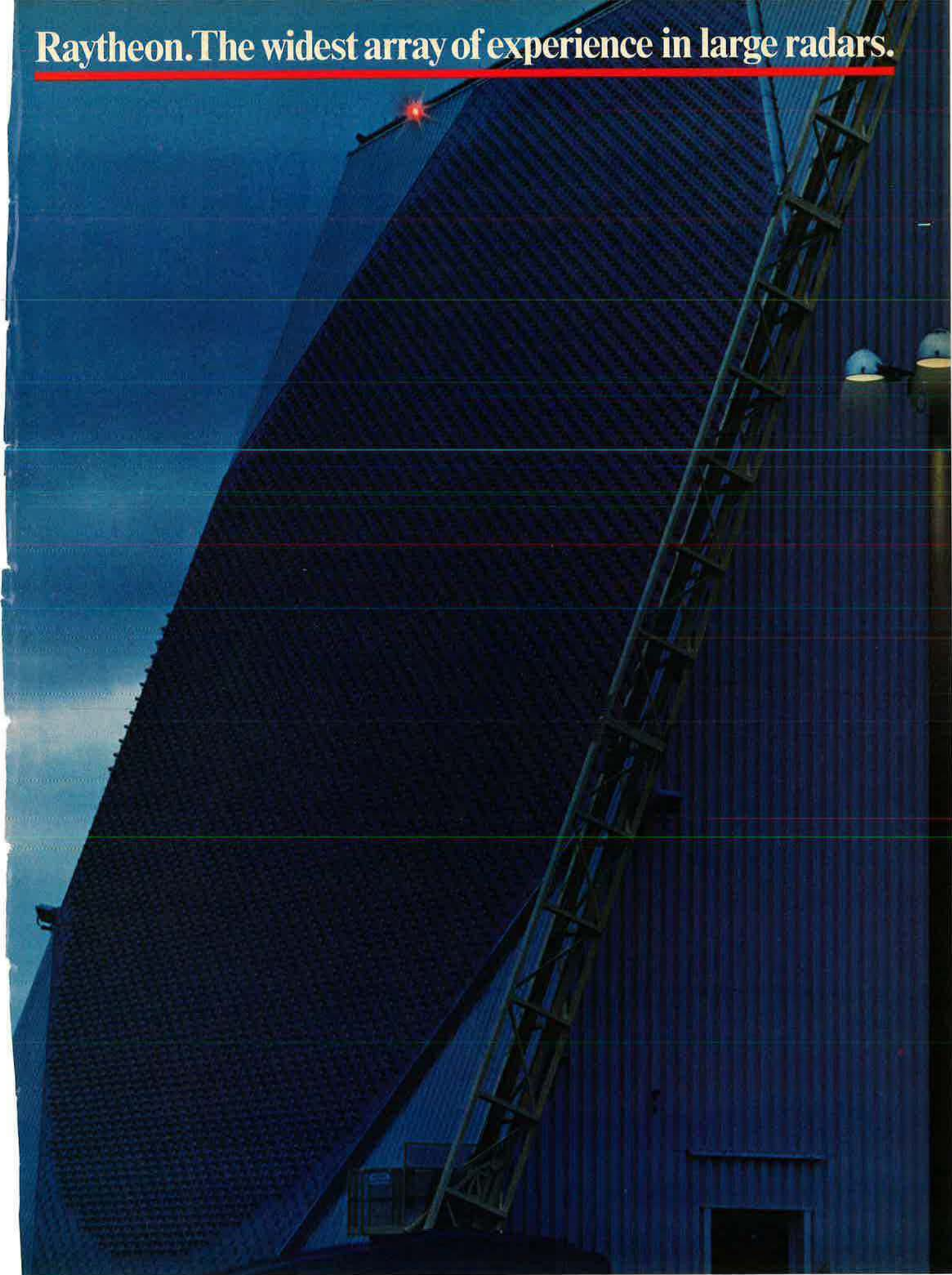
Vandenberg Problems Resolved

Under Secretary of the Air Force Edward C. Aldridge, Jr., told a Senate panel that there was no substance to recent television reports that, when the Shuttle is launched next year, the launch pad at Vandenberg AFB, Calif., would blow up because of uncorrected construction deficiencies and safety problems.

Secretary Aldridge said that while some deficiencies existed, they did not present a major problem of safety or quality assurance that would interfere with the October 15, 1985, launch of *Discovery*. He compared the construction problems to those experienced by NASA at the Kennedy Space Center. The Air Force's management system uncovered all of the 6,000 discrepancies, of which sixty were described as serious. All but fourteen of those construction problems have been corrected.

The Air Force does not expect to launch from the Vandenberg site until all problems are solved and all contractor and government personnel are satisfied that the Shuttle can be launched safely and successfully. ■

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Cobra Dane radar on Shemya Island tracks test flights of Soviet missile systems.

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array radar. And no one has more experience than Raytheon in developing and building these radars for national defense.

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Wide Area Active Surveillance system helps in control and analysis of naval fleet exercises.

U.S. East and West Coasts, and soon in the Southeast and Southwest. Able to spot basketball-size objects as far away as 1,200 miles, these phased array radars also track objects in space that



Cobra Judy radar system on stern of USNS *Observation Island* can

come within their coverage. Working for the Air Force, Raytheon has responsibility for Pave Paws design, development, manufacture, installation and testing.

Across the top of the world, the Ballistic Missile Early Warning System (BMEWS) has long kept watch for ICBM's. Raytheon has been selected to modernize a key BMEWS installation to allow the system to continue to perform its critical role.



Phased array elements form the antenna of this radar for range instrumentation.

Monitoring foreign missile tests.

From Shemya, one of the outermost Aleutian Islands, Cobra Dane keeps an attentive eye on Soviet ballistic missile tests. This powerful 100-foot-high radar, designed and installed by



early warning, intelligence, range instrumentation.



observe the terminal phase of Soviet missile tests.

Raytheon for the Air Force, can also provide early warning of ICBM launches and detect and track satellites.

Aboard the USNS *Observation Island*, a Raytheon-developed phased array radar called Cobra Judy also gathers intelligence data. In addition to the radar, Raytheon's systems responsibility also included refurbishment of the ship from mothball status.

Tracking our own training and testing.

The Navy wanted a way to accurately track and record fleet training exercises, for control purposes as well as later analysis. Solution: the Wide Area Active Surveillance (WAAS) range instrumentation

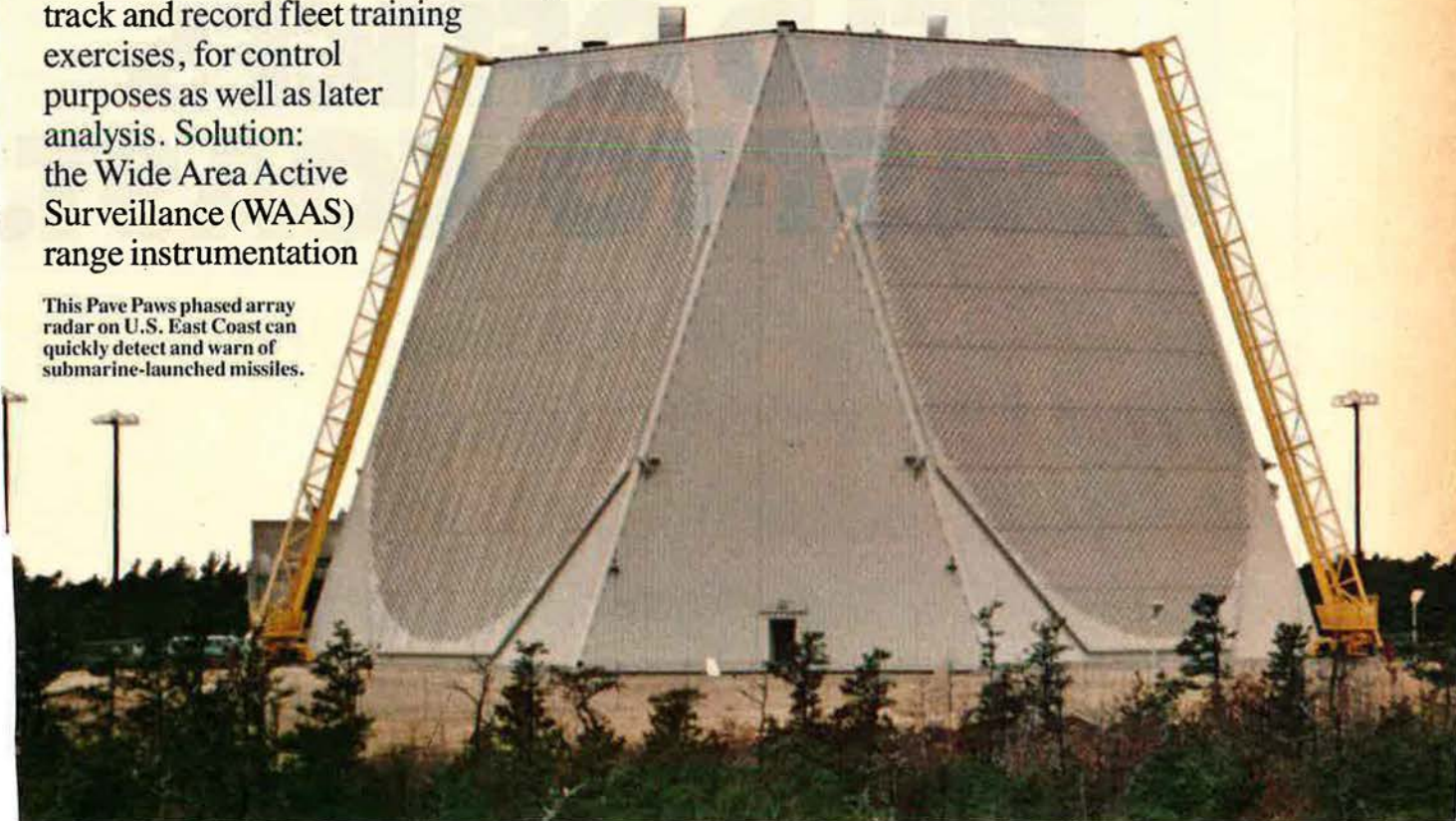
This Pave Paws phased array radar on U.S. East Coast can quickly detect and warn of submarine-launched missiles.

system. At work now in Puerto Rico, this Raytheon-developed phased array system also insures improved range safety and aids in the evaluation of new weapons systems.

A similar but transportable Raytheon phased array radar called MIR (Multiple-Target Instrumentation Radar) will help the Navy track test flights of aircraft and missiles at its Naval Air Test Center.

To sum up: by any measure—number of installations, range of frequencies, variety of uses—Raytheon has unsurpassed across-the-board experience in large, computer-driven phased array radars. Raytheon Company, Government Marketing, 141 Spring Street, Lexington, Massachusetts 02173.

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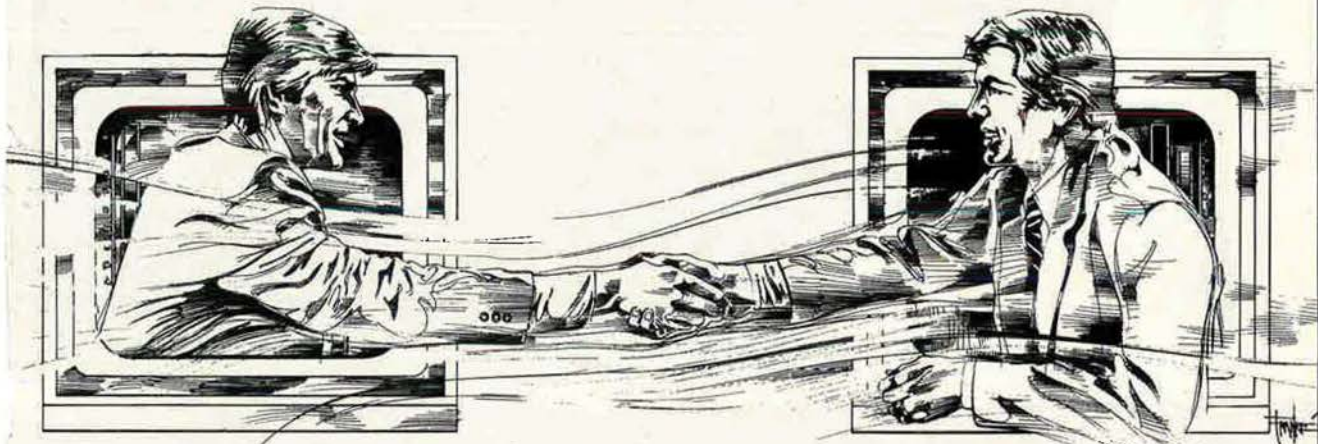


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Amazing capabilities
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sleek shape of USAF's
new strategic bomber.

The Magnificent B-1B

BY JAMES W. CANAN
SENIOR EDITOR

B-1B No. 1 goes on display at its rollout last September 4 in Palmdale, Calif. USAF has high confidence in the B-1B as a strategic penetrator for many years to come.

‘WE DON’T build bombers to go to war. We build them to keep from going to war. May it never fly in anger.”

The setting for this message from Secretary of the Air Force Verne Orr was the rollout of USAF’s new B-1B bomber last September 4 at Rockwell International Corp.’s B-1B assembly plant in Palmdale, Calif.

The first B-1B went on display five months ahead of schedule and only thirty-two months after USAF had ordered it into production. As Rockwell Chairman and Chief Executive Officer Robert Anderson put it:

“We are marking the beginning of the production flow into our nation’s arsenal of a magnificent new strategic bomber.”

Backdropping and dominating the dais at Palmdale, the sleek, darkly painted B-1B looked the part of an exceptionally lethal flying machine. Its flowing, curvilinear surfaces seemed well suited to absorbing and deflecting the signals of enemy radars seeking it out.

And yet, at two-thirds the size of the B-52, the B-1B (thirty-four feet tall, 147 feet long, and with a 137-



foot wingspan) also seemed awfully large for giving such signals the slip.

More Than Meets the Eye

In this regard, however, there is much more to the B-1B than meets the eye. Its low-observables technologies give it a head-on radar cross section—from in front, above, and below—ten times smaller than that of the B-1A and a hundred times smaller than that of the B-52. Its defensive avionics system, as sophisticated as they come, can foil all Soviet aircraft and land-based radars now in being and can be updated to cope with such radars foreseeable through the rest of this century, USAF and its B-1B contractors claim.

Moreover, these officials are confident that the B-1B's Rockwell-built automatic terrain-following system, which enables the bomber to head for targets at high subsonic speeds and at "near-treetop level," will be its means of evading most of the hostile radars it can be expected to encounter.

The B-1B's ability to penetrate to targets through what USAF acknowledges is "the world's heaviest anti-aircraft environment" and to get away unscathed has been called into question by B-1B critics, including those who favor scrapping the B-1B program and going exclusively with the Advanced Technology Bomber (ATB) now in development. Those critics claim that only the ATB, designed for a much lower radar signature than that of the B-1B, will be capable of carrying out the penetration mission well into the 1990s.

USAF is determined to lay this issue to rest, for now, in favor of the bird in hand, and should find the going much easier now that the B-1B has entered production with long-range, multiyear production contracts securely in place.

The Air Force has also set out to show that the crash of the No. 2 B-1A test-bed prototype aircraft at Edwards AFB, Calif., six days prior to the B-1B rollout does not reflect on the B-1B production program and should not detract from its magnitude or its pace.

B-1B a Benchmark

At the rollout, Secretary Orr, the principal speaker, read a message

from President Reagan that signified the President's continuing enthusiasm for the B-1B program that he reinstated, as a key part of his Administration's strategic modernization program, in 1981.

Congratulating all concerned, President Reagan described the occasion as "a benchmark in the defense of our nation" and wrote that "the cornerstone of the modernization of the Strategic Air Command has been set in place" with the introduction of the B-1B.

Gen. Bennie L. Davis, Commander in Chief of SAC, heartily agreed. Recalling that, as a major, he had flown B-52s nearly twenty-five years ago, General Davis hailed the advent of the B-1B, which is destined to replace the B-52 in the manned penetration mission, as "a banner day for the United States Air Force, the Strategic Air Command, and the Free World."

Air Force Chief of Staff Gen. Charles A. Gabriel was among top officials at the rollout. Other speakers were Gen. Lawrence A. Skantze, Commander of Air Force Systems Command (AFSC); Bastian "Buz" Hello, President of Rockwell's North American Aviation Operations; and Rep. William M. Thomas (R-Calif.), whose district embraces Palmdale and Edwards AFB.

The rollout, said Mr. Hello, denoted "that our product is now ready, and we are proud of our work." Paying tribute to the "leadership and inspiration" exemplified by several members of the audience of about 1,500, Mr. Hello introduced, among them, Lt. Gen. Jimmy Doolittle, USAF (Ret.), "whose Tokyo raid had the effect of altering World War II."

General Skantze described the B-1B as "a marvelous airplane" that offers "substantially improved performance over its B-1 predecessor." General Skantze also declared that US deterrent capability "is a function of how long we can maintain our technological superiority" and that such superiority is represented by the B-1B.

Described by Sam F. Iacobellis, North American's B-1B program manager, as "the best bomber that can be put together in the world today," the B-1B is operated by a four-man crew, in contrast to the six-man

crew of the B-52. It is powered by four General Electric F101-GE-102 engines, each rated at 30,000 pounds of thrust. These "extremely capable engines" have actually generated eight percent greater thrust than that for which they were designed, Mr. Iacobellis said.

The powerplants enable the bomber to cruise at low supersonic speed at high altitude, to get into the



Prior to its ceremonial rollout, B-1B No. 1 takes to the tarmac at Palmdale. It was scheduled for transfer to nearby Edwards AFB to take part in USAF's intensive B-1 test program. (Photo by John C. Lewis)

air in a hurry from main operating bases or dispersal bases when they come under threat, and to sustain high subsonic speeds en route to targets.

The bomber's variable-geometry wings make a team with its engines. They can be swung fully forward, at a fifteen-degree forward-edge angle from the fuselage, for takeoff and landing, or fully aft, at 67.5 degrees from the perpendicular, for cruising or penetration.

Subtle Differences

Such attributes were also characteristic of the B-1A. However, the

B-1B differs from the B-1A in many subtle but significant ways.

The production bomber's overwing fairings have been rounded off, its radome has been redesigned, a pitot tube has been repositioned, and its engine inlets have been modified to help reduce its radar cross section. Small windows have been added for its offensive and defensive systems operators.

B-1A, which was to have been produced as a Mach-2-plus aircraft.

Perhaps the most persuasive reason for switching to ejection seats, however, is the complexity and cost of building and maintaining the escape capsule system.

For example, repairing an escape capsule often requires "popping" it clear of the aircraft and inserting braces in its vacated space in order

to maintain the aircraft's internal structural integrity. And once the capsule is repositioned in the aircraft, all electrical and hydraulic lines must be realigned and reconnected.

For example, repairing an escape capsule often requires "popping" it clear of the aircraft and inserting braces in its vacated space in order

well. Beefed up to accommodate external stores, the production bomber is 82,000 pounds heavier—from 395,000 pounds for the B-1A to 477,000 pounds for the B-1B—in gross takeoff weight. It can carry sixty percent more payload or forty percent more fuel.

In fact, said Mr. Iacobellis, the first B-1B off the line weighs 1,000



Those operators are seated side by side in the aircraft about five yards behind both the aircraft commander in the left seat and the crew pilot in the right seat, respectively. Each crew member can now punch out in his individual ejection seat.

USAF's decision to use ejection seats in the B-1Bs instead of escape capsules was based on several factors.

The technology of ejection seats had progressed to the point of high confidence in their ability to function properly at extremely high aircraft speeds. Moreover, the B-1B is designed for slower flight than the

to maintain the aircraft's internal structural integrity. And once the capsule is repositioned in the aircraft, all electrical and hydraulic lines must be realigned and reconnected.

Ejection seats were built into B-1A test aircraft No. 4, whereas the first three B-1As contained crew escape capsules. Since the production bombers will not have such capsules, the performance characteristics of the one involved in the crash of B-1A No. 2 aircraft have become academic in the context of the B-1B program.

The B-1B is a stronger and more

pounds less than anticipated, "and we expect the weight will come down even further" in future production aircraft.

Tremendous Bomb Load

Built for a 125,000-pound maximum payload of nuclear or conventional bombs and missiles, the B-1B—unlike the B-1A—features a movable bulkhead in its forward weapons bay. This gives it greater flexibility in arranging internal stores and fuel. The B-1B can carry twenty-four short-range attack missiles (SRAMs) or eight air-launched cruise missiles (ALCMs) internally.

In addition, it features under-fuselage hardpoints that can accommodate up to fourteen ALCMs or SRAMs.

"The B-1B carries a tremendous bomb load for an airplane that's smaller than a B-52," said Maj. Gen. William E. Thurman, Aeronautical Systems Division's B-1B program director. "Depending on the kinds of weapons, it can carry anywhere from twenty percent to fifty percent more of a payload than the B-52." This, General Thurman said, includes "the conventional weapons of today and the guided conventional weapons that will be coming into the inventory tomorrow."

Moreover, said the General, "we're looking at the possibility right now" of the B-1B carrying the Advanced Cruise Missile being developed for possible SAC deployment. Its integration with the B-1B "would not be difficult," he said.

When the ATB comes along, as planned, in the 1990s, the B-1Bs will be pulled off their penetration mission and assigned to replace the B-52s in the standoff cruise-missile role. This is not a foregone conclusion, however.

Meanwhile, in their penetration mode, the B-1Bs are designed to carry additional fuel tanks in weapons bay spaces where up to eight cruise missiles instead could repose (along with a maximum fourteen cruise missiles carried externally). This, too, is crucial to taking them to faraway targets in the Soviet Union, should it come to that.

It is also crucial to the B-1B's versatility. The bomber's virtue as a nuclear penetrator into the world's heaviest anti-aircraft environment now seems obvious enough. But its potential for a variety of nonnuclear missions could well turn out to be its strong suit in the long run.

Given its range, speed, and lethality, the B-1B could come in very handy on maritime missions in support of the US Navy's efforts to maintain control of sea lanes and on long-distance, overland interdiction missions in support of US ground forces.

The B-1B can clearly take over collateral missions already being flown by the B-52, including sea surveillance, antisubmarine warfare, and mine-laying operations.

No major structural changes, such as drilling of holes or shifting of bulkheads, will be required to wire the B-1B for carriage of conventional bombs or missiles. In fact, wiring for such weapons has already been strung, with ends dangling, in locations where doing it quickly would be the most difficult. For example, the Harpoon medium-range antiship missile now carried aboard some B-52s is compatible with the B-1B's wiring.

"The B-1B would not have to be redesigned to carry Harpoons," one USAF official explains, "but certain interface equipment would have to be installed. We'd have to get the pylons and find the right-size bolts to bolt them onto the airplane."

Weapons delivery systems on the B-1B are similar to those on newly modified B-52s. So are the inertial navigation system and the offensive radar system, which is made up of the latest and best Doppler and altimeter radars.

Electronic Marvels

The most dramatic changes lie in the bomber's avionics. All are self-diagnostic and modular. This means that malfunctioning components can be quickly identified and fixed.

The B-1B's offensive and defensive avionics systems can be reprogrammed—in advance of missions or during them—in accordance with changes in the threats. New modules, designed in anticipation of such changes and built in advance of them, can be plugged into the bomber's avionics systems.

"This airplane can grow to accommodate new kinds of threats and new kinds of information, principally through software changes," General Thurman said. "Not only can the B-1B handle anything that we know about today, we think it can adapt to anything that the Soviets can have on their drawing boards tomorrow."

General Thurman also praised the B-1B's onboard computers. They give the bomber "tremendous computational capabilities," he said, and, "as new threats are presented and new capabilities are needed, we will have the computer power to address them."

But the main point—one emphasized and reemphasized by USAF

and contractor officials in the B-1B program—is that the B-1B is a "software-intensive" weapon system. This is what its critics fail to understand or deliberately ignore in denigrating the B-1B's potential for staying abreast of the threats, such officials claim. These officials believe that the bomber's offensive and defensive avionics systems, on which it depends for precise and safe penetration, weapons delivery, and escape, are electronic marvels.

Boeing Military Airplane Co. integrates the B-1B's offensive avionics system (OAS), which features a multipurpose Westinghouse radar and a Singer-Kearfott inertial navigation system. Boeing also builds the controls and displays for the aircraft's defensive avionics and tail-warning systems.

Offensive Avionics System

The OAS is what guides the bomber to its target and aligns and launches its weapons. It has much in common with the offensive systems of the B-52 and the B-1A, but is a significant improvement over both.

Boeing, says the company, is "giving special attention to achieving commonality with B-52 and F-16 offensive avionics . . . to reduce program life-cycle costs, since B-52 OAS and F-16 avionics are in the US Air Force inventory."

This approach—taking advantage of what's available and building on it—is contributing to keeping B-1B program costs within prespecified bounds of \$20.5 billion, in constant 1981 dollars, for a hundred of the bombers.

Even so, there is a great deal that is brand-new in the B-1B's innards; for example, Westinghouse's APQ-164, a phased-array radar, is at the heart of the B-1B's offensive radar system (ORS). Described by one USAF officer in the B-1B program as "the ultimate in multipurpose radars," the APQ-164 combines the functions of the terrain-following and ground-mapping radars now in the B-1A. It not only navigates the bomber but also identifies targets for weapons delivery.

The APQ-164 radar combines the fruits of two USAF research programs of several years' standing.

One is the Electronically Agile Radar (EAR) program begun in

1974 to develop the next-generation strategic radar. From it came, among other things, the phased-array technology that gives the B-1B's ORS its quicksilver speed and copious capability.

Characterized by inert electronic eyes rather than by actively moving mechanical dishes, the B-1B's phased-array radar is much less susceptible to detection by hostile radars probing for the bomber's passage.

Westinghouse, which built the F-16 radar, is capitalizing on that program too, of course. B-1B radar technologies based on those of the F-16 are incorporated in the bomber's dual-mode transmitter, programmable signal processor, and some other radar components. B-1B/F-16 radar commonality enabled USAF to save an estimated \$350 million in development costs for the B-1B.

Of the four modes in the APQ-164 system that give the B-1B its navigation capability, the main one is the high-resolution Synthetic Aperture Radar (SAR) mapping mode. Westinghouse describes it as "the primary tool for ingress, target attack, and egress." Having scanned, it provides the offensive avionics system operator with a high-resolution image of a ground point selected by the inertial navigation system or the operator from a map on display at his station.

Another critical radar function is that required for B-1B penetration. The APQ-164 scans the terrain in the flight path of the aircraft. It measures the terrain in a range-vs.-altitude profile out to ten nautical miles and stores the data in the radar computer.

Then the profile data is transmitted across the avionics system's multiplex data bus to the terrain-following control unit, which generates the commands to climb, dive, or juke. These are then fed into the pilot's flight control system. It all takes place in a twinkling.

Impressive Defensive System

The B-1B's AN/ALQ-161 defensive avionics system is equally impressive. Developed by Eaton Corp.'s AIL Division, it has been flight-tested for two years with, says USAF, "excellent results." Its coverage of frequencies and reper-



The late Doug Benefield and a B-1A test aircraft. (Photo by John C. Lewis)

The Special Contribution

The September 4 rollout of the first B-1B production bomber was also an occasion of high tribute to the late Tommie Douglas (Doug) Benefield, senior engineering test pilot for Rockwell International Corp.'s North American Aviation Operations.

Mr. Benefield, fifty-five, was fatally injured on impact of a B-1A prototype aircraft escape capsule in the Mojave Desert near Edwards AFB, Calif., on August 29. He and two other crew members had ejected in the capsule prior to the crash of the aircraft.

The others, Air Force Maj. Richard V. Reynolds, the pilot, and Air Force Capt. Otto J. Waniczek, the navigator, were severely injured.

Having retired from the Air Force as a colonel, Mr. Benefield joined Rockwell in 1974 to fly the B-1. He was widely regarded as one of the nation's top test pilots throughout a flying career that spanned thirty-four years.

Mr. Benefield was graduated from Texas A&M in 1949 with a bachelor's degree in aeronautical engineering. He received his USAF pilot's wings in 1950 and completed USAF Test Pilot School at Edwards AFB in 1955.

Following six years as an Edwards test pilot, Mr. Benefield entered the Space Course of the USAF Aerospace Research Pilots School at the base, was graduated, and remained in Test Operations until 1966.

Subsequently, Mr. Benefield flew a Vietnam combat tour in F-4C Phantoms and was trained as a test pilot for the Supersonic Transport Program, which became a Concorde (SST) Test Program.

Mr. Benefield was a past president and a director of the Society of Experimental Test Pilots.

His widow, Suzanne, and sons Terry and Tommie Douglas, Jr., were among guests at the B-1B rollout.

Among the many rollout dignitaries and onlookers who acknowledged Mr. Benefield's special contribution to the B-1B program, USAF Gen. Lawrence A. Skantze, Commander of Air Force Systems Command, had this to say:

"We have been able to accomplish this because we had a guy named Doug Benefield. Doug convinced himself we had a superb airplane, and then convinced the rest of us.

"Doug had a contagious enthusiasm about the program. He left us a challenge to finish it.

"Doug, wherever you are, we're going to finish the program and do it damn well!"

toire of jamming techniques add up to substantial improvements over the original system designed for the B-1A.

The system's unique central feature, however, remains the same. This is the total integration of its radar-receiving and radar-jamming functions.

The system can detect new radar

signals coming at it and begin jamming them almost instantaneously, even while continuing to monitor and jam signals it had already sensed.

This is very important. A penetrating B-1B can expect to find, and must counter, a highly dense environment of signals from increasingly sophisticated and pro-

liferating Soviet radar networks. If such signals are not jammed, SAMs, anti-aircraft rounds, and air-to-air missiles would make things very difficult indeed.

With its AN/ALQ-161 system, together with its low radar cross section, its high speed at low altitude, and whichever other tactical or technological means it may employ, the B-1B will have a very good chance of getting through.

The AN/ALQ-161 contains large numbers of jamming transmitters and antennas, all managed by a network of highly specialized digital computers.

Each of the network's "jamming chains," deployed all around the bomber, can jam signals from many radars all at once. Altogether, in exquisite coordination under computer control, they can play hob with signals in all frequency bands from all directions.

To provide quick-time control of receivers and jammers, the system contains six main data buses that receive data from nine high-speed computers called Jamming Allocation Logic Units. These are housed in two black boxes called Jam Logic A and B.

Still other black boxes embody the system's main computer and other processors for classifying signal data, tracking radar pulse trains, and computing jamming waveforms, among other tasks.

A great beauty of the B-1B is its multicomputer network, wherein all its identical main computers, including that of the AN/ALQ-161 system, communicate via a standard data bus called "1553" and work together in projecting on crew-compartment displays.

This bus also transmits status reports to a Central Integrated Test System that records in-flight

failures or battle damage. The AN/ALQ-161 system has its very own Status Evaluation and Test (SEAT) monitoring network that enables it to route electronic signals around malfunctioning components and thus to maintain its jamming prowess against top-priority threat signals.

All told, the B-1B's defensive avionics system is made up of ninety-seven black boxes, including antennas. They are called Line Replaceable Units (LRUs) and represent more than forty-five unique LRU designs. Most are one to two cubic feet in volume and weigh forty to eighty pounds. Easily accessible, they can be removed or installed very quickly, in most instances by just one or two persons.

Defeating the Threats

USAF officials are confident that the B-1B's defensive system can

Pipeline of Principal Suppliers

USAF's B-1B bomber No. 2 is nearing completion at Rockwell International Corp.'s Palmdale, Calif., assembly plant. The third production bomber is well along in assembly. In addition, major assembly work has begun on six of the bombers. Some parts for all one hundred B-1Bs have already been fabricated.

Bomber No. 13 is expected to be in final assembly a year from now. All B-1Bs are scheduled to be delivered to USAF by mid-1988.

The B-1B program is managed by Air Force System Command's Aeronautical Systems Division at Wright-Patterson AFB, Ohio.

Associate contractors are Rockwell's

North American Aircraft Operations for airframe and integration, Boeing Military Airplane Co. for offensive avionics, Eaton Corp.'s AIL Division for defensive avionics, and General Electric Co. for engines.

Behind them is a pipeline of 5,200 subcontractors and suppliers. Principals are listed below.

Components

Aeronca, Middletown, Ohio—engine shrouds.
Avco, Nashville, Tenn.—wings.
Brunswick, Marion, Va.—radomes.
Kaman, Bloomfield, Conn.—engine access doors and rudders and horizontal actuator fairing.
Martin Marietta, Baltimore, Md.—horizontal and vertical stabilizers and structural mode control vanes.
Vought, Dallas, Tex.—aft fuselage and aft intermediate fuselage.

Systems

AiResearch, Torrance, Calif.—central air data computer and weapons bay door drive.
Bendix, Teterboro, N. J.—vertical scale flight instrumentation.
B. F. Goodrich, Akron, Ohio—tires.
Cleveland Pneumatic, Cleveland, Ohio—main landing gear.
Crane, Hydro-Aire, Burbank, Calif.—anti-skid subsystem.
Garrett Turbine Engine Co., Phoenix, Ariz.—secondary power system.

General Electric, Binghamton, N. Y.—engine thrust control.
General Electric, Wilmington, Mass.—engine instruments.
Goodyear, Akron, Ohio—wheels and brakes.
Goodyear, Litchfield Park, Ariz.—windows.
Hamilton Standard, Windsor Locks, Conn.—air conditioning and pressurization/air recirculation loops.
Harris, Melbourne, Fla.—electrical multiplex.
Hughes Treidler, Garden City, N. Y.—heat exchangers.
Kelsey-Hayes, Speco, Springfield, Ohio—flap/slat actuator subsystem and rotary launcher drive.
Menasco, Burbank, Calif.—nose landing gear shock strut.
Sierracin, Sylmar, Calif.—aft crew windows and windshields.
Simmonds Precision, Vergennes, Vt.—fuel center-of-gravity management system.
Singer-Kearfott, San Marcos, Calif.—flight instrument signal converter and multiplex interface module.

Sperry, Albuquerque, N. M.—automatic flight controls and gyro stabilization.
Sperry, Phoenix, Ariz.—vertical situation display.
Sperry Vickers, Jackson, Miss.—emergency electrical power system and primary hydraulic pumps.
SSP Products, Burbank, Calif.—engine bleed air ducts.
Sterer Engineering, Los Angeles, Calif.—steering and damping subsystem.
Sundstrand, Rockford, Ill.—constant speed drive, engine bleed air controls, rudder control, and wingsweep system.
Swedlow, Garden Grove, Calif.—windshields.
Telephonics, Huntington, N. Y.—central integrated test system.
TRW, Cleveland, Ohio—fuel pumps.
United Aircraft Products, Dayton, Ohio—precooler/heat exchangers.
Weber Aircraft, Burbank, Calif.—ejection seats.
Westinghouse Electric, Lima, Ohio—generator and controls.
Woodville Polymer, Derbyshire, England—wing fairing seals.

sense and beat all manner of threats. They also acknowledge, however, that much may depend on the training and proficiency of the system's operators, who will range in rank from lieutenant to lieutenant colonel.

In this regard, one officer in the B-1B program describes a combat scenario as follows:

"In a typical engagement, the ECM system will note that there's a fighter out there. It will inform the [B-1B] crew as to where the threat is, what kind it is, what its range and azimuth are.

"Not only that, but it will relay what it 'hears' coming from that fighter's radar—he doesn't see us, he sees us, he's searching, he's refined his search pattern, he's locked on, he's launched, the missile is on its way, it's this far away or it's *not* coming at us.

"Somewhere in all that, the B-1B's ECM system will decide that being low and small [on radar] and going fast is not going to cut it, and it will turn on the countermeasures.

"The [defensive system] operator may decide that the countermeasures are not coming on fast enough, or that there aren't enough of them, or that there isn't enough power in a certain area. He also may decide that because the airplane [the B-1B] is flying higher than it's supposed to, or maybe is trailing smoke, the [enemy fighter's] fire search is going to turn into a lock-on far faster than his computer is programmed to accept it.

"So the operator would adjust. He would make the decision to start jamming sooner than the computer normally would.

"Such things can be done any time by the operator."

Chances are good that the B-1B's defensive systems operators will be up to the task. To qualify as such, they will train for two and a half years. Nearly all of what they learn and practice is classified information.

Heading for the target, the B-1B crew would delay turning on active countermeasures as long as possible so as not to compromise the bomber's "stealthy" passage.

"We would do a lot of passive countermeasures just waiting for the time when the active countermeasures are needed," one official

explains. "This would allow us to maneuver if we have the time—to move just a little left or a little right from a searching air missile system, to get behind trees or hills, or down into river beds."

"Hidden" Engines

Without divulging highly classified information, B-1B program of-

engines rather than on a direct one.

As a result, the engines can still breathe adequately, and electromagnetic energy that enters the inlets is reflected downward or is diffused.

The engines themselves have turned out to be models of durability and performance. They have demonstrated this during ac-



A B-1B offensive systems operator mans his station, which is aft of the crew commander. The bomber's highly sophisticated, software-intensive offensive and defensive avionics are crucial to its capability for effective, safe penetration.

officials make clear that the B-1B comes equipped with a variety of "electronic camouflage" techniques that, among other things, can make the bomber appear to be where it actually is not.

The B-1B's stealthy propensities were enhanced by a redesign of its engine inlets. The whole idea was to prevent radar signals from penetrating the inlets, striking the engine's prominently spinning fan blades on a straight line, and then reflecting directly back to the radar on a true course. The engines had to be "hidden" from radar but still be provided, through their inlets, with ample air for breathing.

Among other things, Rockwell and General Electric angled the once-vertical lines of the inlets' guide vanes and other metallic inwards. In the inlets, they also inserted baffles—resembling venetian blinds—that take the air and radar signals on a winding course to the

celerated mission testing that is the equivalent of more than 3,000 hours or ten years of service.

Moreover, the powerplants have performed successfully throughout the B-1B operational envelope—from high-altitude cruise to low-altitude penetration levels—during more than 150 hours of "altitude testing."

To facilitate maintenance, GE is building the B-1B engines in such a way that they can be completely or partially disassembled with relative ease. Each engine has several borescope ports for visual inspection, with emphasis on ports for the nine-stage axial-flow compressor, the annular-type combustor, and the air-cooled turbine that make up the hot section. The variable-geometry exhaust nozzles are hydraulically activated, and the afterburner produces fully modulated thrust throughout the bomber's augmented-thrust range. ■





ABOVE: A thirty-eight-year-old dream was realized on September 16 with the dedication of the Air Force Association Building. **LEFT:** Bunting draped the lower terrace as the gathering of AFA field leaders, national staff, and guests witnessed the raising of the flags. (Photos by Eddie McCrossan)

The Air Force Association Building looks proudly across the Potomac.

AFA'S

New National Home

THE ribbon cut and the dedication speeches made, AFA officers and Convention delegates lingered awhile on September 16 to tour the Association's new headquarters building.

"Our own National Home," AFA's first national President, James H. Doolittle, called it, a distinctive structure with attractive terraces and brick facade, situated on a wooded lot in Arlington, Va., with a panoramic view of the nation's capital just across the Potomac River.

The Air Force Association Building, as it has been named, stands four floors above ground, with four parking levels below. AFA and the Aerospace Education Foundation occupy the entire top floor and most of the third floor, leaving the remaining office space available for lease. Total office space amounts to 70,000 square feet. A broad entrance plaza leads into the elevator lobby, presided over by a life-size bust of Jimmy Doolittle, on long-term loan from Mutual of Omaha. The terraces offer an unobstructed view of Washington, including the US Capitol dome, the Kennedy Center, and the Washington Monument. The Pentagon is nearby on the same side of the river.



ABOVE: AFA's first National President, James H. Doolittle, is flanked by then-Board Chairman John G. Brosky, left, and then-President David L. Blankenship during the ribbon-cutting. Former President Blankenship spoke for all present when he said, "It is with pride and humility that we dedicate this AFA Building, and the efforts of all those who will work here. We dedicate it to the memory of those who have given their lives in the service of our country, and we dedicate it to the cause of peace and freedom here and throughout the world." **RIGHT:** Jimmy Doolittle stands proudly beside the bust that adorns the lobby of the new AFA Building. (Photos by Eddie McCrossan)



The Association staff had moved into the building in August, but the formal dedication was held on September 16, the Sunday before the AFA National Convention opened, so that as many field leaders as possible could attend. Several of those present had cause for special pride during the proceedings: Judge John G. Brosky, former AFA President and Chairman of the Board, during whose tenure the project began; David L. Blankenship, in whose term as President the building was completed; the building committee—Chairman Earl D. Clark, Jr., Jack B. Gross, and George D. Hardy; and Andrew B. Anderson, Deputy Executive Director, who coordinated AFA staff support for the site acquisition, construction, and relocation.

A special open house for military, government, and community leaders, the news media, and others out-

side the immediate AFA family was scheduled for October 4.

A building that the Air Force Association could call its own has been a long time coming, thirty-eight years and six leased headquarters locations after the founding of AFA in 1946. Beginning with a one-room office and furniture abandoned by a previous tenant, the headquarters moved from one rental space to another, settling in at 1750 Pennsylvania Ave., N. W., in Washington, D. C., in 1964 and remaining there for twenty years.

By 1981, the growing operation was cramped in its single-floor quarters on Pennsylvania Avenue. Both space requirements and economic considerations suggested that the time had come to move ahead with a building program rather than to continue to lease space. In September of that year, the newly elected AFA President, Judge Brosky, an-

nounced that a primary effort of his administration would be to find an appropriate building site and get the headquarters construction project under way.

Prime Site

Eighty-two possible locations were considered, and a prime lot at the corner of Lee Highway and North Oak St. in Arlington was chosen. Its availability was a matter of timing and luck. The state of Virginia had acquired this parcel of land, 54,000 square feet, as right of way for Interstate Route 66, which was then under construction as a new freeway leading to the Potomac River bridges and downtown Washington. By fortunate coincidence, AFA's relocation plans matured just as the state declared this lot as excess to its needs for the highway, which was nearly complete by then. Most of the better sites in this area, especially those with commanding views, were built upon long ago.

AFA's partner in the venture has been the Weissberg Development Corp., which constructed the building, owns it, and will see to its management. AFA owns the land and has an option to purchase the building some years hence.

The informal ground breaking took place on February 12, 1983, with formal ground breaking on May 7. Excavation began a few days later. The building was topped out on December 8, and, through the spring and summer of 1984, construction crews worked to finish the interiors and appurtenances so that AFA could be under its new roof well before the 1984 National Convention.

The staff moved on the weekend of August 3-6, only three weeks behind the target date in the schedule planned at the outset of the project.

AFA's John O. Gray, who has been deeply involved in the project since the gleam first developed in the Association's eye, reports the following vital statistics:

Construction required 14,500 cubic yards of concrete, 330,000 bricks, 350 gallons of paint, 10,332 square feet of glass, and 207 miles of electrical wire. The building took 247,000 hours of labor to complete, and the work force consumed approximately 72,000 cups of coffee on the job. ■

Point Team for the Move



The point team for the move, from left: AFA Deputy Executive Director Andrew B. Anderson, Kenneth A. Goss, consultant John O. Gray, and (shown separately in the photo at the right) Administrative Assistant to the Deputy Executive Director Jancy A. Bell.

If, during the past year or so, you asked Andy Anderson, "How's it going?", you were leaving yourself open for an earful. "It," as he understood it, naturally referred to the new AFA building.

You were likely to be told far more than you ever wanted to know about the shortage of brick masons, the legal requirements for valid lease-purchase of equipment, or the perversity of weather as it bears on construction progress. Of necessity, Andy Anderson had been acquiring a substantial expertise in these areas and many more.

As the new Air Force Association Building rose from the stubborn bedrock of Virginia's Potomac shore, Andrew B. Anderson labored as AFA's staff coordinator for the project. He was responsible for liaison with the developer, outfitting of the new offices, relocation of the eighty-member AFA staff, general problem-solving, and keeping the whole enterprise on schedule. He was often a hard man to find as he shuttled from the construction site to meetings with architects, developers, or lawyers, then back to his office to check his in box and his construction PERT chart, and then off again. All this was in addition to his regular duties as AFA Deputy Executive Director.

The building project has likewise been an experience in total immersion for John O. Gray, who retired as AFA Assistant Executive Director after a severe heart attack in 1978 and who has been on supposedly limited duty as a consultant since then. In his case, that has often meant seven-day weeks and workdays that run to double-digit hours. From choice of the site and selection of the brick to securing the Industrial Revenue Development Bond and devising the floor plan, John O. was there and making things happen.

AFA certainly got its year's worth out of Andy Anderson and John Gray, as well as from the two staff members most involved with them in the building project: Kenneth A. Goss and Jancy A. Bell. Ken was Special Assistant to the Executive Director during this period, but has since been named Director of the new Aerospace Education Center, which came into existence in the new building and which now conducts its operations from there. Jancy is Administrative Assistant to the Deputy Executive Director. For much of the spring and summer, though, Ken and Jancy were first and foremost facilitators of matters pertaining to the building and the move, working with Andy Anderson on everything from expediting delivery of carpets to having the

floors covered before the furniture arrived to making sure that the building was ready to pass county inspections for its occupancy permit.

Andy Anderson has been AFA's Deputy Executive Director since 1981. Before he retired from the Air Force in the grade of lieutenant general in 1979, he was Deputy Chief of Staff for Plans and Operations. He is a 1948 graduate of the US Military Academy, flew a combat tour in Korea in C-54 aircraft, commanded a SAC bomb wing, formed and commanded a B-52 air division during the Southeast Asia war, served on the Joint Strategic Target Planning Staff, and was SAC Chief of Staff. He holds two bachelor's degrees in engineering, a master's in history, and is a graduate of the Industrial College of the Armed Forces. After his retirement and before joining the AFA staff, he was a financial planning consultant.

John Gray served with the Eighth Air Force in England in World War II, was recalled to active duty during the Korean conflict, and continued on after that in the Air Force Reserve. He joined the AFA staff in 1957. In October of that year, he became the Association's Administrative Director and soon thereafter its Assistant Executive Director, a capacity in which he served with distinction for the next twenty years. Longtime AFA members recall his energetic work in many areas: military relations, defense legislation, cooperative ventures with other defense-oriented organizations, aerospace education, and much more. He is a retired Air Force brigadier general.

Ken Goss observes his first anniversary with AFA this month. Previously, he was director of plant services for the University of San Francisco. From 1969 to 1973, he was on active duty with the Air Force as a Minuteman missile combat crew commander. He is currently a major in the Air Force Reserve. From 1974 to 1979, he was coordinator of construction for the Denver Center for the Performing Arts and, after that, construction coordinator for the Eugene, Ore., Civic Center project. He holds a commercial pilot certificate with instrument and multiengine ratings and an M.A. degree in communications.

The youngest member of AFA's point team for the move to the new building, Jancy Bell, started her Association career in 1977 as secretary to the Assistant Executive Director for Programs and Association Events. She is an Air Force brat, born at Loring AFB, Me., and has traveled extensively with her family. She was promoted to her present job in 1981.

Concepts for the advanced European fighter and other systems were on parade at Farnborough.



This water-tunnel model reveals the shape of the fighter aircraft of the 1990s as envisioned by Germany's Messerschmitt-Bölkow-Blohm.

EUROPE AIMS FOR THE '90s

BY STEFAN GEISENHEYNER

FARNBOROUGH in southern England is, for the RAF, what Edwards AFB, Calif., and Wright-Patterson AFB, Ohio, are for USAF. Called—with the typically British penchant for understatement—"Royal Aircraft Establishment Farnborough," it is the UK's hub of advanced aeronautical engineering and development.

Every two years, however, during the first week of September, Farnborough opens its gates to industry and the public for one of the world's premier aerospace exhibitions. For many years during the long history of the show—this year's show was the fifty-first—only British products were allowed on display. This restriction was lifted some time ago. Farnborough is now open to all nations, resulting in an international event in the same league as the famous Paris Air Show.

In fact, many in industry prefer the British event to the competing French show. They fault the Paris Show for its politically charged atmosphere in which politicians wrestle to their heart's delight at industry's expense. Farnborough, its advocates contend, has retained its standing as a true industrial fair where merchandise is shown, bought, and sold.

Sales, politics, and exhibits aside, aerospace shows can prove very prophetic in indicating long-term industry prospects. For the insider, they can highlight valid trends. Thus, for many, Farnborough 84 was an important intelligence-gathering exercise. For the aerospace companies in particular, it was vital to be there to exhibit or at least to have representatives on the spot to size up the competition, to learn what rivals are planning, to meet potential customers or possible future industrial partners, or to discuss new technologies or even joint ventures.

EFA: Europe's Fighter for the Future

One full-size mockup, numerous models, and an avalanche of press releases and brochures constantly reminded the visitor that Europe's aviation industry and air forces are battling with publics and governments for the funds needed to realize EFA, the European Fighter Aircraft, which, if ever built, will belong in the same class as USAF's Advanced Tactical Fighter planned for the late 1990s. Before that happens, however, numerous difficulties have to be resolved, not the least of which is based on national pride and the desires of national industries to grab the largest possible production share.

That this aircraft program is also known—depending on who you talk to—by the acronyms ACA, ACX, or TKF highlights the nature of this problem. British officials will talk about their ACA (Agile Combat Aircraft), the French will claim that their *Avion de Combat Futur* (ACX) concept is the best, while the Germans believe that the *Taktische Kampf Flugzeug* (TKF) is the cure-all for European air forces' air-superiority problems.

In order to come up with a single, joint European requirement, the defense ministers of France, Germany, Italy, Spain, and the UK met last July in Madrid to hammer out a Memorandum of Understanding (MOU). They decided to contract for a feasibility study on EFA with the aerospace industries of the five countries. The companies involved are Dassault/Breguet for France, MBB for Germany, Aeritalia for Italy, CASA for Spain, and British Aerospace for the UK.

The hoped-for result of the study is a technical and

operational compromise among the three concepts. This, however, will be quite difficult to achieve because the concepts of ACA, ACX, and TKF were created to fill widely divergent tactical requirements. It is not known publicly what missions and performance parameters Italy's and Spain's air forces have in mind for their EFA version, but it can be assumed that both have requirements at variance with those of the others.

Since it would be financial folly to develop three or possibly even five fighters in parallel just to meet respective national requirements, and because time is pressing, given the tentative goal of having EFA ready to enter service by 1995, the five ministers agreed to a joint EFA program study. However, this largely political meeting has so far produced only these tangible results: The project's name will be EFA; the aircraft will not have an empty weight of more than nine and a half tons; approximately 800 EFAs will initially be needed; and the distribution of the \$200 million study cost will be apportioned among Britain, France, and Germany at twenty-five percent each, Italy at fifteen percent, and Spain at ten percent. (This apportionment may indicate how the work would be shared should an EFA be built.) Next spring, the completed study is to be presented to the defense ministers of the five nations, who will then decide if EFA should go into the definition phase.

Until then, the divergent mission requirements and coproduction deals will remain unresolved. Whether or not they can be resolved at all remains to be seen. Prospects do not appear bright, as snags have already become evident.

The national armament directors of the five defense ministries have yet to agree on precisely what the studies should include. Therefore, detailed instructions have not been issued to industry. Industry fears that further delay will make it difficult, if not impossible, to meet the spring deadline.

On the last day of the Farnborough Show, the Dutch government announced that it had agreed to participate in the EFA project. In view of the insecure future of the venture, this belated decision came as a total surprise. However, the Dutch statement, issued by the defense ministry, explained that the Dutch government considered it essential to lessen European dependence on armaments imported from the US. Participation in the EFA program—despite its high cost—would lessen that dependence and would strengthen the Dutch economy.

French and British EFA Efforts

In France, Dassault has been working for some years on the ACX, relying largely on in-house funding. Their current ACX concept envisions a twin-engine fighter optimized for ground attack, since they expect advanced versions of the Mirage 2000 to continue to fill the air-superiority role into the next century. Extensive preliminary work with fly-by-wire and control-configured-vehicle (CCV) technology has already been accomplished.

The EFA/ACX would feature advanced avionics, a high percentage of fiber-composite structures, and an empty weight of eight tons. The planned engine is SNECMA's M 88, an advanced-technology turbofan already being bench-tested. It is based on the M 53, which powers the Mirage 2000. An experimental aircraft incorporating ACX technology and provisionally

powered by two General Electric GE 404s is slated to fly by 1986 or 1987.

On the whole, though, France has not progressed with its ACX much further than Britain and Germany have with their concepts—that is, beyond the wind-tunnel, long-leadtime hardware production, avionics-development stage. France, nevertheless, insists on design leadership for airframe and engine. Reportedly, British officials have stated that they would withdraw from the EFA project if France is charged with this task.

The Germans, on the other hand, might go along with such a decision, as they have had excellent experiences with other joint French/German ventures. The Germans also have another reason to accept French leadership. German law prohibits export of weapons outside of

application of carbon-fiber composites, for which production facilities have already been built by British Aerospace. Reportedly, the EAP will be powered by two Rolls-Royce RB 199s, the same engine now in service in the Panavia Tornado. A functional cockpit simulator has been constructed, featuring multicolor display screens and the voice-actuated controls planned for EFA/ACA. The RAF envisions the final EAP aircraft as a two-engine, eleven-and-a-half-ton, long-range interceptor suitable initially to support and later to replace the air defense variant of the Tornado.

Disagreements and Questions

Obviously, this aircraft is quite different from the eight-ton ground attack aircraft the French Air Force



NATO unless a special permit is granted. A cooperation agreement, however, would allow export through French channels of any weapon or aircraft on a worldwide basis.

Britain's design efforts for its ACA long-range interceptor are led by British Aerospace and have centered on airframe and avionics development. In order to perform empirical testing and to gain experience, a heavily modified SEPECAT Jaguar has been refitted for CCV and fly-by-wire operation. For flight control, Marconi Avionics has installed a four-channel digital flight-control system. Ten percent negative stability has been achieved, which would be typical for EFA/ACA.

The British Ministry of Defense has also contracted for the construction of an experimental flight vehicle under the designation EAP (Experimental Aircraft Program). The major portion of the EAP demonstrator is being built in Britain, with a fifteen percent contribution from Italy and one percent of the parts originating in Germany.

EAP will incorporate EFA/ACA-essential systems and will feature advanced aerodynamics and large-scale

needs. The Luftwaffe goes along with the RAF in wanting an interceptor, but prefers an aircraft optimized as an air-superiority fighter and featuring STOL capability. Extended range—so necessary for the defense of the British Isles—is superfluous to the Germans. The Luftwaffe also desires an aircraft of great agility and an empty weight of less than nine tons. The weight class is the only parameter where French and German requirements almost coincide.

But all is not disagreement. A major achievement of the ministerial meeting last spring was a tentative EFA engine decision. It will probably be an advanced version of the Rolls-Royce RB 199 (though it is possible that a completely new design would be undertaken jointly). The French are naturally fighting hard for their SNECMA M 88, which is reportedly still in the running. SNECMA was not willing to comment on the matter at Farnborough.

Questions about EFA abound. Among them are how the venture will be managed, where it will be based, how the financial aspects are to be handled, and—above all—where the needed funds can be obtained. Estimates for

total R&D, testing, tooling, and preproduction costs to be spent over ten years run to more than \$4 billion. In view of this sum, no one at Farnborough expressed much optimism that the EFA will ever be built.

It is quite conceivable that one or more governments will change their minds about the cooperation agreement. Should this happen, then France and Britain will most surely build their own aircraft, while the rest of the original five must either continue flying their aging fighters or opt for negotiations with the US for acquisition of AFTI-class (Advanced Fighter Technology Integration) aircraft.

The other nations could also turn to a supplier other than the US. For instance, Israel Aircraft Industries' Lavi fighter is seen as a technically viable candidate. Its

Swedish aircraft. The JAS-39 is fitted with a US-made engine, the General Electric 404, which has been heavily modified by Volvo and is now called the RM12. Still, the engine remains basically an American one. The aircraft cannot, therefore, be exported without US consent. As EFA is supposed to generate export earnings to help sustain European aerospace industries after the year 2000, the reluctance to use US-manufactured or -designed products is understandable.

Still, the JAS-39 offers a relatively cheap way to equip the European air forces with the aircraft they need.

Cooperation Efforts for Helicopter Production

Two promising cooperative helicopter programs were intensively promoted and discussed during Farnborough 84. They involve the four leading rotorcraft manufacturers of Europe. Teamed up for design and construction of a family of battlefield helicopters are MBB of Germany and Aérospatiale of France. Westland of Britain and Agusta of Italy have already progressed far with their venture to produce Europe's medium naval helicopter of the late 1980s.

A formal Anglo-Italian program for the development of a naval helicopter began with the signing of a Memorandum of Understanding late in 1979. This MOU initiated joint feasibility studies for a replacement of the British Sea King now in service with the Royal Navy and the Italian SH3D deployed with the *Marina Militare*.

A second MOU followed in June of 1981 covering the funding of the definition stage of the new helicopter project, from then on called the EH-101. Work continued in both countries, refining the design and planning for the full go-ahead.

This came in January of this year in the form of a third MOU covering the programs needed to carry the project from the development to the production stage. The first flight of the EH-101 is expected for 1986, with the first production rotorcraft becoming available in 1989.

The EH-101 has been designed primarily to meet the antisubmarine warfare (ASW) requirements of the Italian Navy and the Royal Navy. Other military missions



LEFT: The Soviet Union's Mi-26, the world's heaviest helicopter and the only one to operate successfully with an eight-blade main rotor, was on display at Farnborough. **BELOW:** Copilot's station in the cockpit of the Mi-26. (Photos by Norbert Neuser)

procurement, though, would severely damage if not totally destroy the carefully cultivated European-Arab relationship, which is desperately needed to sustain the economies of the Continent. It is, therefore, not seen as likely.

Another dark horse in the EFA race is the Swedish JAS-39, the successor to the formidable J-37 Viggen. This fighter is already far advanced in its development process and will fly in the not-too-distant future. Sweden has always been about four years ahead of Western Europe with its air force modernization endeavors because Swedish long-range planning does not coincide with NATO-nation development cycles.

The JAS-39 contains essentially the majority of the features demanded for EFA, with one exception. While the Western European air forces prefer two-engine aircraft, the Swedish Air Force is satisfied with a single-engine fighter. Since the JAS-39 has only one engine, it is not acceptable to the Luftwaffe or the RAF.

Even if this preference for a twin-engine aircraft were overcome, industry in the Western European nations would fight tooth and nail to prevent acceptance of the



include ship surveillance and tracking, antishipping missile launch, amphibious operations, airborne early warning, electronic warfare missions, and vertical replenishment.

With a 30,000-pound takeoff weight, the EH-101 is a heavyweight in the naval field. Nearly half of this weight can be useful payload for short-range missions. The initial models of the rotorcraft will be powered by three General Electric GE-CT7 Mk 401 engines. However, provisions have already been made to accommodate Rolls-Royce engines at a later stage to assure that export sales are not subject to US permission.

The helicopter will be fitted with a five-blade rotor of advanced aerodynamic design, promising high performance at excellent safety levels. The EH-101's structure is part conventional and part composite, tailored wherever possible on a multiload path and using damage-tolerant design principles. Extensive use of on-board system monitoring equipment is also planned. This will allow longer periods between overhauls.

The flight deck will be equipped with advanced instrumentation, featuring multicolor screen presentation. Avionics and aircraft management will be supported by a comprehensive digital data bus system. There are no specifics yet on military equipment, which will differ considerably in the British and Italian versions. It can be assumed that development of such equipment will run parallel to that of the EH-101.

A utility version is also to be built and will feature a modified fuselage with a large rear ramp for vehicle loading. Another version of the EH-101 is being planned for the civil market. Equipped to carry thirty passengers by airline standards or tailored for offshore work, it is expected to find a sizable market.

Both naval and civil variants will evolve from an integrated test and development program involving the use of nine preproduction rotorcraft, plus one for static ground testing. An important part of the program is intensive flight-testing, which has been dubbed maturity development. This testing is expected to reduce the number of subsequent in-service teething problems.

Production of up to eighty helicopters per year is planned from two assembly lines, one located in the UK and the other in Italy. Major components will be produced by one or the other of the partners and—depending on demand—will be shipped to feed both assembly lines. This, however, applies only to the variants planned. The Italian Navy's ASW EH-101s will be manufactured exclusively in Italy; the ones for the Royal Navy will be produced in the UK. To ensure high availability from date of introduction, both Westland and Agusta will use the latest state-of-the-art technology to produce the helicopter, rather than unproven advanced methods.

EH Industries, a London-based company founded in 1980, will manage this cooperative venture. This firm is controlled jointly by Westland and Agusta, and the board of directors comprises senior officials of both companies. The British Ministry of Defense, acting for both the British and Italian armed forces, is placing the development and production contracts with EH Industries, which in turn subcontracts with the appropriate divisions of Agusta or Westland.

The German Army has been engaged for more than a

decade in defining a requirement for a suitable antitank helicopter. Originally, Bell's AH-1 Cobra was the favorite because, aside from its qualities, acquisition would have brought about much-sought-after equipment commonality with the US Army on NATO Europe's front line. For a number of reasons, some political, this could not be realized.

Instead, the German-built light transport helicopter MBB Bo-105, armed with six HOT antitank missiles, was ordered in quantity. It received the designation PAH-1 (*Panzer Abwehr Hubschrauber*) and serves now with German Army Aviation units. However, from the outset, the PAH-1 was considered a stopgap measure until better equipment became available.

The German military wanted to procure the Hughes AH-64 Apache, which the US Army is buying in quantity. However, two factors ruled this out.

The first problem was the high price tag. The second was purely political. Both Germany and France wished to cement their increasingly cooperative political relations with cooperative military programs. After failing to agree on the joint development of a main battle tank, because of divergent tactical concepts, the two nations explored the feasibility of joint development and production of a helicopter family suitable for use over the battlefields of the 1990s and beyond.

After extended preliminary discussions spanning years, the Ministers of Defense of France and Germany signed in May of this year a Memorandum of Understanding finalizing this plan. Systems leadership is to lie with MBB of Germany, while Aérospatiale of France has been designated as cocontractor. Essentially, this means that the two companies are equal partners.

To implement this plan, a jointly owned company named Eurocopter was established with headquarters in Paris. The company is tasked with management of the venture and will handle future exports. In structure, it is very similar to Euromissile Co., which handles sales and export of the French-German missile production.

One Basic Design

The helicopter cooperation program comprises one basic design from which three versions—the French HAP (*Hélicoptère d'Appui et Protection*), the German PAH-2, and the French antitank HAC-3G (*Hélicoptère Anti-Chars*)—will be developed. The total requirement for both countries amounts to roughly 400 copters. (See "Jane's Supplement," October '84 issue, pp. 94-95.)

This common basic helicopter design features a tandem cockpit, with either the pilot or the gunner sitting in front. The rotorcraft is to be powered by two MTM 385-R engines with a takeoff power of about 1,000 horsepower each. This engine will be developed as a joint venture by the German firm MTU and the French company Turboméca. The copter will have a mission takeoff weight of 10,560 pounds and will be designed for a cruise speed of 160 mph and an endurance of two hours and thirty minutes, plus thirty minutes' reserve. A new-technology rotor incorporating fiber-elastomeric principles, a new rotor head, and a novel main transmission with a dry-run capability of up to thirty minutes are being developed. A high degree of protection from gunfire and crash survivability for the crew is also a prime design objective.



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The German Army requires about 200 second-generation PAHs. They will be fitted with a combined nose sight for gunner and pilot, eight Euromissile HOT anti-tank missiles, and self-defense armament consisting of four General Dynamics Stinger anti-aircraft missiles. Deliveries to front-line units are expected for 1993. The HOT missiles are considered intermediate armament because, by 1995, it is expected that the third-generation, anti-tank, fire-and-forget missile called PARS-3 will be available in quantity. This weapon is under development as a British-French-German cooperative venture.

The helicopter to be developed initially is the HAP model destined for the French Army. Essentially, it is a helicopter gunship, without pronounced anti-tank capability. Its armament will consist of a GIAT 30-mm machine cannon and Matra Mistral air-to-air missiles with a range of up to four miles.

French tactical thinking does not place too much emphasis on straightforward, helicopter-borne anti-tank missions. But they believe that supply of the front by helicopter—ground transport is deemed too vulnerable and too slow—will be essential in future conflicts. However, these transport helicopters will need protection against airborne threats, which they believe can only partly be assured by fixed-wing fighters.

The HAP, when it goes into service by 1992, will accomplish this mission of shepherding helicopter transport convoys to their destinations. French thinking on this subject has been shaped by the Iran/Iraq conflict, where French-made helicopters flown by Iraqis are facing Iran's US-built AH-1 Cobras. Both sides are using copters to disrupt the heliborne logistics lines to the respective front lines. According to the French Army, veritable dogfights among large numbers of armed copters using totally unconventional tactics have developed.

When the HAC anti-tank helicopter enters French Army service in 1996, it will resemble the PAH-2 but will have more advanced weapon systems and avionics. Designed from the outset for the PARS-3 missile, it will feature rotormast-mounted sighting equipment. Cockpit controls will be voice-actuated, and full fly-by-wire systems will be installed, with backup manual systems. On the whole, exclusively European-designed and -produced advanced-technology weaponry will be used in this helicopter to help meet the threats projected for the battlefield of the late 1990s.

When completed, this helicopter family should give the French and German armies the airborne weapon systems they need to fill their respective tactical requirements. This bilateral program and the Anglo-Italian EH-101 program are further steps toward the unification of the aerospace industries of the Continent, which should help to strengthen their competitiveness on the world market.

US-Made Stumbling Block

Much discussed at Farnborough were the restrictions imposed by the US government on high-technology exports. These restrictions upset European industry considerably. Two points of view could be heard.

The first opinion holds that these restrictions are shortsighted and are bound to curtail international trade. This could, it is believed, lead to an estrangement

between Europe and the US that would hurt the industries of both continents.

The second opinion can be summed up by this statement: "We told you so. The Americans can't be trusted!" These words come primarily from the French, who have long attempted to maintain a measure of political and economic independence from the US.

On the whole, though, it seems as if the US's high-technology export restrictions could be a blessing in disguise. In the long run, they might help to promote integration of European industry.

If present political signals are read correctly, a number of European governments will—or will continue to—give strong financial support to any national or Europe-wide long-range R&D venture that seeks to match the technological successes achieved by the US or Japan. In particular, the successes of the latter in the electronic and automotive fields disturb European industry and governments. In the Western European complaints about unfair competition, it is usually conveniently forgotten that Japan is now harvesting the results of a heavily funded and extremely well organized major effort that spanned more than two decades and that is still gaining momentum.

Due to past management errors, it is not likely that Europe will ever catch up with the US and Japan in such specialized technological fields as computer technology or advanced chip design. Some experts in Europe maintain, therefore, that it is folly to try to reinvent at high cost what has already been put on the market. These experts contend that it would be wiser to concentrate on other products that need developing now and that hold promise as sales successes.

These experts, however, tend to forget that competitive research and production will no longer be feasible in the near future without high-speed computers, which depend on US-designed VHSICs (very-high-speed integrated circuits) for efficient operation. These microprocessors might—or might not, depending on US restrictions—be sold to Europe.

Thus, the high-technology export restrictions *could* shift the outlook for the future of the Continent as a technological power from rosy to bleak. Export statistics underline this and dampened spirits during the otherwise very successful Farnborough 84 Show.

On the other hand, a general trend became abundantly clear at Farnborough. If this US policy is not changed in the near future, then Europe is willing and able to design, develop, and construct its military equipment without relying on US-produced hardware, even if this means that the weapon systems might not be as advanced as those built in the US. Obviously, if this happens, cooperative ventures or coproduction with US partners will become a thing of the past. ■

Stefan Geisenheyner is the Overseas Technical Editor for Asian Defence Journal. A native of Germany, he is an acknowledged expert in the field of aviation. He has held the positions of Editor in Chief of the leading West German aerospace technology magazine, Flugwelt International, and Editor for Europe for AIR FORCE Magazine. Mr. Geisenheyner has also done a considerable amount of free-lance writing for European daily newspapers and magazines.



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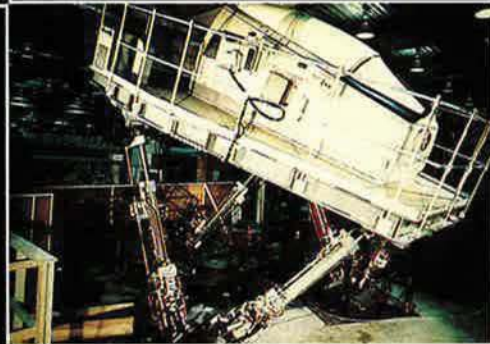


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The United States must be able to launch payloads into space, no matter what the level of conflict may be.

Assuring Access to Space

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

TOTAL Defense Department spending on space systems and related facilities grew from \$8.3 billion in FY '83 to \$9.2 billion in FY '84 and can be expected to reach almost \$12 billion in the coming budget year. Central to the military space mission—and the attendant costs—is the philosophy governing what should be launched, and for what purpose.

Early this year, Defense Secretary Caspar Weinberger put into effect a Defense Space Launch Strategy that strikes a balance between technical and economic constraints and operational requirements. Although this new strategy recognizes the importance of assured access to space across the spectrum of conflict, there is the pragmatic admission that “the ability to satisfy this requirement is currently unachievable if the US mainland is under direct attack.” By default, therefore, the assured launch capability is limited to “levels of conflict in which it is postulated that the US homeland is not under direct attack.” For the time being, the new strategy seeks to bridge this gap by keeping spare satellites on orbital standby and other measures that help ensure “sustained operations of critical space assets after homeland attack.”

A fundamental element of the launch strategy—and the Defense Space Policy that it is a part of—is the recognition of the need for launch capabilities that can back up the Space Shuttle in case of “unforeseen technical and operational problems” and “for operations in crisis and conflict situations.” The new launch strategy stresses the Defense Department’s commitment to the Space Shuttle, but at the same time warns that total reliance on that system “represents an unacceptable national security risk” because of technical and operational uncertainties attending the Shuttle. Also, “a complementary system is necessary to provide high confidence of access to space, particularly since the Shuttle will be the only launch vehicle for all US space users. In

A modified Titan 34D7 is a candidate for a new ELV design that will complement the Space Shuttle, guarantee access to space, and deliver at least a 10,000-pound payload into geosynchronous orbit.

addition, the limited number of unique, manned Shuttle vehicles renders them ill-suited and inappropriate for use in a high-risk environment."

Requirement for ELVs

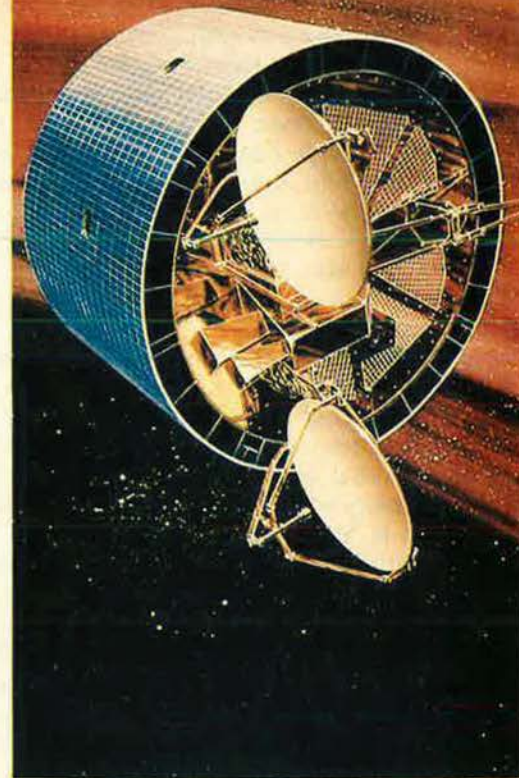
The initial requirement that results from the Defense Space Launch Strategy, according to Under Secretary of the Air Force Edward C. Aldridge, Jr., is development of a new expendable launch vehicle (ELV) that can be available by 1988 and that will be more capable than any existing ELV in meeting future payload requirements. Senior officials of AFSC's Space Division told AIR FORCE Magazine that it is imperative to be able to launch certain essential low-orbit satellites in time of conflict without exposing the Shuttle and its crew to war conditions. There also is no logic to using the sophisticated Shuttle as a straightforward boost vehicle. Yet there are many national security payloads to be orbited over the next decade that require only simple launch service on a reliable, "least-cost" basis. From the Space Division's point of view, "we want to take the most cost-effective, most reliable ride to space." The requirement is for ten ELVs, starting in 1988.

Three candidate designs are under consideration at this time—the Titan 34D7, Atlas II, and SRB-X, a design proposed by NASA. Any of these three ELVs would be capable of delivering a minimum of 10,000 pounds into geosynchronous orbit. (See also "In Focus," August '84 issue, p. 20.)

Three basic benefits would ensue from the proposed new ELVs, according to Secretary Aldridge. First, they provide a prudent hedge against unforeseen Shuttle problems, "whether they be technical, production, or vulnerability—any one of which could result in catastrophic loss or fleet groundings." Second, ELVs furnish "launch-on-demand" flexibility for key national security payloads and, at the same time, reduce "the launch-on-demand pressures on NASA that avoids DoD invoking our higher-priority bumping rights to the consternation of commercial and foreign customers of the Shuttle." Lastly, he believes that the use of ELVs allows the US to maintain an industrial base for space launch vehicles that will otherwise disappear and leave the field entirely to foreign competitors.

The point is, he contends, "that we as a nation are losing a vital national resource. No new contracts are being awarded for procurement of space launch systems. The fourth and last Shuttle Orbiter will be delivered this year, and key ELV lines are coming to an end. We don't believe this is a healthy or acceptable situation for the Department of Defense or the nation."

The Administration's pleas for "commercialization" of ELVs, aimed at maintaining space transportation leadership by encouraging the private sector to initiate commercial launch operations, have so far fallen on deaf ears. Without large, up-front investments by the Defense Department in such a joint venture, the commercial sector is apparently not willing to run the risks associated with this approach. The Defense Department, as a result, will have to launch a conventional development and procurement program if it wants to acquire the ten ELVs deemed essential for backup of the Shuttle. The trouble, of course, is that this will require large investments in 1986 and 1987, tight budget years



There are eight Defense Satellite Communications System (DSCS) satellites in orbit. One, the DSCS III, is a new, more survivable spacecraft with nuclear hardening features and antijam capabilities.

marked by peak funding requirements on the part of already approved programs, according to Secretary Aldridge. The start-up requirement for the proposed ELV program in FY '85, according to Space Division estimates, is \$35 million, a figure that would climb to about \$310 million in FY '86.

Support for the program in Congress, OSD, and even the Air Force appears to be shaky. The all-powerful Defense Resources Board has not yet ruled on whether or not the ELV program is to be funded. The Air Force recently asked industry to submit revised proposals that allow for various funding levels and schedules.

Space Launch Plan 2000

The new Defense Space Launch Strategy, in addition to naming the Air Force the executive agent for running the ELV program and the associated payloads, also charges USAF with development of a "comprehensive space launch plan to meet projected national security requirements through the year 2000." Once approved by the Secretary of Defense, these Air Force recommendations will be incorporated in the FY '86 Defense Guidance Plan.

The long-term segment of the Defense Department's launch strategy, covering the period beyond the early 1990s and the initial phase of the ELV program, involves efforts to "ensure that future national security space missions are not constrained by inadequate launch capability." The Air Force evaluation "should examine potential DoD launch requirements, such as the need for a heavy lift vehicle, and should attempt to take maximum advantage of prior investments in the US launch vehicle technology."

Secretary Aldridge informed Congress recently that "we have system concepts, such as the Strategic Defense Initiative, that may require launch vehicles capa-

ble of placing 100,000 to 250,000 pounds of outside payload in low earth orbit. Development of launch vehicles of this size will require a great deal of development and engineering work. We have requested in the FY '85 budget to begin requirements definition for this extremely large booster. We are participating in an Aeronautics and Astronautics Coordination Board study with NASA to define joint requirements for such a vehicle." Such a heavy lift booster, he pointed out, "would also fill the need for a complementary launch system to provide the DoD with a continued assured access to space."

The Space Division sees the proposed heavy lift booster primarily as a means for making as low as possible the cost per pound of payloads delivered to orbit. This criterion suggests designs relying heavily on recoverable and reusable components as well as on compatibility with the Shuttle facilities now nearing completion at Vandenberg AFB, Calif.

Within the next ten years or so, the need to provide what Secretary Aldridge terms the "robustness and flexibility of the key nodes of our defense space posture" is likely to become pronounced. One of the key nodes that causes concern "is the single Shuttle facility at Kennedy Space Center," he points out, adding that "it seems undeniably unwise for the nation's entire Shuttle fleet to be tied to a single facility, so we are working hard to complete the West Coast Shuttle facility at Vandenberg AFB, [which] is also vital for the accomplishment of polar and retrieval missions not possible from the Kennedy Center."

Another key node in need of backup is the single central control facility for on-orbit control of all national security satellites at the Space Division's Sunnyvale, Calif., facility. All remote tracking stations around the world feed data into that facility. The Consolidated Space Operations Center (CSOC) now under construction at Colorado Springs, Colo., will provide a "much needed complementary satellite control capability for the Defense Department, [with the result that] instead of a single facility located in an earthquake-prone area, we will have two first-class facilities, both working and sharing the load on a daily basis—a far healthier situation."

Return of the Tug?

The Inertial Upper Stage (IUS), the spacecraft that takes payloads from the Shuttle or ELV to high-energy orbits—including the high altitudes required for geostationary satellites—in the past encountered rough going technically as well as in terms of cost. The prevailing notion at AFSC's Space Division is that the program has cleared these hurdles and "is coming along quite well." Thermal and gas leakage problems that have plagued the design appear to have been solved, and the IUS is scheduled for launch on December 8 of this year. The unit cost of IUS, however, will be higher than originally planned. The reason is that, with the decision by NASA to procure Centaur upper stages for certain missions rather than uprated versions of the IUS, the originally envisioned economies of scale have been diluted.

There is high confidence on the part of AFSC's Space Division, however, that the IUS will turn out to be one of the most reliable upper stages the country has ever built.

The Soviet ASAT has been operational for twelve years. Other Soviet systems, including the Galosh ABM interceptor, have the capability for the ASAT mission.



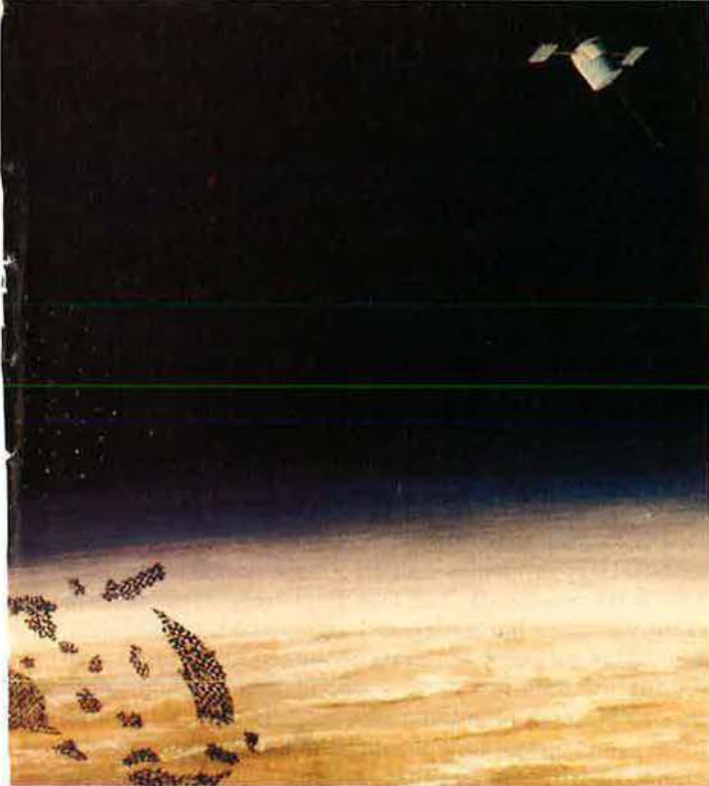
If the buy of the IUS is curtailed, Space Division spokesmen stress, "it will be for reasons other than inadequate performance or insufficient reliability." Refuting NASA insinuations to the contrary, the notion at the Space Division is that "none of us is immune to propulsion problems when it comes to upper stages. We all have had them, and in the IUS we are building really sophisticated hardware that, not surprisingly, had initial growing pains."

Beyond IUS and the Centaur-based upper stage, the Space Division remains "open-minded" with regard to the eventual need for a "space tug," a vehicle that could deliver sizable payloads to geosynchronous orbits and retrieve them for repair or modification. The requirement for such a system will probably be determined by economic considerations—in the main, the cost-effectiveness of repairing and refurbishing geosynchronous spacecraft on the ground and then relaunching them. If such a space tug is manned, on the other hand, it might be possible to repair and refurbish some satellites in orbit. No decision has been made on which form of tug should be explored or whether or not such a vehicle will be needed in the first place.

Antisatellite Interceptors

The Space Division is developing—but because of congressional strictures has not been able to test against space targets—an antisatellite (ASAT) interceptor. Such a weapon, Secretary Aldridge points out, is needed to "deter threats to our space systems and, within the limits imposed by international law, to counter certain satellites that provide direct targeting support for hostile military forces." Unlike the operational, thoroughly tested Soviet space weapon that is a ground-launched coorbital intercept satellite, the US ASAT is a miniature vehicle on a two-stage SRAM/Altair booster carried aloft by and launched from specially modified F-15s.

The present US ASAT system, the Defense Depart-



ment reported to Congress, "will not have the capability to attack Soviet early warning satellites, even at a low point in their orbit." The Air Force is funding at low levels—to the tune of about \$500,000 in FY '85—studies to examine "concepts for improvements to the current ASAT system and other promising technologies which might have ASAT application for the future, but [it] has no [efforts under way] to select specific follow-on ASAT systems with a high-altitude capability." Carrying the US ASAT forward to operational status, according to Secretary Aldridge, is imperative to "correct a glaring basic imbalance of capabilities between us and the Soviets."

The Soviet Union, according to Pentagon reports to Congress, has "several systems or technological capabilities either designed for an ASAT mission or having the inherent potential for such a mission. These include the coorbital homing ASAT interceptor that has been operational for twelve years, the Galosh ABM interceptor, and electronic warfare systems. The USSR could have some additional so-called 'residual' ASAT capability in equipment amenable to undetected or surreptitious development to operational status, or to a status that would permit rapid breakout."

There is concern in the Defense Department that the USSR, under the guise of carrying out routine rendezvous and docking operations in space, might "develop spacecraft equipped to maneuver into the path of, or detonate next to, another nation's spacecraft. Other types of systems with inherent ASAT capabilities include ballistic missiles with modified guidance software as well as space boosters with nuclear payloads."

Other future Soviet efforts "that could produce specialized ASAT systems include developments in directed-energy weapons, space planes, and space stations. Directed-energy weapons could pose difficulties because, for example, a space-based weapon developed for air defense or ballistic missile defense would be even

more effective as an ASAT weapon than in its primary role."

The cost of the US low-orbit ASAT system, according to Defense Department reports to Congress, is estimated at \$1.3 billion in research and development and \$2.5 billion in procurement. The initial operational capability will probably consist of twelve ASAT interceptors and four modified F-15s. The current version of the air-launched miniature vehicle (ALMV) ASAT, Pentagon witnesses told Congress, could eventually be given greater altitude capability by using either a larger first or second stage, or a combination of both. Such a development would take about four or five years and cost about \$600 million. There is also the option to adapt the ALMV to a ground-launched booster. The eventual selection of a particular booster, such as MX or D-5 (a large SLBM under development by the Navy), would depend on specific mission requirements—in the main, altitude, survivability, and negation times—associated with such a future design.

While the Joint Chiefs of Staff foresee no near-term requirement for US ASAT capabilities beyond those incorporated into the current design, advances by Soviet space systems in the future will have to be met by commensurate boosts in US capabilities. This applies both to the US ASAT's ability to deter Soviet attacks on this country's space systems as well as to conventional deterrence by putting at risk Soviet satellites that would support Soviet terrestrial and naval forces directly in the event of conflict.

Over the longer term, one or two decades hence, Secretary Aldridge believes it might become necessary to allow for a "potential shift of emphasis of our space-based systems from a generally accepted mission of support and force enhancement to a mission of force application—that is, weapons in space." He stressed that "any development of space weaponry must, of course, be consistent with national policy, international law, and national security requirements."

Spacecraft Survivability

While the distances of space generically provide satellites with some survivability, these systems and their ground nodes are far from invulnerable. The Space Division's favorite metaphor is that satellites "are nothing more than very tall relay towers." As Secretary Aldridge put it, "The survivability of our space assets must be commensurate with the value and utility of the support they provide the National Command Authorities and our operational military forces." Toward this end, various survivability measures are being incorporated in vital new spacecraft, including proliferation of satellites, extremely high orbits, maneuver capability, and hardening.

At the same time, "We are pursuing technology programs for space computers, on-board processing, autonomous operations, and on-orbit mission extension," according to Secretary Aldridge. These space-based improvements, he stressed, are tied to corresponding improvements for ground facilities: "Mobile mission ground stations with survivable telemetry, tracking, and command capabilities will become more available as we close out the decade. Together with jam-resistant, redundant communications links, our overall space pos-

ture in a conflict" is slated for dramatic improvements. The direct beneficiaries are the military combat commanders, who "will have continuing access to a steady stream of real-time, dependable, and accurate information [across] a broad range to support needs."

Among the first space systems to receive enhanced ground terminals are the early warning satellites of the Defense Support Program (DSP). By the end of next year, the Air Force expects to have completed production of DSP's mobile user terminals that will provide "hardened, jam-resistant links with the users," Secretary Aldridge said. Broad, in-depth survivability measures are being grafted on the Milstar (Military Strategic and Tactical Relay) satellites that are being developed by AFSC's Space Division.

The Milstar System

While the Milstar constellation is still evolving, current plans call for at least four operational satellites hovering in geosynchronous orbit at 22,300 nautical miles above the Indian Ocean, the East Pacific, the West Pacific, and the Atlantic, respectively, as well as two or more in highly elliptical orbits to cover the polar regions. The Milstar satellites will be equipped with substantial maneuver capabilities and sufficient propellants to carry out evasion and escape repeatedly and flexibly to elude Soviet ASATs. The Milstar satellites will also be hardened to as high a degree as practicable against nuclear effects and radiation from future directed-energy weapons.

The use of "high orbital spares"—meaning dormant, dark satellites parked at altitudes as high as 110,000 miles (five times as high as geosynchronous orbits and the altitude beyond which the earth's gravitational pull becomes too weak for keeping objects from drifting off into deep space)—is under consideration for Milstar, but has not been decided on as yet by the Space Division. Over the long term, as Soviet ASAT and related capabilities grow, it might become necessary to deploy new generations of Milstar satellites exclusively in such "supersynchronous" orbits. Such an eventuality is probably a long time off and would not require a major redesign of the key components of the system.

Lastly, Milstar, like most other future satellite systems, will incorporate "cross-orbital relay" features that interlink individual satellites with one another. As a result, flexibility, redundancy, and, most importantly, survivability are boosted while dependence on ground-based relay and tracking stations on foreign soil is reduced or eliminated.

Milstar's development phase is in its second year and, according to senior Space Division officials, is on schedule and progressing smoothly. Lockheed is the prime contractor, supported by TRW and Hughes.

Other Survivability Measures

Since data of one sort or another are the *raison d'être* of most military satellites, the survivability of the information is as important as that of the spacecraft or the associated ground terminals. If, in an operational sense, the survival of the ground stations is a key concern, the first obvious step is to make them mobile, highly transportable, and redundant. A number of design characteristics ensue from these requirements. For one, the an-

tennas will have to be kept relatively small to ensure mobility or transportability. By extension, this means that the data stream must be kept small.

The concomitant requirement is to perform some data processing aboard the spacecraft and to send only essential information to the ground over data links with a low error rate and a narrow bandwidth to provide jam-resistance. This does not mean that spacecraft will soon be transformed into "orbiting computers" that have to function in a thoroughly fail-safe fashion; it does mean that, in the words of a senior Space Division official, "We want to be able to do more and more on-board data sorting."

The Pentagon's concern with survivability of a different kind is reflected in the mutations of the Defense Satellite Communications System (DSCS). Of the eight DSCS satellites in orbit at this time, seven are of the DSCS II type, while one is a new, more survivable DSCS III spacecraft. The DSCS III "upgrades" involve mainly nuclear hardening and antijam (AJ) capabilities. The latter category includes advanced encryption protecting the data links and sophisticated antenna "nulling" to blank out jamming sources. The DSCS III satellites—an eventual buy of fourteen is programmed—are equipped with sensors that instantly spot jamming, report this fact to a ground station, and then wait for the ground station to plot the location of the jammer and to instruct the satellite how to "null" the jammer. The intrinsic advantage of this arrangement is that the major computer elements, the "smarts" of the system, are on the ground rather than on the satellite where weight, space, and power are at a premium.

The DSCS III satellite design recently passed rigorous tests of its nuclear hardening features. The hardness levels of the design meet all the criteria for resistance to collateral nuclear effects—but not direct attack—specified by the Joint Chiefs of Staff. Included are the ability to withstand low-level flash effects, X-rays, gamma rays, and EMP (electromagnetic pulse). DSCS III uses "S" and "X" band links that, while not as resistant to nuclear effects as EHF (extremely high frequency) communications links, are considered adequate for near-term applications.

Over the longer term, OSD requested the Defense Communications Agency to examine concepts for a successor to DSCS known as the Follow-on Wide-Band Satellite System, which might use EHF data links. Complementing the increased survivability of DSCS III's space segment will be new transportable and mobile ground terminals. Some of these terminals are designed to be air-transportable aboard C-130 aircraft; others, tailored for the US Central Command, are ground-mobile and use small five- to fifteen-foot-size antennas.

One of the most challenging satellite systems in early concept formulation is the so-called Boost Phase Detection and Tracking System, a key element of the Strategic Defense Initiative (SDI). This follow-on to the aging Defense Support Program had originally been called the Advanced Warning System. The Boost Phase Detection and Tracking System will serve both SDI and other users. The Space Division, in concert with the SDI program office and other Defense Department elements, is working on initial definition studies for this system. ■

After launch, a TV-guided glide bomb can be controlled by a sophisticated weapon control system. The AXQ-14 Data Link is used with the GBU-15 glide bomb. Imagery from a sensor in the bomb's nose is transmitted by the data link to the launch aircraft or to another aircraft equipped with the data link. The advantages over other air-to-surface guidance systems center around the ability to launch the weapon and guide it accurately to its target from a safe standoff distance. When the GBU-15 is launched on a programmed course to its target, a weapon systems operator can make mid-course corrections by using a cockpit control unit, which sends commands from the aircraft's data link to the data link antenna at the rear of the bomb. Hughes Aircraft Company produces the system for the U.S. Air Force.

Radar and sonar video signals can now be displayed without fading, thanks to a newly developed video image processor. The device converts analog images into digital format so those images can be stored and displayed continuously on a standard television monitor. In addition, images can be shown on remote monitors and be recorded on videotape. The Hughes processor, using digital storage, offers greater versatility and a wider range of information than analog circuitry. Digital storage allows considerably more flexibility in retaining and updating tight images than previously available using analog circuitry. The processed digital image resembles a conventional TV picture and can be seen in ambient light, eliminating the need for a darkened room.

A military laser device transmits a beam so narrow that it can put a spot about two feet in diameter on a target from a range of about three miles. The device is a combination laser designator and rangefinder called a Ground/Vehicular Laser Locator Designator (G/VLLD). It pinpoints targets for laser-homing and conventional weapons. G/VLLD can be remotely operated from inside an armored vehicle or detached for use with a tripod. Hughes has delivered the first of several hundred units to be installed on the U.S. Army's Fire Support Team vehicles.

U.S. Marine Corps A-4M Skyhawk attack aircraft are as much as three times more effective when equipped with the Angle Rate Bombing Set (ARBS), according to pilots who participated in the first overseas operational deployment of such aircraft. ARBS is a computerized bombing system that can be used with bombs, gunfire, and rockets. Its dual-mode TV and laser tracker locks onto and tracks targets either identified by the pilot on a cockpit display or designated by a laser device. Marine Attack Squadron 311 pilots using ARBS in bombing exercises concentrated bomb hits 50% to 75% closer to targets than did pilots using previous manual techniques. These tests demonstrated how the Hughes-built ARBS can cut the number of missions over enemy territory and improve the A-4M's primary close air support mission of attacking targets located near friendly troops.

A microwave/millimeter-wave radar cross-section measurement system, designed to take automated measurements on full-size or scale-model targets, joins the solid-state millimeter-wave product line at Hughes. The new Model 42260H system, originally built for Boeing Military Airplane Co., is the latest in coherent short-pulse instrumentation measurement systems. It is suitable for indoor and outdoor ranges as close as 50 feet and as far away as beyond 4,000 feet. The system uses a modular design concept that accommodates up to six separate radio-frequency transceivers.

For more information write to: P.O. Box 11205, Marina del Rey, CA 90295.

The Price of Freedom

The 1984-85 Statement of Policy, adopted by delegates to AFA's National Convention on September 17, 1984.

Freedom is what the United States is all about. The price of freedom is eternal vigilance.

Our Founding Fathers' commitment to freedom and just peace gave birth and purpose to America. But freedom and the peace to enjoy it are not an automatic birthright of Americans. These precious commodities have to be earned, sustained, and defended in a world divided by competing ideologies, differing values, and conflicting standards of conduct—all the while imperiled by weapons of apocalyptic destructiveness.

These are the realities; probably they will persist for years to come. We can't shout them away with the slogans of pacifism and accommodation. Even with the best of intentions, we cannot wish them away or ignore their presence. The foundations of peace with freedom must be built on the nation's firm resolve not to lose either and the military means to safeguard both.

Peace must not degrade into a choice between capitulation to aggressive totalitarianism or nuclear holocaust. If we make the forces of freedom strong enough to deter both, we will not be faced with this intolerable choice. There is no other choice, for anything less jeopardizes both peace and our freedom.

The cry is rising at home and abroad that the West should "give peace a chance." This is a case of the right message going to the wrong address. This bitter irony was captured by the President of France when he said the West produces pacifists while the Soviets produce weapon systems. Peace is not

being threatened by the United States, for our nation does not seek to conquer or coerce. Neither is peace threatened by NATO, a purely defensive alliance. The threat to peace comes from Soviet imperialism that promises to dispatch to the "garbage heap of history" those who stand in its way, that violates treaties, invades its neighbors, and builds arsenals far in excess of legitimate defense needs.

Arms-control and arms-reduction negotiations are not at an impasse because the US representatives walked out on their counterparts or failed to offer real cutbacks in nuclear force levels. The US representatives not only stayed, but they remained ready to negotiate. The Soviets did walk out, leaving the US delegation face to face with empty chairs and empty rhetoric.

Since 1946, when the US had a monopoly in nuclear weapons, this nation has worked earnestly toward their control, in consonance with the repeated mandates of both of its political parties. The Soviet Union has used arms control as a device for gaining strategic advantages.

The US position on arms control and arms reduction rests on the belief that a full-scale nuclear war would be catastrophic and therefore must be deterred. Further, although the US and the USSR will be rivals for the foreseeable future, they share a common interest in reducing the risk of such a war, in which all of humanity would be the loser. Finally, the US approach to arms control recognizes that the Soviets will not give "something for nothing." The modernization of the US strategic

forces, therefore, is not only imperative to enhance national security but also to provide leverage if and when the Soviets return to the bargaining table.

This Association believes that the US position on strategic arms reduction must treat as nonnegotiable four fundamental principles. To be acceptable, an agreement must:

- Produce significant reductions in the arsenals of both sides.
- Result in equal levels of arms on both sides, since an unequal agreement, like an unequal balance of forces, might encourage coercion and aggression.
- Be fully verifiable, because when national security is at stake, agreements cannot be based only upon trust.
- Enhance US and allied security and reduce the risk of war.

Arms control is not an end in itself but rather a complementary element of national security to ensure peace and stability.

The President's Commission on Strategic Forces, known also as the Scowcroft Commission, succeeded in formulating a brilliant concept for a long-term bipartisan approach that fused strategic force requirements and arms control. The crowning achievement of the Scowcroft Commission was a national consensus of broad political reach. But Soviet intransigence, aimed deliberately at eroding this consensus, is threatening to divide America and thereby cause the loss of the momentum toward strategic stability as well as equitable arms control. We must not let this happen. We must not let the Soviet Union manip-

ulate America's political process or subvert key decisions on vital national security issues. We must not let the Soviet Union dictate our position on arms-control objectives or our definition of peace with freedom. In short, we must not let the Kremlin demoralize or dupe us by its political maneuvers that seek to humiliate us and separate us from our allies. The central requirement, this Association believes, is to retain that consensus and keep intact the five-pronged strategic force modernization program that the Scowcroft Commission endorsed. Elimination of any one component could collapse the entire program structure or lead to piecemeal attrition of the other elements.

This US strategic force modernization effort does not move the world toward nuclear war but away from it by enhancing the strategic balance, creating incentives for the Soviets to reduce their inventory of first-strike weapons, and moving toward a mix of offensive and defensive strategic capabilities.

Modern ICBMs—both the MX and the single-warhead small ICBM type—are imperative to provide a response to the some 800 MX equivalents in the Soviet ICBM arsenal. These Soviet weapons have put at risk the US ICBM force of Minuteman II and Minuteman III missiles. This Soviet move is designed to render obsolete a key component of our strategic forces and thus, by default, permit them to dictate the makeup of the US arsenal. Our failure to counteract this Soviet advantage could have disastrous consequences. At a minimum, it would create an incentive

In this photo, taken from AFA's New National Home (see story on p. 66), the US Capitol dome is colorfully framed by the AFA flag.



for the Soviets to erode, in similar fashion, either the sea-based or air-breathing leg of the US triad.

The other elements of the mutually reinforcing modernization package—the B-1B and Advanced Technology Bomber, the Trident D-5 sea-launched ballistic missile, improved, survivable command and control systems, and revitalized strategic defenses—must be developed and deployed with the same vigor as the new ICBMs. All are essential to counter present and projected Soviet force levels. Deterrence is a product of capability and credibility. If either is low, so is deterrence.

The quickest, surest way to weaken the US capability to deter is to freeze current strategic force levels or to enter into unilateral moratoriums on the testing of new, essential weapon systems. The nation must not forget the warning by President Kennedy, on March 2, 1962, that "we now know enough about broken negotiations, secret preparations, and the advantages gained from a long test series never to offer again an uninspected moratorium."

This Association is equally concerned about attempts to shortchange fundamental force structure requirements in both the strategic and conventional warfare arenas by alleging that correcting deficiencies in readiness and sustainability must be funded first. We need both essential force levels and essential preparedness and sustainability. One will not work without the other. Sidestepping politically tough decisions on the acquisition of essential weapon systems or needed increases in force levels by

portraying readiness and sustainability as the only urgent defense requirements—and thereby creating the mirage of a prodefense posture with the electorate—may buy votes but hurts defense. Under-equipped, understrength forces mismatched against superior enemy forces would not gain from ample stores. Under such circumstances, the only beneficiary might be the enemy, after he overruns the defender's position and captures these stores.

These issues—and the fundamental question of preserving peace and deterring war—can be resolved only if the electorate understands them fully. War

is an act of politics meant to compel the defender to do the aggressor's will. The defender either submits to the will of the aggressor by capitulation and suffers the consequence or contests the aggressor on the battlefield. The Soviet Union understands the politics of war with alarming clarity. It is Moscow's avowed creed that, when waged by the Communist camp, any war is just and progressive, for it would be the continuation of revolutionary policy, whose ultimate goal is to make the world over in the Soviet image.

Under our system of government, policy ultimately is the responsibility of the American people. The po-

litical will of the people determines whether the military forces needed to deter aggression are put in place or not and whether or not freedom—America's own or that of allies—is worth defending and fighting for.

This Association believes that the task of keeping all of our citizens properly informed on matters affecting national security, preservation of peace, and deterrence of war is paramount. We have long been concerned with correcting distorted public impressions, inadvertent or deliberate, concerning the role and responsibility of the nation's military forces. The Vietnam era, and the extensive media reporting associated with it, exacerbated this pervasive problem and has left lasting scars on our democratic society and our services.

We support enthusiastically current efforts by respected individuals, agencies, and responsible media leaders to correct false impressions, avoid slanted reporting, and provide the nation with the comprehensive and balanced information needed to make proper provision for our national security.

It is our firm belief that nothing would strengthen America's deterrence capabilities—and hence the chances for peace—more than the restoration of an enduring, bipartisan consensus on our vital national security requirements and of the will to support them on a sustained basis. The stakes for America, for peace, and for freedom demand this from us now and in the years ahead.

This is our challenge. Peace through strength is not just a slogan; it must become a fact of life. ■

Credibility Restored

A policy paper titled "Force Modernization and R&D," adopted by delegates to AFA's annual National Convention on September 17, 1984.

America is restoring the credibility of its defenses. In this, the third year of our restoration efforts, we have come a long way. Today's aircrews fly more hours and train more realistically. Combat capability is going up dramatically. Rising inventories of top-flight weapon systems contribute to a more flexible expression of airpower geared to matching an evolving, growing threat. Closer cooperation between the Air Force and the Army and Navy further strengthens US military power by lessening duplication—thus saving tax dollars—and by developing mutually reinforcing combat-operation doctrines. The recent Air Force and Army Chiefs of Staff Memorandum of Understanding is a revolutionary attempt at interservice cooperation. This momentum must be maintained in step with the growing threats we and our allies face around the world.

The Air Force Association believes the American people must not let rhetoric and fabricated anxieties cloud our vision. There are those who seek to sway public opinion and keep America from doing what needs to be done by playing up the fears of an arms race. The facts tell a different story: The US has today, deployed worldwide, some 8,000 fewer nuclear weapons than it did fifteen years ago. The combined yield, or megatonnage, of all deployed US nuclear weapons has been reduced about seventy-five percent over the last decade. In short, the arms race has been one-sided. As the Soviets raced forward, we in this country exercised restraint. As a result, the Soviets now possess forty percent more nuclear delivery systems than does the US, and they significantly surpass this country in missile throw-weight, an impor-

tant measure of nuclear punch.

The second half of the arms-race myth is the alleged incompatibility between a strong defense and a strong economy. Defense spending in FY '85 amounts to a smaller share of the federal budget than it did during the 1950s and 1960s, even though the potential threat is greater than at any time in our history. While any federal spending affects the size of the budget deficits, it is the non-defense sector that has grown by about eighty-five percent over the past decade. Contrary to popular perception, defense spending as a share of the Gross National Product has declined to 6.8 percent from a high of 10.1 percent during the Vietnam War.

The US must have both a strong defense and a strong economy. There has been considerable discussion concerning the US economy's ability to support the planned defense buildup without contributing to the projected large federal deficits, creating inflationary pressure, and causing supply shortages. It has been argued that these factors present a strong case for cutting defense spending. The Air Force Association recognizes the defense budget does have an impact on the economy, just as the economy has an impact on the formulation and execution of the defense budget; however, these arguments do not consider the national security concerns that demand the current levels of defense spending.

The defense budget is not and should not be used as a fiscal shock absorber. Defense budgets are based on the long-term national strategy for dealing with the threats we face, not in response to short-run economic developments. Moreover, strictly on economic grounds, even drastic cuts

in the proposed defense program would not produce dramatic, long-term reductions in the deficit—fifteen years of budgetary history prove this to be true. After careful analysis, we believe issues related to our national security and economic well-being are too important to the future viability of our way of life to be discussed in terms of one issue—defense spending. Doing so is not only ineffective fiscal policy but also increases defense costs and impairs our national security.

Economies and Efficiencies

The vast scope of Air Force programs requires attentive, aggressive management to prevent misuse of tax dollars. Mistakes have been made, and some waste resulted; however, this Association believes that the Air Force has developed and put in place sound management programs to meet national security needs and to provide prudent fiscal stewardship.

Air Force spare-parts acquisition and management programs have received national attention recently—mostly adverse. In fairness, it must be emphasized that the Air Force itself discovered and reported these flaws in its procurement practices. The sheer size of this program justifies much of this interest—the Air Force manages more than 850,000 spare parts worth more than \$85 billion. Another \$6 billion will be spent in 1984 to purchase 80,000 more spares.

Heavy media coverage to the contrary, general spare-parts pricing is not unreasonable; every contractor is not overpricing spares, and most instances of overpricing are not deliberate attempts to defraud the government. The Air Force, of course, must continue its

aggressive efforts to prevent excessive pricing of spare parts. Recommendations of Air Force Management Analysis Groups are being implemented, resulting in beefed-up Zero Overpricing and Competition Advocacy Programs. The Air Force is adding new civilian manpower slots to its Logistics Command (AFLC) to provide closer supervision of spare-parts pricing and acquisition. The Air Force's recently inaugurated Spare Parts Retention Program is designed to prevent disposal of usable spare parts temporarily declared excess. This program should result in substantial annual savings. Despite recent successes, continued emphasis on spares program management must remain a top USAF priority.

Another significant area of cost savings, keyed to improving defense industry productivity, is a series of acquisition initiatives. The Air Force's goals of enhancing program stability, expanding multiyear procurement, and achieving economic and stable production rates offer significant potential for controlling the escalating high cost of modern weapon systems. The Air Force is encouraged to continue development and use of program management tools, such as Independent Cost Analyses (ICAs), contractor incentives for product reliability and support, early programming and budgeting for improved readiness and support, and competition advocacy, including dual-sourcing, for competitive acquisition of system production and follow-on contracts.

Although this Association believes the Air Force is a good steward of the taxpayers' dollars and applauds recent efforts to improve upon an already impressive record, the threat facing our nation

coupled with growing budget deficits makes it imperative that we gain the greatest defense capability possible from every available dollar.

Total Force

Since 1970, the Air Force has pursued a Total Force policy, incorporating the Air National Guard and the Air Force Reserve in wartime planning and peacetime operations and providing them newer, more capable equipment. For certain missions, they represent the best buy for the dollar to expand force capabilities.

The Air National Guard and the Air Force Reserve carry a large and important part of the day-to-day mission for the strategic, general-purpose, and mobility forces and maintain a continuous high state of readiness to respond in crisis situations with personnel who are highly experienced, proficient, and professional. The Air Force and Department of Defense rely heavily on their contribution to national security. In terms of wartime roles, they provide thirty-four percent of the tactical fighter capability, fifty-eight percent of the tactical airlift and fifty percent of the strategic airlift aircrew capability and tanker/cargo aircrew capability, twenty-one percent of the strategic aerial refueling capability, thirty-three percent of the tactical air support, and sixty-seven percent of the air defense mission.

As the contribution of the Air Guard and Reserve to the Total Force grows, the need for continuing modernization becomes increasingly important. Their air defense capability should not be allowed to diminish due to increasing obsolescence and budget restrictions. Current line aircraft of the Guard and Reserve are being upgraded to provide max-

imum air defense capability by replacing F-4 aircraft with F-15s and F-16s. The antiquated C-130A is not sustainable to support Army and Air Force fighting forces in the field. Obsolescent 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 the 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, with their more economical operation and advanced technology, also adds to the efficiencies of the Reserve and Guard. The equipment must be upgraded so as to be logistically and operationally interoperable with that of the active force.

Nuclear Forces

At the top rung of the ladder of military requirements, the strategic nuclear forces of the United States—and the host of capabilities needed to maximize their effectiveness—remain in dire need of qualitative and quantitative improvements.

Massive Soviet investments in strategic nuclear systems have wrought a dramatic shift in the strategic balance. Gone is the clear-cut US superiority of the 1960s and the rough parity of the late 1970s; today, Moscow enjoys an advantageous position. The momentum of Soviet strategic modernization programs, if not countered by a vigorous US response, presents the ominous fact of ever greater Soviet superiority in the years ahead.

ICBM Modernization: The most destabilizing aspect of the Soviet strategic buildup has been the vast

improvement in the ICBM force. In contrast to US reliance on a balanced triad of strategic nuclear delivery systems, more than fifty percent of Soviet strategic delivery capability and about seventy-five percent of their available warheads are concentrated in their ICBM force. While USAF's newest missile—Minuteman III—entered the force in the early 1970s, the USSR has deployed more than 750 SS-17, SS-18, and SS-19 ICBMs since the mid-1970s, most armed with multiple warheads. Moreover, the Soviets are continuing to upgrade their arsenal and have under development a new generation of missiles that is being flight-tested.

The US ICBM modernization program is vital to offset the unilateral Soviet growth in counterforce capability and ultimately to provide assured credibility of US retaliatory forces. These challenges can best be met by a broad, flexible approach to ICBM modernization incorporating the best of our modern technology and responding to the imbalances in throw-weight caused by Soviet ICBM deployments. We must provide this nation with a highly accurate, capable, and responsive ICBM force.

A threefold approach to ICBM modernization, as recommended by the President's Commission on Strategic Forces and approved by the President and Congress, will provide such a force. This Association endorses this approach.

First, we should continue our efforts to deploy 100 Peacekeeper (MX) missiles in Minuteman silos. The Peacekeeper is needed to redress the significant and growing asymmetry between US and Soviet strategic forces in the capability to place hardened targets at risk. The decision to deploy the Peacekeeper missile recognizes the im-

portance of retaining the unique characteristics of the land-based ICBM: quick, flexible response; high alert rate; dependable, proven command control and communications; high accuracy; and low operating cost.

Second, this Association supports enhancing these characteristics through the development of a small, single-warhead ICBM that could be deployed in a variety of more survivable basing modes. This missile and its wide range of deployment options, in conjunction with the deployed Peacekeeper and Minuteman forces, could provide a diversification of forces capable of checking Soviet war plans. Development of this missile is under way with a view toward initial deployment in the early 1990s.

Third, these programs should be augmented through a vigorous research and development program including new hardening techniques for silos and shelters that may be used for deployment of Peacekeeper or small missiles and different types of land-based vehicles or launchers, particularly hardened vehicles for mobile deployment of small ICBMs.

The underlying objective of this comprehensive approach to ICBM modernization is to provide stability through deterrence and more effective arms control. The small missile enhances this objective by permitting the US, and encouraging the Soviet Union, to move toward weapon systems that can be less threatening and that have inherently reduced value as targets themselves. On the other hand, Peacekeeper provides the leverage needed to persuade the Soviet Union to negotiate seriously in this direction while providing a critical

counterbalance to the capabilities of their existing systems.

Deployment of Peacekeeper does not detract from the need to continue qualitative improvements to our Minuteman force. Improvements to propulsion, guidance, and reentry systems are needed to redress growing support problems with these aging systems and to provide flexibility to counter continuing Soviet advances in strategic capability.

In the area of sea-based deterrence, development and deployment of the US Navy Trident II (D-5) submarine-launched ballistic missile (SLBM) are required to counter growing Soviet capabilities.

Air-Breathing Leg

Soviet advances in air defense and to a lesser degree in offensive weapons will make the current bomber force increasingly vulnerable. Soviet deployments of AWACS-type airplanes, "look-down/shoot-down" fighters, and monopulse radars—all in large numbers—by the late 1980s will severely stress the ability of the B-52 force to penetrate the Soviet heartland and destroy critical targets.

As a pivotal part of the strategic modernization program, the United States urgently needs to continue production of 100 B-1B bombers, with an initial operational capability in 1986.

The manned bomber is the only leg of the triad that can be used across the entire spectrum of conflict—conventional to nuclear. As reusable, multi-purpose delivery systems, long-range combat aircraft can also deliver large nuclear or conventional payloads accurately throughout the spectrum of conflict. The bomber element of the triad of strategic forces can be launched

prior to a final decision to employ these weapons, permitting the National Command Authorities (NCA) more time to evaluate strategic warning indications fully. Since the bomber can be recalled or withheld at any time, it is the least destabilizing strategic system.

Weapons-carrying bombers can be launched to ensure their survivability or to signal national resolve during time of crisis—with confidence that the crews can be redirected or recalled as the situation develops. Bombers provide the only capability to provide damage assessment of the primary target using the crew and aircraft sensors and, if necessary, to attack assigned alternate targets.

In conventional roles, bombers can provide an important supplement to US naval forces. They can provide collateral maritime support in long-range sea surveillance, ship attack, and minelaying. Bombers also carry a large number of diversified weapons, and each bomber can cover widely separated targets.

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 for the cruise-missile carriage mission. To keep the B-52s as a viable penetrating weapon system over the next decade and beyond would require numerous, expensive modifications. Should the B-1B's capability to penetrate decline in the face of growing Soviet defensive efforts, the B-1B will be able to function as a very effective cruise-missile carrier and conventional weapon system. In view of developing Stealth

technology, the acquisition of penetrating Advanced Technology Bombers (ATB) should start in the 1990s. The B-1B would be even more important if current expectations in regard to ATBs don't materialize. A combined force of B-1Bs and ATBs incorporating Stealth technology provides a most effective bomber modernization program for long-range combat missions (nuclear or conventional) well into the twenty-first century. Both systems are needed.

In the meantime, the air-launched cruise missile (ALCM) and avionics modification program for the B-52 force must continue to keep these aircraft viable through the 1980s. This modification program transforms the B-52 from a shoot-then-penetrate role to a standoff role. The ALCM, which achieved an initial operational capability on the B-52 in 1982, will provide greater accuracy and flexible routing and targeting and will stress Soviet air defenses. Its follow-on, the advanced cruise missile (ACM), takes advantage of new developments in cruise-missile technologies and will further ensure that our force of cruise missiles will maintain their flexibility and effectiveness well into the future. The ALCM and ACM, deployed in conjunction with short-range attack missiles (SRAM) and gravity weapons, improve the overall capability of the air-breathing leg of the strategic triad. For more than a decade, SRAM has enhanced the capability of the manned bomber to perform the penetration mission. This unique operational capability must be retained for our modernized bomber force in order to prevent optimization of enemy defenses and to maintain maximum flexibility of the bomber. The advanced air-to-surface missile

(AASM) is planned to replace the venerable SRAM.

Strategic C³I: Nowhere is the need for modernization more critical than in the area of strategic command control communications and intelligence (C³I), which, in the case of conflict or crisis, should give the national leadership the real-time, fast-changing picture of what is going on when and where and should provide the means for initiating the necessary responses. Years of inattention and underfunding have resulted in a gravely weakened C³I system while Soviet capabilities to attack and disrupt US strategic networks have greatly increased. C³I must be redesigned to give the NCA flexible operational control. Strategic force changes resulting from deployment of new systems require innovations in command and control in order for our forces to realize their full potential.

Improvements and further developments are needed in ground- and space-based radars for our C³I network to operate in all phases of nuclear conflict. Current deficiencies are such that C³I systems' survival from 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. Costs for needed improvements are substantial, but not out of line with other planned strategic force modernization costs. The triad's ability to perform its mission ultimately depends on reliable 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 through upgrades, the use of nuclear-hardening tech-

Test firing of a ground-launched cruise missile (GLCM). Deployment of GLCMs in Europe is part of a long-range theater nuclear modernization program agreed upon by NATO in December 1979.

niques, higher power transmitters, redundancy and proliferation of critical C³ nodes, and employment of new satellite and air- and ground-based systems. Key requirements include:

- The World-Wide Airborne Command Post (WWABNCP) C³ systems must be upgraded and hardened against nuclear effects.

- The Air Force's world-wide high-frequency (HF) radio stations need upgrading to provide coverage and higher power. Airborne HF radio equipment should be replaced with modern equipment.

- Existing tactical warning and attack assessment systems require extensive upgrading.

- The very-low-frequency/low-frequency (VLF/LF) systems require modification with a new processor to improve transmission in a stressed environment. VLF/LF receivers must be expeditiously installed in bombers.

- The Ground Wave Emergency Network (GWEN), a low-frequency, overlapping radio relay network supporting critical two-way data communications in a nuclear environment, should be fielded expeditiously. Electromagnetic pulse (EMP) protection for critical communications equipment must be provided through the Aircraft Alerting Communications EMP Program, including screened enclosures for selected equipment at Strategic Air Command main operating bases.

- Over the long term, there is a need for improved satellite capabilities at frequency ranges that sustain communications in a nuclear-disturbed atmosphere. The Milstar Satellite Communications Program 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.

Intermediate-Range Nuclear Forces: There is a crucial need to augment the strategic nuclear forces with modernized intermediate-range nuclear forces (INFs) comprising Pershing II missiles and ground-launched cruise missiles (GLCMs). The latter, with a range of 2,500 kilometers, will be able to strike fixed targets throughout Eastern Europe and in the Soviet Union from their sites in England, Italy, West Germany, and possibly other

Western European locations.

In response to the large-scale Soviet theater nuclear force buildup, notably their continuing deployments of the SS-20 mobile intermediate-range ballistic missile and the Backfire bomber, NATO agreed in December 1979 to a long-range theater nuclear modernization program involving deployment by the US Air Force of GLCMs and by the US Army of Pershing II missiles in Western Europe. Initial operating capabilities were achieved in December 1983. Deployment of GLCM will allow the use of dual-capable aircraft in the conventional role for a longer period before transitioning them to a nuclear

role. This would allow planners to take full advantage of the inherent flexibility and capability offered by manned aircraft to strike targets of opportunity. Soviet propaganda campaigns keyed to Western European sensitivities as NATO allies have, for the most part, failed to affect deployment of GLCMs and Pershing IIs.

Strategic Defense

Our strategic defense forces must provide timely, high-confidence warning and attack assessment to enable the NCA and the strategic retaliatory forces to take appropriate survival and response actions and to limit damage from an enemy attack. Reliable and survivable strategic defense systems contribute to overall deterrence by reducing the prospect that the Soviet Union could carry out a successful attack. The US lacks adequate strategic air defenses because of the limited range of existing surveillance systems and major gaps in low-altitude and coastal surveillance coverage of potential avenues of attack. Existing detection systems cannot assure sufficient tactical warning for the NCA and appropriate military commanders to take necessary survival measures. Furthermore, even with tactical warning, the current fighter force would not be able to conduct effective, active defense against low-level penetrators, since the bulk of this force lacks a look-down/shoot-down capability against such a threat.

Atmospheric Defense: The current Distant Early Warning (DEW) Line was installed in the 1950s. The DEW Line can be underflown or circumvented seaward with minimal range penalty, and its radars are increasingly costly and difficult to maintain. Some seaward surveillance is provided by the joint sur-

veillance system (JSS); however, this system is line-of-sight limited and also has numerous medium- and low-altitude gaps. Over-the-horizon backscatter (OTH-B) radars must be deployed on both East and West coasts as well as in a south-looking site in order to remedy these problems. These radars will provide coverage out to about 1,800 nautical miles.

With the bulk of the United States air defense fighter force more than twenty years old and only marginally effective against Soviet capabilities, modernization of these fighters is one of the Air Force's most pressing needs. Active and Air National Guard F-106 squadrons should continue to be converted to F-15s and F-16s. The Air National Guard and Air Force Reserve provide sixty-seven percent of the air defense mission in wartime.

The USAF/FAA JSS will provide the command and control capability required for peacetime surveillance and control. In conjunction with the E-3A Airborne Warning and Control System (AWACS), it will provide a limited wartime capability. Since the JSS is not survivable and provides only limited radar coverage, wartime air defense surveillance and battle management are dependent on the E-3A.

To detect the modern multiple independently targetable reentry vehicle (MIRV) missiles and to solve maintenance and supply support problems of an aging system, a two-part program to modernize the ballistic missile early warning system (BMEWS) must be completed expeditiously. Modifications should include replacement of the missile impact predictor computers at all three sites and upgrades of the detection and tracking radars at two sites.

Also, two additional phased-array SLBM missile warning sites (PAVE PAWS) must be built in the southeast and southwest United States. These new PAVE PAWS sites 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.

Strategic Defense Initiatives: On March 23, 1983, President Reagan called for a robust research and technology program to investigate the technological potential to eliminate the threat of nuclear ballistic missile attacks. This call created the Strategic Defense Initiatives. Its first product, the Fletcher Committee Report, advocated a multitiered system of space and ground weapons, communications, surveillance, and support assets to meet the challenge. The report also indicated that recent progress in enabling technologies was such that the US was ready to investigate at an accelerated rate. The Air Force's main participation will focus on the space segments of a defense technology effort and the critical battle management, C³, and system survivability considerations as a major partner in the OSD lead program. The Air Force Systems Command and Space Command bring to the program a vigorous technology and operating community in the areas of surveillance, acquisition, and tracking of targets; kinetic- and directed-energy research and development; command and control architecture and operating systems; and some twenty years of complex space system operation. This Association fully supports strong Air Force participation in this vital program.

Readiness and Sustainability

The United States Air

Force's investments in force structure and modern weapon systems need to be translated into warfighting capability by near-term investments in readiness and sustainability programs. The proper mix of modern equipment and well-trained, dedicated people who have at their disposal effective repair facilities, sufficient spare parts inventories, adequate munitions, and fuel is essential. The Air Force has made the readiness and sustainability of existing forces the number-one priority for conventional forces.

Readiness is the ability of force units, weapon systems, or equipment to accomplish their assigned mission. It is achieved through 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. 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.

Recent devotion of resources to readiness and sustainability initiatives—spares, maintenance, training, personnel, munitions, and fuel—has begun to pay off. The downward trend is being reversed. Flying time for tactical aircrews has increased by fifty percent since 1978, and the 1983 mission-capable rates for the F-15, F-111, and F-4 are at the highest levels in five years. This, however, is not enough. Funding for readiness and sustainability must continue to receive the highest priority. Efforts to increase operational flying, expand stocks of spare and repair parts and munitions, decrease the depot

maintenance backlog, and provide near-term combat capability need to be sustained.

The wartime performance of our modern aircraft can be only as good as the munitions they carry. More modern 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. Munitions shortfalls will require more time to correct than those for 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. Special attention must continue to be devoted to these accounts to eliminate the existing backlog in unfulfilled requirements. Maintaining a combat-ready force will require a steady and balanced provision of significant resources over time.

Force Projection

The ability to project forces early and to keep them resupplied is essential to deterrence and critical to the outcome of conflict. Success in battle depends on having the right forces in the right place at the right time, and with the right supplies. This requires the movement of critical cargo to a theater of operations and then within that theater. Airlift, sealift, and repositioning play vital roles in the mobility equation, but only airlift, the most flexible component of today's mobility forces, can provide timely reinforcement, supply of forward deployed forces, and support of rapid force projection. The Air National Guard and Air Force Reserve are crucial

C-23 Sherpa in rollout ceremony. As the dedicated aircraft for the European Distribution System, the C-23 requires continued funding to assure airlift capability for quick delivery of fighter spare parts to Europe.

elements of the airlift force, providing fifty percent of the strategic and fifty eight percent of the tactical airlift aircrew capability. Even though airlift enhancements were supported during 1984, mobility assets remain inadequate to meet the deployment requirements of US combat forces.

In all contingencies, airlift provides the means for rapid deployment, and in many contingencies, airlift—with its flexibility, speed, and long range—is the only answer, either because of geographic location or the swiftness with which a threat arises. Hence, the importance of adequate and responsive airlift cannot be overstated. The global character of US interests and commitments makes it imperative that we have the capability of quickly deploying and providing initial support for combat forces anywhere in the world. Growing Soviet offensive capabilities have reduced warning and mobilization time, placing a premium on bringing US power to bear rapidly.

Airlift Master Plan: The Air Force Airlift Master Plan was developed to address proposed solutions to airlift needs using FY '83 capability as a baseline. In seeking to attain the congressionally mandated 66,000,000 ton-miles per day, the full potential of existing resources—seventy-seven C-5As, 267 C-141s, and twenty-six KC-10s—should be realized as quickly as possible. The C-5A wing modification, adding some 30,000 hours to its service life as well as range and payload improvements, must continue expeditiously. The capability of these existing aircraft must be maximized by increasing spare parts stocks to permit higher sortie rates. Due to the growth in requirements for airlift peacetime operating stocks



(POS) and war readiness spares kits/base-level self-sufficiency spares (WRSK/BLSS), recent improvements in funding have been diluted. Shortages of spare part sources seriously restrict the ability to meet projected wartime utilization rates. Increases in levels of spares involve long-lead times; therefore, funding must not be delayed.

The acquisition of fifty C-5Bs and forty-four KC-10s should continue to help correct today's insufficient capacity and meet near-term requirements dictated by national policy. The fifty C-5Bs requested by the Administration will add 7,500,000 ton-miles per day and provide a sixty

percent increase in outside cargo capability. The KC-10, a combined cargo and tanker aircraft, will provide both a new dimension in long-range aerial refueling capability and the capability of transporting large amounts of bulk and oversize supplies. While the new C-5Bs and KC-10s will provide an important and welcome step in the right direction, they will not satisfy completely the Congressionally Mandated Mobility Study's call for an intertheater airlift capability of 66,000,000 ton-miles per day. Further, they do not alleviate serious shortfalls in intratheater airlift capability.

There is a continuing need for intratheater mobil-

ity and resupply. The C-130 is the backbone of the current force—the only airlifter with realistic intratheater capability. Just as the C-141 and C-5A have been upgraded to improve their capability and extend their service life, the C-130 also requires enhancement. This aircraft is showing the results of twenty years of hard service as experienced in Southeast Asia. Replacement of the outer wing and installation of a self-contained navigation system and enhanced station-keeping equipment will improve and extend its mission capability, and the radar homing and warning system will aid in protecting it against hostile fire in combat. Preservation of the C-130 is mandatory, as it is our only aircraft currently capable of performing intratheater airlift. These modifications must go forward, but a replacement for it and the C-141 will be needed in the 1990s.

C-17: Initiation of full-scale development (FSD) of the C-17 in FY '85 prepares the way for procuring the airlift system designed as the core of the Airlift Master Plan. The C-17's performance characteristics make it unique—direct delivery of outside cargo to both major and austere airfields. Augmented by the C-5 and C-141 in the strategic and by the C-130 in the intratheater airlift roles, the C-17 provides the heart of the future airlift force. Full funding of the programmed 210 C-17 aircraft must be accomplished without slips or cuts to meet mobility and support requirements.

European Distribution System: The new European Distribution System Aircraft (a small, off-the-shelf commercial cargo aircraft designated the C-23 Sherpa) requires continued funding to assure the airlift capability for rapid delivery of fighter aircraft spare parts

The objective of the EF-111A is to disrupt the enemy's air defense network by denying or degrading information collection and flow. Continued emphasis on research and development is needed in this area.



in Europe and improvement of their warfighting ability. This new concept promises to be an inexpensive process to enhance readiness in NATO.

CRAF: The Civil Reserve Air Fleet (CRAF) provides more than forty percent of the intertheater airlift—passengers and cargo combined—available under crisis conditions. Further expansion of the CRAF wide-body fleet is planned. Even if full FY '85 programs are implemented, airlift shortfalls will exist and will require major future efforts.

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

Rescue and Special Operations: The USSR and its surrogates seek to promote revolutions and insurgencies around the world. This factor, combined with the potential for low-level conflict within and among Third World countries, makes it essential that the US maintain special operations forces capable of conducting missions in every region of the world where the US has vital interests. In peacetime, these forces must be able to assist friendly nations that confront externally supported low-level subversion or insurgency. In war, special operations forces must be capable of conducting various missions, including special strategic operations and the destruction of military targets. It is essential, therefore, to modernize as well as to expand the fixed-wing aircraft fleet—especially the MC-130H Combat Talon II aircraft.

Air Force responsibility for combat rescue and recovery far behind enemy lines requires additional capability. The Air Force decision to replace helicopters of limited payload, range, and cruise speed with the HH-60A warrants full Defense Department and congressional support. Support for this replacement program is necessary to assure that the best low-level, night, operational capability exists.

Aerial Refueling: USAF analyses show that additional aerial refueling capability is needed for optimum bomber penetration routes to support the single integrated operational plan (SIOP). In addition, the requirement for tanker sup-

port is increasing as B-52Gs and Hs begin to carry ALCMs. Compounding this is the growing requirement to refuel airlift and tactical aircraft for such contingency operations as in NATO or Southwest Asia. Present aerial refueling requirements for combined SIOP contingency missions exceed capabilities substantially. During simultaneous operations, strategic and other missions would be seriously degraded because of tanker limitations.

The Air National Guard and Air Force Reserve are vital components of the aerial refueling force. They provide fifty percent of the strategic tanker/cargo aircrew capability and twenty-

one percent of the strategic aerial refueling capability.

The Air Force program to reengine the KC-135 fleet with CFM56 and JT3D/TF33 engines, therefore, is imperative. This will add refueling capability and overcome specific operational and environmental problems. These problems include limited thrust and fuel offload capabilities, excessive fuel usage, chronic water augmentation (takeoff thrust) problems, and excessive engine noise and gaseous emissions. Recent experience with US Central Command forces in such scarce water areas as the Mideast shows water requirements would be a problem for KC-135s. Reengining the KC-135A will correct these problems. Eventually the entire inventory of 640 KC-135s must be reengined.

In addition to the KC-135 reengining, additional air refueling capability must be provided through KC-10 procurement. These two programs must be funded in sufficient quantities to help satisfy growing refueling requirements and to provide a flexible tanker force to satisfy a wide range of strategic and general-purpose missions. Each aircraft in the tanker role is ideally suited to a specific mission: the KC-10A to long-range deployment of aircraft and cargo, and the KC-135 to the SIOP, mid-range deployment, or employment scenarios. The KC-10 does not solve present tanker deficiencies in terms of "boom" intensive requirements, in which more booms, not more fuel, are required to meet employment tactics. However, it does release KC-135s from other missions to fill this requirement. KC-10s provide a much-needed long-range refueling capability. A proper force mix of KC-10 and KC-135 aircraft is needed to enhance both

long- and mid-range off-load capacity and to provide increased basing flexibility.

Tactical Airpower

The Air Force faces a continuous challenge within a constrained defense budget in striking a proper balance between funding essential modernization of its tactical fighter forces and supporting programs designed to improve the near-term readiness and sustainability of these forces.

US tactical forces must be continually modernized and expanded to cope with the growing Soviet threat during day and night and all weather conditions. The potential for attrition in modern warfare is dramatic; our vital, reusable aerial delivery systems must not be exposed unnecessarily—standoff weapons with all-weather capability must be developed and produced. Continued improvements in the density, quantity, and complexity of the Soviet air defenses force USAF and allied air forces to pursue carefully selected tactical programs that will enhance the flexibility, deployability, firepower, and quick-response capability of their tactical forces. Further, since it is unlikely the US will ever match the numerically superior Soviet force on a one-for-one basis, the Air Force has to maintain an effective tactical air arm by exploiting the US technological edge. This requires emphasizing systems that achieve higher effectiveness through accuracy and lethality while reducing aircraft attrition.

The Soviets continue to outproduce the US in tactical fighters, and their sustained rate of investment and production translates into an increasingly sophisticated offensive force. Two-thirds of their 4,500 fighters are new "third-gen-

eration" aircraft, including the MiG-23 Flogger, MiG-25 Foxbat, Su-24 Fencer, and later-model Sukhoi Fitter aircraft, and they will begin producing their fourth-generation aircraft before completion of the third-generation buy. The result is that the average age of their force is one-half that of the US tactical force.

Tactical Fighter Road Map: Based on an assessment of the current force, a specific rationale and procurement strategy was designed for the total force and is outlined in what is called the Tactical Fighter Road Map. This strategy addresses our tactical fighter requirements from three perspectives.

- Procure the required number of fighters to flesh out, modernize, and sustain a forty tactical fighter wing force—twenty-seven active and thirteen reserve—plus an air defense force.

- Buy the needed mix of fighters to accomplish specialized and multirole missions.

- Develop the quality improvements to enable fighters to accomplish demanding combat missions.

The current fighter force consists of approximately thirty-six wing-equivalents with seventy-two combat aircraft each. Due to fiscal constraints, the goal to increase to forty equivalent wings will not be reached until the early 1990s rather than in the late 1980s as originally expected. Procurement is the key to the road map, and in order to grow, modernize, and sustain a forty-wing goal, we must reach a procurement level of 260–280 aircraft per year. In 1986, planned procurement will reach 228 fighters and by 1988 hopefully will reach the required level of 276 aircraft per year.

To meet the Soviet chal-

lenge in the near term requires the Air Force to continue evolutionary improvements to existing fighters and to continue a balanced procurement of F-15s and F-16s. Tactical forces must be able to achieve air superiority in order to interdict and destroy enemy air and ground resources under all weather conditions and to provide effective close air support for friendly ground forces.

While we have an excellent air-to-surface weapon system, the A-10, there is a need today to close gaps in surface-attack capability, around-the-clock all-weather interdiction capability, and jam-resistant C³ capability. Emphasis on a survivable, capable tactical C³ network is essential to counter significant Soviet improvements in this arena. Further, the US tactical C³ network must be interoperable with those of our allies to provide better detection, location, and classification of enemy forces. The E-3A AWACS, a uniquely capable airborne command and control system of the US Air Force and allied powers, must be exploited to realize its full potential for force enhancement. Low-altitude navigation and targeting infrared for night (LANTIRN) must be developed and deployed to penetrate enemy air defense at low altitude and to find and destroy enemy targets at night and under the weather. Likewise, the global positioning and microwave landing systems must be exploited to provide all Air Force aircraft a survivable, all-weather navigation, attack, and landing capability.

The centerpiece of the Tactical Fighter Road Map is the decision to buy the F-15E dual-role fighter. It satisfies the requirement for an aircraft that can fulfill the interdiction and offensive counterair missions. The F-15E will be able to

carry out these missions against fixed and mobile targets both at night and under the weather. In addition, it will retain its inherent air-superiority characteristics and increase the theater all-weather defensive counterair capability. The planned 392-aircraft buy will equip four combat wings and allow theater commanders flexibility never before available in application of tactical airpower.

By the 1990s, current fighter designs will be twenty years old, and modifications will no longer be as cost-effective. The performance edge of these aircraft today will be narrowed significantly or be gone. Thus, to meet the threat in the 1990s and beyond, the Air Force must now begin work on a new fighter. The advanced tactical fighter program, coupled with associated efforts in engine technology, needs to be carried forward expeditiously to reach a planned initial operational capability (IOC) in the mid-1990s.

In terms of wartime roles, the Air National Guard and Air Force Reserve will be crucial elements of the tactical force, providing thirty-four percent of the tactical fighter capability and thirty-three percent of the tactical air support.

Modern Munitions: Sufficient stocks of modern, effective munitions are essential to our warfighting capability. The Air Force has a large stockpile of aging Vietnam-era munitions characterized by gravity bombs, low-probability-of-kill air-to-air missiles, and a general lack of precision guidance. While they remain reliable weapons, they are ill-suited to counter growing Soviet capabilities. Efforts must continue to improve the quality and size of the munitions inventory.

Particular emphasis on

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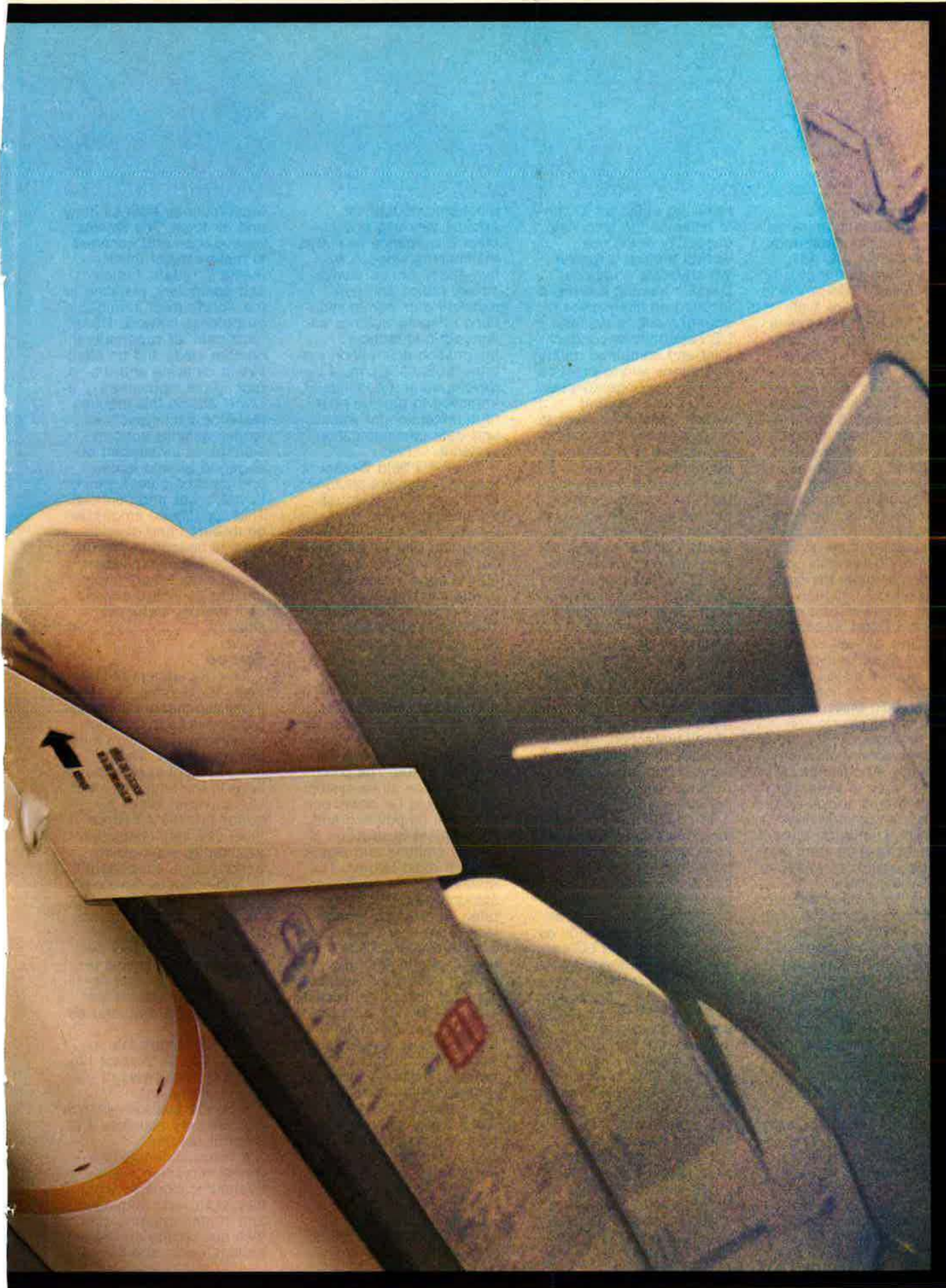
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building up Air Force stocks of air-to-air missiles through development and procurement of the advanced medium-range air-to-air missile (AMRAAM) is imperative to cope with Soviet force improvements. AMRAAM will give fighters the capability to engage multiple targets more effectively and will increase aircraft survivability because of its high-speed range and lock-on after launch potential. In the near term, additional AIM-7M air-to-air missiles are required to meet stockpile requirements. We must buy more of such munitions as low-level, laser-guided bombs; GBU-15; 30-mm gun pod and ammunition; the combined effects munition (CEM), a new cluster munition; and Gator, an antiarmor mine, as well as to improve the effectiveness of such guided air-to-ground weapons as the imaging infrared (IIR) Maverick. Currently, US forces do not have the specific munitions to attack enemy airfields efficiently. Acquisition by the Air Force of Durandal, a French-built, rocket-assisted, runway-cratering munition, should be followed by development of a new generation of weapons and submunitions.

Intensive R&D efforts are required to realize the next generation of munitions: sensor-fuzed weapons (SFW), hypervelocity missiles (HVM), and the extended-range antiarmor munition (ERAM). Accelerated development is required for hardened target munitions (HTM), an improved 2,000-pound bomb, and an alternate warhead for the IIR Maverick.

Realizing the importance of realistic training for readiness, AFA fully supports the continuation and broadening of the current family of tactical "Flag" exercises as invaluable tests and demonstrations of tactics, doctrine, and technology—

involving allied air forces—to enhance the response capability of the free world's tactical airpower. We advocate additional specific training exercises, focused on likely areas of engagement, to evaluate US capability to conduct joint and combined military operations and to practice existing contingency plans.

Electronic Combat Needs: Electronic combat (EC) is one of the fastest developing and changing elements of air warfare. It is frequently the one element that tips the scales of victory, as has been shown in recent battles around the world. Combat commanders must be provided viable EC options for aircraft self-protection to jam, exploit, deceive, or destroy combatant elements of the enemy air defense and command and control systems. A major requirement is continued, expeditious development and deployment of an integrated mix of self-protection, destructive, and disruptive systems to suppress enemy defenses and to protect penetrating US forces.

To conduct air operations throughout a campaign and to reduce the attrition of our numerically inferior forces, the enemy air defense system must be countered quickly and effectively. Self-protection as well as dedicated EC assets that counteract hostile air defense systems are essential. Also, protection capabilities are needed to ensure that aircraft avionics and ground- and space-based weapon systems remain effective in an electronic combat environment. Development of airborne self-protection jammers, updated existing radar warning receivers, procurement of low-smoke engines, and continued installation of new flare and chaff dispensers must receive high priority. Protection for our aircraft

electronic equipment against jamming and nuclear disturbance is vital to maintaining weapon system effectiveness. Jam-resistant radios and jam-resistant data communications systems, such as enhanced joint tactical information distribution systems (EJS/JTIDS), must be developed and continually improved to provide near-term protection for voice and data communication systems.

The F-4G Wild Weasel is a central element of USAF's EC capabilities. Through the use of the on-board avionics package, the F-4G is able to deliver antiradiation missiles and other conventional ordnance accurately and quickly against surface emitters. The planned updates of this avionics package, along with the acquisition of the high-speed antiradiation missile (HARM) and IIR Maverick missile, are required to increase the lethality of the Wild Weasel and to extend its viability into the 1990s. The precision location strike system (PLSS) must be developed to permit pinpointing and subsequent destruction of enemy emitters and attack of other fixed targets. The ability to guide aircraft and standoff weapons accurately to a target, regardless of weather conditions or time of day, makes PLSS a high priority for suppression of enemy air defenses.

In the disruptive support area, the EF-111A, presently in production, will electronically jam early warning, acquisition, and ground-controlled intercept radars, while Compass Call, also in production, will counter selected tactical communications. Their objective is to disrupt the air defense network by denying or degrading information collection and information flow.

The Soviet Union relies heavily on electronic

equipment for both its army and air force. The Soviets have made—and continue to make—major investments in radars, radios, and computers, resulting in the world's most formidable air defense network. USAF must gain air superiority in combat areas and be effective in delaying and disrupting the momentum of a Soviet attack; this requires real-time intelligence, effective defense suppression, close air support of engaged ground forces, and electronic confusion of Soviet forces and controls. Thus, continued emphasis on research and development is needed to provide our combat commanders with the necessary equipment to counter the threat as it evolves and intensifies.

Space

The Department of Defense is becoming increasingly dependent on space-based assets to conduct effective and efficient military operations. The full integration of space operations in the employment of US terrestrial forces requires that the Air Force meet user requirements of availability, survivability, performance, supportability, and capacity. Space operations must include the conduct of those activities necessary to protect our use of space, protect our resources from threats in and from space, and operate space systems that enhance land, sea, and air forces.

The Air Force's role in space is to be prepared to conduct three types of space operations:

- Space support—launch and recovery activities and on-orbit support.

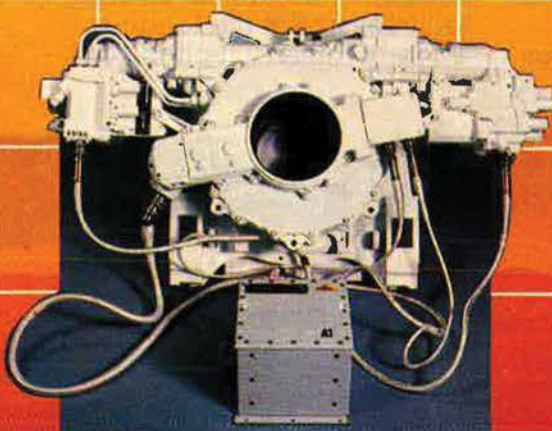
- Force enhancement—global surveillance and communications capabilities, worldwide command and control systems, precise positioning and navigational data, and current,

SPECO Division develops subsystems for B-1B program.

Drawing on extensive experience in the design and manufacture of precision gear drives and actuation systems, SPECO Division designed and produced the gearbox and two subsystems shown below. SPECO Division, Aerospace Operations, Kelsey-Hayes Co., Springfield, OH 45501. A subsidiary of Fruehauf Corporation.



In cooperation with Garrett Turbine Engine Co., SPECO Division developed this gearbox for a Secondary Power Supply Subsystem providing hydraulic and electric power for airframe accessories and avionics. Pictured above is the gearbox in attitude test.



Working with Rockwell International, SPECO Division designed and produced the Rotary Launcher Drive Subsystem (RLDS) that is installed in each weapons bay. The Rotary Gearbox, Electronic Controller Assembly (ECA), and Cables that comprise the subsystem provide for precise angular positioning upon command. Actual position signals are provided to the offensive systems operator.



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In support of its Bare Base mission, the U.S. Air Force has ordered 23 more of these turbine mobile generator sets to add to its current complement of 26.

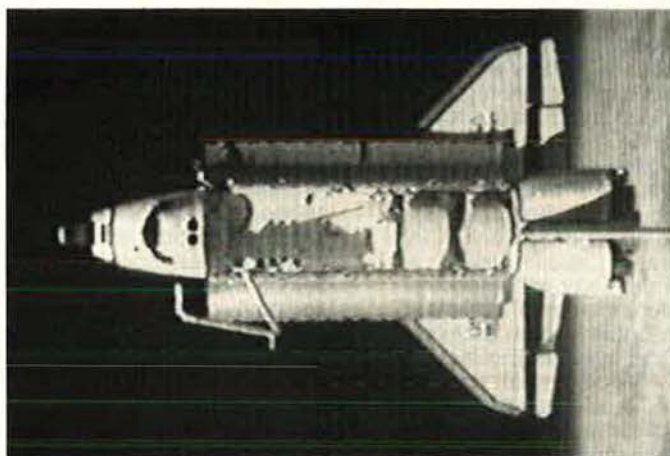
The Space Shuttle is important to USAF's space operations. The Air Force must have priority access to all elements of the space transportation system for tasks not possible with expendable launch vehicles.

detailed, timely meteorological data.

• Space defense operations—detecting, tracking, and identifying all objects in space, timely warning to the NCA of hostile actions to the United States and our allies, developing the capability to deny or nullify hostile actions committed in or through aerospace, and conducting sustained operations to detect and analyze aerospace threats.

The timely creation of Space Command (SPACECOM) provides for the consolidation of operational space activities into a major command and provides for a stronger working relationship between space-related research, development, and acquisition agencies and the operational users. More efficient use of our space systems in both peacetime and wartime, coupled with the very real Soviet threat, the increasing number of multipurpose, multiuser systems, and the legal mandate that forces be employed through the unified and specified command structure, leads this Association to recommend strongly that a Unified Space Command be activated early in 1985.

Development of the consolidated space operations center (CSOC) is essential for future US space operations. For management, operational, and economic efficiencies, CSOC will combine satellite control capabilities and DoD Shuttle flight planning, readiness, and command and control in a single facility, thereby providing increased capacity and redundant control. CSOC will enhance operational capabilities by providing greater mission flexibility and increased survivability of the satellite control network. For the Shuttle role, CSOC is vital to control military missions directly and to enhance protection of na-



tional security information.

Full funding of a vigorous program to enhance the survivability of our space systems is essential. Steps must be taken to improve the survivability of critical space systems, such as the defense support program (DSP). Equally essential are a satellite-based relay system, the survivable control system (SCS), and mobile telemetry tracking and control capability to provide survivable satellite command and control.

The Space Shuttle is important to USAF's space operations because it performs space launch services for critical DoD satellites. Beyond the objective of providing an economical, reliable, safe, timely, and reusable space-launch capability, the Air Force must have priority access to all elements of the space transportation system (STS) for tasks not possible with expendable launch vehicles and not practical with earlier manned space programs. In addition, the Shuttle allows man to become a routine part of space operations. The new opportunities provided by the manned presence, coupled with the increased payload size and weight limits, should be exploited to enhance US national security.

While affirming its com-

mitment to the STS, the DoD must still provide expendable launch vehicles (ELVs) to ensure the availability of an adequate launch capability to provide flexible and operationally responsive access to space. The STS will remain the primary launch vehicle for routine DoD launch services. Unmanned ELVs will provide a complementary capability to the STS. In this respect, development of a viable, commercialized ELV industry is essential. It is further urgent that measures be taken to protect the development of this crucial private-sector, high-tech industry from heavy foreign government subsidized competition.

Development of a higher-energy upper stage for the Space Shuttle is essential because of the growth in the payload weight requirements. The increase in payload weight results mainly from modifications to extend the life span of each satellite and from the accommodation of Shuttle on-orbit expendables to prolong the duration of each mission.

The Air Force should closely monitor NASA's development of a permanently manned space station for future potential military applications. There are many potential mis-

sions, such as communications command and control, surveillance, on-orbit service and repair of satellites, and research and development, that could be performed from a space station.

The Air Force should exploit fully the potential of a national system of space-based platforms, equipped with radar (and possibly infrared) for needed extension of our air defense networks. Such active space-based systems would be extremely effective for intelligence gathering, warning, forward posturing, and force management.

Development and flight-testing of this country's first nonnuclear space defense weapon, the F-15 miniature vehicle antisatellite (ASAT) system, must continue.

Research and Development

Tomorrow's military capabilities are the products of today's science and technology programs. The science and technology program, which includes manufacturing technology and materials technology efforts to increase the productivity and vitality of the industrial base, has 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 those of potential adversaries. Not only is the development and production of military equipment fundamental for the long-term strength of the armed forces—along with such factors as the skills, training, and morale of military people—but the high visibility of these programs makes them a crucial component of deterrence.

The United States relies on technological, rather than numerical, advantage to maintain superiority of its weapons over those of

the Soviet Union. This Association firmly believes that loss of a qualitative edge is an ominous long-term threat. Today's qualitative lead over the Soviets is a direct consequence of this nation's prior technology investments.

We must maintain this edge. Over the past decade, the Soviets invested some \$135 billion more than the United States in military R&D; because of the effects of inflation, the buying power of our investments in basic research and exploratory development declined by some forty percent since 1966. Over this same period, the Soviets graduated four to five times more engineers and scientists than the United States; through overt and covert means, the Soviets have been exploiting Western technology for use in their expanding military forces. Recent trends show alarming gains by the USSR in an increasing number of basic technologies, such as the application of charged particle beams and high-energy lasers, chemical warfare, antisatellite, and in other areas.

This country needs to maintain steady, adequate, moderate annual real growth in its technology base. Continuity of effort at a moderately increasing level is more productive and far more economical than crash programs conceived and executed in haste. Steady annual growth in those basic research and exploratory development programs that generate innovative concepts and that demonstrate their theoretical soundness and technical promise will translate into real capabilities for the future. High payoff technologies that the United States needs to exploit robustly include electronics, weaponry, propulsion, flight vehicles, and materials.

Integrated circuit technology is the keystone of modern military electronics. The very-high-speed integrated circuits (VHSIC) triservice (USAF-funded and -managed) program is imperative to provide the technology for coming generations of integrated circuits. VHSIC technology will allow implementation of advanced avionics system architectures in future production F-15/F-16 aircraft and the future advanced technology fighter that integrate subsystems for redundancy, use sensor information, and allow incorporation of artificial intelligence concepts. Payoffs will include enhanced performance and reliability and reduced life-cycle costs. The same is true for solid-state phased-array radars, which, with improved performance, higher reliability, and reduced size and weight, will provide air- 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 Advanced Radiation Technology program should proceed expeditiously to exploit laser technology.

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. The complementary Advanced Turbine Engine Gas Generator and the Aircraft Propulsion Subsystem Inte-

gration 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 Air Force Rocket Propulsion program is needed for advanced air-launched tactical and strategic missiles, space launch systems, satellites, and ballistic missiles.

An essential R&D goal is improved aircraft performance. Short takeoff and landing technology is crucial to reduce dependence on conventional runways. So are enhanced flight control weapons delivery systems and systems for 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 whatever 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. Work must continue on technologies needed for the next generation of space missions.

The Soviets are continuing their intensive program to acquire Western advanced technology through espionage and by exploiting inadequately controlled transfers abroad. The US must halt this flow of its technology to the USSR.

Cooperative efforts in research and development need to be continued to capitalize on the technological advantages and 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.

One of the key objectives

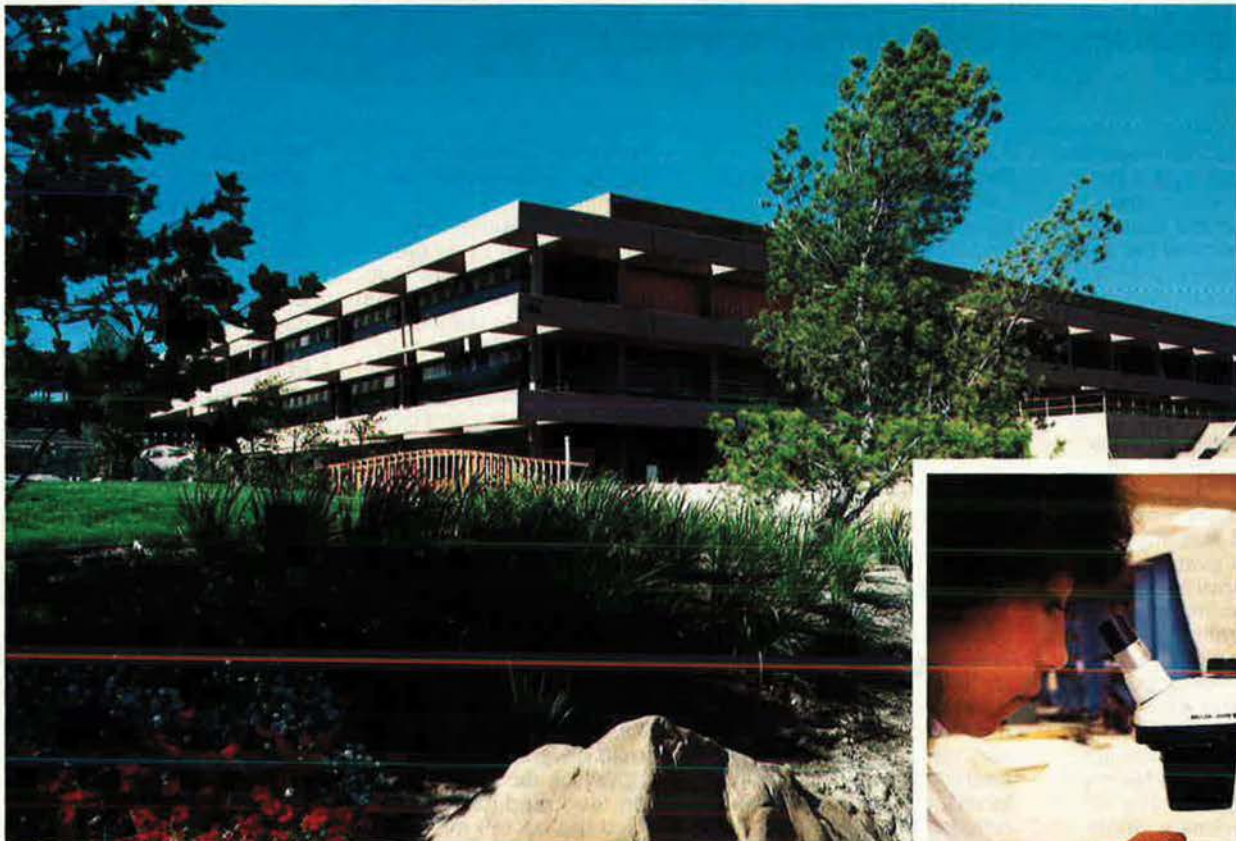
in all military research and development efforts, in the view of this Association, must be to maximize return on investment. This means that, in developing new systems, care must be taken that they are logistically supportable and affordable. The most technically advanced system, unless supported by 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 that involves cycles of moves and counter-moves. The US must not only be able to understand and correctly forecast Soviet weapon developments but must 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 its most important advantage 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; it has already produced adverse trends in the military technology balance that we must reverse promptly. Sustained investment growth and cost-effective management are the most immediate requirements facing us. We urge that priority attention be given to meeting this central need in the next Five-Year Defense Plan.

In summary, the preservation of peace and freedom depends on more than rhetoric and one side's good intentions. Peace does not happen; it must be earned at a price. The price of freedom is eternal vigilance. ■

Did You Know...?



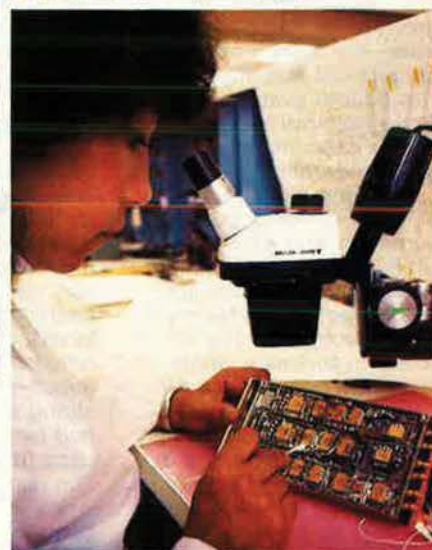
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People Are the Priority

A policy paper titled "Defense Manpower Issues," adopted by delegates to AFA's annual National Convention on September 17, 1984.

Our success depends on getting the most out of every dollar and ultimately on the quality and dedication of our people. Well-trained, well-led, and highly motivated people are the key to strong and ready forces . . . strong and modern strategic nuclear forces, improved readiness and sustainability, more mobility, and modern tactical forces give the Air Force the hardware—the tools it needs—to carry out that mission. Our people give life to those systems and ultimately determine the course of battle."

This was the joint statement of Air Force Secretary Verne Orr and Air Force Chief of Staff Gen. Charles A. Gabriel when they appeared before the Ninety-eighth Congress. The Air Force Association wholeheartedly agrees! The Air Force must continue to attract and retain high-quality people to ensure that it is ready to fight and prevail in any conflict in which America may be engaged.

Today, it appears that the Air Force is well on the road to recovery from the devastating personnel losses that occurred in the late 1970s. During the past year, the Air Force enjoyed unprecedented recruiting and retention successes. Pilot and navigator inventory shortages have been eliminated for the first time since 1979. The shortage of critically skilled noncommissioned officers has been reduced from almost 7,800 last year to approximately 4,200. A cautionary note—despite these recent successes, the Air Force still suffers from low experience levels in some direct supporting skills.

In the coming years, the Air Force will be challenged to keep up this momentum and maintain an adequate resource of both military members and civilian employees. The Air

Force is in a period of force growth brought on by changing military strategies and expanding roles and defense missions. At the same time, a declining youth population, anticipated increased private-sector competition for skilled people, rising employment, and an improving economy will make it difficult to keep pace with the growing demand for high-quality people.

In many ways, today's environment is reminiscent of 1975, when the services were unknowingly on the brink of a severe military manpower crisis. In that year, this nation experienced an economic downturn with high unemployment. A military pay cap was imposed in response to public pressure to reduce government and defense spending. This situation was followed by a strong economic recovery and two additional pay caps in 1978 and 1979. The result was that all services failed to attain their nonprior-service recruiting goals. More importantly, all services experienced alarming losses of trained careerists, including pilots, navigators, engineers, and enlisted personnel in critical skills, resulting in a severe impact on Air Force readiness. For this reason, the Air Force must continue to rebuild its experience base by sustaining the momentum and not ignoring past lessons.

Of particular concern to AFA is the impact of any efforts to degrade essential entitlement programs. The retirement systems, especially, continue to be reviewed by a number of agencies. It must be remembered that the principal purpose of the military retirement system is to sustain readiness. It has worked well in helping maintain a vigorous, experienced, and combat-ready force. The fact that it is the

Air Force's number-one military career incentive further emphasizes the necessity to sustain the current system in its present state. This system is a well-earned entitlement that partially offsets the extraordinary demands of a military career (long hours, frequent relocations, enforced family separations, exposure to risk, injury, or death, etc.). The Civil Service Retirement System is, similarly, the single most important benefit for civilian employees. Further erosion of their retirement benefits could result in a crippling loss of highly skilled workers who are critical to the Air Force mission. Any adverse changes to these programs could have a devastating impact on recruiting, retention, and readiness and affect the overall mission of the Air Force.

The Air Force continues to be the leader in Total Force integration. The Total Force includes all active-duty, Reserve, Guard, and civilian personnel and is organized, trained, and equipped as a team. The Air Guard and Reserve represent a significant portion of the Air Force's combat capability and, in recent years, have assumed an increasing share of Total Force responsibilities. Since 1972, active forces have been reduced by sixteen percent, while Air Guard and Reserve manpower has grown thirty-three percent. Today, they comprise approximately fifteen percent of the Total Force and nearly twenty-five percent of all Air Force flying and support missions. As the Air Force continues to modernize and identify new and expanded missions for the Air Guard and Reserve, many factors must be weighed to ensure that the Air Force can meet its peacetime and wartime requirements. The current Total Force mix

has been set by objective analysis and provides a peak readiness capability. Any further directed changes or conversions should include similar analysis to ensure our nation's ability to deter our enemies and, if necessary, to fight and win.

Air Force civilian employees make up about twenty-four percent of the Total Force. Civilian employees are dedicated to supporting the efficient and effective accomplishment of the Air Force mission, including readiness for emergencies, and their contributions are significant and essential.

The Total Force is working, and together the military and civilian components satisfy the requirements for deterrence, peacetime presence, and immediate response in a crisis, national emergency, or war. With this in mind, AFA urges that Congress continue adequately to compensate and recognize what is truly the Total Force Air Force.

In sum, the rebuilding of our nation's defense must be sustained if we are to continue to meet the ever-growing threat. How well we meet that threat depends on people. To quote Secretary Orr and General Gabriel again, "Over the past three years, the Air Force has made a good start in regaining its strength—strength sapped by inadequate support for defense in the 1970s. Although we still have a long way to go, we're beginning to see results in the quality of our forces—highly skilled and motivated people with the right equipment, innovative tactics, and realistic training. With public and congressional support, we will keep up the momentum in building strong and ready forces."

There is no doubt that the current military and civilian retirement systems,

pay comparability, compensation initiatives, and quality of life have been the key ingredients in regaining a strong and ready force. AFA does not believe that this is the time to cut back on these vital people programs. Rather, we believe it is crucial to look ahead at the challenges the Air Force faces in attracting and retaining high-quality people with technical skills.

With the foregoing in mind, AFA highlights the following crucial issues to maintain the momentum of the last three years.

Retirement and Estate Programs

Military Retirement System: The principal purpose of the military retirement system is readiness. As such, the present military retirement system serves several vital objectives. It provides a legitimate base for the nation's mobilization plans and ensures that a large, standing pool of skilled, experienced manpower will be available to meet wartime support requirements. It maintains an orderly flow of officers and enlisted members throughout the ranks to retirement while allowing sufficient incentives and rewards for advancement through promotions.

The retirement system also provides the foundation for the strong institutional support that partially offsets the extraordinary demands of a military career. The military retirement system is the services' primary career incentive. If this incentive is significantly diminished, highly skilled, marketable people will leave for the private sector in increasing numbers to obtain a more secure and stable future and a more predictable life for themselves and their families. The military retirement system has undergone numerous piecemeal changes

in recent years. Changes since 1980 alone will reduce the value of lifetime retired pay for future retirees by twenty percent. Further reductions of this nature would jeopardize seriously our ability to maintain a quality force.

Civil Service Retirement System (CSRS): The CSRS is equally critical to civilian employees, who have already seen significant reductions to their retirement benefits. The cumulative reduction in retirement payments resulting from legislative changes to the CSRS between 1975 and 1983 already totals in excess of \$5.3 billion. Further reductions could threaten the Air Force's ability to recruit and retain top-quality employees—particularly those in high-technology occupations critical to the Air Force mission.

Supplementary Pension Plan: Congress is currently designing a supplementary pension plan to augment Social Security for new and former federal employees hired after December 31, 1984. It is critical that this plan offer a level of benefits that is competitive with those offered by major corporations, with which the federal government must compete for skilled employees.

Cost-of-Living Allowances (COLA): In the past four years, retirees have been asked to assume twice their fair share of the economic burden. Last year, eighty percent of the military retirees took a reduction in their cost-of-living allowance. For retirees under age sixty-two, this COLA adjustment, which is paid to help protect retired pay from erosion due to inflation, has been reduced. No COLA will be paid in 1984.

A COLA cap constitutes a reversal of the longstanding national policy of preserving the purchasing

power of retirees. Making a COLA cap permanent would reduce the lifetime value of retired pay by thirty-three to thirty-six percent for most military retirees. It is an immediate money-saver but, for the long term, is an unstable and unacceptable solution, as it discriminates against military retirees as a group on the basis of their age. Such a cap could have a growing corrosive effect on the attractiveness of the military retirement system as a career incentive as the cumulative reduction in purchasing power becomes apparent. This could have damaging consequences on retention, experience, and readiness levels. Finally, it appears to be a "selling out of military retirees" in the name of saving money.

Survivor Benefits Plan: Elimination of Social Security Offset: Under the Survivor Benefits Plan (SBP), when a widow or widower reaches age sixty-two or no longer has a dependent child, whichever occurs later, the monthly SBP annuity is reduced by the lesser of the amount of the Social Security benefit to which the widow would be entitled based solely upon post-1956 military service of the deceased servicemember spouse, or forty percent of the monthly annuity. These provisions have been interpreted to require that the monthly SBP annuity be reduced even when the widow or widower is receiving a Social Security retirement benefit based solely on that person's own work. AFA does not believe that an SBP annuitant who has earned and is receiving a Social Security retirement benefit based on his/her own work record should be penalized by having their SBP annuity reduced.

Survivor Benefits Plan: Payment to Spouses of

Missing Persons: AFA is concerned about a deficiency in both the Retired Serviceman's Family Protection Plan (RSFPP) and the Survivor Benefits Plan (SBP) that arises when participants in these programs disappear under circumstances in which it is reasonable to conclude that such participants have died. The deficiency is that there presently exists no authority for a determination of death. A determination of death of the participant is necessary to permit the payment of annuities under both the RSFPP and SBP. Under decisions of the Comptroller General, when a member who is entitled to retired or retainer pay is determined to be missing, the retired pay of that member may not be paid. Under existing law, the result is that, when a retired member is declared missing, the beneficiary of that member, usually the member's spouse, is denied access to the member's retired pay and may not be paid an annuity under either RSFPP or SBP, as the case may be. AFA supports action to permit the service Secretary concerned to make a determination that a participant in either RSFPP or SBP is missing under circumstances from which it can be reasonably concluded that such person is dead, provided the person has been absent for at least thirty days. Such a determination would permit the payment of an annuity under either RSFPP or SBP to begin.

Servicemen's Group Life Insurance (SGLI): SGLI is term life insurance available to service members (active duty and qualifying reservists). The principal purpose of the program is to make life insurance protection available, without war restrictions, at a reasonable cost to service

members. The recently completed 5th Quadrennial Review of Military Compensation (5th QRMC) concluded that the current SGLI coverage of \$35,000 does not provide a comparable basic level of coverage available to private-sector employees. In its final report to the President, the 5th QRMC recommended increasing the basic level of SGLI coverage to \$50,000 and concurrently offering an additional \$50,000 optional coverage on a voluntary, by-application basis.

Federal Employees Group Life Insurance (FEGLI): When civilian employees are separated, placed on leave without pay, or furloughed for military service, their FEGLI coverage is mandatorily terminated. This is a disincentive for federal employees to serve on active duty and could represent a severe financial loss, as FEGLI benefits can be substantial. The Office of Personnel Management has agreed to an Air Force request that they pursue legislation to correct this inequity.

Death Gratuity: The Death Gratuity is an immediate lump-sum cash payment to survivors of deceased service members that provides an "emergency fund" while payment of Dependency and Indemnity Compensation, Survivor Benefits Plan payments, Social Security benefits, and life insurance proceeds are pending. Current entitlement is based on six months' pay, with a minimum payment of \$800 and a maximum of \$3,000. The 5th QRMC determined that the Death Gratuity payment, as presently computed, does not meet the legitimate needs of survivors. The report recommends basing the Death Gratuity on three months' Regular Military Compensa-

tion (basic pay, quarters allowance, and subsistence allowance), with a minimum payment of \$3,000 and a maximum payment of \$9,000.

AFA Supports:

- Sustaining the present military and civilian retirement systems. If changes are mandated, they must be the result of thoughtful, deliberate, and thorough study of the system, taking into account the impact of such changes on military force management and readiness.

- Honoring commitments to military retirees and those on active duty by "grandfathering" these individuals against the effects of changes.

- 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 preretirement counseling for both military and civilian employees.

- Having retirees become active in Air Force retiree programs, including the involvement of retirees in preretirement preparation and/or briefing programs.

- The Air Force Enlisted Men's Widows and Dependents Home Foundation and the Air Force Village.

- Developing a fair and equitable supplementary pension plan for federal employees that is competitive with those offered by major corporations in the private sector.

- Enacting legislation to discontinue the Social Security offset to a SBP annuity when a surviving spouse is receiving a Social Security worker's pen-

sion based on his/her personal contribution.

- Enacting legislation permitting the service Secretaries to determine that a participant in SBP is missing under circumstances from which it can be reasonably concluded that such person is dead, provided the person has been absent for at least thirty days. Such a determination would permit payment of the SBP annuity.

- Increasing the SGLI basic coverage to \$50,000.

- Basing the Death Gratuity on three months' Regular Military Compensation, 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 FEGLI benefits during periods of active-duty military service.

AFA Opposes:

- Any proposal permanently modifying the 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.

- Further reducing Civil Service Retirement System benefits for covered employees.

- Changing the federal civilian annuity computation formula to a "high five" average salary from the present "high three."

Compensation

Military Pay Comparability: Long overdue pay raises in FY '81 and FY '82 essentially restored military pay to comparable levels with wages in the private sector. Undoubtedly, restoration of pay comparability was a critical factor in reducing the severe losses of the Air

Force's mid-career and senior NCOs and mid-career officers during the late 1970s. However, similar to 1975, when a pay cap spurred a nearly disastrous downward recruiting and retention spiral, military pay was capped at four percent on October 1, 1982, and again on January 1, 1984. This left a comparability gap of 8.7 percent—the greatest since 1972; previous low point was a 7.8 percent pay gap on October 1, 1979. Private-sector wages increased 4.7 percent between March 1983 and March 1984. Assuming a four-percent pay raise in FY '85, military pay will lag behind the private sector by approximately ten percent. Failure to reverse this pay cap trend portends adverse readiness consequences.

Civilian Pay Comparability: The principle of pay comparability for federal white-collar salaries was first established in 1962, later refined in 1967, and finally perfected in 1971 with the passage of the Federal Pay Comparability Act (PL 91-656). The system worked well during the initial years following its 1971 enactment, with the exception of 1975 when an alternative plan was first adopted allowing a five-percent increase instead of the 8.66 percent needed to achieve comparability. Since 1978, however, alternative plans have become the rule for the annual pay adjustments, rather than the exception, and, at present, the "gap" between federal civilian and private-sector pay is estimated to be as much as twenty-one percent. While some adjustments or "fine-tuning" to the system may be required, a return to a pay system based on comparability to the nonfederal sector is necessary to restore credibility. Failure to

do so will detract from the Air Force's ability to recruit and retain the quality of federal civilians needed to keep the Total Force working.

Variable Housing Allowance (VHA): The Variable Housing Allowance (VHA) program was implemented on October 1, 1980, and became a statutory entitlement on September 30, 1981. It was created to help members afford an acceptable standard of housing in the continental United States (CONUS) and to eliminate disparities in standards of living. Responding to fiscal pressures, Congress capped the FY '83 VHA program and required members to absorb housing costs equaling 19.4 percent of the BAQ (annually about \$700 per person). The FY '84 DoD Appropriations Act froze combined BAQ plus VHA (i.e., housing allowances) at FY '83 levels and reduced VHA dollar for dollar by the amount of the BAQ increase. In addition, the Act limits VHA plus BAQ to \$800 for members with dependents and \$600 for members without dependents. These VHA limitations mean that military members will incur annual out-of-pocket housing expenses of about thirty percent of BAQ to pay for housing costs (\$900 million, or about \$1,200 per person)—that's double the fifteen-percent absorption rate prescribed by statute.

Tax-Exempt Status of Military Allowances: The Internal Revenue Service (IRS), in IRS Ruling 83-3, is attempting to reduce the tax deductions clergy members are allowed to take for housing expenses (interest, real estate taxes, etc.) by an amount equal to nontaxable income. Treasury has proposed application of the same concept to military members. Such a ruling would have a devastating

financial impact on military personnel. More than 300,000 military homeowners would incur an additional tax liability of approximately \$800-\$4,000 annually—the equivalent of a four- to nine-percent pay cut. As the pay gap widens and the economy improves, retention will suffer. If rendered, the IRS ruling would expand the current 8.7 percent gap between military homeowners and private-sector homeowners, forcing some members to sell their homes. The Treasury proposal ignores the fact that the tax-exempt status of housing allowances is an integral part of military compensation and has been accounted for in establishing military pay levels since 1965. Further, taxation of military allowances is contrary to congressional intent, legal precedent, and a previous IRS ruling.

Career Basic Allowance for Subsistence (BAS): Denial of BAS to single careerists persists as one of the most significant career irritants to E-5s and above. The requirement to eat twenty-one meals each week in the same place is unrealistic. This "forced feeding" negates any potential benefit of interaction between career NCOs and their first-term subordinates during meal hours. It is particularly demeaning for single NCOs/supervisors in pay grades E-5 and above to be required to use a government mess while their married junior enlisted counterparts may eat where they choose. Experience with payment of BAS to all members at two bases confirmed that, when use of a government mess is made optional, the utilization rate is not affected and the desired positive interaction between NCOs and first-termers still results.

Civilian Uniform Allow-

ance: Civilian employees, such as firefighters and police officers, who must wear uniforms receive an annual allowance of \$125. This amount has not been changed since 1969 and is grossly inadequate, resulting in substantial out-of-pocket expenses for these employees. This statutory limit must be raised to an amount reflective of actual costs today.

AFA Supports:

- Using a phased approach, beginning in 1986, to restore military and civilian pay to reasonable comparability with nonfederal sector pay.

- Eliminating the pay ceiling for senior Air Force military and civilian personnel.

- Restoring the full Variable Housing Allowance based on the provisions of the FY '85 DoD Authorization Act.

- Permanently exempting military personnel from a possible tax ruling similar to IRS 83-3 or any other action which would limit military members' tax deductions by requiring them to offset mortgage interest and tax deductions by the amount they receive in BAQ, VHA, and/or rent plus.

- Retaining the pay and allowance system as the fundamental form of military compensation.

- Granting authority to pay BAS to E-5s and above as an initial step, then expanding the criteria to all careerists (E-4s with more than four years of service).

- Increasing the uniform allowance for federal employees.

- Permanently authorizing enlisted flight pay.

- Establishing a permanent system of flight pay for flight nurses, similar to that authorized for flight surgeons.

AFA Opposes:

- Imposing a "freeze" on VHA benefits that would

result in a "double pay cap" when combined with other caps on pay and allowances.

- Applying pay increases to other than basic pay.

Health Care

Copayment Fees in Military Treatment Facilities: The concept has been studied and/or recommended by the Congressional Budget Office, the President's Private Sector Survey, the General Accounting Office, and the Rand Corp. Military health care has traditionally been ranked as one of the top institutional supports associated with military service. Charging military beneficiaries for care would be a serious erosion of benefits and would adversely impact on morale and retention. Imposition of a fee, purportedly to reduce unnecessary demand, will be viewed by many beneficiaries as a ploy to raise revenues for the Department of Defense. While some visits to outpatient clinics can be retrospectively categorized as marginally unnecessary, based on a physician's subsequent determination of the patient's condition, the vast majority of beneficiaries take the time and effort to seek care based on a genuine concern that professional treatment or advice is required. On the other hand, a financially driven decision to defer care may be counterproductive in costly care in the long run. Hardest hit by a copayment fee will be the approximately 400,000 dependents DoD-wide of junior enlisted personnel in pay grades E-4 and below. The sense of security that, regardless of their financial status, health care will be provided for their families would be severely diminished.

Defense Health Agency (DHA): DoD has proposed

consolidation and centralization of medical planning and budgeting within the Office of the Assistant Secretary of Defense for Health Affairs (OASD/HA). This centralization would convey broad new powers to an OSD staff element, thereby implanting an additional bureaucratic layer into the chain of command of the military services and the Joint Chiefs of Staff (JCS). It would remove from the operational commanders the critical prerogatives of command, budget, and programming in support of peacetime and wartime requirements. The change would conflict with the statutory responsibilities of the service Secretaries who, along with the service Chiefs, are in the best position to evaluate, prioritize, and allocate medical resources in support of the overall mission.

CHAMPUS Improvements: To ensure military health care remains an effective retention incentive, new benefit improvements should be added. These include CHAMPUS coverage for eye exams, a dental-care plan for active-duty dependents and retirees, a cap on catastrophic CHAMPUS expenses, and expansion of CHAMPUS organ transplant coverage.

Federal Employees Health Benefits Program: Copayments and deductibles have increased for civilian federal employees over the past three years, while premiums have risen significantly. Many employees have been driven into plans requiring only relatively low premiums but who must then pay thousands more in out-of-pocket expenses should they suffer a serious illness or injury.

AFA Supports:

- Ongoing DoD CHAMPUS cost containment initiatives.
- Enacting legislation providing space-available

dental care for active-duty dependents, with an ultimate goal of a CHAMPUS-style dental program for all nonactive-duty beneficiaries.

- Enacting legislation authorizing CHAMPUS to cost-share eye exams.
 - 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 family CHAMPUS liability.
 - Expanding organ transplant coverage under CHAMPUS to include heart and other organ transplants.
 - 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.

Travel Allowances

PCS Reimbursement: A 1983 Air Force survey showed that members incurred substantial out-of-pocket expenses each time they made a permanent change of station (PCS) move. For example, exclusive of home-ownership costs, the median unreimbursed expenses were \$1,510 for mid-level enlisted members and \$1,969 for junior officers. For an E-5, the out-of-pocket costs represent a loss equivalent to thirty-one months of the January 1984 four-percent pay raise. For an O-3, the loss represents an amount equivalent to twenty-three months of the January 1984 pay raise. More than half (fifty-eight percent) of the survey respondents stated they needed to borrow or withdraw from savings to meet PCS expenses.

Failure to reimburse military people adequately for government-directed PCS moves will adversely affect retention, as eventual improvement of the economy will entice more people to leave the service rather than endure continued out-of-pocket costs.

Civilian employees also have inadequate reimbursements for shipment of household goods and reimbursement for real estate expenses, especially with respect to overseas tours. The Civilian Career Management Program was developed for high-grade civilians (GS-12 and above) to place the best quality persons in job vacancies worldwide. In order to ensure the success of this program, and thus the most efficient use of high-grade Air Force civilians, legislation must be passed to authorize travel/transportation expenses and certain real estate expenses for employees who have relocated for the benefit of the government.

Per Diem Inequities: Effective November 1, 1981, all members, enlisted and officers, were entitled to payment of Basic Allowance for Subsistence (BAS) and the food portion of per diem in cash when on official travel. These payments to enlisted members culminated an intensive seven-year effort by the Air Force to eliminate a serious career disincentive and significant financial inequities for enlisted members on official travel. However, after only two months, legislation passed on December 29, 1981, reversing per diem equity by requiring that an enlisted member's per diem payments be reduced by the BAS received, again creating inequities between the per diem payments to officers and enlisted members on the same official trip with similar expenses.

Locality-Based Flat Rate

Per Diem System: The current reimbursement system is actually two methods of payment: actual expense reimbursement or per diem. As the actual expense method requires each item to be itemized separately and both methods require lodging receipts, the record-keeping for the traveler is extensive and quite confusing. Additionally, the myriad of separate rules and limitations on individual lodging and meal costs creates significant administrative costs in the processing and payment of travel expenses. Travelers are continually unsure of what they will receive as reimbursement for their official travel expenses. To eliminate these problems, the President, the Office of Management and Budget, the General Services Administration, the General Accounting Office, and the services are working to develop a simplified and fair reimbursement system: Locality-Based Flat Rate Per Diem.

AFA Supports:

- Increasing PCS reimbursements for military members and eliminating the "negative compensation" associated with PCS moves.
- Increasing the PCS mileage allowance for military members.
- Increasing the mileage allowance for military dependents.
- Increasing maximum weight limitation on shipment of household goods for military members and DoD civilian employees.
- Providing military members a Temporary Lodging Allowance for PCS moves within the continental United States.
- Legislation to change the tax law regarding taxes on reimbursement for relocation expenses of civilian personnel.
- Funding for continuation of the program to provide one round trip per

year for dependents of members assigned overseas to attend secondary schools or undergraduate college.

- Providing adequate travel reimbursement to junior enlisted members being reassigned in the continental United States.

- Eliminating the restrictive language that creates differences between officer and enlisted per diem payments for a return to per diem equity.

- Implementing a Locality-Based Flat Rate Per Diem System for military and civilian travelers.

- Providing travel/transportation expenses to home of record upon retirement for civilian employees who have relocated for the benefit of the government.

- Providing transportation of dependents and personal effects when a civilian employee dies en route to or within three months after reporting to a new duty station.

- Providing reimbursement for expenses for sale of a residence at a civilian employee's former duty station (in US and nonforeign areas) if not reassigned to that former duty station upon completion of an overseas tour of duty in a foreign area.

Commissaries

The President's Private Sector Survey on Cost Control (PPSSCC): The Survey recommends that DoD terminate the operation of the commissary system in the continental US (CONUS) in areas where adequate commercial facilities are available. Reduced commissary support would undermine morale, which is a key element of military preparedness. DoD-wide, there are more than 951,000 married careerists who place great reliance on commissaries. In addition to careerists, discontinuance of the CONUS commissaries would be

devastating to: (1) the many junior enlisted families who are hard pressed to make ends meet; (2) the 39,270 widows of Air Force members; and (3) the 139,755 totally disabled veterans eligible for commissary patronage. It would be difficult to quantify the impact that reduced morale will have on retention and ultimately on readiness; however, one could predict that it would be substantial, based on member reaction when the proposal to phase out the commissary subsidy was advanced in previous years.

AFA Supports:

- Continuing the current commissary system.

AFA Opposes:

- Contracting out the management and control of commissary operations.

End Strength

End Strength: The Air Force requires programmed increases in both military and civilian end strength to support urgently needed force modernization and enhanced readiness. Requested manpower levels represent the minimum essential to field new weapon systems, many of which were recently approved.

AFA Supports:

- Increasing military manpower in support of force structure, force modernization, and enhanced readiness.

- Removing civilian end strength ceilings to enable the service to manage the size of the force within fiscal constraints consistent with overall service priorities.

Morale, Welfare, and Recreation

Morale, Welfare, and Recreation (MWR) Programs: More than ninety-three percent of Air Force members have stated that discontinuance or nonavailability of MWR programs would have a negative im-

act on their morale. More than eighty percent of the commanders surveyed feel that the impact would be major. Almost ninety percent indicate that there would be a negative impact on retention, with almost thirty-three percent indicating the impact would be major. More than sixty-eight percent of Air Force members indicate there would be a negative impact on family life. More than fourteen percent indicate a major impact on family life, with more than fifty-five percent of the commanders indicating a major impact.

AFA Supports:

- Constructing such new people support facilities as child-care centers, libraries, recreation centers, gymnasiums, arts and crafts centers, and youth centers.

The Family

Air Force Family Matters: AFA believes that family attitudes play a key role in the member's job, morale, and productivity, and in overall Air Force readiness. Since two-thirds of Air Force members have families, the impact on the mission by the families is significant.

AFA Supports:

- Expanding support functions and developing new programs responsive to 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, including help in obtaining temporary lodging at the new station before departure, help in locating new housing, and help in settling at the new location.

- Improving the quality of household goods shipment.

- Improving the quality

and quantity of existing military family housing units and dormitories.

- 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.

Flying Incentive Pay

Aviation Career Incentive Pay (ACIP): Air Force rated requirements are based on wartime personnel resource needs. Peacetime cockpit seats, budget constraints, and operating costs make it undesirable to require all rated officers to fly and maintain full proficiency; yet, officers assigned to other than operational flying provide the rated personnel resources needed for wartime. The Air Force has critical positions, such as operations staffs, that require rated expertise but that do not permit the member actively to fly. In addition, career-broadening assignments, such as the rated supplement, Professional Military Education, and graduate education, are vitally important in the development of future Air Force leaders but, again, do not permit the rated officers actively to fly.

The management system used to ensure that each aviator has the proper balance of cockpit/noncockpit duties is the "gate" system. This system requires an officer to earn entitlement to ACIP by performing operational flying for specified periods. ACIP has a payment rate schedule that reduces monthly payments to aviators in year groups that have reduced flying activity. This system is visible, provides compensation stability, is cost-effective, and has been proven with experience.

Officer and Enlisted Crew Member Flight Pay: The recently completed 5th Quadrennial Review of Mili-

tary Compensation (5th QRMC) found that the services require crew member incentive pay to attract and retain volunteers in sufficient quantity to meet their needs. The current crew member rates, which range from \$83 to \$131 per month for enlisted members and \$110 per month for officers, were found to be too low to provide an effective incentive. In addition, the 5th QRMC found that officer crew member flight pay should be reestablished. With the creation of Aviation Career Incentive Pay for rated officers in 1974, officer crew member rates, which ranged from \$100-\$245 per month, were repealed, and nonrated officer crew members were paid at the noncrew member rate of \$110 per month, regardless of rank. The depressed officer crew member rates have created an imbalance and inequity. For example, an E-7 Medical Service Technician on an aeromedical evacuation crew receives \$131 per month, while an O-4 Flight Nurse on the same crew only gets \$110 per month. To correct this situation, the 5th QRMC recommended that officer crew member flight pay be reestablished at \$125 to \$250 per month and that enlisted crew member flight pay rates be raised to \$110-\$200 per month.

AFA Supports:

- Continuing the present ACIP system.

- Reestablishing non-rated officer crew member flight pay rates at \$125 to \$250 per month and raising enlisted crew member rates to \$110-\$200 per month.

AFA Opposes:

- A "Fly-for-Pay" system or payment of ACIP only to operational flyers.

Enlistment/Reenlistment Bonus Authority

Bonus Authority: The En-

listment Bonus (EB) and the Selective Reenlistment Bonus (SRB) are incentives to enlist and reenlist in the Air Force. Since original passage in May 1974, the EB/SRB authority expiration date has been extended six times. Several times, the extension legislation was passed after the expiration date, and a number of airmen were adversely affected because their reenlistment dates happened to coincide with the time gap. The SRB has been in effect for more than ten years and has proven to be a valuable retention tool. There is no reason for the bonus authority to have an expiration date that only serves to inconvenience a certain group of enlistees or airmen every two years.

AFA Supports:

- Legislation giving the services permanent authority to pay Enlistment Bonuses and Selective Reenlistment Bonuses.

Engineers and Scientists

Engineers and Scientists: Although the situation has been ameliorated to some degree, engineering and scientific skills will continue to be in short supply, particularly those involving electrical engineering disciplines. This area remains one of critical concern for constant attention.

AFA Supports:

- Continuing to fund for payment of an engineering and scientific continuation bonus and the AFIT Scientific and Engineering Continuing Education Program.

- Continuing the College Senior Engineering Program (CSEP).

Recruiting

Recruiter Special Pay: The present level of Special Duty Assignment Proficiency Pay (SDAPP) (\$50-\$150 per month, depending on experience) is no longer a viable incentive for highly qualified per-

sonnel to volunteer for recruiting duty. Those rates have been in effect since 1958 and have been seriously eroded by inflation. The all-volunteer recruiter force is essential to the sustainment of future recruiting success and must be maintained. It has been well-documented that a volunteer recruiter force is more trainable, more motivated, more productive, and cost-effective. An increase in SDAPP is essential if the Air Force is to continue to attract and retain the high-quality individuals needed within the recruiting service.

The Air Force has led all services in providing military service opportunities for women. Currently, ninety-eight percent of all specialties and ninety percent of all Air Force positions are open to women. However, in conjunction with the FY '85 Defense Authorization Bill, the House directed the Air Force nearly to double its female enlisted nonprior-service accession percentages in the future. In addition, the House directed that the Air Force undertake a complete review and reevaluation of the current system used to determine female accessions. A special Air Force study group has been formed to conduct the review and will provide their results to Congress.

AFA Supports:

- Increasing Special Duty Assignment Pay (SDAP) to \$275 per month.

- Giving the service Secretary authority to determine the definition of "recruiting duty," with entitlement payable regardless of level of assignment.

- Retaining for each service Secretary the prerogative to manage each services' recruiting policies and procedures, within statutory limitations.

- Providing adequate recruiting resources.

Air Force Junior ROTC

AFJROTC: The Air Force currently funds 285 AFJROTC units. The AFJROTC serves as an important source for Air Force Academy, ROTC, and enlisted accessions.

AFA Supports:

- Increasing the number of funded AFJROTC units to the authorized level of 335 units.

Commissioned Officer Accessions

Officer Accessions: The Air Force must attract, from both college students and recent graduates, officer candidates able to meet the intellectual and technological challenges as leaders of the future. AFA continues to support all officer accession programs, i.e., Academy, ROTC, OTS, etc.

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 grant limited credit.

- Increasing the funded AFROTC scholarships from 7,500 to 8,000 for FY '85 and beyond.

- Continuing funding at the 395 entry level for the Airman Education and Commissioning Program through the Five-Year Defense Plan (FYDP).

- Offering opportunities for highly qualified enlisted members to become commissioned officers.

New Educational Assistance Program

Educational Assistance Program: The services have long seen an educational-incentives program not only as necessary for manning an All-Volunteer Force but also as an institutional reward for military service.

However, the Vietnam-era GI Bill terminated in 1976, and its replacement—the Veteran's Educational Assistance Program (VEAP)—has proven to be ineffective. After six years, less than five percent of eligible Air Force members are participating. The declining pool of seventeen- and nineteen-year-olds, the reasonable likelihood of a strong economy, and the increasing need for technically oriented personnel will exert severe pressures on future recruiting and retention efforts. Historically, an effective means of offsetting these factors has been a noncontributory educational program. Features of a new educational assistance program should include: (1) noncontributory basic entitlement to enhance recruitment; (2) a noncontributory basic second tier available to attract quality people to stay beyond the second term; and (3) transferability of unused entitlements to immediate family members after ten years of active duty.

AFA Supports:

- Establishing a new educational assistance program developed to meet quality manpower needs over the long term—the mid-1980s and beyond.
- 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.

Training

Training: The Air Force depends on high-quality people, realistic training, innovative tactics, and superior technology to give it the critical edge in combat.

AFA Supports:

- Retaining 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.

- Strengthening Air Force individual training programs to keep pace with changes in technology and new missions.

- Legislation providing for a Skilled Enlisted Reserve Training program.

Air Reserve Forces

The Air Force Reserve and Air National Guard: These are vital partners in the Total Force. The Director of the Air National Guard (ANG) and the Chief of Air Force Reserve (AFRES) have the responsibility for overseeing the overall management of their respective component forces, which total approximately 464,000 personnel (177,000 Selected Reserve and the balance Individual Ready Reserve, Standby Reserve, and Retired). They must ensure that the resources needed to meet the mission requirements of an extensive system of unit and individual programs are justified, programmed, and approved. Since reliance on reserve components has increased considerably over the past few years, the Air Guard and Reserve have been tasked with more combat and combat-support missions. The addition of these missions has resulted in heightened visibility. In this regard, there are a number of issues that require support for the reserve components in order to ensure they have adequate programs to attract and retain the type of personnel required to meet the quality standards for which they are striving.

AFA Supports:

- Continuing to recognize the Air Reserve Technicians and Air Technicians as the primary peacetime management cadre for the Air Force Reserve and Air National Guard. The use of statutory tour personnel as part of this management cadre should be at the option of the Reserve/Guard Component Chief.

- Enacting a Reserve Officers' Personnel Management Act (ROPMA), which will enhance readiness.

- Retaining current military leave policies for federal employees who are also members of the Reserve Forces.

- The President's National Committee for Employer Support of the Guard and Reserve.

- Having employers develop equitable military leave policies that do not interfere with regular vacations for reservists.

- Studying the feasibility of a change to the reserve nondisability retirement plan to allow payment of an actuarially reduced annuity before age sixty.

- Raising the ceiling of sixty creditable inactive retirement points for Air Force Reservists and Air Guardsmen.

- Legislation permitting totally disabled reservists, who have otherwise qualified for reserve retirement, receipt of immediate retirement pay.

- Continuing enlistment, reenlistment, and educational bonus programs for Air Force Reservists and Air National Guardsmen.

- Legislation providing authorization for special pay programs for Air Force Reserve and Air National Guard physicians and dentists.

- Legislation totally eliminating the Social Security offset from the benefits received from the Reserve Forces Survivor Benefits Plan (RFSBP).

POWs/MIAs

AFA Supports:

- Continuing the United States government's current efforts to resolve the POW/MIA issue and urges that resolution of this tragedy continue to receive the highest national priority until such time as the government has obtained the return of all US personnel who may still be held captive, the fullest possible accounting for those still missing, and the repatriation of the remains of those who died serving our nation.

- Resuming US government sponsorship of exploration of the US crash in Laos.

Former POWs

Congress, through Public Law 97-37, has directed that former POWs receive redress for past oversights of their physical and mental condition brought about through incarceration in enemy military prisons. Often, specific medical history, as required by the Veterans Administration, is lacking due to nonexistent or grossly inadequate medical records. Thus, the law declares that an assumption will be made that the disease or condition is the result of the incarceration, and it will be the responsibility of the VA to adjudicate each individual anew from the premise that it is impossible for the former POW to provide proper and detailed medical records from his imprisonment.

Comprehensive medical examinations were not always performed upon repatriation. Evidence now acquired through research indicates that long-term diseases and afflictions were initiated due to lack of food and the extreme living conditions that the prisoners endured.

Some POW veterans have now waited thirty-five to forty years for manifest diseases to be addressed. A



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TRW



special Advisory Committee on Prisoners of War has reported to the President, and their report is now under study by Congress. We urge speedy and compassionate action be taken by the VA to correct these past oversights.

AFA Supports:

- Recognition of the dedicated efforts of the Advisory Committee on Prisoners of War to the Veterans Administration, which has developed a significant report now being studied by Congress.

- Greater adherence to the intent of the POW redress law PL 97-37, allowing presumption of service-connected disorders.

Overseas Service

AFA Supports:

- 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.

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 Program and its aerospace education mission.

- Legislation authorizing the Secretary of the Air Force to: (1) allow CAP to acquire excess items of equipment and supplies from all federal departments and agencies; (2) allow CAP the use of facilities and services of all federal departments and agencies; (3) expend appropriated funds to provide major items of equipment, particularly light aircraft, to

assist CAP in fulfilling its emergency services mission; and (4) issue a complete service blue uniform to each CAP cadet to make the program more affordable and, therefore, available to a broader spectrum of American youth.

- Legislation increasing Federal Workman's Compensation disability and death benefits for CAP members and expanding that coverage to include all CAP flying activities.

Veterans

AFA Supports:

- Continuing medical treatment for veterans with nonservice-connected disabilities and construction and resources needed to treat the nonservice-connected disabled veteran.

- Extending time restrictions on eligibility for earned veteran's education benefits beyond December 31, 1989.

- Restoring the \$300 burial allowance to all veterans, regardless of the cause of death.

AFA Opposes:

- Reducing, in any way, benefits associated with veteran's compensation, pension programs, and/or the VA medical care system.

- Reducing VA medical care facilities, hospitals, domiciliary care, or reimbursable travel funds for disabled veterans.

- Capping the cost-of-living increases for disabled veterans.

Education Reform

The Air Force Association associates itself with the recent report of the National Commission on Excellence in Education that highlights the fact that the education foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people.

The seriousness of our lack of excellence in edu-

cation is characterized in the report in the following paragraph:

"If an unfriendly power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievements made in the wake of the Sputnik challenge. Moreover, we have dismantled essential support systems which helped make those gains possible. We have, in effect, been committing an act of unthinking, unilateral educational disarmament."

The Air Force Association concurs with the substance of the recommendations of the Commission that:

- State and local high-school graduation requirements be strengthened and that, at a minimum, all high-school students seeking a diploma be required to lay the foundations in the five new basics (English, Mathematics, Science, Social Studies, and Computer Science) during their four years of high school: (1) four years of English; (2) three years of Mathematics; (3) three years of Science; (4) three years of Social Studies; (5) one-half year of Computer Science; and, (6) for the college bound, two years of foreign language.

- Schools, colleges, and universities adopt more rigorous and measurable standards, and higher expectations, for academic performance and student conduct, and that four-year colleges and universities raise their requirements for admission.

- Significantly more time be devoted to learning the new basics. This will require more effective use of the school day, a longer school day, or a lengthened school year.

- Appropriate actions be taken to improve the preparation of teachers and to make teaching a more rewarding and respected profession.

- Citizens across the nation hold educators and elected officials responsible for providing the leadership necessary to achieve the needed reforms, and that citizens provide the physical support and stability required to implement the reforms.

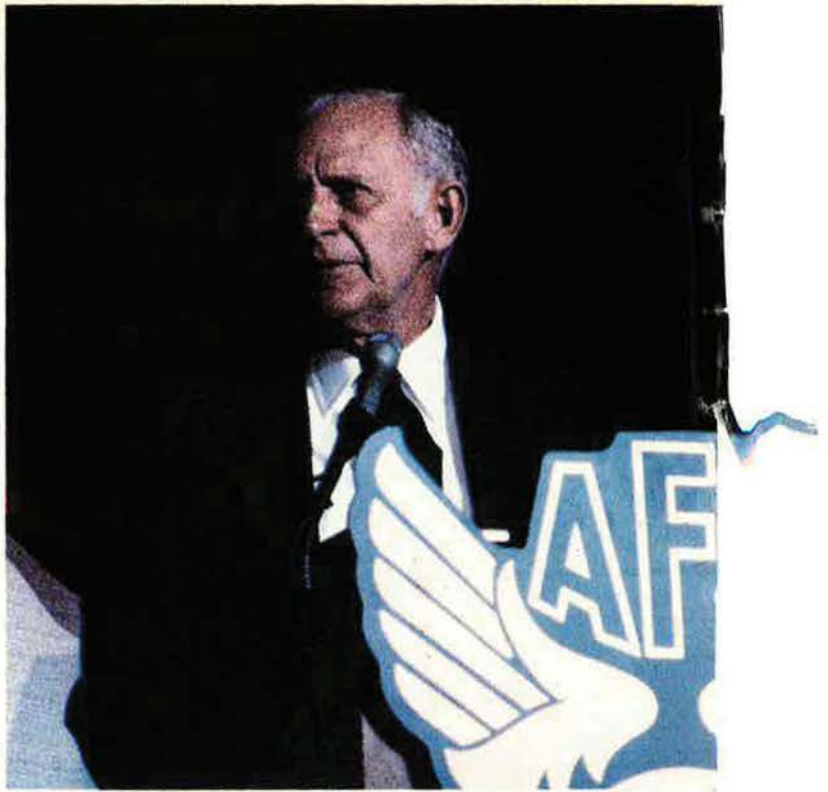
The Air Force Association applauds the many actions that have been initiated throughout our country to improve our level of excellence in education—but we have only started. We realize our country is under challenge from many quarters—but the need to improve the educational opportunities for all our children, and particularly for those who will eventually serve their country in uniform, is paramount.

A nation's ability to influence other nations and survive in freedom depends on the integration of its economic, political, social, and military power in a purposeful design. In democracies, this design, and the roles and capabilities of its major elements, are determined by the populace. In the United States, where the military is civilian-controlled, the makeup and activity of the military are set by the people through their legislative and executive representatives. Since knowledge is better than ignorance in sound decision-making, military studies should be included along with economic, political, and social studies. Therefore, to enhance public understanding of the importance of national defense to our nation's freedom and survival, AFA advocates a deliberate program of education in military history and military science in American schools and colleges. ■

From a speech on September 18 at AFA's 1984 National Convention.

Setting The Record Straight

About all those stories that the military is less ready, less capable, less efficient . . .



BY THE HON. VERNE ORR
SECRETARY OF THE AIR FORCE

THIS is the fourth time I have had the pleasure of speaking before you. Talking to you today is especially significant, since exactly thirty-seven years ago on this day at approximately this hour, the United States Air Force became an independent service when Stuart Symington was sworn in as the first Secretary of the Air Force.

I have called these previous reports, as I call this one, "Reports to the Stockholders," because in the final analysis the United States Air Force is responsible to and responsive to the citizens of this country, and you are their representatives here today. I have entitled this particular talk "Let's Set the Record Straight," because for at least the last year you and I have been subjected to a steady stream of stories denigrating the ability of your military—drumbeating on its faults—leading one to believe that it was less capable, less ready, less efficient than it was, causing many to doubt our effectiveness and some even to doubt our integrity.

Let's spend a few minutes looking at the historical record of our Air Force, then consider where we are, and offer a few thoughts about where we are going.

Where We've Been

First, a little historical perspective. It was seventy-five years ago that the Wright brothers sold their first airplane to the United States Army by flying it ten miles in fifteen minutes, thereby earning themselves a \$5,000 additional award for exceeding the prescribed speed. Today, the SR-71 flies that distance in sixteen seconds!

Fifty-two years ago, Amelia Earhart became the first woman to fly across the Atlantic. Last year, an all-female crew flew a C-141 across the Atlantic, and, even more important, today we have, either on active duty or in training, 450 women pilots and navigators.

Twenty-five years ago, the Air Force Academy graduated its first class of 207. This year's class was 1,021, and we now have a total of 17,000 graduates from that distinguished institution.

Five years ago, sixty-three Americans were held captive and America was held up to ridicule throughout the world for lack of strength and lack of resolve. Last year, at the request of nearby nations, we rescued, on forty-eight-hour notice, Americans in Grenada and served notice to the world we have the abil-

ity and determination to protect American lives wherever and whenever they are threatened.

Women

Last year, I talked about the magnificent work women are doing in the Air Force and about how proud I was that today 11.3 percent of our force is women—a higher percentage than any of the military services. There are currently some 60,000 jobs out of a total of 596,000 in the Air Force from which military women are barred. Forty percent of those 60,000 jobs are in the security police. We already have women serving in law enforcement, but, up to this time, they have not been able to enter the security police. Today, I am proud to announce that, effective January 1, 1985, women will be admitted to the security police of the United States Air Force. More than 26,000 of the 60,000 jobs from which they are now barred will be opened to them. Most of the remaining jobs in which women cannot participate are those that involve potential offensive combat. Most of that disbarment is prompted by the combat exclusion of the law.

How many women will go into security police? I haven't the faint-



est notion, nor do I care. The important thing is that if *one woman* finds that an effective and a satisfying career, that woman, the Air Force, and this nation are stronger because of it. We are not interested in a numbers game; we are interested in opening doors and breaking down barriers.

Advertising

Last year, I pointed out that most corporations devoted a great percentage—if not all—of their advertising to talking about how plane A was better than plane B or missile C over missile D. And I stated that none of this advertising is particularly effective if the people of the United States are not convinced that they need any planes or missiles. I suggested that firms might consider devoting a portion of their advertising to explaining to the American people the needs of defense.

I am very pleased to acknowledge that, in this past year, two major corporations have undertaken substantial advertising campaigns to point out the need for a stronger defense consensus. I would encourage our corporate representatives here to discuss in their boardrooms

enlarging that number so that we can continue to build in the public mind the value and need for a strong defense.

Where We Are

A few weeks ago, we had a report from a congressional committee that implied readiness had decreased. That report came from, ironically, the committee that has done more to cut appropriations for military readiness and sustainability than any other committee in Congress. Now, by any commonsense approach, let me assure you that the Air Force today is far more ready than it was four years ago. We are phasing out F-106s; we are putting F-15s and F-16s into the active force. We have five squadrons of F-16s in the Guard and Reserve, and F-15s will start going in within the next few months. We have added nearly fifty percent to flying hours.

Spare parts take about two years' lead time. So, the money that Congress voted for us in 1981 and 1982 is now being translated into the spare parts that are reaching the bins today.

Best of all—and most important of all—the morale of the Air Force is, I believe, at an all-time high. And I'd like to pause to tell you that I think a tremendous amount of that high morale is due to the Chief of Staff, Gen. Charles A. Gabriel. He is not only a capable Chief of Staff, but he is one of the most cooperative persons a Secretary could ever hope to work with. Sometimes late in the evening, General Gabriel comes into my office, and we sit discussing Air Force issues and problems, with our wives wondering when we'll be coming home. In two and a half years of those conversations, never once has there arisen a comment like, "Well, that's really a blue-suit problem," or "That's really in the area of the Secretariat." General Gabriel and I look on the leadership of the Air Force as a partnership. And I like to think that, in the most remote base or outpost, our people know that there is neither dissension nor divergence in the views at the top of this Air Force.

Defense Budget and B-1B

I would ask that you keep in mind

that this is not really a *large* defense budget. Despite all the comments you see or hear in the press or on the radio and television, if we get the money we seek, we still will be under seven percent of our Gross National Product spent for defense. That compares with eight to nine percent under President Kennedy, ten to eleven percent under President Eisenhower—and you never heard a word in those days that we had a backbreaking budget, that it was too much for us to bear, or that it was causing inflation and deficits. A recent survey indicated that only ten percent of the people know the real proportion, or close to it, that we spend on national defense. Ninety percent were higher—some even thought we were spending more than fifty percent of our Gross National Product on national defense. The fascinating point is that, of all those people with that misconception, seventy-one percent wanted to hold the line or spend more on national defense!

Two years ago at this Convention, I told you that the B-1B was "on budget or under budget and it will roll out in October 1984" five months early. Well, I was wrong! It rolled out in September, six months ahead of schedule! At that rollout, I expressed the view that we do not build bombers to win wars; we build bombers to prevent wars. And I said then, and I repeat now, that the fondest hope I have for the B-1B is that the plane may never fly in anger.

Peace Academy

Earnest people on the Hill, in both Houses, have gotten behind a bill to create a "peace" academy. In my opinion, they are too late—exactly 182 years too late. We established the first peace academy in America on the banks of the Hudson at West Point, N. Y., in 1802, and we call it the United States Military Academy. It and the other academies all have just one purpose—peace. If we're going to raise a generation of negotiators and appeasers, a generation of Neville Chamberlains who think they can acquire peace through capitulation and without strength, I hope they will remember the words of Konrad Adenauer, who said that an infallible way of appeasing a tiger "is to allow one's self to be devoured."

Major civic buildings usually have plaques. I hope the Academy of Peace, if there is one, places at one side of the entrance a plaque bearing the words of Lenin:

"It is inconceivable for the Soviet republic to exist alongside of the imperialist states for any length of time. One or the other must triumph in the end. And before that end comes, there will have to be a series of frightful collisions between the Soviet republic and the bourgeois states."

On the other side of the entrance, why not a plaque with Khrushchev's words, "We will bury you"? At least going in to class they'll know where we stand; God knows what they'll know coming out!

MIA's

All of us are concerned with the heartbreak, the tragedy, and the drama of our POWs and our MIA's. I read a story in the paper recently that said that, of the 2,483 Americans who are still missing or otherwise unaccounted for in Indochina as a result of the Vietnam War, only one still remained who had not been declared "killed in action," and the Pentagon had offered no explanation. So today I'll give you that explanation.

When I first became the Secretary of the Air Force, I did a great deal of study on the POW/MIA issue, and one fact stood out clearly: The loved ones of those missing who had visited the Communist governments of Southeast Asia stated that they were laughed at—they were told their own government had written off the Vietnam War and were ridiculed for their continued interest. For the families of our missing men, it seemed as if they were the only ones who cared. But in the past few years, this issue has gained new importance, and the resolution of the POW/MIA issue is now a matter of the highest national priority. This priority has been transmitted throughout the entire executive branch of the US government, and our efforts enjoy broad bipartisan support in Congress. We have not forgotten these brave Americans or their families.

Of greatest concern to us is the possibility that Americans might still be held captive in Indochina. We thoroughly investigate each live

sighting report we receive through interviews and, if required and agreed to by the sources, lie-detector examinations. Although we have not, thus far, been able to confirm these reports or by other means determine that Americans are still detained against their will, the information available does not let us rule out that possibility. Investigation of live sighting reports now receive, and they will continue to receive, every necessary priority and resource based on the assumption that some Americans are still held captive in Indochina. The President has pledged that decisive action will be taken on any live sighting report that can be confirmed.

As a result of rulings based on US law, the status of all but one of those unaccounted-for men, Captain—now Colonel—Charles Shelton, has been changed to "killed in action." Let me emphasize that these presumptive findings of death are legal administrative rulings, based upon the public law, and they have nothing to do with our efforts to resolve the fate of our men. As a pledge to the families of our men, let me state that as long as I am Secretary—and I speak for this Administration—the status of Colonel Shelton—the remaining American listed as a POW—will remain unchanged unless I receive new information. Until the Communist governments of Southeast Asia account for each and every one of our missing—within the limits of human ability and recognizing that some may have perished in remote spots under jungle canopy, their location unknown to any living individual—until we get a satisfactory final accounting, we will say that we have not heard of the fate of Col. Charles Shelton and of his fellow missing Americans, and until we hear, the door is not closed, the last chapter has not been written.

Spares

While we are talking on that subject, I think it was Josef Goebbels in the Hitler regime who talked about the big lie: "If you tell a lie often enough, people begin to believe it." Well, many people today believe that the United States Air Force paid \$9,600 or more for a twelve-cent allen wrench. Let me set the record straight. We did not! Our

system found that ludicrous price, and our system refused to pay it. But today, because of disinformation, literally tens of thousands of people probably actually believe we paid such a price for a wrench.

In almost every instance I have seen of excess prices, they have come to the public's attention for one reason only: Our system is working. It has been Air Force people who have discovered those prices and enabled corrections to be made.

In the process, we have heard a lot of media comments about so-called "whistleblowers"—I don't like the term, because of the connotation that it's wrong to highlight potential problems or errors to us. Our approach is quite the opposite. The Assistant Secretaries and I have been to every Logistics Center giving out awards and recognition to Air Force people for bringing excess prices to our attention. We intend to keep on doing that. Our people who bring in ideas that save us money, or who bring to our attention items we can purchase for less, will continue to be rewarded.

More than that, we have rewritten job standards. Most of them used to be written around how much volume that person could generate. Now they are judged on how much competition they generate.

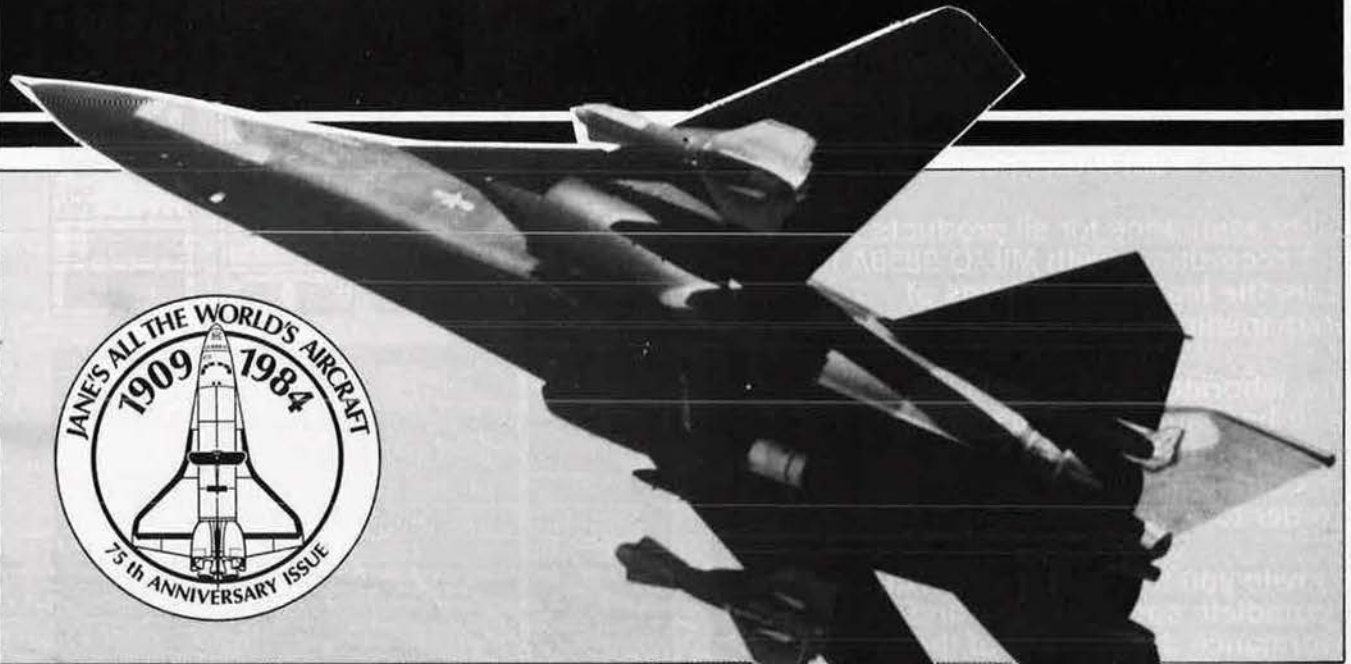
In our efforts to buy products at the lowest price with the greatest benefit to the taxpayer, we've instituted 550 different actions. One of them I'd like to mention is called Pacer Price. It involves putting six or seven experts around a table, and every disputed price—eventually every part we buy—will go before the board. And they will look and see if that's a reasonable price. If it is not, we'll go back to the manufacturer and negotiate a better price, or we'll find another buyer, or, as a last resort, we can make it ourselves in our shops.

Where We're Going

Now, I'd like to suggest to the corporate persons here that "it takes two to tango." For every time we look at a part that was overcharged, somebody had to charge us too much. The old days of *caveat emptor*, "let the buyer beware," may make for short-term profits. They may look great at the bottom

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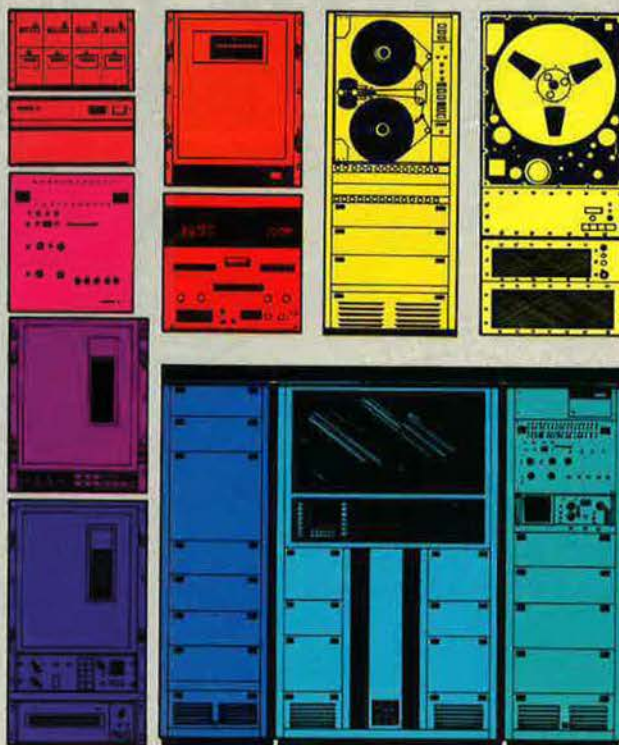
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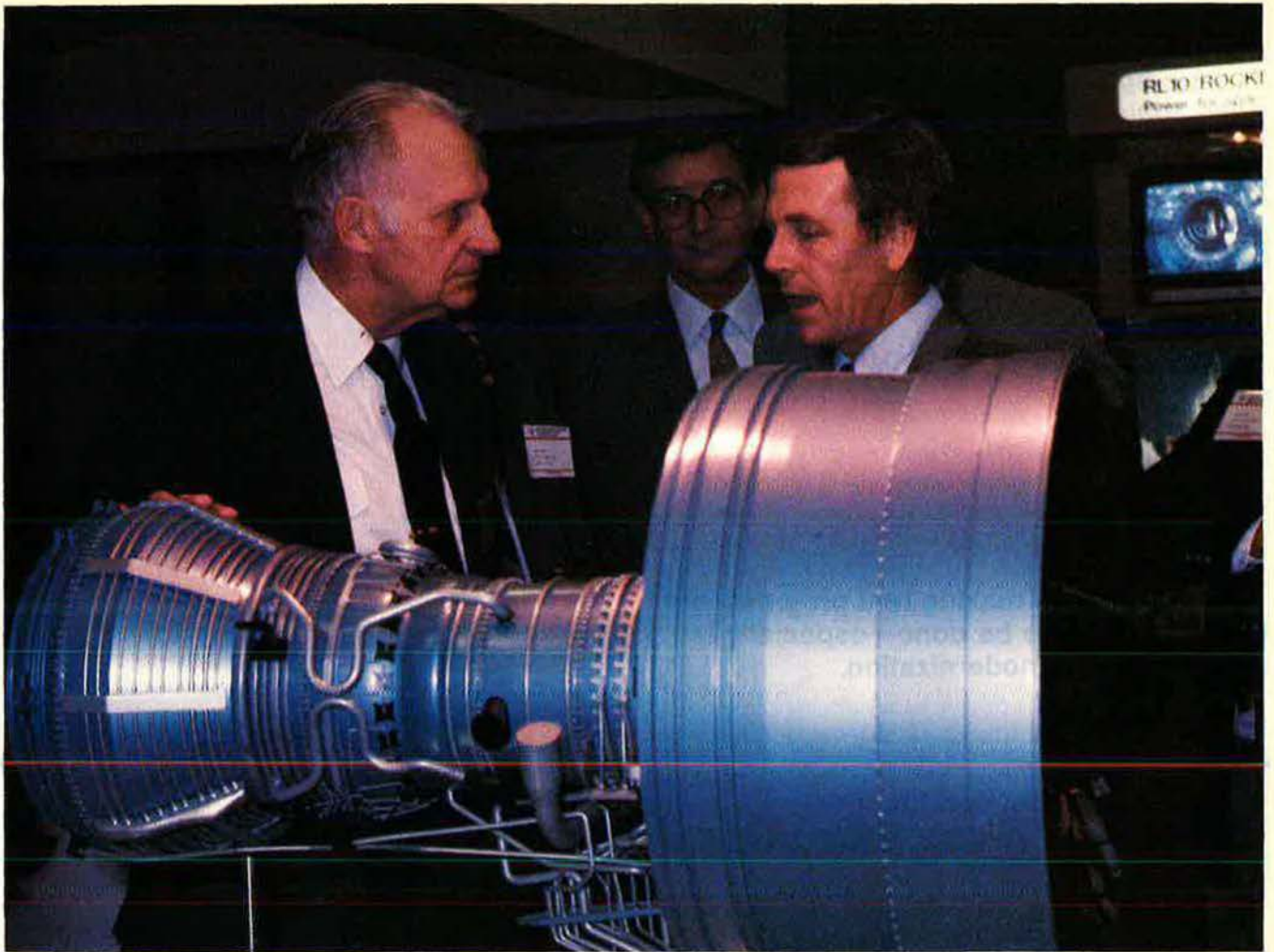


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Secretary of the Air Force Verne Orr discusses the merits of the new Pratt & Whitney PW2037 engine (in miniature in foreground). The PW2037, a new-technology turbofan rated at 37,600 pounds of thrust, has been selected by the US Air Force for the new C-17 airlifter and by several domestic and foreign airlines for the Boeing 757.

of this year's balance sheet, but they're going to look disastrous in the long run. I would suggest to you that you set up your own Pacer Price board. Why not set up a small group of engineers within each company to look at each part and its price? The keynote ought to be, "Could the president of your company justify that price publicly before the American taxpayer?" The few dollars you lose are infinitely less costly than the columns of print, the editorials, and the minutes of television coverage linking your name to unfair pricing.

It is no excuse to say, "Well, we abided by the rules, we followed instructions." If we're that dumb—and at times we have been—the public is going to say that the military is dumb or incompetent. But they are not going to excuse the pro-

ducer, the manufacturer; they are going to say you are crooks. Working together, we can keep a strong defense consensus. But if we work separately, that willingness of the public to sacrifice a substantial part of their taxes to keep America strong will be destroyed.

Conclusion

Today we are in the middle of the quadrennial process where we look at ourselves to see whether much of our government should continue down the path we've been following, or whether it should change. There is no one in this room who would change that type of American activity, even though it occasionally leads to excessive statements and emotionalism.

It is important to remember that national defense is not the pre-

rogative of one party or the other. We have had excellent budgets during the past three and a half years. They have come about not only because of a strong executive branch but because of the willingness of a bipartisan Congress to fund us. We will continue to have good defense budgets only as long as both parties continue to support defense.

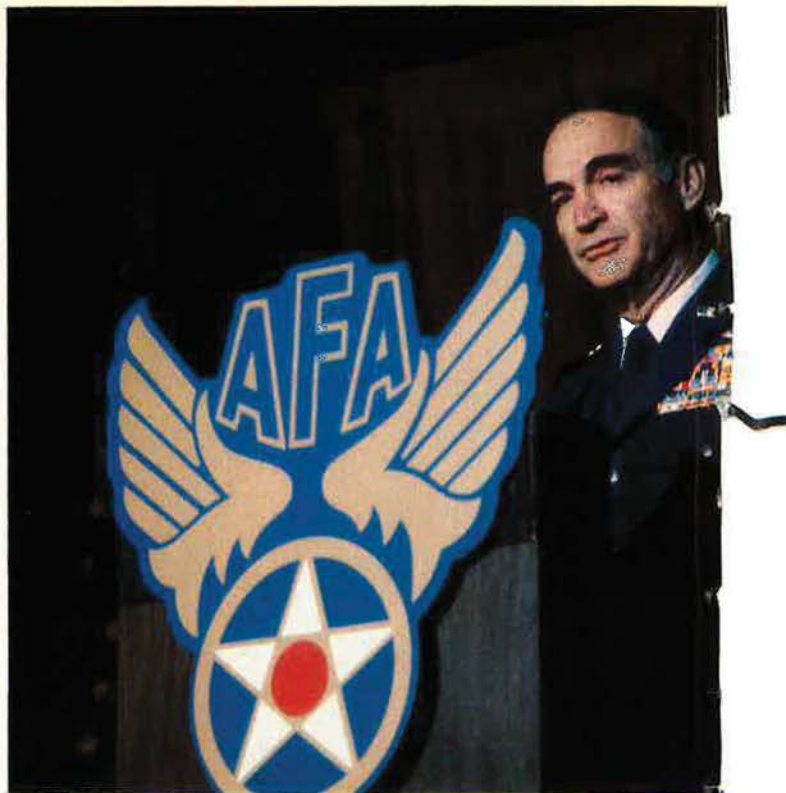
And in the vein of bipartisanship, I would like to close with the words of one of the younger and certainly one of the most idolized Presidents, John F. Kennedy: "Only when our arms are sufficient beyond doubt can we be certain they will never be employed."

That was true in the 1960s, when Kennedy spoke; it's true in the 1980s, with Ronald Reagan as our leader. God willing, it will be true in the twenty-first century. ■

From a speech on September 19 at AFA's 1984 National Convention.

Toward a Safer World

The Air Force is making real progress, but much remains to be done—especially in strategic force modernization.



**BY GEN. CHARLES A GABRIEL, USAF
CHIEF OF STAFF**

MONDAY evening, AFA recognized several courageous airmen. Their deeds epitomize the Convention theme of "Global Access Through Aerospace." Maj. Gen. Leigh Wade in the Douglas World Cruiser, H. Ross Perot, Jr., and J. Coburn in the Bell 206 LongRanger, and Maj. John Durham and Lt. Col. Bill Thurston in the B-52 can all be proud of their achievements in circumnavigating the globe.

Yesterday, another pioneering airman, retired Air Force colonel and ex-POW Joe Kittinger, completed the first solo transatlantic balloon flight. Joe holds several records, not the least of which is the world's highest parachute jump—102,800 feet. His recent [balloon] flight of eighty-four hours and 3,558 miles is also a record.

Yesterday was also important because the US Air Force had another birthday. During thirty-seven years as a separate service, we have matured into the greatest Air Force in the world. And you in this room have played a major role as partners in this effort. I'm happy to report that progress in the last few years

has been especially good—morale is "sky-high," our combat readiness is much better, and, because of it, we as a nation are safer. A momentum has been established, and we as a nation have to keep it going. Winston Churchill told us why that is important. Almost forty years ago, he said, "I am convinced that there is nothing the Soviets admire so much as strength and there's nothing for which they have less respect than weakness, especially military weakness." I believe Churchill's insight is as correct today as it was in 1946.

Fortunately, the American people believe in a strong national defense. And thanks to their backing, the Administration and Congress have been providing the resources to ensure continued progress toward rebuilding our military capabilities. Improvements in readiness, training, recruiting, and retention are continuing and accelerating.

Restoring the Balance

Since 1980, we have made real progress in restoring the military balance and ensuring deterrence. Deterrence is the cornerstone of

American defense policy—deterrence based on nuclear capabilities, both strategic and theater—and on conventional capabilities strong enough to convince our enemies that aggression would be foolish.

During the 1960s and 1970s, the Soviets increased their capacity for nuclear attack while our ability to respond became less credible. Low defense budgets put deterrence at risk during these years. However, we are now engaged in a concerted effort, along with our allies, to restore the strategic and theater nuclear force balance. We have seen significant results.

Two weeks ago, we rolled out the first B-1B, and development of the Advanced Technology Bomber is on track.

B-52s are being modified to carry air-launched cruise missiles, and new offensive avionics have improved bombing accuracy by fifty percent. Better defensive avionics are also being added to increase survivability.

Tanker support for our bombers is getting much better—upgraded engines will add refueling capability to KC-135s, twenty percent to the



Guard and Reserve and fifty percent to the active KC-135s.

Our small ICBM program is on solid footing. We have also improved the accuracy of our Minuteman IIIs by nearly thirty percent through the guidance upgrade program. Our big ICBM problem area is the Peacekeeper missile—the key element of the Scowcroft Commission's recommendations to maintain strong deterrent forces. Lack of support for Peacekeeper sends the wrong message to both adversaries and friends. Without it, we are grossly outgunned in this crucial leg of the triad—and our arms-reduction negotiating position is weakened.

Last December, we deployed the first ground-launched cruise missiles in Great Britain, and the Army began putting Pershing IIs in Germany. In March, our second GLCM base at Comiso, Italy, became operational, and last month we established the third base at Florennes, Belgium. NATO's deterrent has been upgraded substantially by these improvements. The dangerous theater imbalance in Europe that resulted from the Soviet

Union's aggressive SS-20 deployments is finally being redressed, thanks to strong, cohesive action by all NATO nations.

We and our allies have improved our *conventional* capabilities. On the US side, we have increased the daily carrying capacity of our strategic airlifters by twenty-eight percent since 1980 through added capacity, some modifications, and increased spares. We have also stretched all the C-141s, giving them thirty percent more lift capability. The C-5A wing modification increases airframe life by 30,000 hours, and two new KC-10 squadrons have been activated. We have also equipped five Reserve squadrons with new C-130Hs since 1980 and are now moving C-141s and C-5s into the Air Reserve Forces.

The First C-23

Last month, we rolled out the first C-23—a small intratheater airlift airplane. This system will add thirty percent more combat sorties in Europe by expediting parts and engines to the bases. All these improvements are tied together by the Airlift Master Plan, which identifies airlift needs and tells how we can best fill them. Clearly brought home is the need for the C-17 in reaching the 66,000,000-ton-mile-per-day goal identified by the Congressionally Mandated Mobility Study. Our plan will move C-17s directly into both the active and reserve units.

B-52Gs now carry Harpoon missiles. This new Air Force maritime operations capability resulted from the October 1982 Air Force-Navy Memorandum of Agreement.

Four years ago, we had about 4,300 fighters in the total force—most of them were older F-4s, A-7s, and F-106s. Today, we have 4,800 fighters, and most are modern F-15s, F-16s, and A-10s. We can fly sixty-two percent more wartime sorties in Europe, and our aircrews are getting twenty-three percent more flying time.

Another key factor in our improved warfighting posture has been the aggressive development and procurement of modern munitions. Munitions funding has grown fivefold, and bins are being filled with modern, effective munitions.

These improvements mean better-trained and more combat-ready

forces. New fighters using improved munitions give us a thirty-four percent increase in delivery accuracy. This was demonstrated in our most recent "shootout"—the Gunsmoke competition. In 1981, the winner flew an A-7 and dropped bombs within twenty-nine feet of the target. Last year, an F-16 won the competition with bombs within five feet of the target.

Even though we've been flying more and doing it more aggressively, our safety record is the best in history. Last year, I told you of our unbelievably low record-setting 2.33 rate in 1982. The 1983 record was 1.73 accidents per 100,000 hours of flying—realistic training, not just boring holes in the sky. To date, our 1984 record is about the same as last year's. Many of you have helped us achieve this outstanding record. You are the ones designing and building our airplanes with safety, reliability, and maintainability in mind.

The Readiness Question

Secretary Orr told you of our heavy commitment to improve readiness and sustainability. The Secretary also talked of how we are improving the way we buy spares. Today, I want to stress a couple of points that amplify his comments. We now have strong competition advocacy programs at all Air Logistics Centers—more emphasis on break-out for competition, value engineering in spare parts and repair kits—along with a welcome spirit of cooperation in the contractor community. These efforts have already produced savings of nearly \$400 million in costs of spare parts. We are using these savings to buy more parts at the lower prices. If these trends continue, we can fill our wartime requirement years ahead of our current schedule.

In the conventional forces arena, some people are suggesting our Air Force is not as ready and capable today as it was four years ago.

Critics have focused on C-ratings in making their arguments. The problem is that C-ratings are a JCS logistics management tool and offer only a snapshot of a unit's capability against the current goals—they are not an accurate measure of capability over time. This is because we intentionally moved the goal line.



Dozens of exact-scale models provided some of the focal points for technology and hardware questions by General Gabriel at the AFA Convention.

Since 1980, we've adjusted the rating system several times—by expanding the areas rated and tightening the criteria. For example, in 1980, only sixty-seven tactical fighter squadrons were committed to deploy and fight for a period of time—either fifteen or thirty days. Today, eighty-six squadrons are committed—all of them for thirty days of combat. Spare engines and critical parts are now rated. They weren't before, and as I said earlier, we're flying more—crews are more proficient. Sixty-two percent more combat missions are available in Europe today, as well as twenty-eight percent more airlift to take us to the fight.

All this buildup in capability and the dramatic improvements in the effectiveness of modern aircraft and munitions are *not* considered in the C-ratings. We in the military are at fault for not having a rating system that Congress and others can use to track our capabilities from year to year. The JCS are working on a better way to tell our story. We've got to clear up the confusion being created by the present system.

The Challenges Ahead

In September 1947, [Gen. Carl A.] "Tooney" Spaatz became the first Air Force Chief of Staff. When

he took over, he faced the challenges of an uncertain future. Today's challenges are different from those General Spaatz had to face—but we still must deal with an uncertain future. Many challenges lie ahead.

We depend on space systems for strategic warning and for command control communications and surveillance—and the Soviet threat highlights the need for a unified Space Command. Just as we employ our land, sea, and air forces—through the unified and specified command structure—we should have a unified Space Command to exercise control of US military space systems.

I mentioned earlier the bombers, missiles, and other strategic systems—our challenge is to continue the President's strategic modernization program and to stay on the path charted by the Scowcroft Commission.

As we pursue our strategic program, we must continue to be aware of the changing threat, the need to be sensitive to arms-reduction negotiations, and the possibility of strategic defensive systems in the future. Our sea-based strategic nuclear forces must also continue to be integrated with bomber and ICBM programs, and all forces

must be supported by strategic connectivity.

Another tough challenge will be meeting increasing manpower needs for the active and air reserve forces. Declining youth population, increased mission demands, and increased competition for available manpower from a robust economy require that we develop a comprehensive manpower plan for the future. The plan will have to look at all aspects of the recruiting and retention picture, as well as at innovative approaches to reduce manpower requirements, such as better-designed, more reliable and maintainable weapon systems.

In the past, the key factors in our acquisition process have been cost, schedule, and performance. This week, Secretary Orr and I signed a policy statement directing that supportability be the fourth leg under the acquisition stool. Improved reliability and maintainability are a vital part of the solution. The Air Force has 490,000 enlisted people today. About one out of every three works in aircraft maintenance. Let me compare some weapon systems in terms of maintenance man-hours per flying hour and highlight the importance of improvements we are making in reliability and maintainability.

The F-16 requires about half the maintenance man-hours per flying hour as the older F-4—and the F-15 requires one-third less than the F-4. The C-17 will require about a third of that of the C-5A. The B-1B will require twenty-five percent fewer maintenance man-hours than the B-52. These reduced work loads translate directly into manpower and cost savings.

We will have to look for new opportunities to increase the Guard and Reserve force contribution to the Total Force—as we are doing with strategic airlift C-141s and C-5s in the reserve forces. We are pursuing more host nation support and increasing the use of civilians and outside contracting. This is a big undertaking, but we'll be hard pressed to man the force unless we can manage these and other manpower efficiencies.

Interservice Cooperation

Almost twenty years ago, [then USAF Chief of Staff] Gen. John P.



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The more than 200 Beechcraft C-12s already in the military inventory are flying for all four branches of the armed forces. Based at 101 sites in 35 countries, and serviced by BASI, Beech Aerospace Services, Inc., these aircraft have a sustained readiness rate of over 90%.

This mission readiness is a tribute to BASI support, a tribute to C-12 reliability and dependability.

The Military Airlift Command's new Beechcraft C-12F is in service now, bolstering the operational support needs of an Air Force with worldwide commitments.

For further details on how the C-12F contributes to military efficiency write: Beech Aircraft Corporation, Aerospace Programs, Wichita, KS 67201

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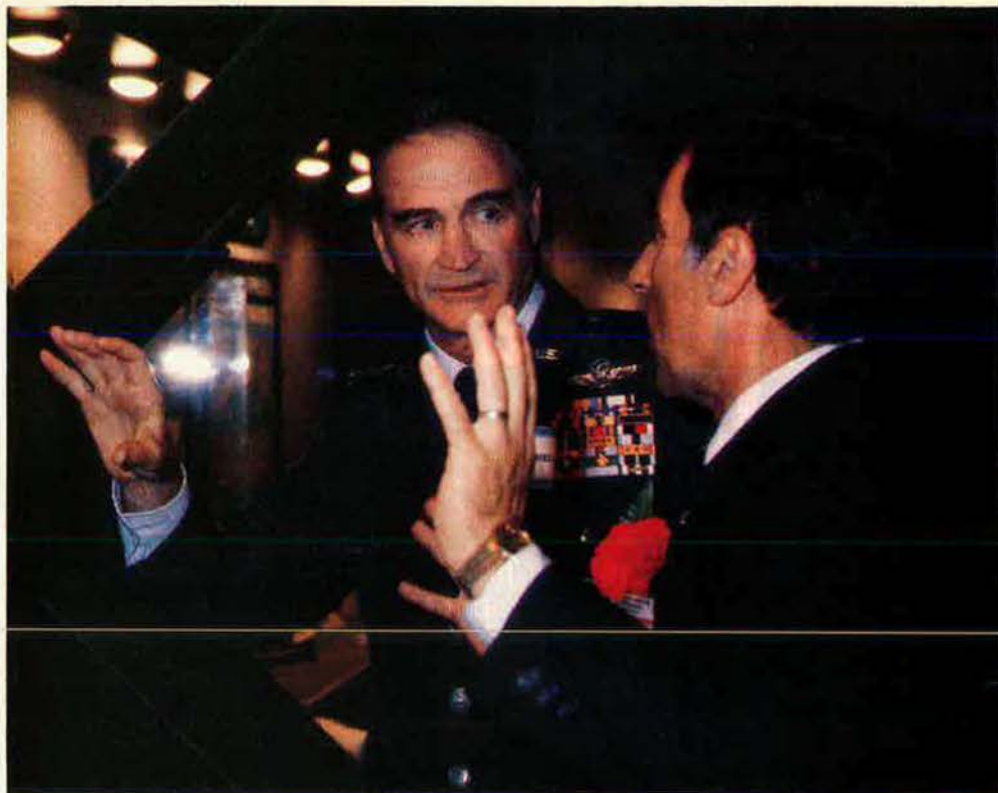
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For your information, our name is Harris.

On the display floor, the Chief of Staff gets a first-hand feel for the capabilities of Rockwell's GBU-15 glide bomb.



McConnell and Army Chief of Staff Gen. Harold Johnson signed a landmark Memorandum of Understanding for closer Army-Air Force cooperation. It assigned fixed-wing aircraft missions to the Air Force and rotary-wing to the Army.

In May, Gen. John Wickham and I, working in the same spirit, put together a team of our brightest, most objective experts—they started out with a blank sheet of paper, looked at the jobs we had to do in the combat environment, and identified areas where we had duplication and voids. From this list, we identified thirty-one initiatives. Some commit the Air Force and Army to terminate programs where the need can be filled by other programs. For example, the Air Force has canceled development of its ground-based electronic warfare system, Comfy Challenge, because the Army is developing a system that can do that for us. The Army has terminated its program for an airborne radar jamming system—the Air Force will provide this support.

We are also institutionalizing cross-service participation in the development of our annual budgets. Service programmers are actively taking part in the other service's review process. For closer coopera-

tion in areas of mutual interest, seven Army staff officers have been assigned exchange duty to the Air Staff, while seven Air Force officers work on the Army staff.

There is still a lot to do. Former Secretary of State Henry Kissinger was once asked how difficult it was to make foreign policy decisions. He answered that making the decisions was nothing compared to getting them implemented. Some of our initiatives are already being implemented. The best example is the recently signed Memorandum of Agreement to develop the C-18 as the single platform for the Joint Surveillance and Target Attack Radar System—Joint STARS. We will now have a common radar *and* a common platform.

A more controversial initiative that has met some resistance is the proposal to transfer our rotary-wing special operations force mission to the Army. Here's the way I see it. The Army operates more than 8,000 helicopters and their troops conduct special operations. The Air Force has only nine Pave Low helicopters capable of supporting the full range of special operations. This adds up to an Army mission.

As we go along, we will thoroughly monitor each initiative—we're not going to do anything

dumb. Before we transfer missions, the gaining service will be fully prepared and combat-ready. But I can assure everyone here that John Wickham and I are committed to the fullest implementation—we won't stand for a "slow roll."


I also see possibilities for greater cooperation with the Navy. In addition to the expanded USAF/Navy operations we have managed in the last few years—F-15s, AWACS, and tankers to extend the outer air battle, and B-52s with Harpoons—the CNO, Adm. Jim Watkins, will in the very near future tell us how the Navy might fit into our projects. We are making good progress with these efforts to enhance the nation's military posture and field the most affordable and effective combined combat capability.

Meeting these challenges—and opportunities—will take a lot of hard work and dedication. As President Reagan has said, "A safer world will not be realized simply through honorable intentions and good will. It requires a dedicated effort to support our friends and defend our interests." We have to do this: The taxpayers deserve it, and the nation's security demands it. The Air Force Association can help, and we look to you for continued support. ■

From a speech at AFA's 1984
National Convention.

Technology and The Nuclear Treadmill

The President's Science Advisor predicts
a major shift in the way we think about
strategic weapons and forces.



minute. Nuclear weapons are a different class of animal, and crossing the line between conventional and nuclear is probably the most dangerous step I can imagine in a battlefield scenario. They call that boundary the nuclear threshold for very good reason, because once crossed it becomes very difficult to control the escalation toward the use of more and larger nuclear weapons.

BY DR. GEORGE A. KEYWORTH, II

THOSE of you who have heard me speak at other Air Force Association events know that I'm a strong, even perhaps abrasive, proponent of the value of using technology to enhance our military capabilities. Specifically, I'm firmly convinced that the strongest lever the United States can use in assuring its national security is to take full advantage of our tremendous scientific and technical capabilities. And I would add that I do generally find a strongly positive reaction to that idea when I meet with this organization.

Today I'd like to explore the impacts of technology on national security in a fairly broad sense—you might say even in a philosophical sense. And rather than discuss, as I have before, the payoffs of new technology in specific weapon systems, I want to look instead at the impact that a wise use of technology can have on what may be people's most fundamental concern—nuclear stability.

Now, frankly, I find it puzzling that, with all the public attention given to concern over nuclear stability, almost all the attention is focused on strategic nuclear arms—and very little on tactical nuclear weapons. I find that surprising, because the challenges to long-term nuclear stability decidedly include *both* kinds of nuclear weapons—strategic *and* tactical. In fact, the reluctance to face up to the full impact of this situation sometimes extends to what I consider to be alarming extremes.

Tactical Nuclear Weapons

Sometimes, when people are discussing tactical nuclear weapons, we hear them say there's little real difference between a small nuclear explosive and a large conventional one. Well, I worked in nuclear weapons research for many years, and I don't believe that for a

But tactical nuclear weapons have one undeniable attribute: They're an effective and economical way to counter the massive Soviet and Warsaw Pact deployments of men and machines. For the West, those tactical nuclear weapons are a way to have the defensive strength of mobilization without really mobilizing. The question we have to ask ourselves is whether we're willing to accept the inherent instability of that situation.

My own answer is that we shouldn't be. The presence—or even worse, the reliance—on those weapons creates an unacceptably low nuclear threshold. I recently had a conversation with Army Gen. Bernard W. Rogers, the Supreme Allied Commander in Europe, in which he pointed out the difference between tactical nuclear weapons as *deterrents* and as actual *warfighting* tools. As deterrents they're very effective—and to an intelligent adversary they loom very large. But the history of the world reminds us that it's not necessarily *expected* events and *rational* people who start wars—and *that's* the unpredictable factor that could lead to a resort to ultimate weapons.

Raising the Nuclear Threshold

Well, we *do* have a choice, a choice we can make well in advance of a crisis. That choice is to take the high road, to use our technology to develop far more effective *conventional* tactical weapons—weapons to displace the need for nuclear weapons and, consequently, start raising that nuclear threshold.

Let me call in some higher authority to back me up on this statement. In a speech last year, the President addressed this same issue when he said, "... we must take steps to reduce the risk of a conventional military conflict escalating to nuclear war by improving our non-nuclear capabilities. America does possess—now—the technologies to attain very significant improvements in the effectiveness of our conventional nonnuclear forces. Proceeding boldly with these new technologies, we can significantly reduce any incentive that the Soviet Union may have to threaten attack against the United States or its allies."

If you encounter anyone who still wonders how strongly committed President Reagan is to developing and taking advantage of technology in improving our national security, you can refer them to that statement. I'll let you in on something else. That strong support for the use of technology to enhance our conventional forces was a key part of the President's famous 1983 "Star Wars" speech—a speech that, in fact, laid out an often-overlooked *broad* vision about national security.

The Importance of Conventional Weapons

The President's position is that conventional weapons are a key to the transition away from dependence on those tactical nuclear weapons deployed in the field near potential battlegrounds. That position reflects the many ways in which technology enables us to exchange our current dependence on the brute force of nuclear munitions for the surgical precision of supersmart conventional munitions.

But moving in this direction really involves two different debates—and both involve money. I said earlier that tactical nuclear weapons were economical. Such a statement provokes expressions of disbelief from many people who assume, because nuclear weapons seem to get the most attention in the press, that the high cost of defense can be attributed to them. But as most of you know, the persistence of tactical nuclear weapons in the NATO alliance stems from their low cost relative to the two alternatives. One alternative is to match the Soviets in terms of men and machines—which would mean for the Western nations to go on the kind of quasi-war footing that characterizes totalitarian countries. In today's world, that's highly unlikely.

The other alternative is to spend the money necessary to gain the kind of leverage that technology can give. Frankly, the costs of incorporating revolutionary technological advances into weapon systems cannot be ignored. There's no free lunch in this department, but there *are* tremendous payoffs in terms of the security of the free world—security both against the threat of physical incursion across borders and against the grave fear that a relatively small argument could grow to deadly proportions.

Reaching a Meaningful Military Capability

The challenge before us is to convert the free world's remarkable scientific and industrial strengths into a meaningful military capability. This is obviously a major task, because an enhanced technological capability has to be well enough integrated into the military structure to permit displacement of our present dependence on those nuclear weapons.

That's a big and intimidating transition. The only way we can get to that point is through a coordinated effort. It's not enough for the people in the lab to come up with a great idea. Just as the military will have to rethink their missions, the scientists and engineers in industry will have to show they can provide the military with the kind of operational flexibility and reliability that high-tech systems all too often fail to deliver. But in many ways these are the kinds of steps that our industrial scientists and engineers are taking today in their competition with the Japanese in the commercial marketplace. The battlefield requires the same ingenuity—both to avoid a resort to armed confrontation with an adversary in the first place and to be successful in the unavoidable situation where conflict occurs.

The potential is there, no question about it. Our industrial and military R&D programs already offer a host of new technologies and opportunities. These include, but aren't limited to, Stealth technology, precision munitions, advanced radars, improved reconnaissance, and advances in such fundamental technologies as data processing, new materials, and communications.

Soviet Doggedness

The primary reason that the Soviets have been able to build their immense—and increasingly modern—military force has been because of their doggedness in making incremental and steady improvements in their weapon systems. But the West has an overwhelming advantage over the Soviets in its industrial and technical base, as well as in the free enterprise system that fuels it. If we could link that resource with the kind of resolve and steady effort the Soviets manage to sustain, I think it would be no contest—just as there's no contest in the industrial arena.

Now it's an interesting, almost pathological, phenomenon that although almost everyone is enthusiastic about using technology to reduce reliance on *tactical* nuclear weapons, many of those same people run in the other direction if it's suggested that we can use technology to reduce our reliance on *strategic* nuclear weapons.

The reason, I think, for this reaction has little to do with *technology*, but a lot to do with a kind of *theology*—that is, a set of beliefs that have become deeply ingrained and resistant to questioning. The real challenge today is to step back from that dogma and become more willing to rethink the role of strategic nuclear arms in assuring national security—and to explore unconventional actions that offer new hope for a peaceful future.

I'm going to ask your indulgence to present a brief chronology about nuclear arms, because it helps to understand how that theology developed.

Steady Buildup of Nuclear Arsenals

For most of the past forty years, the world has seen a steady buildup of nuclear arsenals. In that buildup, the United States retained a significant military advantage for many years, some think until the late 1960s. But since the early 1970s there's been essential parity between the Soviet Union and us in terms of the technologies of strategic systems, though each country has chosen quite different mixes of weapons to deploy. In any case, for the past twenty years, we've both been basing our national securities on the threat of massive

nuclear retaliation if the other side should attack first. There are many who conclude that, for all practical purposes, we've entered a kind of suicide pact to which most people in the world, willing or not, are signatories.

But there still remains a sizable body of public opinion that asserts that this mutual standoff provides a high degree of protection. People who subscribe to that belief view with great suspicion any proposals that threaten to alter the relative balance of weapons. They point out that balanced offensive forces, even though they've grown immensely over the years, have maintained the nuclear peace. In truth, the history of the modern nuclear arms race has, ironically, been a peaceful history.

However, there are compelling reasons that warn us not to live in the past. History consists of epochs, and the convergence of several independent trends at some point can suddenly transform history's course. I have little confidence in the view that what has worked so far will continue to work into the future, because that view ignores those converging trends. In reality, each year more people are sensing that the stability of this standoff is diminishing and that sooner or later we'll have to move to some other means of self-protection.

Crossroads Ahead?

I really do believe there's an inevitability about this transition. To me the question is not *if* but *when* we're going to modify the current posture—which the President has likened to two people holding pistols at each other's heads. Somewhere on our path there's a crossroad. Maybe 1984 is the year we turn off, maybe later. But I'm sure we will in time.

Let me offer some reasons why I think we're near a major shift in the way we think about strategic nuclear weapons. First, we're coming to see that our continuing difficulties over the decades in achieving meaningful arms reductions don't stem from lack of effort or from lack of desire to succeed. The fact is that the central stumbling block is the difficulty of coming up with a formula that suits both sides. Everyone—Soviets, Americans, Democrats, and Republicans—wants to reduce stockpiles of strategic arms. But I think most people have grown weary and suspicious of the naïve assertion that if we *really* wanted to reduce arms we could simply sit down at the table and do so. People are beginning to realize that there are fundamental problems to overcome on the path to successful negotiations—problems that are rooted in the differing military objectives that each side has for its nuclear forces. So there's an increasing public awareness that we need some bold departure from the past several decades to break out of that arms-control stalemate.

The Relentless March of Technology

A second reason that the future won't simply be an extension of the past is the relentless march of technology. Our nuclear deterrent—by which I mean our threat of massive retaliation should the Soviets attack us first—is effective *only* if it remains largely invulnerable to that first strike. Fifteen years ago, our triad of deterrents—airplanes, land-based ballistic missiles, and submarine-based ballistic missiles—provided us with triple insurance against a preemptive attack. Each could deliver a crippling retaliatory blow.

That was fifteen years ago. Today, the Soviet Union has concentrated its nuclear firepower in a massive, modern ICBM force that's optimized for use in a preemptive strike against us. In fact, if we were struck without warning by a Soviet preemptive attack, it's possible that ninety percent of our own ICBMs would be destroyed, that most, if not all, of our bombers would be gone, and that more than half of our strategic submarine fleet would be sunk in port. That means that today, under worst-case circumstances, we already rely to an inordinate degree on a single arm of that deterrent triad—the ability of our remaining submarines to stay hidden at sea.

It was new technology that compromised our formerly secure ICBMs and bombers. And who's to say how many more years it will take to compromise submarines as well? I'm not saying we have a problem with submarines today, but I'm describing a consistent trend away from the *stability* of invulnerable nuclear deterrents and toward an *instability* that confers increasing advantage on the side that strikes first. So that's another important factor that's forcing us to reconsider traditional strategy.

Getting Off the Treadmill

The third reason I think change will occur is the *other* side of the technology coin. Forty years ago, technology, in the form of the nuclear explosive, completely rewrote the book on strategic war. Today, after four decades of postwar scientific and technological upheavals, it appears that we have the possibility of bringing about similarly far-reaching changes in how we view national and world security.

The reason is not so profound. After all, notwithstanding the technical brilliance that they embody, nuclear weapons are the world's best example of the brute force approach to war—and to preventing war. But modern technologies point toward the day when we can achieve comparable strategic and tactical military objectives using *nonnuclear* weapons. Is it possible, then, that just as new technology put us *on* the nuclear treadmill two generations ago, *newer* technology can get us *off* that treadmill in the future? Or is there an *inevitability* to our current course, one that will resist all attempts to change direction?

I, for one, believe that the option to change from today's massive nuclear standoff is not only possible, not only inevitable, but that it is already being offered to us.

Obviously that statement needs some substantiation. Because of the constraints on our time, I can't go into great detail here, but let me try to outline my rationale.

Soviet Progress Through the 1970s

When the President took office nearly four years ago, he inherited a situation in which the Soviet Union had made startling military progress through the 1970s—far more than we had. First of all, they had produced highly effective conventional weapon systems—such as aircraft and air defense systems, tanks and other battlefield armaments, and surface ships and submarines. It was clear that if we were ever forced into conflict, we and our allies would have our hands full.

Even worse, the 1970s were a time for vast expansion

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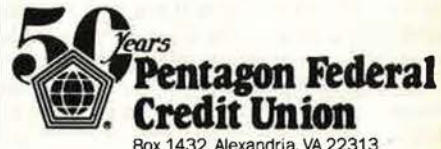
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and improvement in the Soviets' *strategic* arsenal. As I said earlier, they built and deployed a *huge* force of land-based ICBMs—the reason, incidentally, for NATO's decision to deploy new missiles—and they moved boldly into the development of new submarines as well. The technical ability of their land-based ICBMs to deliver warheads now virtually equals ours. But in addition, their land-based ICBMs outnumber ours by a margin of more than three to one. And while their submarines are still less capable than ours, they've closed that gap substantially as well.

The Strategic Modernization Program

In 1981, the President's initial response to this situation was to embark on the strategic modernization program. That was an overdue response to the near-obsolence that overtook many of our strategic weapon systems during the 1970s. But the President also realized that while making up for those years of neglect was essential to restoring short-term balance and to pressuring the Soviets to take our arms-reductions proposals seriously, it didn't really address the problem of long-term strategic stability.

Now don't misunderstand; in no way am I saying that we don't still have strong deterrent. But Presidents, if they're true leaders, have to think about more than just today. They have to consider how their actions are going to affect the options they prepare for their successors. They have to consider the legacy they'll leave for future Presidents. It was with that perspective that Ronald Reagan addressed the nation on March 23 of last year.

He proposed that we should reexamine our fundamental strategic doctrine. He proposed that we shouldn't tacitly accept the likelihood that our deterrent forces would become increasingly vulnerable, that we shouldn't thoughtlessly drift or blunder into a future less stable than today. In particular, he asked if emerging technologies could support a transition to a *lessened* dependence on offensive forces for retaliation and to an *increased* dependence on defensive measures.

Let me emphasize this point—the President has essentially asked that we examine the tools we'll need and the tools we can develop to affect future strategic stability. He has made *no* recommendation yet for *deployment* of defenses, and the technologies we might someday deploy will probably be considerably changed from what we have available today. But he *has* made it clear that our responsibility to the future is to develop the technical knowledge that will permit an intelligent assessment of future options.

The Soviets' Destabilizing Capability

Today, and for the foreseeable future, the Soviets' massive force of land-based ICBMs constitutes the most *destabilizing* military capability on earth. Our goal, broadly, would be a defensive system capable of stopping ballistic missiles from being successfully used against us or our allies. Under this goal, even the initial stages of an antiballistic missile defense could drastically reduce, if not eliminate, any ICBM first-strike capability.

The reason is that a first strike, or a preemptive strike, is an all-or-nothing military gamble. It can't partly succeed, because unless it essentially annihilates the other

side's ability to retaliate, a first strike opens the door to terrible retribution upon the attacker. So even a partial ballistic missile defense would create great uncertainty that a first strike could succeed. And no military planner would seriously contemplate a first-strike unless he had very high confidence that his opponent would be crippled by it—that is, unable to retaliate.

For that reason, even the short-term returns from an antiballistic missile defense would have extremely important consequences for long-term stability. Such a defense would effectively change the strategic value of the ICBM, because it would eliminate its possible use as a first-strike weapon. That's an incredibly important step, because it's been the threat of a first strike on one side—countered by the need to have enough surviving ICBMs on the other side—that's largely driven the arms race in ballistic missiles.

Among the benefits, then, of moving toward a strategic defense system would be the far greater likelihood that we and the Soviets could at last agree on meaningful reductions in ICBM forces, the most fearsome of today's strategic weapons. So, strategic defense can be an important catalyst for arms control. Strategic defense can *be* that bold departure from tradition that I mentioned earlier.

If we had more time, I could go into greater detail on the recent technical breakthroughs that make the Strategic Defense Initiative so attractive today, as well as on the high-leverage role it could play in arms reductions. But the point I really want to make is that advanced technology offers us enormous potential for enhancing our national security, whether it's in the area of strategic or tactical weapons.

I've taken advantage of the Air Force Association's kind offer of this platform to offer this overview and to show why I think we're now in a period where great change is possible in the realm of nuclear arms. More than anything, I would urge everyone to do some *re*-thinking about how we got to our current situation and how we might break out of it. This is a good time to set aside preconceived ideas and stifle our instincts to protect ideological turf against new approaches.

The Strategic Defense Initiative, as well as the extreme leverage we can gain using advanced technologies in conventional arms, are variations on the same theme. Each uses forefront technology to defuse the instability of nuclear weapons. The two approaches, taken together, can finally begin to reverse decades of increasing nuclear tensions and point the way to the kind of world we want to pass along to our children. ■

Dr. George A. Keyworth, II, is the Director of the Office of Science and Technology Policy and serves as Science Advisor to the President. He is a native of Boston, Mass., and holds a bachelor's degree in physics from Yale University as well as a Ph.D. in nuclear physics from Duke University. Dr. Keyworth has worked extensively in the area of nuclear and fundamental interaction physics at the Los Alamos Scientific Laboratory, directing several hundred scientists and technicians engaged in basic research. A Fellow of both the American Physical Society and the American Association for the Advancement of Science, Dr. Keyworth has written widely on nuclear physics and other scientific subjects.




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Two Air Force people view Raytheon's static display of the Sidewinder, Sparrow, and AMRAAM missiles. Thousands of visitors saw the briefings and displays sponsored by 108 companies or divisions of companies representing aerospace industry.

THE displays and exhibits of 108 companies or divisions of companies at the September 17–20 annual National Convention of the Air Force Association in Washington covered a broad range of technologies and products and confirmed the vitality of the aerospace industries in the US and allied countries.

Hundreds of visitors to the display areas of the Sheraton Washington Hotel saw many full-scale mockups, including Aerojet Electro Systems' ceiling-high Trailblazer Test Module sensor system for the Defense Support Program early warning satellite, General Electric's Unducted Fan aircraft engine, and Rockwell International's thirteen-foot-long AGM-130 boosted glide bomb.

Congressional, government, and industry visitors to AFA's thirty-eighth annual Convention also sat in on regularly scheduled briefings by fifty-five companies or divisions of companies on such subjects as electronic warfare, command and control, and space defense.

The Strategic Defense Initiative (SDI)—under which current and futuristic technologies, including lasers, would be used in space or from the ground to defend against attack by ballistic missiles—was a topic of some interest since the Defense Department coincidentally released a request for proposals (RFP) to industry on the first day of the show. The RFP, responses to which were due in mid-October, sought initial industry ideas on the overall design of a multitiered system to defend against

intercontinental and submarine-launched ballistic missiles. More than 200 companies are said to have shown interest, but the plan was for only ten or twelve to be picked for this phase, with contracts of \$1 million to be let before the end of the year. The potential for companies with the best ideas on this and other phases of the effort is great—several hundred billion dollars could be spent on the project over the next few decades.

Among companies addressing SDI at the show were Aerojet General, Rockwell International, and TRW.

Aerojet said, among other things, that its air- and space-based surveillance and communications systems could carry out battle-management roles, that its booster technology could be used on exoatmospheric and endoatmospheric defensive missiles, that it has demonstrated the rapid, precise engine control required for missiles to intercept incoming warheads accurately, and that it has been working on the technology for a space-based hypervelocity electromagnetic gun.

Laser Technologies

Rockwell noted its work on high-energy laser optics, including mirror positioners designed to give "microradian precision and stability" to laser beams over long distances, and adaptive optics including deformable mirrors able to correct "low temporal frequency aberrations in cylindrical lasers."

TRW said it has been working on lasers since 1961 and

Aerospace briefings and displays furnish a chance to see the latest in defense technology.

A Show of Systems

BY RICHARD TUTTLE

on high-energy lasers for the last fourteen years. TRW's high-energy types include the Baseline Demonstration Laser and six other large chemical lasers. Ground-based lasers are being studied for defense against aircraft as well as reentry vehicles and hostile spacecraft, and a variety of potential laser weapon technologies has been tested at the company's Capistrano, Calif., facility.

If the US builds a ballistic missile defense system, some argue, it will also have to upgrade its currently weak defenses against air-breathing threats. Companies likely to be involved in such an effort had displays at the AFA show. Among them were General Electric and Hughes Aircraft.

GE's Military Electronic Systems Operations is producing the AN/FPS-118 Over-the-Horizon Backscatter (OTH-B) radar for Air Force Systems Command's Electronic Systems Division (ESD). It bounces radar signals off the fifty-mile-high ionosphere to see beyond the curve of the earth—out to some 1,800 nautical miles—and could detect aircraft at any altitude within that range. Air Force plans call for building 180-degree systems on each coast and in the southern part of the US.

GE also discussed its minimally attended, solid-state AN/FPS-117 air defense radar, also in production for ESD and being used to upgrade systems covering the northern approaches to Canada and the US.

Hughes Aircraft's Ground Systems Group promoted its Joint Surveillance System (JSS), developed for Tac-

tical Air Command by ESD, which monitors US and Canadian airspace. Like the FPS-117, JSS is expected to be less expensive and more effective than current systems.

Upgrading C³I

To tie together any new ballistic-missile and air-breathing defense systems, the US will have to upgrade command control communications and intelligence (C³I) systems, and companies with expertise in the field were at the AFA show. They included GE's Space Systems Division, GTE's Strategic Systems and Communications Systems Divisions, Hughes Aircraft's Space Systems Group, IBM's Federal Systems Division, Space Communications Co., and TRW's Defense Systems Group.

GE reported on its Defense Satellite Communications System Phase III (DSCS III) spacecraft effort. GTE stressed its ability to handle such projects as the World-Wide Military Command and Control System's Information System (WIS). Hughes, thought to be the builder of the classified Satellite Data System (SDS) communications satellite, one of which was launched September 8, addressed its effort to design terminals for the Air Force for the Milstar communications satellite program, intended to allow bombers and airborne command posts to stay in contact with ground and naval stations even during the outbreak of a nuclear war.

IBM noted its work in upgrading the Air Force's Satellite Control Network (SCN). IBM's Data System Modernization (DSM) project will automate hardware to allow for a planned doubling of the current 100,000 satellite contacts per year that are now accomplished by tracking stations around the world through the Air Force's Satellite Test Center in Sunnyvale, Calif. Major IBM subcontractors include Litton and Lockheed, which were represented at the AFA show, and Harris Corp. Related efforts on satellite remote tracking stations are being carried out by another AFA show participant, Ford Aerospace and Communications Corp.

Space Communications Co. discussed its efforts on the Air Force's Consolidated Space Operations Center (CSOC) and its accomplishments in the Tracking and Data Relay Satellite System (TDRSS), which it owns and operates for NASA.

TRW, meanwhile, noted its work on the Air Force's Space Defense Operations Center (SPADOC), CSOC, and the Command Center Processing and Data System (CCPDS) for strategic early warning. TRW, which makes the early warning Defense Support Program satellites, has also built five Fleet Satellite Communications (FLTSATCOM) spacecraft and has a contract to build three more. The FLTSATCOMs, an official said, are a "bridge" to the Milstar program.

New ICBMs

While command and control for strategic defense was stressed at the AFA show, offensive capabilities were also discussed. Applications include the projected small ICBM (SICBM), efforts on which were detailed by a number of companies.

Receiving RFPs on September 18 for continued design and testing of the SICBM's hard mobile launcher were Bell, Boeing, General Dynamics, and Martin Mar-

ietta. RFPs for additional propulsion work were slated to be released in October to Aerojet, Chemical Systems Division of United Technologies Norden Systems, Hercules, and Morton Thiokol. Meanwhile, one of four missile system integration competitors—Boeing, GD, McDonnell Douglas, and Martin Marietta—was expected to be chosen for further work next spring. Competing for SICBM guidance have been GE, Honeywell, Litton, and Northrop.

Among companies at the show making presentations on the MX Peacekeeper ICBM were Boeing and Martin Marietta. Boeing officials noted that the first silo launch of the missile—from Vandenberg AFB, Calif.—is planned for the third quarter of 1985. Eight pad launches from Vandenberg will precede the silo launch. Five had taken place by the time of the AFA show. A total of twelve Peacekeeper silo firings is planned.

Martin Marietta Denver Aerospace Division's MX responsibilities include multiple development tasks under the assembly, test, and subsystem support (AT&SS) launch-system development and basing-studies contracts. It will also have a role in assembly, checkout, and support during deployment of the missile.

Martin Marietta, GD, and NASA are involved in an effort to develop an expendable launch vehicle by 1988 to complement the Space Shuttle and to put 10,000-pound national security payloads into geosynchronous orbit. Martin Marietta, whose Titan series of boosters has launched defense payloads since the early 1960s,

had displays at the show noting the advantages of a new ELV using a Titan 34D standard core and stretched first and second stages and a Centaur G Prime hybrid upper stage. For future missions, including those envisaged by Strategic Defense Initiative planners, Martin Marietta is proposing an ELV that could put nearly 300,000 pounds into low earth orbit.

Martin Marietta's role in space systems and satellites was also apparent at the show. It is developing the Transfer Orbit Stage (TOS) and the Apogee and Maneuvering Stage (AMS) for Orbital Sciences Corp. as affordable upper stages for the Shuttle.

Aerojet Tech Systems noted its Liquid Propulsion Module (LPM), to be used with TOS and AMS.

Navstar Users

Prime contractor Rockwell, as well as IBM and Texas Instruments, detailed their work on the Navstar Global Positioning System, whose satellites allow users on land, sea, and in the air to determine their location and speed accurately.

Among airborne users of Navstar will be crews of tactical aircraft, possibly including the F-16D modified for a reconnaissance role that General Dynamics officials talked about at the AFA show. The Air Force's Aeronautical Systems Division plans a flight demonstration of the aircraft next summer at Edwards AFB, Calif. Using video systems instead of the cameras and film used by the Air Force's present tactical reconnaissance

Aerospace Industry Roll of Honor

Companies Represented at the 1984 Aerospace Development Briefings and Displays

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Recent Accomplishments in High Mass Fraction Solid- and Liquid-Propulsion Systems</p> <p>Alkan U.S.A., Inc.
Advanced Ejector Release Units: Common Technology Approach</p> <p>Avco Systems Div.
Modernization Strategic and Tactical Weapon Systems—A Progress Report</p> <p>Boeing Co., The
ICBM Modernizing for Continuing Stability</p> <p>British Aerospace
British Aerospace Technology: Today and Tomorrow</p> <p>Brunswick Corp.
Streamlined Low-Altitude Dispenser</p> <p>Canadair Ltd.
Multimission Challenger 600 and 601</p> <p>Control Data Corp.
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Electronic Battle Management—A Force Multiplier</p> <p>Eaton Corp.
Challenge: Eaton's Defensive Avionics System for the Air Force's B-1B</p> <p>EDO Corp.
High-Performance Aircraft Ejection Rack Unit Developments and Derivative Designs</p> <p>Fairchild Industries, Inc.
The Multipurpose Trainer—T-46A and AT-46A</p> <p>Ford Aerospace & Communications Corp.
Defense, Space, and Communications Systems</p> <p>Garrett Corp., The
Aircraft Components and Systems</p> <p>Gates Learjet Corp.
Learjet: Standard of Excellence</p> <p>General Dynamics Corp.
The Thunderbirds and the F-16s</p> <p>General Electric Co.
Aerospace Business Group
Integrated Aircraft-Control Systems and the GAU-5/A 30-mm Gun Pod Capabilities
Aircraft Engine Business Group
New Aircraft Technologies</p> <p>Grumman Aerospace Corp.
EF-111A Raven—Reliable, Maintainable, and Mission-Ready</p> | <p>GTE Government Systems Corp.
WWMCCS Information System: A New Beginning</p> <p>Gulfstream Aerospace Corp.
The C-20A Gulfstream: The First Year</p> <p>IBM Corp.
IBM's Involvement in Tactical and Strategic Avionics and Space Systems</p> <p>Israel Aircraft Industries, Ltd.
Reliable Intelligence in Time/The Critical Subcontractor</p> <p>ITT Gilfillan
MPN-XX Tactical Air Traffic Control System</p> <p>Lear Siegler, Inc.
Tactical and Strategic Avionics and Controls—"Integrated Flight"</p> <p>Litton Industries
Data Systems Div.
Modular Command and Control
ITEK Optical Systems
ITEK Optical Systems Capabilities</p> <p>Lockheed Corp.
Meeting Today's Challenges with Tomorrow's Technology</p> <p>Loral Electronic Systems
Loral Electronic Systems Combat Electronic Capabilities</p> <p>LTV Aerospace and Defense Co.
Advanced Air Force Tactical and Strategic Defense Systems</p> <p>Martin Marietta Aerospace
LANTIRN Low-Altitude Navigation and Targeting Infrared for Night System</p> <p>McDonnell Douglas Corp.
Douglas Aircraft Co. "C-17"
C-17 Airlifter
Douglas Aircraft Co. "KC-10"
KC-10 Extender
McDonnell Aircraft Co.
F-15 Eagle
McDonnell Douglas Astronautics Co.
Stone Age to Space Age—The Advancement of Defense Technology</p> <p>MBB Messerschmitt-Bölkow-Blohm GmbH
MBB's Contributions to and Participation in Transatlantic Defense Programs</p> | <p>Northrop Corp.
America's Newest Tactical Fighter—The F-20 Tigershark</p> <p>Raytheon Co.
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Autonetics Strategic Systems Div.
"Strategic Legacy"
Collins Government Avionics Div.
Navstar GPS—A Field-Proven System
Missile Systems Div.
GBU-15 and AGM-130: Stand Off and Strike
North American Aircraft Operations
B-1B Aircraft Program
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Peacekeeper Stage IV, Space Shuttle, Shuttle Main Engines, Navstar</p> <p>Rolls-Royce, Inc.
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aircraft, the McDonnell Douglas RF-4C, a modified F-16D could monitor enemy movements in near-real time, giving battlefield commanders an advantage. GD officials said that the high mission-capable rates of the F-16—more than eighty percent—would be an asset in the low-level, high-speed reconnaissance role.

Low level and high speed are requirements of the interdiction mission tasked to Europe's Tornado aircraft, and British Aerospace, the UK partner in the consortium that builds it—Germany and Italy are others—was at the AFA show to give details. BAe is also producing the Tornado Air Defense Variant (ADV) for the Royal Air Force.

BAe sees the Tornado as a lead-in to its Experimental Aircraft Program (EAP) aircraft, a high-performance technology demonstrator scheduled to fly in 1986. The company is also involved in the European Fighter Aircraft (EFA) project, which could yield some 800 aircraft for the UK, Germany, France, Italy, and Spain beginning in the mid-1990s. (See also "Europe Aims for the '90s" on p. 70 of this issue.) British Aerospace says the EAP effort is relevant to EFA in that it will demonstrate systems and technologies needed to meet the EFA requirement.

Demonstration is the key to the Air Force/NASA/Defense Advanced Research Projects Agency/Grumman Aerospace X-29 forward-sweptwing experimental aircraft program. The X-29, rolled out in August at Grumman's Calverton, N. Y., plant, is expected, among

other things, to show the air combat maneuvering advantages of forward-swept airfoils.

ATF Coming

Further down the road is the Air Force's Advanced Tactical Fighter (ATF), a follow-on to the F-15 and F-16. Describing such a fighter at the AFA show was Rockwell. It showed a twin-engine, twin-tail, delta-wing design.

Since short-field performance will be important for ATF and other future Air Force aircraft, a number of propulsion companies, including Rolls-Royce, builder of the Pegasus engine for the V/STOL Harrier, are working on new ways to solve the old problem. At the AFA show, Rolls showed its hybrid fan vectored-thrust engine. For takeoff, nozzles are pointed aft, and, "at unstick speed, they are rotated through fifty degrees to augment wing lift," Rolls says. With acceleration, they are swung aft again, "and the engine performs as a high bypass turbofan for supersonic cruise." For a vertical landing, "the nozzles are rotated through ninety degrees."

Tactical aircraft described at the show in addition to EAP, EFA, and ATF included McDonnell Douglas's C-17 airlifter, the Sikorsky/IBM HH-60D search and rescue helicopter, and the B-52 bomber fitted with non-nuclear standoff systems. Detailing the latter were Boeing Military Airplane Co. and United Technologies Norden Systems. The Conventional Standoff Capability

The following companies displayed but did not hold briefings

Allied Bendix Aerospace
Capabilities and Features of Selected Advanced Electronic Equipment

American Cyanamid Co.
Safety Flares

Beech Aircraft Corp.
C-12F and MQM 107B

Bell Helicopter Textron, Inc.
VSTOL Concepts—The TiltRotor, XV-15

Canadian Marconi Co.
Doppler Navigation Systems and the Latest in Aircraft Controls

Delco Systems Operations, GMC
Delco Systems State-of-the-Art, Avionics Products and Capabilities for Air Force Programs

Fairchild Control Systems Co.
EXTERNAL FUEL TANK CERTIFIER

Fairchild Spacecom, Space Communications Co.
Tracking and Data Relay Satellite Systems, TDRSS

Fairchild Weston Systems, Inc.
Electro-Optical (CCD) TV Imaging Systems Cockpit Television Sensor (CTVS), Expandable Jammers, Unmanned Vehicles Payloads

Ferranti, PLC
Head-Up Display, Video Camera, Colour/Monochrome Displays, Mission Planner and Inertial Navigator

GA Technologies, Inc.
Compact Thermionic Nuclear Reactor for the Space Power Program

Gould, Inc.
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UHF and VHF Communications, HAVE QUICK, Spread Spectrum Communications, Navstar/GPS User Equipment

Marconi Avionics Ltd.
Head-Up Displays, Night Vision System, ATE

McDonnell Douglas Electronics Co.
VITAL Visual Simulation Systems and the Helmet-Mounted Display Systems

Morton Thiokol, Inc.
Advanced Air-to-Surface Missile (AASM) Propulsion Technology

Motorola Government Electronics Corp.
PPN-19, APX-104 Radar Beacon Transponders

Northrop Corp.
Defense Systems Div.
QRC-82-03 Infrared Countermeasures System

Electronics Div.
AIRS Advanced Inertial Reference Sphere

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Television Camera Set, AN/AXX-1 and SEEHAWK FLIR, AN/AAS-40

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Fiberscopes, Borescopes, and Accessories

Pacific Car and Foundry Co., Div. of PACCAR
Minuteman Transporter Erector, Minuteman Van Transporter, Tractor R9 Refueler

RCA, Government Systems Div.
RCA Competence in Electronics from Major Systems to Microelectronics

Rediffusion Simulation Inc.
Computer-Generated Imagery

Rockwell International, Collins Defense Communications Div.
ARC 182 UHF/VHF Multi-Mode Radio and the ARC 190 HF Radio with SELSCAN for B-1B Aircraft

Roim Corp.
Mil-Spec Computer Products

Sanders Associates, Inc.
Advanced Technology Electronic Systems and Products

Science Applications, Inc.
Systems Integration Capabilities in C³I Monitoring

Smiths Industries Aerospace & Defense Systems, Inc.
Head-Up Displays and Aircraft Control Systems

Space Ordnance Systems
Decoy Flares, Release and Separation Devices, and Crew-Escape System Components

Sperry Corp.
Sperry Electronic Systems Air Force-Oriented Products and Capabilities

Stanley-Vidmar
Deployment Cabinets: Control Tool Kit (CTK)

Sundstrand Corp.
Aircraft Electrical Power-Generating Equipment and Controls, Engine Equipment and Flight Controls

Syscon Corp.
An Automated Wargame Designed to Reinforce Tactical Skills

Syston Donner
Engine and APU Fire/Overheat Detection System Components for Fighter and Transport Aircraft

Time and Space Processing, Inc.
Secure Voice Systems

Turbomach Div. of Solar Turbines Inc.
Titan II Gas Turbine Load Compressor

United Technologies Corp., Hamilton Standard
Central Aircraft Support Systems

Vega Precision Laboratories
Components of Target-Tracking Control System

Vitro Corp.
Major Systems Engineering and Technical Services for the Military

Western Gear, Flight Structure Div.
Air Force Multiple Stores Ejector Rack (MSEER), the Lo Pro Ejector Unit, and the Multiple Practice Bomb Rack

(CSC) B-52, said Boeing, features an Integrated Conventional Stores Management System (ICSMS), Common Strategic Rotary Launcher (CSRL), updated controls and displays, offensive avionics, and a more capable radar. The Strategic Air Command's requirement for a new B-52 radar apparently has been validated by the Air Staff, and Norden and others would compete for a contract to supply it.

A Versatile B-1

Conventional roles are also planned for Rockwell's

Corp., maker of a number of devices, including the AN/ALR-56 radar warning receiver for the F-15 and a target acquisition system for attack helicopters; Sanders Associates, supplier of systems that include the AN/ALQ-137 electronic countermeasures system for the FB-111A; and Litton, maker of such systems as the AN/ALR-69 receiver for the US Air Force and some European countries.

Litton, Loral, and Sanders also noted their efforts in the Air Force/Navy Integrated Electronic Warfare System (INEWS) program, in which other companies are



Air Force Association Convention spectators examine General Dynamics' full-scale mockup of an F-16C cockpit. Also on display was the avionics checkout equipment for the F-16F.

B-1B strategic bomber, company officials said at the show, noting that the ability to perform a number of missions makes the B-1B different from Northrop's projected Advanced Technology Bomber (ATB), which is being optimized for the strategic penetration role. Being able to perform a variety of missions, said the Rockwell officials, may mean that more than 100 B-1Bs will be produced. At the moment, the 100th and final B-1B is slated to come off Rockwell's line in early 1988. Rockwell officials say that the company has invested \$450 million in the B-1 program, including \$100 million in a new production facility in Palmdale, Calif., and that it wants to stay in the airplane business.

A variety of electronic warfare systems is expected to help the B-52, B-1B, ATB, and other aircraft carry out their missions, and the EW houses displayed some of their systems at the AFA show.

Eaton Corp.'s AIL Division described its work in developing the B-1B's AN/ALQ-161 jammer, saying it will counter surface-to-air missile, anti-aircraft, and air-to-air missile fire-control radars and will degrade early warning and ground-controlled intercept radars. Flight tests are under way at Edwards AFB, Calif.

AIL and Grumman described their competitive efforts on the Air Force's \$250 million EF-111A tactical jamming system upgrade program, required because Soviet radars are being improved.

Other tactical EW systems were described by Loral

also competing. The goal is to develop an EW system that will protect future tactical aircraft from radar, electro-optical, laser, infrared, and other threats. Sanders said its INEWS and related work with "generic countermeasures and smart integrated circuits . . . [will] support high-technology aircraft, such as low-observable aircraft which are no longer expected to rely on conventional black-box concepts."

Israel Aircraft Industries' Elta division, which helped develop EW devices that were used successfully in the 1982 Lebanon war, described its EL/L-8202 airborne self-protection jammer, as well as radar warning systems and chaff and flare dispensers. Elta has also developed airborne standoff and escort jamming equipment.

In addition, Elta described some of its signals intelligence (SIGINT) gear, including communications intelligence (COMINT) and electronic intelligence (ELINT) systems.

Many RPV Roles

IAI's remotely piloted vehicles, which gained attention because of their good performance during the 1982 war, were also noted by company officials at the show. Similar RPVs were exhibited by Boeing Military Airplane Co. and E-Systems' Melpar Division. Boeing's "Brave," the company said, can fly with an effective battlefield jamming system. It cited recent tests in the Pave Tiger defense suppression program at the Tonapah

test range in Utah. Melpar said its mini-RPVs have capabilities in the roles of harassment, defense suppression, command control and communications support, and reconnaissance.

RPV reconnaissance is an application of British Aerospace Dynamics Group's miniaturized infrared Linescan 2000 system, which was exhibited at the AFA show. Earlier in September, BAe and Hughes Aircraft signed an agreement to market Linescan 2000 and 4000 in the US for use by the armed services. Linescan 4000 is for high-performance aircraft flying low-level reconnaissance missions. BAe, Honeywell, and Texas Instruments are involved in the IR linescan portion of GD's F-16D reconnaissance aircraft demonstration effort.

Texas Instruments described at the show its work on a new forward-looking infrared (FLIR) system designed for use with smaller aircraft and helicopters. It is fourteen inches in diameter, seventeen inches high, and

said. It also stressed that, while it adds air-to-surface capabilities, it does not degrade the F-15's air-to-air mission.

Another multimode radar, the AN/APG-67, developed specifically for Northrop's F-20 Tigershark, was discussed at the show by GE's Aerospace Electronic Systems Department.

US and UK Arms

Antiradar missiles were described at AFA by Texas Instruments and British Aerospace. TI said the third year of full-scale production of its HARM (High-speed Anti-Radiation Missile) is under way in Dallas, Tex., with rates of thirty per month expected by the end of 1984. BAe's ALARM (Air-Launched Anti-Radar Missile), which was chosen by the UK over HARM, will be carried by RAF Tornado, Jaguar, and Harrier aircraft. BAe is also developing an ALARM for helicopters.

A Boeing official explains the remotely piloted vehicle (Brave 200), as seen from a rear view. Designed at low cost to perform multiple missions, Brave 200 is well suited for a variety of uses.



weighs forty pounds. TI also noted its efforts in the enhanced terrain-masked penetration program, aimed at attacking ground targets from cover.

Hughes Aircraft's Electro-Optical and Data Systems Group showed a ninety-nine-pound night vision system for helicopters that permits nap-of-the-earth flight in darkness.

Night attack is the mission of Martin Marietta Orlando Aerospace's LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) system. It is also the mission of a navigation and attack FLIR pod developed by the Electro-Optical Surveillance Division of the UK's GEC Avionics. Both were described at the AFA show.

Night or day, all-weather ground attack is one of the capabilities of Hughes Aircraft Radar Systems Group's AN/APG-70 radar for the F-15, and it was described at the AFA show. Based on the AN/APG-63, it incorporates new technology, requires less support, and features improved reliability and maintainability, Hughes

Hughes Aircraft Missile Systems Division showed its radar-guided AMRAAM (Advanced Medium-Range Air-to-Air Missile), and BAe showed the infrared-guided ASRAAM (Advanced Short-Range Air-to-Air Missile) that it is developing with West Germany's *Bodenseewerk Geratetechnik*. AMRAAM and ASRAAM are each to be produced on either side of the Atlantic.

ASRAAM will be a follow-on to the Sidewinder, described at the show by Ford Aerospace, which is producing the AIM-9P version for the US Air Force, the AIM-9M for the US Navy and allies, and the MIM-72 for the US Army's Chaparral short-range air defense system.

BAe's Rapier Laserfire—first firings of which took place recently at the UK Ministry of Defense's Test Range at Aberporth in Wales—was shown, as were the Blindfire and Tracked Rapiers. The US Air Force has chosen Rapier to protect the airfields it operates from in the UK.



A Martin Marietta official explains the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. LANTIRN is currently in the testing phase.

Among air-to-ground weapons at AFA was Hughes Aircraft's AGM-65 Maverick family, used by the Air Force, Navy, and Marine Corps.

Guided Bombs

Rockwell's Missile Systems Division described an Air Force go-ahead for product improvement of its GBU-15 glide bomb, saying it had received a contract providing initial funding of \$6.1 million. Total contract value is expected to reach \$63 million. Under the contract, Rockwell will develop and test a rocket-powered version of the GBU-15, designated AGM-130. It is intended to give the Air Force improved standoff capability.

Hughes Aircraft's Radar Systems Group, meanwhile, showed its AN/AXQ-14 data link for the GBU-15. With it, said Hughes, an aircraft's weapon systems operator can guide the bomb "all the way to impact or can select one of several autonomous weapon control modes. . . ."

Texas Instruments described its Paveway III Low-Level Laser-Guided Bomb (LLLGB), designed for use in bad weather against heavily defended targets.

Officials of Brunswick Corp.'s Defense Division told visitors about its Low-Altitude Dispenser (LAD), designed for low-cost, standoff delivery of submunitions. LAD, said the company, "will compute its own trajectory, either premission or at launch," and "will fly off-axis and down-range to dispense its armament."

Coordinating attacks by such weapons will be a number of tactical command and control systems, some of which were displayed at AFA. Officials of United Technologies Norden Systems, for instance, told of their company's capabilities to upgrade the C-130 Airborne Battlefield Command and Control Center (ABCCC) now supporting US Central Command. Norden proposes state-of-the-art computer processing for increased efficiency and reduced manpower requirements.

Hughes Aircraft's Ground Systems Group described the Stand Alone JTIDS (Joint Tactical Information Distribution System), which is aimed at providing access to radar surveillance information supplied by the Boeing E-3A Airborne Warning and Control System (AWACS) aircraft.

Hughes also described its Airborne Early Warning/Ground Integration Segment (AEGIS), which provides AWACS information to NATO commanders so that each nation can direct its own fighters against intruding aircraft. ■

Richard Tuttle is Managing Editor of Aerospace Daily. He has been with the Ziff-Davis publication since 1967. He is an active sailplane pilot and has also flown in the F-15, the F-14, the F-5F, the A-7K, the two-seat A-10, the Harrier, and the Hawk. He holds a master's degree in journalism from Ohio State University.

KING RADIO'S AN/ARC-199 THE LATEST WORD IN TACTICAL HF



For more than a year King Radio engineers have been developing and testing the latest word in HF capability: the AN/ARC-199.

Soon this advanced technology HF/SSB radio will be flying on numerous military helicopters and fixed wing aircraft. The AN/ARC-199 is capable of providing reliable, secure communication when line-of-sight contact isn't possible due to excessive distance or terrain masking. This capability plus a variety of automated features makes this radio ideally suited for operations in a combat environment—including the Air Force's demanding Search and Rescue Mission.

One factor that makes the AN/ARC-199 attractive to the military is the MIL-STD 1553B data bus interface which provides compatibility with the new avionic systems architecture. Other points in the system's favor include the small size and light weight of the AN/ARC-199 (approximately 30

pounds for an installed system) and the reliability associated with King equipment. Weight and space savings, of course, allow for an increase in mission payloads.

Utilizing four microprocessor chips, the AN/ARC-199 is able to scan 20 preset channels and to automatically recognize incoming voice messages by their addresses. Add to these features selective squelch, BITE, variable power output, secure voice and data capability plus the growth potential for frequency agility, frequency link analysis, automated communications and electronic operating instructions—and you have the potential for a truly ADAPTIVE HF SYSTEM.

King Radio has also developed the companion radio to the AN/ARC-199—the AN/VRC-86. This radio, which is functionally identical to the AN/ARC-199, is suitable for use at a fixed site or in military vehicles. Both radios work with telephone-like simplicity to allow pilots and ground based operators to

easily keep in touch with each other during tactical operations.

Since winning this first AN/ARC-199 contract in 1982, King Radio's achievements in HF haven't gone unnoticed. Another HF contract has already come our way—this time to build an advanced HF for use in the rugged operational environment of tactical fighter aircraft. King is developing the AN/ARC-200 (a derivative of the AN/ARC-199), which will be used in the RAAF version of the F/A-18 strike fighter aircraft.

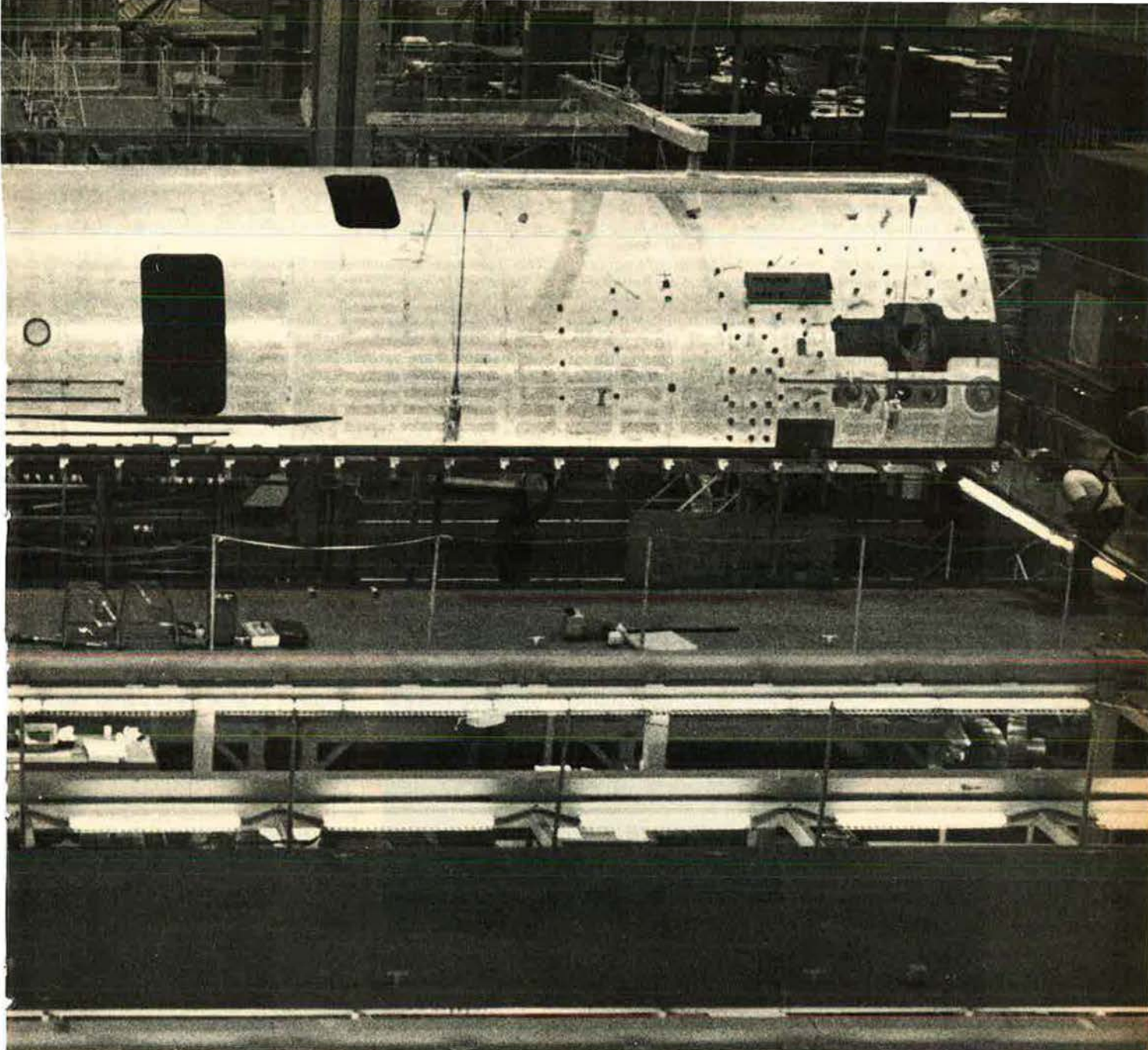
If King's tactical capabilities interest you contact: Director, Special Programs Department, King Radio Corporation, 400 North Rogers Road, Olathe, Kansas 66062. (800) 255-6243. Telex WUD (0) 4-2299. Cable: KINGRAD.

KING



October 1984.

The C-5B. Hardware taking shape.



In the massive facility at Marietta, Georgia, Lockheed's first new C-5B airlifter is showing its real dimensions...in hardware.

It continues to meet or exceed program requirements—proof of the high production quality designed into the program. That's a tribute to the world's most experienced airlifter builders: the men and women of Lockheed-Georgia.

The first of the new C-5Bs will roll out and fly next year, going directly into service to join the 77 C-5As already in the Military Airlift Command force. The new airlifters will significantly enhance operations with improvements including a simplified automatic flight control system; lighter, more reliable color weather radar; a highly advanced navigation/communication system; and a digital air data computer, plus other refinements based on the Military Airlift Command's experience.

The C-5B will have improved engines with

increased reliability. And much of the aircraft will use new, stronger and more corrosion-resistant alloys, plus other major advances in maintainability.

The fixed-price C-5B program will add 50 new aircraft and boost America's C-5 outsize cargo capacity by 65%.

America's enhanced ability to airlift fully assembled helicopters, infantry fighting vehicles, self-propelled artillery, M-1 tanks and other outsize equipment will underscore MAC's motto, "Backbone of Deterrence." And speed vital combat equipment to any part of the globe in a matter of hours.

The Air Force C-5B.

A new generation of airlift strength is taking shape.

 **Lockheed-Georgia**

AWARDS AT THE 1984 AIR FORCE ASSOCIATION NATIONAL CONVENTION

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The H. H. Arnold Award (AFA's highest annual award)—To **The President's Commission on Strategic Forces**, also known as the Scowcroft Commission, for its valuable, historic role in formulating a cohesive bipartisan approach to modernization of our strategic nuclear deterrent forces and for fostering a national consensus on the twin imperatives of maintaining sufficient strength to deter nuclear aggression while sponsoring measures to reduce the threat of nuclear war through equitable arms control. (Accepted by Lt. Gen. Brent Scowcroft, USAF (Ret.))

The David C. Schilling Award ("The most outstanding contribution in the field of Flight")—To **Lt. Col. James D. Latham, USAF**, Commander of the 16th Tactical Fighter Squadron at Hill AFB, Utah, for his exceptional leadership and superior airmanship as commander and leader of the USAF Thunderbirds in supervising the transition to F-16 aircraft, rebuilding a cohesive demonstration team, and flying lead aircraft throughout the most successful demonstration season in Thunderbirds history.

The Theodore von Kármán Award ("The most outstanding contribution in the field of Science and Engineering")—To **Maj. Gen.**

complex supply squadron in United States Air Forces in Europe (USAFE). His management innovations have added significantly to the mission readiness of USAFE. He has displayed superb leadership in his dual rôle as Commander, 86th Supply Squadron, and Chief of Supply, 86th Tactical Fighter Wing. The Air Force Association is proud to salute his outstanding achievements.

The Veterans Administration Employee of the Year Award—To **Candace Carter-Childs, R. N.**, VA Medical Center, San Francisco, Calif., for her leadership, creativity, and resourcefulness in making substantial contributions to the fields of cancer nursing and hospice care for our nation's veterans. As an Oncology Clinical Nurse Specialist, she has established the highest levels of care and inspired others throughout the Veterans Administration to emulate her achievements in providing care for cancer patients. We salute her dedicated efforts to improve the quality of care and the quality of life for veteran patients.

The Juanita Redmond Award for Nursing—To **Capt. Janet S. Barber, USAF**, School of Health Care Sciences, Sheppard AFB, Tex., for her sustained professional excellence in all aspects of her duty as a nurse at Wilford Hall USAF Medical Center, Lackland AFB, Tex., and in recognition of her inspiration and exam-



LEFT: Lt. Gen. J. B. McPherson, USAF (Ret.), accepts the Hoyt S. Vandenberg award for contributions in the field of aerospace education from AFA President David L. Blankenship during the Aerospace Education Foundation luncheon on September 17. **RIGHT:** Gen. Thomas M. Ryan, Jr., USAF, Commander in Chief of Military Airlift Command, accepts an AFA Citation of Honor on behalf of MAC from AFA Board Chairman John G. Brosky while AFA President David L. Blankenship looks on. MAC was cited for its role in last year's Grenada rescue operation. The Citation was presented at the luncheon honoring the Air Force Chief of Staff on September 19. (Photos by Eddie McCrossan)

Aloysius G. Casey, USAF, Commander of the Ballistic Missile Office at Norton AFB, Calif., for his exceptional leadership and professional performance as Commander of Air Force Systems Command's Ballistic Missile Office and for crucial technical management of the Peacekeeper ICBM program from full-scale engineering development to initial production, highlighted by the most successful test program in the history of US ICBM development.

The Gill Robb Wilson Award ("The most outstanding contribution in the field of Arts and Letters")—To **The MacNeil-Lehrer News-hour**, for its accurate, thorough, and highly informative coverage of significant geopolitical and national security issues, thereby fostering a deeper public understanding of central national defense requirements. (Accepted by Dan Warner, Managing Producer.)

The Hoyt S. Vandenberg Award ("The most outstanding contribution in the field of Aerospace Education")—To **Lt. Gen. J. B. McPherson, USAF (Ret.)**, Alexandria, Va., for his prescient recognition of important gaps in the recorded history of USAF evolution and the experiences of its leadership and for his dynamic personal role in stimulating the production of valuable authoritative publications to fill those gaps. Through his outstanding initiative and dedication, he has made a major contribution to aviation history and aerospace education.

The Thomas P. Gerrity Award ("The most outstanding contribution in the field of Logistics")—To **Col. James N. Bevis, USAF**, Chief of Supply for the 86th Tactical Fighter Wing, Bitburg AB, Germany, for his unique and important contributions as a senior logistician and commander of the largest, most diverse, and

ple for others. Her achievements and contributions in the area of emergency trauma care and her clinical and teaching contributions underscore her exceptional professionalism and valuable contribution to the welfare of all military personnel.

The General Edwin W. Rawlings Award for Energy Conservation—To **Maj. Brian A. Arnold, USAF**, Air Command and Staff College, Maxwell AFB, Ala., and **MSgt. James H. Sanders, USAF**, Energy Conservation Reports Manager, Hq. Air Training Command, Randolph AFB, Tex., for their outstanding achievements in energy conservation within the United States Air Force.

AWARDS AT THE 1984 AIR FORCE ASSOCIATION NATIONAL CONVENTION

Maj. Jon R. Alexander, USAF, and Maj. Daniel J. Silvis II, USAF, 4th Tactical Fighter Wing, Seymour Johnson AFB, N. C., for their superb airmanship while piloting an F-4E over the Atlantic Ocean. Responding with decisiveness and courage to a catastrophic aircraft emergency involving the loss of the right engine, they nonetheless accomplished refueling under extremely adverse conditions and made a successful emergency landing, demonstrating the highest level of professional competence.

Maj. Salvatore R. Balsamo, USAF, Frank J. Seiler Research Laboratory, USAF Academy, Colo., for his superb professionalism in developing and demonstrating the feasibility of passive ring laser gyroscope concepts and innovative technical efforts in developing the highly reliable onboard helium-neon laser-based clock.

Capt. James E. Brown, USAF, Operations Officer, 317th Tactical

Airlift Wing, Pope AFB, N. C., for his sustained excellence and superb performance as an expert in military security and for a particularly outstanding display of leadership as commander of all MAC security forces staging out of Barbados during the successful Grenada rescue operation. His personal efforts contributed uniquely and directly to the effectiveness of that critical military effort.

Donald M. Cole, Air Force Weapons Laboratory, Kirtland AFB, N. M., for his exceptional leadership and professionalism as a program manager of the Air Force Weapons Laboratory in measuring the survival rates of strategic weapons in a nuclear environment and for brilliant technical expertise in designing and analyzing the CARES-DRY research test series.

1998th Communications Group, McGuire AFB, N. J., for its sustained record of providing superior communications and air traffic control and especially for furnishing effective command and control communications to all participating military airlift units in support of the successful Grenada rescue operation. (Accepted by Col. Jay F. Feibelman, USAF, Commander.)

DeWitt S. Copp, Alexandria, Va., for his sustained literary contributions in the field of military history and biography and, in particular, for his recent works *A Few Great Captains* and *Forged in*



Fire. These superb writings will help perpetuate the rich military aerospace history and heritage of our nation and will serve as inspirational references for future aerospace leaders both in and out of the United States Air Force.

Crew E-113, 42d Air Refueling Squadron, Loring AFB, Me. Crew members **Capt. Robert J. Goodman**, **Capt. Michael F. Clover**, **Capt. Karol R. Wojcikowski**, and **SSgt. Douglas D. Simmons** demonstrated unique airmanship and superb crew coordination during an airborne emergency involving an F-4E that had lost the right engine during a transatlantic flight and that was experiencing multiple malfunctions. Demonstrating the highest level of professional skills and resourceful creativity, this KC-135 crew successfully used their refueling boom to achieve and to maintain contact with the F-4E and tow it for more than 160 nautical miles until it was able to recover successfully. The crew's exemplary airmanship saved human life and brought great credit to themselves and their profession.

The Directorate of Soviet Affairs, Air Force Intelligence Service, Bolling AFB, D. C., for its superb dedication and sustained professionalism in pioneering and conducting the comprehensive Soviet Awareness Program, which is designed to explain to Air Force personnel the tactics, strategy, and doctrine of the Soviet Union. Their outstanding work has made a major contribution to the readiness and relative military skills of the United States Air Force. (Accepted by Col. George V. Wish, USAF.)

The 1st Mobile Aerial Port Squadron, Dyess AFB, Tex., for its superb, sustained, and effective support of a continuing series of demanding worldwide exercises. The squadron's ability to deploy reliably on short notice under a variety of geographical

and logistical situations and to furnish effective support to all exercise participants has made a significant contribution to the readiness and versatility of our nation's armed forces. (Accepted by Lt. Col. Kenneth D. Clonts, USAF, Commander.)

John J. Ford, Avco Corp., Washington, D. C., who, for more than a quarter of a century, played a leading role in maintaining the critical military capabilities of the United States' armed forces. As an outstanding military affairs journalist and then as one of the key professional staff members of the US Congress, his understanding and concern extended to all aspects of the nation's military needs and made a major contribution to the morale and welfare of America's service men and women.

SSgt. Robert F. Griffin, USAF, 1723d Combat Control Squadron, Hurlburt Field, Fla., for his conspicuous personal courage and outstanding professional example during the successful Grenada rescue operation. His role as a member of a combat control team under fire was superbly executed and proved to be essential to the success of the operation. After parachuting into a hostile fire zone, he spent two days controlling air traffic, including sorties of strike aircraft, and coordinating effective search and rescue operations for downed American flyers.

1st Lt. Roger L. Hall, USAF, Space Command, Peterson AFB, Colo., for his outstanding performance supporting NORAD's space mission through solution of unique and complex space tracking problems under stressful conditions. His superior insight and technical expertise in resolving the complexities of satellite tracking has brought great personal and professional credit to him and to the United States Air Force.

Frank W. Jennings, Chief, Policy and Program Development, Air Force Service Information and News Center, Kelly AFB, Tex., for almost a quarter century of dedicated service to the Air Force's internal information program. Most significantly, as the prime mover in the creation and sustainment of the Air Force Policy Letter for Commanders, he has made a major contribution to the effectiveness of the Air Force and the national security of America.

Military Airlift Command, Scott AFB, Ill., for the sustained and effective performance of all members of the command preceding and during the Grenada rescue operation. All mission elements of MAC were tasked in this operation. Without degradation of other ongoing tasks and responsibilities involving their global commitments, the men and women of MAC flew more than 800 missions successfully in the performance of their critical role in the effective rescue operation in Grenada. Their overall command performance is recognized and saluted by the entire Air Force Association. (Accepted by Gen. Thomas M. Ryan, Jr., USAF, Commander in Chief.)

MSgt. Charles E. Muston, USAF, Hq. Air Force Reserve, Robins AFB, Ga., for his outstanding professional skill and unique achievements in the field of public affairs. His editorial skills, reporting, home-town release program, and support of command projects within the 51st Tactical Fighter Wing in Korea brought top awards within Pacific Air Forces and have served as models for unit information programs. The Air Force Association recognizes and salutes this superb public affairs specialist.

The NATO Airborne Early Warning Force, Supreme Headquarters, Allied Powers Europe, Belgium, for successfully implementing a truly unique international task force that has met and overcome with distinction all of the operational and logistical challenges posed in forming an effective operational unit from aircrews and support personnel from several NATO nations. The Airborne Early Warning Force has affirmed the fundamental NATO principles of Allied unity, cooperation, and vitality and has charted a dynamic and vital course for the future.

Robert A. Roberts, Hill AFB, Utah, for his creativity as a civilian employee at Hill AFB in developing a new process for removing paint from aircraft surfaces without pollution, chemical contamination, or personnel hazards. His method, which is receiving worldwide acclaim, will save millions of dollars for the United States and will help to eliminate hazardous working conditions as well.

Brig. Gen. H. L. Russell, USAF, Director of Joint Analysis, Washington, D. C., in recognition of his brilliant and important contri-

butions to the security interests of the nation in a critical assignment on the staff of the National Security Council. He exemplifies and demonstrates professional military performance and has brought great credit to the United States Air Force and the military profession in this demanding role of advising the nation's leadership.

Dr. Stephen W. Tsai, Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB, Ohio, for his sustained dedication to excellence and his brilliant technical expertise in reliably predicting and proving the superior characteristics of composite materials in weapon system design. He has made a major contribution to the United States' lead in composite material application in aircraft, missiles, and space structures.

AFA MANAGEMENT AWARDS FOR LOGISTICS

AFA Executive Management Award—To **Col. Thomas J. Rush, USAF**, Chief of the Aircraft Division, Directorate of Maintenance, Oklahoma City Air Logistics Center, Tinker AFB, Okla., for his outstanding contributions to management while assigned to Air Force Logistics Command.

AFA Middle Management Award—To **James R. Huffman**, Electronic Warfare Management Division Program Office, Warner Robins Air Logistics Center, Robins AFB, Ga., for his outstanding contributions to management while assigned to Air Force Logistics Command.

AFA Junior Management Award—To **Capt. Philip M. Liller, USAF**, Air-Launched Cruise Missile Deputy Program Director for Logistics, Air Force Acquisition Logistics Center, Wright-Patterson AFB, Ohio, for his outstanding contributions to management while assigned to Air Force Logistics Command.

AFA MANAGEMENT AWARDS FOR SYSTEMS

AFA Distinguished Award for Management—To **Maj. Gen. Elbert E. Harbour, USAF**, Deputy for Airlift and Trainer Systems, Aeronautical Systems Division, Wright-Patterson AFB, Ohio, for his outstanding contributions to management while assigned to Air Force Systems Command.

AFA Meritorious Award for Program Management—To **Col. James R. Nelson, USAF (Ret.)**, former Deputy for Propulsion, Aeronautical Systems Division, Wright-Patterson AFB, Ohio, for his outstanding contribution to management while assigned to Air Force Systems Command.

AFA Meritorious Award for Support Management—To **Col. John P. Slinkard, USAF**, Hq. Air Force Systems Command, Andrews AFB, Md., for his outstanding contributions to management while assigned to Air Force Systems Command.

AIR NATIONAL GUARD AND AIR FORCE RESERVE AWARDS

The Earl T. Ricks Memorial Award—To **Capt. Richard S. Cain, USAF**, 157th Tactical Fighter Squadron, McEntire ANG Base, S. C., for his outstanding airmanship and demonstration of the highest degree of flying skill while piloting an F-16A over Arizona. He recovered successfully from an in-flight emergency and effected a perfect unpowered landing, thereby preserving defense resources and human life.

The Air National Guard Outstanding Unit Award for 1984—To the **136th Tactical Airlift Wing**, Hensley Field, Dallas, Tex. (Accepted by *Brig. Gen. Bobby W. Hodges, ANG, Commander.*)

The Air Force Reserve Outstanding Unit Award for 1984—To the **315th Military Airlift Wing**, Charleston AFB, S. C. (Accepted by *Col. Billy R. Henderson, Commander.*)

The President's Award for the Air Force Reserve—To a crew of the **300th Military Airlift Squadron**, Charleston AFB, S. C. (Accepted by *Capt. John M. Bookas, Aircraft Commander.*)

SPECIAL CITATIONS AND OTHER AWARDS

McConnell AFB, Kan., for outstanding support of the Air Force Recruiter Assistance Program. (Accepted by *TSgt. Richard E. Roberts, USAF.*)

Air Force Space Command, for command excellence and individual professionalism of its personnel that culminated in the creation of Air Force Space Command and the initiation of a series of actions designed to make this vital command operational in record time. The Air Force Association proudly salutes the outstanding men and women of USAF's Space Command and expresses its commendation for their exceptional achievements. (Accepted by *Gen. Robert T. Herres, USAF, Commander.*)

Col. Arnauld D. Gabriel, USAF, Commander, US Air Force Band, Bolling AFB, D. C., for his outstanding professional career as Commander of the Air Force Band. His career has been highlighted by recurring international recognition and exemplary contribution to Air Force spirit and morale. For thirty years, he has told the Air Force story to the nation and the world through the medium of military musicians and distinctive music. His unusual dedication, superb skills, and outstanding leadership have brought a new and distinctive dimension to military music, which he has shared generously with our Association throughout his career. The Air Force Association is proud to recognize and salute the accomplishments of this remarkable officer.

The Stuart R. Reichart Award for Lawyers—To **Col. Thomas G. Jeter, USAF**, Office of the Staff Judge Advocate, Hq. AFSC, Andrews AFB, Md., for outstanding achievements in the field of law within the United States Air Force.

The Paul W. Myers Award for Physicians—To **Lt. Col. Arthur Carrizales, USAF**, USAF Regional Hospital, Carswell AFB, Tex., for outstanding performance, innovation, and initiative in developing a wide range of clinical programs aimed at facilitating patient care, including a Family Practice Module Program, a patient advocate program, and a home health-care guide for patients. His personal involvement and commitment rendered the highest quality of patient care during his service as Chief of Clinical Services, USAF Clinic, Eielson AFB, Alaska.

The General Curtis E. LeMay Strategic Aircrew Award—To **Crew E-05**, 77th Bombardment Squadron, 28th Bombardment Wing, Ellsworth AFB, S. D., as the best overall aircrew in Strategic Air Command. (Accepted by *Capt. Robert C. Little, USAF, Aircraft Commander.*)

The General Thomas S. Power Strategic Combat Missile Crew Award—To **Crew S-099**, 533d Strategic Missile Squadron, 381st Strategic Missile Wing, McConnell AFB, Kan., as the best overall combat missile crew in Strategic Air Command. (Accepted by *Capt. David K. Shiller, USAF, Missile Combat Crew Commander.*)

The Lieutenant General William H. Tunner Aircrew Award—To a crew of the **16th Special Operations Squadron**, 1st Special Operations Wing, Hurlburt Field, Fla., as the best overall aircrew in Military Airlift Command. (Accepted by *Maj. C. W. Twiford, USAF, Pilot.*)

The Lieutenant General Claire Lee Chennault Award—To **Capt. Michael Bebo, USAF**, Squadron Weapons Officer, 525th Tactical Fighter Squadron, Bitburg AB, Germany, as the outstanding aerial warfare tactician.

The Chief Master Sergeant Dick Red Award—To **CMSgt. Gene A. Killilea, USAF**, 121st Consolidated Aircraft Maintenance Squadron, Rickenbacker ANG Base, Ohio, as the outstanding Air National Guard aerospace maintenance technician.

The Outstanding USAF Personnel Manager of the Year Award—To **Maj. Michael J. Berenc, USAF**, Office of Civilian Personnel, Randolph AFB, Tex., for his outstanding knowledge and demonstration of professional skills in creating and applying unique and effective management solutions to personnel programs while assigned as Chief of the Personnel Division, Lajes Field, the Azores.

The Outstanding ROTC Cadet of the Year Award—To **2d Lt. Roderick C. Zastrow**, Columbia, S. D.

The Outstanding CAP Cadet of the Year Award—To **Cadet Col. Peter L. Freeland**, Aumsville, Ore.

AFA honors the
Outstanding Airmen.

Tribute to Excellence

BY CAPT. NAPOLEON B. BYARS, USAF
CONTRIBUTING EDITOR



UPPER RIGHT: The Outstanding Airmen took time out during Convention week to visit some of Washington's sights. This was the scene at the Smithsonian's Air and Space Museum.

THE Outstanding Airmen of the Year, representing the best and the brightest of Air Force enlisted members, were honored guests at AFA's National Convention in Washington, D. C. Gen. Larry D. Welch, USAF Vice Chief of Staff, was the speaker at the Outstanding Airmen Dinner, which was held on the opening night of the Convention.

"This is a special evening in a special week for the Air Force as we focus on equipment, ideas, and people important to the future of the Air Force," General Welch told his audience.

He pointed out to the twelve airmen that it was a fitting tribute to the importance of their role in the Air Force that their recognition dinner was being held on the first night of the Convention.

Speaking of the quality of the airmen on active duty, General Welch said: "These are the quiet heroes, the dedicated, the determined people who keep the Air Force running in peacetime and who will rise to the occasion in crisis. For all that, we owe them our full support, we owe them adequate compensation, we owe them gratitude and recognition. Tonight we all have the special privilege of recognizing these outstand-

ing individuals from the ranks of extraordinary Air Force enlisted men and women."

As members of AFA's Enlisted Council, one of their duties will be to work to ensure that the concerns of enlisted people are brought to the attention of AFA leadership. This year's selections are characterized by youth, experience, and—of course—excellence.

Sgt. Kevin M. Brown is an instrumentation mechanic in the 4950th Test Wing, Aeronautical Systems Division, Wright-Patterson AFB, Ohio. He enlisted in the Air Force in February 1981 and was an honor graduate at Lowry AFB, Colo., where he received technical training as an instrumentation mechanic. Sergeant Brown was also the 1983 Air Force Systems Command's Missile Maintenance Technician of the Year. He is involved in numerous base and community programs and is presently pursuing an associate degree in computer science. He has earned several decorations, among them the Meritorious Service Medal and the Air Force Achievement Medal. Sergeant Brown and his wife, Stephanie, have two children: Kevin, Jr., and Tanika.

MSGt. John T. Connell, Jr., is the



Brown



Connell



Dart



Dupoise



Frank



Lacaillade

assistant NCOIC of the 55th Aerospace Rescue and Recovery Squadron's pararescue team at Eglin AFB, Fla. When he was selected as an Outstanding Airman of the Year, he was serving with the 33d Aerospace Rescue and Recovery Squadron, Kadena AB, Japan. In his fourteen years of active duty, he has been a distinguished graduate at NCO Leadership School and the honor graduate at pararescue training. Sergeant Connell, while stationed at Osan AB, Korea, and Kirtland AFB, N. M., flew on seven rescue missions, which saved as many lives. He has also participated in several rescue and special missions on Okinawa and mainland Japan. His many decorations include the Meritorious Service Medal, the Air Medal, and the Air Force Commendation Medal with three oak leaf clusters. A master parachutist with more than 130 jumps, Sergeant Connell and his wife, Raydeen, have three children: Courtney, Stacy, and Rachel.

SSgt. Deborah M. Dart is currently assigned to the 3420th Technical Training Group, Lowry AFB, Colo., as a tactical intelligence processing and interpretation instructor. When she was selected as an Outstanding Airman of the Year, she was assigned to the 67th Tactical Reconnaissance Wing at Bergstrom AFB, Tex. After entering the Air Force in September 1980, Sergeant Dart attended the Defense Language Institute at Lackland AFB, Tex., and was then assigned to Monterey, Calif., for the Chinese Language Course at DLI's West Coast campus. Sergeant Dart's decorations include the Air Force Commendation Medal, the Air Force Outstanding Unit Award Ribbon, and the Basic Military Training Honor Graduate Ribbon. She is

married to Air Force TSgt. Steven D. Dart.

CMSgt. Paul W. Dupoise is the programs manager for fuels operations, Air Force Energy Management Office, Deputy Chief of Staff for Logistics and Engineering, Hq. USAF, Washington, D. C. Chief Dupoise entered the Air Force in September 1960 and has completed the TAC NCO Academy and Senior NCO Academy. He also holds an associate degree in Human Resources Administration from Saint Leo College. His military assignments have taken him to Alaska, Korea, the Philippines, and Labrador. While stationed at Kunsan AB, Korea, Chief Dupoise was responsible for initiating several fuels facility upgrade projects that modernized and increased the fuels operational support capability. His many decorations include the Meritorious Service Medal with one oak leaf cluster, the Air Force Commendation Medal, the Air Force Outstanding Unit Award Ribbon, and the Philippine Presidential Unit Citation. Chief Dupoise and his wife, Shirley, have three children: Mark, Susan, and David.

SrA. Bernard J. Frank is a signals search and development operator, 6950th Electronic Security Group, RAF Chicksands, UK. Airman Frank entered the Air Force in August 1981 under the Delayed Enlistment Program and was called to active duty four months later. He attended Gannon College in Erie, Pa., prior to enlistment and was graduated with honors from the Corry Naval Technical Training Center, Pensacola, Fla., where he received training as a printer systems operator. His military decorations include the Meritorious Service Medal and the Air Force Achievement Medal. Airman Frank

and his wife, Wallene, are both active in base chapel activities and work as youth counselors.

MSgt. Terry L. Lacaillade is a security police air base ground defense planner, Hq. Eighth Air Force, Barksdale AFB, La. When he was selected as an Outstanding Airman of the Year, he was assigned to the 351st Security Police Squadron, Whiteman AFB, Mo. After entering the Air Force in July 1971, Sergeant Lacaillade served as a student flight chief and was an honor graduate at the Security Police Technical School at Lackland AFB, Tex. His Stateside assignments have taken him throughout SAC to include Pease, Ellsworth, and Whiteman AFBs. While assigned to Whiteman AFB, Sergeant Lacaillade received numerous awards for both military and civic involvement. Among Sergeant Lacaillade's many decorations are the Air Force Commendation Medal with one oak leaf cluster, the Presidential Unit Citation Emblem, and the Air Force Achievement Medal. He and his wife, Bonnie, have three children: Shane, Shannon, and Sean.

SrA. James A. Mathis II is a tactical satellite communications operator/technician assigned to Operating Location-B, 1957th Communications Group, Wheeler AFB, Hawaii. In high school, Airman Mathis was a member of the National Beta Club and earned the Star Government Student Award for demonstration of leadership. He entered the Air Force in October 1981 under the Delayed Enlistment Program and was called to active duty in February 1982. Airman Mathis was an honor graduate both at basic training, Lackland AFB, Tex., and at satellite communications technician training, Keesler AFB, Miss. His military decorations include the



Mathis



Overmyer



Silva



Steis



Todd



Varney

Basic Ribbon and the Basic Military Training Honor Graduate Ribbon. He and his wife, Cynthia, are both active in chapel activities.

SSgt. Cecil J. Overmyer is a nuclear weapons technician assigned to the 308th Missile Maintenance Squadron, 308th Strategic Missile Wing, Little Rock AFB, Ark. Sergeant Overmyer, who is currently pursuing a degree in electrical engineering, entered active duty in November 1980. Upon completion of basic training, he began technical training at the Nuclear Weapons Technical Training School, Lowry AFB, Colo. In July 1981, Sergeant Overmyer was assigned to Little Rock AFB, where he has consistently been selected for top honors and awards as well as promotion to senior airman below-the-zone. He and his wife, Kathy, are active church members.

MSgt. Guadalupe Silva is the guidance system test manager for the Peacekeeper Flight Test Program, 6595th Missile Test Group, Vandenberg AFB, Calif. Following basic training in October 1972 and technical school at Lowry AFB, Colo., he was transferred to the 10th Aerospace Defense Squadron at Vandenberg AFB, Calif. There he served as a member of the launch crew for the nation's first anti-satellite interceptor system. In his twelve years of service, Sergeant Silva has participated in several space programs and was assigned to help monitor the construction of the missile assembly building and supervised the installation of MX checkout equipment. A distinguished graduate of the Twenty-second Air Force NCO Leadership School, Sergeant Silva wears the senior missile badge and master space badge. His military decorations include the Meritorious Service

Medal with one oak leaf cluster, the Air Force Commendation Medal, and the Air Force Outstanding Unit Award Ribbon. In 1983, he was selected by the Goddard Chapter of AFA as the Engineering Technician of the Year. Sergeant Silva and his wife, Celia, have one child, Jason.

TSgt. Roger A. Steis is an avionics instrument systems technician, 425th Tactical Fighter Squadron, Williams AFB, Ariz. He entered the Air Force in July 1971 and was graduated with honors from technical training in avionics instrument systems at Chanute AFB, Ill. Sergeant Steis has worked in avionics maintenance on C-141, C-5A, and WC-130 aircraft. In September 1979, his technical expertise and professionalism earned him an assignment with the US Air Force Demonstration Squadron—the Thunderbirds. He was NCOIC of the Avionics Section and directed the team's Aircraft Structural Integrity program. In April 1982, Sergeant Steis was assigned to his current unit and recently completed the MAC NCO Academy, graduating with honors. His many decorations include the Air Force Commendation Medal with two oak leaf clusters and the Air Force Outstanding Unit Award Ribbon with four oak leaf clusters. Sergeant Steis and his wife, Doreen, have two children: Ahren and Ryan.

TSgt. Katherine R. Todd is a special equipment operator assigned to the Reconnaissance Operations Division, Hq. Air Force Technical Applications Center, Patrick AFB, Fla. She flies with the Navy on P-3s as the Air Force coordinator for the Center's hydroacoustic collection efforts and also assists in the management of worldwide aerial sampling missions in support of the Limited Test Ban Treaty. Sergeant

Todd entered the Air Force in August 1976 and was graduated at the top of her class in the Special Electronic Technician's Course at Lowry AFB, Colo. She was selected for airborne technique training in 1979, becoming the first woman to be accepted for training in this field. She was also the first woman WC-130 crew member and B-52 crew member. Active in base and community sports programs, Sergeant Todd is a recent AFLC NCO Leadership School honor graduate. Her military decorations include the Air Medal, the Air Force Commendation Medal with one oak leaf cluster, and the Air Force Outstanding Unit Award Ribbon. Sergeant Todd is single.


MSgt. Jack I. Varney is NCOIC of training for Detachment 1, 3636th Combat Crew Training Wing, Eielson AFB, Alaska. After enlisting in the Air Force in November 1967, Sergeant Varney completed basic and then attended the Air Training Command Survival Training Instructor Course at Fairchild AFB, Wash. He has served tours of duty in the Philippines, Thailand, the Republic of Vietnam, and Okinawa. Sergeant Varney holds associate degrees from Spokane Falls Community College and the Community College of the Air Force. He is also an ATC master instructor and was selected five times as NCO of the Quarter. He is an honor graduate of ATC's NCO Leadership School and a distinguished graduate of the ATC NCO Academy. His military decorations include the Meritorious Service Medal, the Air Force Commendation Medal with one oak leaf cluster, and the Air Force Outstanding Unit Award Ribbon with four oak leaf clusters. Sergeant Varney and his wife, Phyllis, have two children: Kirk and April. ■

When blue-suit advisory groups met during AFA's National Convention, C³ took on a new meaning.

A Charge to Communicate

BY CAPT. NAPOLEON B. BYARS, USAF
CONTRIBUTING EDITOR

IN THE thirty-eighth year of the Air Force Association, an assembly of the very finest enlisted people and officers met to give new meaning to the acronym C³. The blue-suit assembly was composed of two councils sponsored by AFA and an Air Force-sponsored get-together



CMSgt. Jan C. Boyd, SAC Senior Enlisted Advisor, ponders issues brought up during a Professional Update Seminar.

traditionally hosted by AFA at the National Convention—AFA's Enlisted Council, Junior Officer Advisory Council, plus the Senior Enlisted Advisors of the Air Force. Their charge was to communicate the feedback gathered from their peers, to confer on how best to consolidate their inputs, and to counsel the top leaders of AFA and the Air Force on the concerns of airmen. Communicate, confer, and counsel—C³.

The Enlisted Council is made up of selected representatives from the major commands. Its nucleus is the Outstanding Airmen from the previous year. It is a high-powered group of talented airmen dedicated to service and to improving the quality of the enlisted force and of Air Force life.

The Junior Officer Advisory Council (JOAC) is a group of specially appointed representatives from the major commands and organizations that make up the Air Force. They are all top performers and active members of AFA, and they serve as spokesmen for their peers throughout the Air Force.

The Senior Enlisted Advisors, led by CMSAF Sam E. Parish, represent the highest levels of NCOs throughout the Air Force. From their unique positions, the SEAs hear the problems of enlisted people in the field and, drawing on their many years of experience, make recommendations to help bring about solutions that will benefit all Air Force people.

The Joint Conference

During their four-day stay in Washington D. C., the group—called the Joint Conference—held a series of intense working sessions devoted to discussing Air Force issues and completing projects that had been begun earlier in the year. In addition to a number of executive sessions, they were given several briefings and opportunities to voice

their opinions to senior AFA and Air Force leaders.

During the Convention, the groups also visited the Aerospace Development Briefings and Displays, where top scientists and engineers from aerospace industry were on hand to explain state-of-the-art technologies. Conference members also found time to tour AFA's new National Headquarters Building at 1501 Lee Highway in Arlington, Va. From the terrace of the four-story structure, they took in the panoramic view of the Capitol, the Washington Monument, and skyline of the nearby city of Rosslyn.

AFA Executive Director Russell E. Dougherty welcomed the group and urged them to consider the importance of their role as communicators.

Maj. Gen. Robert C. Oaks, Director of Personnel Plans, gave the Conference keynote address. He urged his audience to keep abreast of the thoughts, feelings, and attitudes of the blue-suit Air Force. Explaining that the Conferees' task is threefold, General Oaks told his audience to channel their knowledge into a format usable by AFA, to provide feedback to their respective commanders, and also to help get the word out to the people they represent. He reminded the gathering that this year's AFA Statement of Policy took into account their input.

"You are here to counsel the leadership of the Air Force and the country," General Oaks said. "We rely on your communication, your input. Take your selection as Conference members seriously," he added. The councils did just that as they went about discussing tough issues and working on their respective projects. The SEAs likewise devoted many hours to problems that cut across command lines.

The Chiefs

Two topics dominated the working sessions of this year's Enlisted

Council—publication of *The Chiefs* and the preliminary work on a booklet for later publication.

The Chiefs, a publication sponsored by the Enlisted Council and published by AFA's Aerospace Education Foundation, was unveiled at the Outstanding Airmen Dinner during AFA's National Convention. *The Chiefs* chronicles the selection of all eight Chief Master Sergeants of the Air Force, documents the history of the establishment of the position, and contains colorful insights by the Chiefs and their opinions on major issues.

United Technologies Corp. underwrote the production cost of *The Chiefs*. It begins with an introduction by the current CMSAF, Sam E. Parish.

The first publication to tell the story of the eight top Air Force NCOs, *The Chiefs* reveals the personalities behind and events leading up to the installation ceremony for the first CMSAF, Paul W. Airey, on April 3, 1967. Two of the early advocates for establishing a top enlisted post in the Air Force were Jackson V. Rambeau, Director of Military Relations for AFA in the early 1960s, and Rep. L. Mendel Rivers (D-S. C.), then Chairman of the House Armed Services Committee. Representative Rivers, a powerful spokesman for the concerns of enlisted people, introduced a bill to create the position in all four services, but the measure did not pass.

In October 1966, the Air Force acted on its own to establish the position. By January 1967, the first CMSAF was selected.

The Chiefs contains a wealth of information on the careers of the eight men who have occupied the top enlisted post in the Air Force. It highlights the fact that they are eight entirely different personalities bound by the common threads of professionalism, excellence, and pride in service to the Air Force. Though not intended as *the* blue-

print for success, *The Chiefs* offers a rare look into how eight airmen reached the top of their profession.

An explanation of the roles and duties of the CMSAF, as well as lively comments by the Chiefs on issues that are of particular interest to enlisted people, is also included.

"I'm happy to be a part of something this special," said TSgt. Mark A. Smith, council member and Chief Loadmaster for C-141 Special Operations, Charleston AFB, S. C. "*The Chiefs* will be real inspirational to the enlisted force."

For the first time in AFA Convention history, all eight Chiefs were on hand to receive the honor. All in all, *The Chiefs* is a first-class publication that received rave reviews from Council members. It should become "must" reading.

Council Sessions

The Enlisted Council also began work on a project for next year. Council Chairman CMSgt. James C. Binnicker, Assistant for Chief Master Sergeant Matters, Air Force Manpower and Personnel Center, Randolph AFB, Tex., said that the target group for the new booklet will be newly appointed NCOs.

"It will help explain what NCO status involves and what is required of the new NCO," Chief Binnicker said. He also stressed that the new booklet would not be a reprint of existing material, but a consolidation of advice and guidance on matters that confront new NCOs.

The Junior Officer Advisory Council spent the majority of its sessions updating its popular pamphlet entitled *Off We Go*. Over the years, the pamphlet has been a helpful tool for newly commissioned second lieutenants. The JOAC believes that a number of unknowns about the Air Force will be explained by the updated pamphlet. It will address career development as well as broadening opportunities available to young officers. In addition,



Former CMSAF Thomas N. Barnes autographs litho artwork picturing all eight chiefs while attending the Outstanding Airmen Dinner that was held during AFA's National Convention.



tion, it will include comments, from the JOAC perspective, on an Air Force career.

"It will get a second lieutenant off on the right foot," said JOAC Chairman Capt. Terry L. Barton, Squadron Officer School Faculty Member, Maxwell AFB, Ala. "We wanted it to be, foremost, a positive approach to explaining that early time frame in an officer's career."

The JOAC also identified the five most problematic personnel concerns reported by their peers. The five concerns identified are the uncertainty of proposed changes to the retirement system, the erosion in pay comparability widening to a point where retention may markedly decrease, possible tinkering with commissary and base exchange privileges, the IRS plan to tax military allowances, and the present perception that there is less than adequate medical and dental care for dependents.

The Senior Enlisted Advisors' working sessions centered on the concerns and problems of enlisted people stationed Stateside and overseas. The number-one concern of airmen in the field is the current talk of changing the retirement system. As one Chief put it: "The young airmen, and also those of us who have been in the service a long time, view the present retirement system as an implied contract between us and Uncle Sam. Any proposed changes to that contract will cause severe recruiting and retention problems."

The SEAs sounded out a number of concerns and difficulties faced by enlisted people in their respective organizations. Another Chief remarked: "It sure is eye-opening to hear what sort of difficulties confront our people in Germany as opposed to the problems of our people Stateside. This is a valuable exchange."



Maj. Gen. Robert C. Oaks, Director of Personnel Plans, gives the Conference keynote address. To his left are Capt. Terry L. Barton, Chairman of the JOAC, and CMSAF Sam E. Parish. The Conference was a forum for feedback by the Councils and SEAs.

Professional Update Seminar

That the Conference fulfilled its duty to provide feedback to the leadership of AFA and the Air Force is beyond doubt. "We came here to offer valuable grass-roots feedback that will help keep quality people manning our weapon systems," said Capt. Sidney L. Evans, Executive Officer to the Deputy Chief of Staff for Manpower and Personnel, Hq. AFLC, Wright-Patterson AFB, Ohio. "We came here because our duty is not to be selfish. There is a satisfaction in tackling tough jobs that outweighs civilian monetary rewards," he added.

This year's Professional Update Seminar featured a series of briefings and open discussions with key Air Force leaders and a member of Congress. Members of the Enlisted Council, the SEAs, and JOAC, in combined conference, made the most of a valuable opportunity to direct questions and comments to

the people who shape Air Force policy and guidance. Air Force seminar speakers included Gen. Charles A. Gabriel, USAF Chief of Staff; Lt. Gen. David L. Nichols, Deputy Chief of Staff for Plans and Operations; Maj. Gen. Keith D. McCartney, Assistant Deputy Chief of Staff, Manpower and Personnel; Brig. Gen. Richard F. Abel, Air Force Director of Public Affairs; Brig. Gen. Michael C. Kerby, Deputy Director of Legislative Liaison; and CMSAF Sam E. Parish. Rep. Thomas F. Hartnett (R-S. C.) honored the Enlisted Council by presenting US flags to each member and also gave an update on congressional activities.

The Issues

The seven speakers covered a broad range of issues, some of which were discussed further by the Councils during executive sessions. The major issues addressed included:

- The role of Conference members as public spokesmen. Members were challenged to speak out positively in their communities on behalf of the Air Force.

- Drug and alcohol abuse. Drug abuse by service members continues to be a problem of serious concern. Air Force leaders will continue to emphasize a policy that cracks down on drug abusers. The Air Force will also abide by the twenty-one-year-old minimum age for the purchase of alcohol being adopted by many states.

- Join-spouse assignments. The Air Force will continue to work at keeping married service couples together. However, as the numbers and ranks of married couples increase, it will become more difficult to accommodate join-spouse assignments. Married service couples should anticipate some assignment separations in the future.

- A new physical training test. A new PT test has been field-tested,

and the results are undergoing analysis. Ultimately, the decision to adopt a new PT test will be weighed against any manpower increases required to conduct the measurement.

- The GI Bill. There are two versions of a new GI Bill currently working through Congress. The Air Force has recommended that the Vietnam-era Bill benefits be extended to last until the tenth year following a member's separation or retirement from service. Under present guidelines, the Vietnam-era Bill's education benefits will terminate on December 31, 1989.

- Promotion opportunities for the enlisted force. More than 1,400 chief master sergeants will retire in the next year. Consequently, promotion opportunities will improve down the line. This exodus of experience is an area of concern as leaders continue to step up efforts to improve the quality of the force.

- Congressional focus will be on issues that affect Air Force members. The size of the federal deficit, and lawmakers' attempts to reduce it, will affect service strength levels as well as any future pay increases. The President has recommended a 3.5 percent pay increase, to become effective on January 1, 1985. Even if the recommended increase comes about, the pay comparability gap will still amount to more than ten percent.

- Legislative efforts to change the current military retirement system will again surface in the new Congress. If a new retirement system is devised, it will most likely contain a clause to "grandfather" Air Force people already on active duty.

As the AFA National Convention came to a close, the Conference members had indeed given a new meaning to C³. They had represented their peers admirably, and, in doing so, they had served the Air Force well. ■



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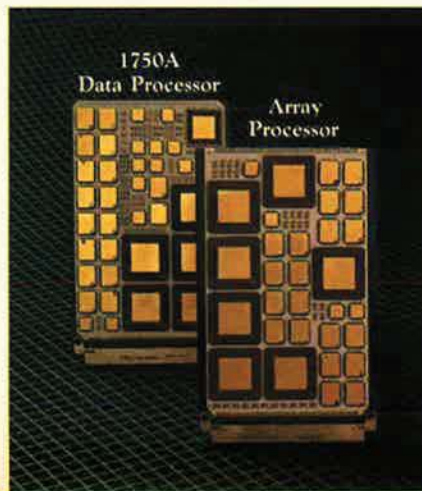
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(As of October 15, 1984)

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**Director of Contracting and
Manufacturing Policy**
Brig. Gen. Bernard L. Weiss

Director of Program Integration
Col. James J. Lindenfelser

**Special Assistant for ICBM
Modernization**
Brig. Gen. Gordon E. Fornell

Deputy for Strategic Forces
Brig. Gen. Charles A. May, Jr.

**Special Assistant for Tactical
Modernization**
Brig. Gen. Jimmie V. Adams

Ass't DCS/L&E
Maj. Gen. George B. Powers, Jr.

**Director of Logistics, Plans and
Programs**
Maj. Gen. Alfred G. Hansen

Director of Transportation
Brig. Gen. John E. Grilloth

**Director of Engineering and
Services**
Maj. Gen. Clifton D. Wright, Jr.

**Director of Maintenance and
Supply**
Brig. Gen. Richard L. Stoner

The Major Commands

<p>Alaskan Air Command (AAC) Hq. Elmendorf AFB, Alaska</p>	<p>Air Force Communications Command (AFCC) Hq. Scott AFB, Ill.</p>	<p>Air Force Logistics Command (AFLC) Hq. Wright-Patterson AFB, Ohio</p>	<p>Air Force Systems Command (AFSC) Hq. Andrews AFB, Md.</p>	<p>Air Training Command (ATC) Hq. Randolph AFB, Tex.</p>	<p>Air University (AU) Hq. Maxwell AFB, Ala.</p>
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Lt. Gen. Bruce K. Brown
Commander



Maj. Gen. Gerald L. Pralther
Commander



Gen. Earl T. O'Loughlin
Commander



Gen. Lawrence A. Skantze
Commander



Gen. Andrew P. Iosue
Commander



Lt. Gen. Thomas C. Richards
Commander



CMSgt. Herman F. Thompson
Senior Enlisted Advisor



CMSgt. Jeremiah T. Hayes
Senior Enlisted Advisor



CMSgt. Jack E. Bowerman
Senior Enlisted Advisor



CMSgt. Robert H. Williamson
Senior Enlisted Advisor



CMSgt. Robert W. Carter
Senior Enlisted Advisor



CMSgt. Larry E. Fowler
Senior Enlisted Advisor

Vice Commander
Brig. Gen. Donald L. Moore
Scott AFB, Ill.

Air Force Teleprocessing Center
Col. Allen D. Lang
Gunter AFS, Ala.

Air/III Communications Div.
Col. Victor S. Stachekzyk
Scott AFB, Ill.

Engineering Installation Center
Col. William R. Taylor
Tinker AFB, Okla.

European Information Systems Div.
Brig. Gen. James S. Cassidy, Jr.
Ramstein AB, Germany

Continental Communications Div.
Col. Glenn G. Giddings, Jr.
Griffiss AFB, N. Y.

Pacific Information Systems Div.
Col. Wayne E. Schramm
Hickam AFB, Hawaii

Space Communications Div.
Maj. Gen. John Paul Hyde
Peterson AFB, Colo.

Strategic Information Systems Div.
Brig. Gen. Robert H. Ludwig
Offutt AFB, Neb.

Tactical Information Systems Div.
Col. William L. Sickenberger
Langley AFB, Va.

Ogden Air Logistics Ctr.
Maj. Gen. Charles McCausland
Hill AFB, Utah

Oklahoma City Air Logistics Ctr.
Maj. Gen. Richard A. Burpee
Tinker AFB, Okla.

Sacramento Air Logistics Ctr.
Maj. Gen. Dewey K. K. Lowe
McClellan AFB, Calif.

San Antonio Air Logistics Ctr.
Maj. Gen. Raymond C. Nutt
Kelly AFB, Tex.

Warner Robins Air Logistics Ctr.
Maj. Gen. Cornelius Nugteren
Robins AFB, Ga.

Logistics Operations Ctr.
Col. Joseph K. Spiers
Wright-Patterson AFB, Ohio

Logistics Management Systems Ctr.
Brig. Gen. Lee V. Greer
Wright-Patterson AFB, Ohio

AFLC International Logistics Ctr.
Brig. Gen. Stuart R. Boyd
Wright-Patterson AFB, Ohio

Air Force Acquisition Logistics Ctr.
Maj. Gen. Monroe T. Smith
Wright-Patterson AFB, Ohio

Aerospace Guidance and Metrology Ctr.
Col. John K. Davidson
Nowark AFS, Ohio

Military Aircraft Storage and Disposition Ctr.
Col. Edwin H. Moore
Davis-Monthan AFB, Ariz.

Air Force Contract Maintenance Ctr.
Col. John C. Novak
Wright-Patterson AFB, Ohio

Air Force Museum
Col. Richard L. Uppslom
Wright-Patterson AFB, Ohio

Logistics Support Center, Europe
Col. Billy G. Edenfield
RAF Kenble, UK

Cataloging and Standardization Ctr.
Col. Ronald Via
Battle Creek, Mich.

USAF Medical Center
Col. Lawrence R. Smith
Wright-Patterson AFB, Ohio

Aeronautical Systems Div.
Lt. Gen. Thomas H. McMullen
Wright-Patterson AFB, Ohio

Space Division
Lt. Gen. Forrest S. McCarney
Los Angeles AFS, Calif.

Electronic Systems Div.
Lt. Gen. Melvin F. Chubb, Jr.
Hanscom AFB, Mass.

Aerospace Medical Div.
Brig. Gen. Fredric F. Doppelt
Brooks AFB, Tex.
(effective Nov. 7, 1984)

Air Force Flight Test Ctr.
Maj. Gen. Peter W. Odgers
Edwards AFB, Calif.

Armament Division
Maj. Gen. William T. Twining
Eglin AFB, Fla.

Ballistic Missile Office
Maj. Gen. Aloysius G. Casey
Norton AFB, Calif.

Air Force Contract Management Div.
Brig. Gen. Donald J. Stukel
Kirtland AFB, N. M.

Space and Missile Test Organization
Brig. Gen. Donald W. Henderson
Vandenberg AFB, Calif.

Arnold Engineering Development Ctr.
Col. Philip J. Conran
Arnold AFS, Tenn.

Foreign Technology Div.
Col. Earl A. Poulus
Wright-Patterson AFB, Ohio

Air Force Space Technology Ctr.
Col. John Friel
Kirtland AFB, N. M.

Air Force Military Training Ctr.
Maj. Gen. Carl R. Smith
Lackland AFB, Tex.

Chanute Technical Training Ctr.
Maj. Gen. Joseph D. Moore
Chanute AFB, Ill.

Keester Technical Training Ctr.
Maj. Gen. Thomas J. Hickey
Keester AFB, Miss.

Lowry Technical Training Ctr.
Maj. Gen. William M. Usher
Lowry AFB, Colo.

Sheppard Technical Training Ctr.
Maj. Gen. William M. Charles, Jr.
Sheppard AFB, Tex.

USAF Recruiting Service
Brig. Gen. Robert L. Rutherford
Randolph AFB, Tex.

Air War College and Center for Aerospace Doctrine, Research, and Education
Maj. Gen. Paul H. Hodges
Maxwell AFB, Ala.

Air Force Institute of Technology
Brig. Gen. James T. Callaghan
Wright-Patterson AFB, Ohio

Air Command and Staff College
Brig. Gen. Richard A. Ingram
Maxwell AFB, Ala.

Hq. Civil Air Patrol—USAF
Col. John T. Massingale, Jr.
Maxwell AFB, Ala.

Squadron Officer School
Col. Richard E. O'Grady
Maxwell AFB, Ala.

USAF Senior NCO Academy
CMSgt. Bobby G. Renroe
Gunter AFS, Ala.

Leadership and Management Development Ctr.
Col. John E. Emmons
Maxwell AFB, Ala.

Educational Development Ctr.
Col. William A. Wojciechowski
Maxwell AFB, Ala.

Extension Course Institute
Col. Melvin R. Smith
Gunter AFS, Ala.

Air University Library
Robert B. Lane
Maxwell AFB, Ala.

Electronic Security Command (ESC)

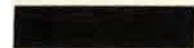
Hq. San Antonio, Tex.



Maj. Gen. John B. Marks
Commander



CMSgt. Okey Warden
Senior Enlisted Advisor



Military Airlift Command (MAC)

Hq. Scott AFB, Ill.



Gen. Thomas M. Ryan, Jr.
Commander in Chief



CMSgt. Carl A. Roberts
Senior Enlisted Advisor

1st Air Force
J. Gen. Robert D. Springer
Guire AFB, N. J.

d Air Force
J. Gen. Donald D. Brown
Vis AFB, Calif.
(active Nov. 1, 1984)

d Air Force
J. Gen. William J. Mall, Jr.
AFB, Ill.

Pacific Air Forces (PACAF)

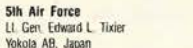
Hq. Hickam AFB, Hawaii



Lt. Gen. Robert W. Bazley
Commander in Chief



CMSgt. James E. Steinmark
Senior Enlisted Advisor



5th Air Force
Lt. Gen. Edward L. Tixier
Yokota AB, Japan

13th Air Force
Maj. Gen. Michael A. Nelson
Clark AB, Philippines

313th Air Div.
Brig. Gen. Donald Snyder
Kadena AB, Japan

314th Air Div.
Maj. Gen. Craven C. Rogers, Jr.
Osan AB, Korea

326th Air Div.
Col. Barrett V. Johnson
Wheeler AFB, Hawaii

Air Weather Service
Col. George E. Chapman
Scott AFB, Ill.

Aerospace Audiovisual Service
Col. James D. Elmer
Norton AFB, Calif.

Strategic Air Command (SAC)

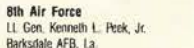
Hq. Offutt AFB, Neb.



Gen. Bennie L. Davis
Commander in Chief



CMSgt. Jan C. Boyd
Senior Enlisted Advisor



8th Air Force
Lt. Gen. Kenneth L. Peck, Jr.
Barksdale AFB, La.

7th Air Div.
Brig. Gen. Wayne W. Lambert
Ramshein AB, Germany

19th Air Div.
Brig. Gen. Loring R. Astorino
Carswell AFB, Tex.

40th Air Div.
Brig. Gen. Richard B. Goetze, Jr.
Wurtsmith AFB, Mich.

42d Air Div.
Brig. Gen. Larry D. Fortner
Blytheville AFB, Ark.

45th Air Div.
Brig. Gen. Martin J. Ryan
Pease AFB, N. H.

15th Air Force
Lt. Gen. James E. Light, Jr.
March AFB, Calif.

3d Air Div.
Maj. Gen. Ellie G. Shuler, Jr.
Andersen AFB, Guam

4th Air Div.
Brig. Gen. Robert L. Kirtley
F. E. Warren AFB, Wyo.

12th Air Div.
Brig. Gen. Pinkard M. Dyer III
Dyess AFB, Tex.

14th Air Div.
Col. John R. Farrington
Beale AFB, Calif.

47th Air Div.
Col. W. John Soper
Fairchild AFB, Wash.

57th Air Div.
Brig. Gen. Samuel H. Swart, Jr.
Minot AFB, N. D.

1st Strategic Aerospace Div.
Maj. Gen. Jack L. Walkins
Vandenberg AFB, Calif.

Space Command (SPACECOM)

Hq. Peterson AFB, Colo.



Gen. Robert T. Herres
Commander



CMSgt. Thomas J. Echols
Senior Enlisted Advisor



1st Space Wing
Brig. Gen. Ralph E. Spraker
Peterson AFB, Colo.

Tactical Air Command (TAC)

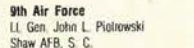
Hq. Langley AFB, Va.



Gen. Jerome F. O'Malley
Commander



CMSgt. Richard P. E. Cook
Senior Enlisted Advisor



9th Air Force
Lt. Gen. John L. Piotrowski
Shaw AFB, S. C.

12th Air Force
Lt. Gen. Jack I. Gregory
Bergstrom AFB, Tex.

Deputy Commander for Air Defense
Maj. Gen. Russell L. Violet
Langley AFB, Va.

USAF Southern Air Div.
Maj. Gen. William E. Masterson
Howard AFB, Panama

USAF Tactical Air Warfare Ctr.
Maj. Gen. Thomas S. Swalm
Eglin AFB, Fla.

USAF Tactical Fighter Weapons Ctr.
Maj. Gen. Eugene H. Fischer
Nellis AFB, Nev.

USAF Air Defense Weapons Ctr.
Brig. Gen. Charles A. Huxner
Tyndall AFB, Fla.

552d Airborne Warning and Control Div.
Brig. Gen. William K. James
Tinker AFB, Okla.

United States Air Forces in Europe (USAFE)

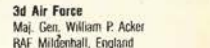
Hq. Ramstein AB, Germany



Gen. Charles L. Donnelly, Jr.
Commander in Chief



CMSgt. John R. McCauslin
Senior Enlisted Advisor



3d Air Force
Maj. Gen. William P. Acker
RAF Mildenhall, England

16th Air Force
Maj. Gen. William A. Gorton
Torrejón AB, Spain

17th Air Force
Maj. Gen. William J. Breckner, Jr.
Sembach AB, Germany

Deputy CINCUSAFE for Southern Area and COMAIRSOUTH
Lt. Gen. James R. Brown
Naples, Italy

USAF's Separate Operating Agencies

Air Force Accounting and Finance Center

Hq. Denver, Colo.



Brig. Gen. Daniel B. Geran
Commander



CMSgt. Michael K. Thompson
Senior Enlisted Advisor

Air Force Commissary Service

Hq. Kelly AFB, Tex.



Brig. Gen. M. Gary Alkire
Commander



CMSgt. Glenn H. Lewis
Senior Enlisted Advisor

Air Force Inspection and Safety Center

Hq. Norton AFB, Calif.



Maj. Gen. Gordon E. Williams
Commander



CMSgt. Ronald L. Rude
Senior Enlisted Advisor

Air Force Legal Services Center

Hq. Washington, D. C.



Maj. Gen. Thomas B. Bruton
Commander



CMSgt. Jerry L. Becker
Senior Enlisted Advisor

Air Force Medical Service Center

Hq. Brooks AFB, Tex.



Brig. Gen. Gerald W. Parker
Commander



CMSgt. Daniel E. Chapman
Senior Enlisted Advisor

Air Force Audit Agency

Hq. Norton AFB, Calif.



Jerome Stolarow
Auditor General



Col. Basil H. Pflumm
Commander
Deputy Auditor General
(Detailled to the Pentagon)

Air Force Engineering and Services Center

Hq. Tyndall AFB, Fla.



Col. Jerry A. Smith
Commander



CMSgt. Norman F. Karaszewski
Senior Enlisted Advisor

Air Force Intelligence Service

Hq. Washington, D. C.



Brig. Gen. Paul H. Martin
Commander



CMSgt. Richard H. Gantzer
Senior Enlisted Advisor

Air Force Manpower and Personnel Center

Hq. Randolph AFB, Tex.



Brig. Gen. James B. Davis
Commander



(Temporarily Vacant)
Senior Enlisted Advisor

Air Force Office of Security Police

Hq. Kirtland AFB, N. M.



Brig. Gen. P. Neal Scheidel
Commander



CMSgt. Robert C. Agee
Senior Enlisted Advisor

Direct Reporting Units

Air Force Office of Special Investigations

Hq. Washington, D. C.



Brig. Gen. Richard S. Beyea, Jr.
Commander

Air Force Reserve

Hq. Robins AFB, Ga.



Maj. Gen. Sloan R. Gill
Commander

Air Reserve Personnel Center

Hq. Denver, Colo.



Brig. Gen. James D. Kellim
Commander

Air Force Academy

Colorado Springs, Colo.



Lt. Gen. Winfield W. Scott, Jr.
Superintendent

Air National Guard

Hq. Washington, D. C.



Maj. Gen. John B. Conaway
Director



CMSgt. David O. Goodman
Senior Enlisted Advisor



CMSgt. Henry J. Scott
Senior Enlisted Advisor



CMSgt. Larry L. Vance
Senior Enlisted Advisor



CMSgt. Bernard E. Carbon
Senior Enlisted Advisor

Air Force Operational Test and Evaluation Center

Hq. Kirtland AFB, N. M.



Brig. Gen. Richard W. Phillips, Jr.
Commander

Air Force Service Information and News Center

Hq. Kelly AFB, Tex.



Col. Donald Hilkemeier
Commander

Air Force Technical Applications Center

Patrick AFB, Fla.



Col. James R. Clapper, Jr.
Commander

USAF Historical Research Center

Maxwell AFB, Ala.



Lloyd H. Cornett, Jr.
Director



CMSgt. Raymond F. Enright
Senior Enlisted Advisor



CMSgt. David A. Sheeder
Senior Enlisted Advisor



CMSgt. Donald V. Tale
Senior Enlisted Advisor

Air Force Generals Serving in Joint and International Slots

FOUR STARS



Gen. James E. Dalton
Chief of Staff, SHAPE
Mons, Belgium

Responsible for reviewing and recommending policies to SACEUR that affect the operational capability of forces assigned from member nations of NATO to Allied Command Europe, in addition

to directing, coordinating, and supervising all activities of the SHAPE staff.



Gen. Richard L. Lawson
Deputy Commander in Chief
US European Command
Vaihingen, Germany

Responsible for ensuring maximum combat readiness of forces assigned to subordinate commands and advises USCINCEUR on the formulation of policy for the conduct of combat operations within the entire European theater.

THREE STARS

Lt. Gen. James A. Abrahamson
Director, Strategic Defense
Office of the Secretary of Defense
Washington, D. C.

Program Director for the nation's strategic defense effort, with a goal of developing and deploying an effective defense against ballistic missiles.

Lt. Gen. James R. Brown
Commander, Allied Air Forces Southern Europe
Deputy Commander in Chief, USAFE,
for the Southern Area
Naples, Italy

Conducts air operations and manages the total Southern Region land-based air resources in support of the region's NATO nations.

Lt. Gen. John T. Chain, Jr.
Director, Bureau of Political-Military Affairs
Department of State
Washington, D. C.

Serves as principal advisor in the State Department for the development and implementation of policies on the full range of security assistance and other national security matters that have foreign policy implications, including the politico-military aspects of arms control, nuclear policy and operations, and outer space.

Lt. Gen. Edgar A. Chavarrie
Deputy Assistant Secretary of Defense for
Military Personnel and Force Management
Office of the Secretary of Defense
Washington, D. C.

Principal advisor to the Assistant Secretary of Defense (Manpower, Installations and Logistics) on policy matters affecting active-duty and retired military personnel and their dependents. Primary mission is to pursue manpower and compensation policies that are in the best national interest and that meet service needs.

Lt. Gen. Lincoln D. Faurer
Director, National Security Agency
Chief, Central Security Agency
Fort Meade, Md.

Organizes and manages the resources of the National Security Agency in accomplishing national intelligence missions under the direction of the Secretary of Defense.

Lt. Gen. Philip C. Gast
Director, Defense Security Assistance Agency
Office of the Secretary of Defense
Washington, D. C.

Manages activities relating to the transfer of US defense equipment, services, and military education and training by sale or grant to friendly countries.

Lt. Gen. Harry A. Goodall
Deputy Commander in Chief,
US Readiness Command
Vice Director, Joint Deployment Agency
MacDill AFB, Fla.

Assists CINCREDCOM in providing a general reserve of combat-ready forces to reinforce other unified commands and in mobilization planning for a unified command comprised of all CONUS-based major combatant general-purpose Army and Air Force forces.

Lt. Gen. John L. Pickitt
Chief of Staff, Combined Forces Command
Deputy Commander US Forces, Korea
Deputy Commander in Chief UN Command, Korea
Seoul, South Korea

As the second senior military representative in the Republic of Korea, he assists CINCUNC in exercising combined command of UN Forces and is the senior US representative in Status of Forces Agreement negotiations.

Lt. Gen. Winston D. Powers
Director, Defense Communications Agency
Washington, D. C.

Coordinates and manages all United States defense communications requirements.

Lt. Gen. Richard K. Saxer
Director, Defense Nuclear Agency
Washington, D. C.

Provides support, staff advice, and consolidated management of all US nuclear weapons, stockpiles, testing, and research.

Lt. Gen. Herman O. Thomson
Director, J-5
Joint Chiefs of Staff
Washington, D. C.

Responsible for JCS planning, formulation, and analysis of US worldwide defense policy.

OFFICE OF THE SECRETARY OF DEFENSE

Maj. Gen. Kenneth D. Burns
Deputy Assistant Secretary of Defense
(Near Eastern and South Asian Affairs)
Office of the Secretary of Defense
(International Affairs)
Washington, D. C.

Directs the coordination and development of DoD aspects of international security affairs, to include military assistance programs for countries and regional organizations in the designated area.

Maj. Gen. Buford D. Lary
Senior Military Assistant to the
Deputy Secretary of Defense
Office of the Secretary of Defense
Washington, D. C.

Serves as the Executive Assistant to the Deputy Secretary of Defense, advising and assisting him in all areas encompassing the entire range of defense responsibilities and national security affairs.

Maj. Gen. Earl G. Peck
Director for Intelligence and Space Policy
Office of the Secretary of Defense
Washington, D. C.

Principal advisor to DoD for all intelligence-related activities, including mapping, charting, and geodesy, use of outer space, and related subjects.

Maj. Gen. Stuart H. Sherman, Jr.
Deputy Assistant Secretary of Defense for
Guard/Reserve Manpower and Personnel
Office of the Secretary of Defense
Washington, D. C.

Serves as the principal staff assistant and advisor to the Assistant Secretary of Defense, Reserve Affairs, with specific responsibility for overall supervision and the development, evaluation, and implementation of policies for Guard/Reserve manpower, personnel, and compensation.

OFFICE OF THE JOINT CHIEFS OF STAFF

Maj. Gen. Donald O. Aldridge
JCS Representative for START
Joint Chiefs of Staff
Washington, D. C.

Represents the Joint Chiefs of Staff at the International Strategic Arms Reduction Talks held in Geneva, Switzerland, works closely with the Joint Staff and the military services in preparing negotiating positions, and participates in on-site discussions.

Maj. Gen. Thomas C. Brandt
Chief, Joint Planning Staff for Space
Joint Chiefs of Staff
Washington, D. C.

Recommends policy to the JCS Chairman and to the Director of the Joint Staff in relation to the technical aspects of space systems development, employment, and integration into the national defense effort.

Maj. Gen. Bradley C. Hosmer
Vice Director, Joint Staff
Joint Chiefs of Staff
Washington, D. C.

Responsible for assisting the Director of the Joint Staff in supervising, coordinating, and administering the work of the Joint Staff and for providing guidance to certain specialized activities of the Organization of the Joint Chiefs of Staff.

Maj. Gen. Maurice C. Padden

Vice Director, J 3
Joint Chiefs of Staff
Washington, D. C.

Exercises staff supervision over joint operational matters pertaining to exercises, operational planning and direction, force readiness and operations analysis, reconnaissance operations, electronic warfare, special activities, command and control, and operations security.

Maj. Gen. Click D. Smith, Jr.

Deputy Director for Logistics
(Strategic Mobility), J-4
Joint Chiefs of Staff
Washington, D. C.

Assists the Director, J-4, in advising the JCS Chairman on joint and combined worldwide logistics/transportation matters and evaluates the capabilities of joint and specified commands to logistically support current operational activities, contingency operations, and plans.

USCENTCOM/JDA/USREDCOM

Maj. Gen. Spence M. Armstrong

Chief, United States Military Training Mission
Dhahran, Saudi Arabia

Responsible for coordination and integration of all military aspects of the US security assistance program to Saudi Arabia.

Maj. Gen. James I. Baginski

Director of Deployment
Joint Deployment Agency
MacDill AFB, Fla.

Directs worldwide joint service mobilization deployment planning and coordination for the Joint Chiefs of Staff.

Maj. Gen. Archer L. Durham

Director, J-5 (Plans and Policy), and
Inspector General, US Readiness Command
MacDill AFB, Fla.

Principal advisor to CINCREDCOM on plans, policies, tactics, and procedures for rapid and effective deployment of combat-ready forces.

Maj. Gen. Davis C. Rohr

Deputy Commander in Chief
US Central Command
MacDill AFB, Fla.

Deputy Commander in Chief of a Unified Command responsible for US military and security interests in a nineteen-country area in the Persian Gulf, Horn of Africa, and southwest Asia.

NATO/SHAPE/EUCOM

Maj. Gen. Leon W. Babcock, Jr.

Deputy Commander, 6th Allied Tactical Air Force
Izmir, Turkey

Assists the Commander, 6ATAF, as the head of a multinational air force that conducts air operations in support of ground forces and provides air defense of the southeastern NATO region.

Maj. Gen. Louls C. Buckman

Chief of Staff, AIRSOUTH
Hq. Allied Forces Southern Europe
Naples, Italy

Assists COMAIRSOUTH in conducting air operations and managing the total southern region land-based air resources in support of the defense and preservation of the integrity of NATO nations in the southern region.

Maj. Gen. Thomas L. Craig

Director, J-5, (Plans and Policy)
US European Command
Vaihingen, Germany

Develops plans, programs, and policies on all matters pertaining to war plans, force structure, and other elements of JCS support by USCINCEUR in coordination with other unified and specified commands.

Maj. Gen. Gerald D. Larson

Air Deputy, AFNORTH
Hq. Allied Forces Northern Europe
Kolsaas, Norway

Principal advisor to AFNORTH on all allied air operations in the command.

Maj. Gen. Randall D. Peat

Assistant Chief of Staff, Operations, SHAPE
Mons, Belgium

Responsible for assisting in the development and implementation of operational and contingency plans and formulation of force requirements for Allied Command Europe.

Maj. Gen. Harold W. Todd

Chief of Staff, 4th Allied Tactical Air Force
Heidelberg, Germany

Assists the Commander, 4ATAF, in the conduct of vital allied tactical and air defense operations in the central NATO region, utilizing the combined air assets, personnel, and resources committed to 4ATAF by the US and her allies.

PACIFIC COMMAND

Maj. Gen. Walter C. Schrupp

Deputy Chief of Staff
Hq. Pacific Command
Camp Smith, Hawaii

Assists the Chief of Staff, PACOM, in supporting CINCPAC mission to advance the national policies and interests of the US in the Pacific and Indian Ocean areas, to include assisting in the preparation of plans, conduct of operations and exercises, and coordination of all PACOM assigned and gained forces.

SOUTHERN COMMAND

Maj. Gen. William E. Masterson

Deputy Commander in Chief, USSOUTHCOM
Commander, US Southern Air Division, TAC
Howard AFB, Panama

As Deputy CINC, Southern Command, responsible for all joint military matters in Latin America; as Commander of USAF Southern Air Division, responsible for USAF support to Southern Command.

FEDERAL AND DEFENSE AGENCIES

Maj. Gen. Schuyler Bissell

Deputy Director
Defense Intelligence Agency
Washington, D. C.

Assists the Director of DIA in providing timely military intelligence upon which long-range military plans are formulated.

Maj. Gen. Joseph H. Connolly

Deputy Director (Acquisition Management)
Defense Logistics Agency
Cameron Station, Va.

Responsible for the agency's worldwide contracting activities, to include providing all services and DIA a wide range of technical and administrative contract support.

Maj. Gen. Lawrence D. Garrison

Commander, Defense Construction Supply Center
Defense Logistics Agency
Columbus, Ohio

Responsible for managing a worldwide distribution of repair parts for all military weapon systems, including aircraft, ships, submarines, automotive vehicles, missiles, and construction materials.

Maj. Gen. Joe P. Morgan

Director, Quality Analysis
Defense Logistics Agency
Cameron Station, Va.

Principal staff advisor for the development and application of major policies, plans, programs, and procedures relating to quality and reliability analysis of major systems, equipment, supplies, and services procured on government contracts.

Maj. Gen. Richard D. Murray

Commander, Army and Air Force Exchange Service
Dallas, Tex.

As commander of a joint command ranked as the seventh largest retailer in the US, he is responsible for policy and operational management of all AAFES merchandising outlets in CONUS and overseas.

Maj. Gen. Perry M. Smith

Commandant
National War College
Fort McNair, Washington, D. C.

Commands the NWC, which prepares senior US military and State Department officers for the planning and formulation of high-level national strategy.

VIEWPOINT

Canada's New Course

By Gen. T. R. Milton, USAF (Ret.), CONTRIBUTING EDITOR

Prime Minister Mulroney promises increased defense spending and better relations with the US. Improvements seem to be in store for the Canadian forces.



A Canadian admiral once remarked that if he were given total power to go to Russia to destroy their armed forces, he would unify them, put them into green uniforms, place them

on a fixed budget, and leave. Following this sardonic comment on Canada's defense scheme, the admiral soon found himself on the beach.

Not all Canadian military men feel so strongly about the great unification experiment, but the sixteen years since Defense Minister Paul Hellyer's massive reorganization took place have not been shining ones for Canada's armed forces. They lost not only their service identities but dwindled, in the almost uninterrupted Trudeau regime, to a strength of barely 80,000. And, aside from pay and allowances, which were kept at a generous level, little money existed for new weapons and equipment.

The Trudeau government's indifference to defense extended to NATO. During the spring of 1969, there were some disagreeable sessions in the NATO Secretary-General's office in which Canada's planned cutback was discussed. The Canadian Ambassador, whose personal opposition to the reduction was never in doubt, warned the small group that NATO had better take what was offered. The alternative, given a sufficiently provoked Mr. Trudeau, might be a total withdrawal.

Thus, the Canadian NATO contingent, 10,000 troops and six fighter squadrons, generally conceded to be the most professional in the Alliance, was abruptly halved. The remaining three fighter squadrons were limited further to nonnuclear missions. The years since that decision have not

seen things change. Canada's 1983 defense expenditure, measured in percentage of Gross National Product, ranked last in the Alliance save for those of tiny Luxembourg and Iceland. Iceland has no military forces.

This summer, while we were preoccupied with our own seemingly interminable presidential campaign, our neighbors to the north, putting an end to the long years of Liberal rule, gave a landslide victory to Brian Mulroney.

Mr. Mulroney has promised increased defense expenditures and friendlier relations with the United States, welcome news in Washington and Brussels. He has even hinted at abolition of the green uniform and a return to distinctive service dress, a clue, perhaps, to his attitude toward military amalgamation. Total integration Canadian-style has proven, in practice, to be largely a fiction, except in Ottawa where defense matters are truly unified.

At the outset, there were two field commands—Mobile Command for the soldiers and Maritime Command for the sailors. The once-proud RCAF disappeared into the two commands almost without a trace. Some years later, the airman's identity was restored with the creation of Air Command. Meanwhile, integration has spawned a number of lesser pseudo-services.

It is a curious fact that Canada has more people identified as airmen than as soldiers, a unique arrangement. And, with the current purchase of 138 CF-18s, the Canadian version of the US Navy's F/A-18A, a large part of the defense procurement budget is going for what would usually be called the air force. These new airplanes are badly needed in an air arm now flying an assortment of museum pieces. What is still needed is a new assessment of Canada's defense aims and responsibilities.

Presumably, the Canadian commitment to NATO will remain as it is at present—a light brigade and three fighter squadrons reequipped with CF-18s. There would be little purpose in making even a small increase in

Canada's NATO contingent, for that would reduce even further the little left for continental defense. It is alarming, when we think about it, to realize how undefended the northern rim of our continent is to any sort of incursion. A few squadrons of CF-18s will help, but the far north remains a vast undefended region.

Throughout the Trudeau years, Canada continued to be a staunch, if junior, partner in NORAD. And while the seven NORAD regions have distinct national ties, a reflection of attitudes in the 1970s, there is no doubt about the integration of United States and Canadian air defense. The integration of this defense comes with a few caveats, such as the retention by Canada of the right to increase the alert status, but the day-to-day working relationships in NORAD are those of close and friendly neighbors. NORAD itself has achieved institutional status. Without question, the agreement will be renewed when it next comes due in 1986.

There are other areas where cooperation is close and informal. Twice a year, for instance, Canada hosts the Maple Flag exercises at Cold Lake in Alberta, a northern version of the realistic Red Flag air encounters over the American desert. Against severe opposition, Mr. Trudeau, for his own reasons, agreed to cruise-missile testing over Canadian territory.

On the whole, however, this past era has not been the best one for the two lands with, as we all learned in school, the longest undefended border. For all his charisma and intellectual powers, Pierre Trudeau was not the neighborly sort.

Prime Minister Mulroney has major problems ahead of him, and there is no way of knowing just where defense is on his list. But what we do know is that defense *is* on his list, and that, along with his announced intention of improved US relations, is good news. After all, as Canadian writer Peter C. Newman has put it, any country that hands over its defense to another becomes that nation's colony—which is not the road either to friendship or improved mutual security. ■



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Journey to Java

Remnants of two bomb groups and a fighter squadron flew into Java in early 1942—their near-suicidal task, to check Tokyo's drive toward Australia.

BY JOHN L. FRISBEE

THE AAF's brief Java campaign against Japanese naval forces and airfields is little remembered except by military historians and the few survivors. There was enough heroism in those two opening months of 1942 to fill a book, and that is what historian and novelist Walter Edmonds did at Hap Arnold's suggestion. *They Fought With What They Had*, published by Little Brown in 1951, tells the story of the Philippines disaster and the Java campaign through the eyes of more than 160 officers and NCOs who were interviewed during and immediately after the war. If you can find a copy, read it.

The campaign opened early in January when ten or eleven (depending on your source) obsolescent B-17Cs and -Ds of the 19th Bombardment Group that had been evacuated from the Philippines to Australia landed at a sod field in eastern Java. Those early Fortresses had no tail guns, top turrets, or ball turrets, and only the Ds were equipped with self-sealing fuel tanks. The bombers arrived in Java with one crew and two mechanics per plane and virtually no spare parts. Ahead of them lay 1,500-mile missions through violent tropical fronts with no fighter escort, no rescue service—only swarms of Japanese fighter planes flown by the cream of Japan's pilots who frequently displayed their marksmanship against parachuting American airmen.

The 19th Bomb Group had seen

combat in the Philippines. Not so the crews of 7th Bomb Group's B-17Es and LB-30s (a lightly armed version of the B-24, built for the RAF) that began arriving from the States on January 10. One LB-30 pilot had only a twenty-minute briefing on the plane before taking off from MacDill Field in Florida, and many crewmen of both B-17s and LB-30s had never before flown in a four-engine bomber. Nevertheless, the 7th, like the 19th, was a gung ho outfit. Its squadrons that reached Java were ready to fly missions in forty-eight hours.

Late in January, P-40s of the 17th Pursuit Squadron (Provisional) started arriving after a 3,000-mile ferry flight from Australia. Eventually, about forty pursuits were in place at Blimbing to defend Java, and later still a few A-24 dive bombers joined them. (*For the pursuit story, see "You Men on Java Are Not Forgotten," September '80 issue, p. 106.*) By that time, despite heroic efforts of the bomb groups and the few US Navy ships in the area, the Japanese had established bases in the East Indies from which they could bomb and strafe the four American airfields—none of which had antiaircraft defenses—and cut off the meager flow of supplies from Australia.

By early February, it was obvious that the trickle of bombers from the States could no more than replace combat losses. It was a rare day when the two bomb groups could get a dozen planes in the air. But they continued to fight the losing battle, crews sometimes flying five eight- to ten-hour missions a week and helping with aircraft maintenance in between.

The mission of February 8 against the Japanese airfield at Kendari on Celebes Island, some 750 miles from Java, typified the conditions under which the airmen fought. Only nine B-17s, one of which aborted with engine trouble, could

be mustered for the mission. At 17,000 feet over the Java Sea, they were attacked by Zeros coming in head on, where they were vulnerable to only the .30-caliber gun in the nose of each bomber. The B-17s' bomb bay tanks were not self-sealing. Two bombers were downed almost immediately with blazing tanks, and a third jettisoned his to save the plane from blowing up.

By the time the remaining six B-17s reached cloud cover, all had suffered battle damage. The tail of the bomber flown by Lt. Paul Lindsey was so badly shot up that he couldn't hold down its nose, and it went into a flat spin. The copilot, navigator, and one gunner bailed out to an uncertain fate, but another gunner was severely wounded. Lindsey refused to abandon the spinning plane. Finally the bombardier struggled up to the cockpit. Using their feet against the control column, Lindsey and he forced down the nose and got out of the spin at 7,000 feet. Another crew member tied the column in a forward position with a piece of rope. Then, with his flight controls half gone, his compass shot out, and the navigator's maps lost, Lindsey brought the wounded bomber home through rapidly worsening weather to a safe landing—one of the three to make it. It was his first combat mission.

By March 1, when the Japanese landed in force on Java, the AAF had only nine P-40s and even fewer bombers operational. All the P-40s were lost that day, either in the air or to strafing. Bombers flew the handful of Air Force people to Australia from under the invaders' noses.

Those days of defeat and retreat during the early months of the Pacific war are often forgotten. They should not be, nor should the valor of the men who, with obsolete or untested equipment and little support, fought to the end against insurmountable odds. ■

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By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Survey Plumbs MIA Concern

The National League of Families of American Prisoners and Missing in Southeast Asia recently asked members of Congress some searching questions on their attitudes toward and knowledge of the POW/MIA issue. More than 200 of the some 535 legislators responded.

The League noted that the importance of the poll really lies in demonstrating the genuine bipartisan concern for this issue within Congress to the families concerned, the Indochinese governments, the American people, and the media. A League spokesperson said: "It is our hope that resolving this humanitarian matter will continue to transcend political considerations and that the legislative body will play an integral role in implementing the Administration's commitment to obtain the fullest possible accounting for our men still missing in Southeast Asia."

All of those responding agreed that this matter should command "the highest national priority." All but one agreed that appropriate action should be taken to ensure the return of any proven captives. Most said they were "unaware" of the Defense Intelligence Agency briefing on the subject that is available to members of Congress, but, of those, most said they would request it.

The vast majority said they supported both the recently passed authority for a commemorative POW/MIA medal and the efforts to proclaim a National POW/MIA Recognition Day. An overwhelming majority said they would not support normalization of relations with Vietnam in the absence of the "fullest possible accounting" for Americans still missing.

If you want to know how your member of Congress responded, you can find out. The League will respond to your inquiry. Write them at 1608 K St., N. W., Washington, D. C. 20006. The League requests that you enclose a stamped self-addressed envelope.

Women's Equity Stressed

Secretary of Defense Caspar W. Weinberger says DoD is setting up a

Task Force on Equity for Women. The Task Force will look at current DoD policies, programs, and practices, evaluate how they affect opportunities for women, and recommend changes where appropriate.

The number of "Defense Women" has increased markedly in the past three years. Right now they total more than 1,500,000, which breaks down into about 200,000 military women, 300,000 civilian women, and more than 1,000,000 civilian spouses of military people.

The Task Force, chaired by Dr. Lawrence J. Korb, Assistant Secretary of Defense for Manpower, Installations and Logistics, will look not only at the DoD regulations, etc., affecting women, but will also study the likely effect of existing and proposed legislation on equitable opportunities. Further, it will look at all material produced by DoD to ensure that it is free of gender-based references or effects.

No time was announced for a final report of the group.

Prolific Paper Pushers Proscribed

Save a tree—quit using paper!

That's the thrust of a new program, aptly titled "Save a Tree," kicked off recently by the Army and Air Force Exchange Service. It seems there's plenty of opportunity for savings—last year, the Service churned out enough pages of forms and directives to go once and a half around the world. That's end to end. Stacked, they'd go twice as high as Mount Everest.

AAFES Commander Maj. Gen. Richard D. Murray, USAF, knows that his more than 70,000 employees—who operate 18,000 retail outlets around the world—are probably so prolific out of necessity. Such a large organization demands lots of words and paper to keep moving. However, in starting his paper-use reduction campaign, he's asking administrators to take a closer look at how they might reduce forms, cut the size of directives, drastically pare distribution lists, and limit paper storage. They're also being urged to reduce, consolidate, and eliminate local bulletins, supplements, and other paperwork.

In fact—and this may be too much—they're being asked to forgo the traditional office memo and to use



Maj. Gen. Carl R. Smith, USAF, left, Commander of the Air Force Military Training Center, and Mrs. Lois Ziler unveil a plaque at Randolph AFB, Tex., dedicated to World War II Women's Airforce Service Pilots (WASP). See item on opposite page.

personal calls, office visits, or computer transmissions instead.

General Murray highlighted the inauguration of the program—which is scheduled to run indefinitely—and honored an employee for his paper-saving redesign of a lengthy form by planting a tree in his honor at the headquarters in Dallas. He told employees at the ceremony, "Last year, the AAFES headquarters consumed approximately 3,100 trees in meeting our paper needs. It's time we saved some of those trees."

WASPs Honored

In a recent, moving ceremony at Lackland AFB, Tex., twenty World War II Women's Airforce Service Pilots (WASP) watched as a B-26 Invader was formally dedicated to them (see photo on opposite page).

Mrs. Lois Ziler, former WASP, and Maj. Gen. Carl R. Smith, Commander of the Air Force Military Training Center, unveiled the plaque before a crowd of several hundred onlookers. "This is the first aircraft and perhaps the only one in the Air Force to be dedicated to women," said General Smith. "They [the WASPs] were the forerunners of women in military aviation. They served so well and were so far ahead of their time."

More than 1,100 WASPs flew more than 60,000,000 miles—and thirty-eight lost their lives—during their World War II service as ferry pilots and instructors as well as in towing targets and in other flying jobs that freed male pilots for combat. The WASPs' B-26 joins sixteen other World War II and Korean War vintage aircraft at the Lackland site, where they serve to inspire the thousands of basic trainees who pass through each year.

Aviation Explorer Conference

The first-ever national gathering of some 300 Aviation Explorers took place recently at Ohio State University in Columbus, Ohio, during the annual get-together of more than 4,000 Explorer Scouts.

The Air Force, which supports this program wholeheartedly, was well represented. Capt. Willis J. Humiston, Director, East Central Region, Office of Air Force Relations with National Youth Organizations, was on hand and told AIR FORCE Magazine that this conference was the largest of its kind of any youth organization in America.

He noted that "almost two years of planning from USAF personnel from around the nation helped make this event" a positive experience for not only those attending but also for parents, teachers, Scout leaders in local communities, and so on.

TSgt. Lori A. Campo of the 926th Tactical Fighter Group (AFRES), New Orleans NAS, La., meets Seymore D. Fair, the pelican mascot of the 1984 Louisiana World Exposition, in front of the US Pavilion at the World's Fair. September 8 was Air Force Day at the Fair. (USAF photo by Bill Barber)



Air Force participation included Air National Guard flights, a Soviet Threat briefing, static display of eleven operational aircraft, a military aviation career day, and booths and displays from various Air Force elements. Mach One, the USAF rock band, staged a concert.

The Air Force selects volunteers from among its young officer force to serve as liaison officers between the Air Force and the national and regional offices of nationwide youth organizations. Recent changes to regulations provide better guidance and faster processing of permissive TDY requests for activities taken by any member in conjunction with national Scouting activities. For example, up to thirty days of permissive TDY may be approved for Scouting activities sponsored by council level or higher. When Air Force people support individual troop or unit activities, ten days' permissive TDY may be authorized annually.

Best Foot Forward?

The military might have to go barefoot in the event of war. Who says so? Well, not surprisingly, the Footwear Industries of America, Inc., a trade group of about 200 domestic footwear manufacturers and suppliers.

The organization recently urged Congress not to allow increased import of foreign shoes, citing as one compelling reason the necessity to maintain a strong domestic program to make shoes for the military. US law now provides that the Department of Defense buy only US-made footwear, so that's not an issue.

What is at issue, says the coalition, is that increased imports will dry up the supply of US citizens engaged in the manufacture of shoes. If war or other national emergency should

strike, it is, they say, "highly unlikely that the domestic footwear industry could provide sufficient footwear for the military and civilian population."

Imported shoes make up more than seventy percent of the domestic market today, the group says. They note that "our dependence on foreign producers for shoes is higher than our dependence on foreign producers for oil."

Both the Department of Defense and the General Accounting Office have initiated studies of the ability of the domestic footwear industry to supply shoes to the military during war. Results from both studies are expected by the end of this year.

DoD and Drug Enforcement

In recent testimony before congressional subcommittees overseeing the Treasury, Justice, and Agriculture Departments, DoD spokesmen shed some light on the involvement of DoD units in support of civilian antidrug efforts.

Army Lt. Gen. R. Dean Tice, Director of the DoD Task Force on Drug Enforcement, put the DoD role in perspective:

"Under [current] legislation, DoD provides federal, state, and local civilian law enforcement officials with information collected during the course of normal military operations, makes military equipment and facilities available, and provides training and expert advice. This law expressly forbids direct participation by members of the Army, Air Force, Navy, or Marine Corps in arrest and seizure activities or in any other form of law enforcement—except, of course, where allowed under other statutory authority."

With that legal framework in mind, General Tice and others detailed for

lawmakers a wide range of actions being taken by the military. For example, much of the DoD assistance has come from the Navy and consists of E-2C radar squadrons flying surveillance missions in the South Florida and Gulf regions in support of Customs Service requirements. Navy P-3 antisubmarine warfare aircraft also support the Coast Guard in detection of traffickers in coastal and open-ocean environments.

The Marine Corps flies OV-10D Bronco aircraft equipped with Forward-Looking Infrared (FLIR) sensors that provide observers with good nighttime vision. The Army also furnishes helicopters and spaces at its Intelligence School.

The Air Force uses C-130s to fly frequent training missions in support of the drug-enforcement program in the Gulf. B-52 aircraft on routine training flights also observe suspect ship traf-

THE BULLETIN BOARD

fic. AWACS radar aircraft are used extensively along the Southeast, Gulf, and Southwest border areas. Also, the Air Force supports drug-interdiction efforts in the Bahamas with a twin-engine, night-capable, over-water helicopter unit. The Customs Service and the Air Force are looking at the possibility of collocating Customs command centers in USAF Region Operations Control Centers at Tyndall AFB, Fla., and March AFB, Calif.

Who pays the bill for this type of activity? According to the testimony, most of the assistance is on a non-

reimbursable basis because the support was incidental to normal military operations or the flights provided needed training. However, the spokesmen stressed that, "to the extent that we do not obtain any direct training or operational benefits from the provision of assistance to another agency," reimbursement must be made.

Short Bursts

The Armed Services YMCA will make available **210 loaner infant car seats to children of service members** under its **Baby's First Ride program**. Nine military locations, including Air Force sites at Eglin AFB, Fla., Hawaiian units, and Chanute AFB, Ill., will share in the program. The seats were donated by Government Employees Insurance Co. (GEICO).

Many retirees may not know that an **Air Force Retired Personnel lapel**

SENIOR STAFF CHANGES

PROMOTIONS: To be **Lieutenant General:** James R. Brown; Monroe W. Hatch, Jr.; Robert H. Reed.

RETIREMENTS: L/G William E. Brown; B/G Jesse S. Hocker; L/G Howard W. Leaf.

CHANGES: L/G Robert W. Bazley, from IG, Hq. USAF, Washington, D. C., to CINC, Hq. PACAF, Hickam AFB, Hawaii, replacing Gen. Jerome F. O'Malley . . . M/G Robert D. Beckel, from Dir. of Ops., DCS/P&O, Hq. USAF, Washington, D. C., to DCS/Ops., & Dep. Dir. for Ops., Strategic Air Combat Ops. Staff, Hq. SAC, Offutt AFB, Neb., replacing M/G John A. Brashear . . . B/G Philippe O. Bouchard, from DCS/Science & Technology, Hq. AFSC, Andrews AFB, Md., to Vice Cmdr., ASD, AFSC, Wright-Patterson AFB, Ohio, replacing M/G John T. Buck . . . M/G John A. Brashear, from DCS/Ops., & Dep. Dir. for Ops., Strategic Air Combat Ops. Staff, Hq. SAC, Offutt AFB, Neb., to C/S, Hq. SAC, Offutt AFB, Neb., replacing M/G (L/G selectee) Monroe W. Hatch, Jr. . . . M/G (L/G selectee) James R. Brown, from Ass't C/S for Ops., SHAPE, Mons, Belgium, to Cmdr., Allied Air Forces Southern Europe, & Dep. CINCUSAFE, Southern Area, Naples, Italy, replacing retired L/G William E. Brown.

B/G Alexander K. Davidson, from Dep. Dir. for Ops., DCS/P&O, Hq. USAF, Washington, D. C., to Dep. Dir. for Plans, DCS/P&O, Hq. USAF, Washington, D. C., replacing M/G Charles R. Hamm . . . B/G James B. Davis, from Dir. of Personnel Prgms., DCS/M&P, Hq. USAF, Washington, D. C., to Cmdr., Hq. AFMPC, & Ass't DCS/M&P for Mil. Personnel, Randolph AFB, Tex., replacing M/G Robert D. Springer . . . M/G Michael J. Dugan, from IG, Hq. TAC, Langley AFB, Va., to DCS/Ops., Hq. TAC, Langley AFB, Va., replacing M/G (L/G selectee) Robert H. Reed . . . B/G Robert F. Durkin, from Dep. Dir. for Strategic Forces, DCS/RD&A, Hq. USAF, Washington, D. C., to Dep. Dir. for Ops., DCS/P&O, Hq. USAF, Washington, D. C., replacing B/G Alexander K. Davidson . . . B/G David M. Goodrich, from Dep. Dir., Nat'l Mil. Command Ctr. (#1), J-3, OJCS, Washington, D. C., to Dep. Dir., Defense Mapping Agency, Washington, D. C., replacing B/G William B. Webb.

M/G Charles R. Hamm, from Dep. Dir. for Plans, DCS/P&O, Hq. USAF, Washington, D. C., to Dir. of Ops., DCS/P&O, Hq. USAF, Washington, D. C., replacing M/G Robert D. Beckel . . . M/G Winfield S. Harpe, from DCS/Tech. Training, Hq. ATC, Randolph AFB, Tex., to Dir. of Personnel Prgms., DCS/M&P, Hq. USAF, Washington,

D. C., replacing B/G James B. Davis . . . M/G (L/G selectee) Monroe W. Hatch, Jr., from C/S, Hq. SAC, Offutt AFB, Neb., to IG, Hq. USAF, Washington, D. C., replacing L/G Robert W. Bazley . . . Col. (B/G selectee) Richard E. Hearne, from IG, Hq. ATC, Randolph AFB, Tex., to DCS/Plans, Hq. ATC, Randolph AFB, Tex., replacing B/G Monte D. Montgomery . . . Col. (B/G selectee) Frank B. Horton III, from Cmdr., 321st SMW, SAC, Grand Forks AFB, N. D., to Dir. for Command & Control, Hq. SAC, Offutt AFB, Neb., replacing B/G Charles A. May, Jr.

Col. (B/G selectee) John E. Jaquish, from Ass't DCS/Requirements, Hq. TAC, Langley AFB, Va., to IG, Hq. TAC, Langley AFB, Va., replacing M/G Michael J. Dugan . . . B/G Charles A. May, Jr., from Dir. for Command & Control, Hq. SAC, Offutt AFB, Neb., to Dep. for Strategic Forces, DCS/RD&A, Hq. USAF, Washington, D. C., replacing B/G Robert F. Durkin . . . B/G Monte D. Montgomery, from DCS/Plans, Hq. ATC, Randolph AFB, Tex., to Dir., Manpower & Organization, DCS/M&P, Hq. USAF, Washington, D. C., replacing M/G Larry N. Tibbetts . . . B/G (M/G selectee) Randall D. Peat, from Dep. Dir. for Force Development & Strategic Plans, J-5, OJCS, Washington, D. C., to Ass't C/S for Ops., SHAPE, Mons, Belgium, replacing M/G (L/G selectee) James R. Brown . . . B/G Robert R. Rankine, Jr., from Dep. & Ass't for Directed-Energy Weapons, & Acting Dep. Dir. for SDI Org., OSD, Washington, D. C., to Spec. Ass't for SDI, DCS/RD&A, Hq. USAF, & AFSC, Washington, D. C.

M/G (L/G selectee) Robert H. Reed, from DCS/Ops., Hq. TAC, Langley AFB, Va., to Ass't Vice C/S, Hq. USAF, & Senior USAF Member, Mil. Staff Committee of the UN, Washington, D. C., replacing retired L/G Howard W. Leaf . . . M/G Stuart H. Sherman, Jr., from Staff Dir., 5th Quadrennial Review of Mil. Compensation, OSD, Washington, D. C., to Dep. Ass't Sec. of Def., Guard/Reserve M&P, OSD, Washington, D. C. . . . M/G Larry N. Tibbetts, from Dir. of Manpower & Organization, DCS/M&P, Hq. USAF, Washington, D. C., to DCS/Tech. Training, Hq. ATC, Randolph AFB, Tex., replacing M/G Winfield S. Harpe . . . B/G William B. Webb, from Dep. Dir., Defense Mapping Agency, Washington, D. C., to Dep. Ass't C/S for Intelligence, J-2, SHAPE, Mons, Belgium.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Robert C. Agee, to SEA, Hq. AFOSP, Kirtland AFB, N. M., replacing CMSgt. John T. Adkins . . . CMSgt. Thomas J. Echols, to SEA, Hq. SPACE-COM, Peterson AFB, Colo., replacing CMSgt. Charles P. Zimkas, Jr. ■



Raymond Razul, left, and Chuck Fischer, right, from Merck, Sharpe and Dohme Pharmaceuticals, present Maj. Martin F. Kazmaier, second from left, Chief of Pharmacy Services, USAF Hospital, Beale AFB, Calif., and Col. John A. Anderson, hospital commander, with a certificate marking the pharmacy's one-millionth prescription.

button—a round blue-and-gold pin—is available through clothing sales stores. The price just went up to \$1.06.

Student loan program defaulters who work for the government are being dunned to pay up. If they don't, new legislation allows agencies to withhold repayments amounting to up to fifteen percent of paychecks. The Department of Education says that the Air Force has possibly about 3,000 of the estimated 13,000 active-duty, retired, reserve, and DoD civilian employee defaulters. However, an Air Force spokesman, citing possible problems with the Department of Education list, says the Air Force won't rush into garnishment action since it believes that "once DoE has purged the list, only about 300 people will actually owe the government money."

DoD has begun a three-year test at fifteen bases to let the local commander try new management methods and keep any savings from his new procedures to improve local services and facilities. During the test, "Model Installation Program," commanders will be given more authority to run their installations. Air Force bases involved include Moody AFB, Ga., Kirtland AFB, N. M., Reese AFB, Tex., Hickam AFB, Hawaii, and White-man AFB, Mo.

The 1984 Air Force Suggester of the Year is Ralph G. McNamara, Ogden Air Logistics Center, Utah. He had six adopted suggestions, resulting in savings of more than \$4 million. A biggie, contributing more than \$3 million in savings, recommended that practice bombs that were previously purchased with plumbing intact and

then emptied and filled with concrete be bought empty to begin with.

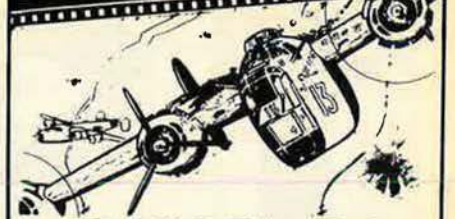
The Veterans Administration, in a first-of-its-kind federal agency program, is reserving selected design contracts for disadvantaged and minority architect-engineer firms. The initiative expands opportunities in a professional service industry in which these firms have traditionally had limited participation. Competing firms must qualify under appropriate provisions of the Small Business Act.

The National Aquarium—which, surprisingly, is in Baltimore, Md.—is now offering active-duty military a discounted admission that knocks off \$1.50 from the regular \$5.75 fee. The Aquarium houses more than 5,000 fish, birds, and other marine animals in twenty theme exhibits, including a 220,000-gallon Open Ocean Tank featuring several species of sharks.

The Air Force has reminded both single-parent members with children and two-member couples with children that regulations require them to designate a nonmilitary person in the local area as prime-care provider in case of emergencies. Naming distant relatives or other nonlocal contacts isn't acceptable.

If you want to "Do Business with the Federal Government" or need to know "How to Get a Job in the Federal Government," the Government Printing Office has booklets addressing both topics. Write to Superintendent of Documents, GPO, Washington, D. C. 20402, for information on how to buy these or any of the thousands of government booklets available. ■

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1984 AFA National Convention Salutes Global Pioneers

Marking the thirty-seventh anniversary of the establishment of the United States Air Force as a separate service and AFA's thirty-eighth birthday, the 1984 Air Force Association National Convention focused on the critical theme of "Global Access Through Aerospace."

Throughout the many Convention activities, the importance of the role of aerospace in worldwide access was highlighted at every opportunity. Ten individuals were specifically recognized for their contributions in significant around-the-world flights. The first such flight was completed on September 28, 1924, and a member of the team that made the flight, Maj. Gen. Leigh Wade, USAF (Ret.), was present at the Convention. The most recent circumnavigation by a Convention honoree was made by Brooke Knapp, who flew a Gulfstream III business jet named *American Dream II*. (For more on round-the-world flights, see "Round the World," September '84 issue, p. 182.)

National Headquarters Building

The dreams of many AFAers were finally realized on Sunday, September 16, as the AFA National Headquarters Building was formally dedicated. Meeting for the first time in their own Board Room, the National Board of Directors missed by just hours the many contractors who worked virtually up until dedication day to finish the last details for the ceremony. The dedication itself was both moving and exciting as AFA President David L. Blankenship, Chairman of the Board Judge John G. Brosky, and AFA's first National President Jimmy Doolittle formally cut the ribbon to allow more than 300 AFA members, spouses, and guests to enter "their" National Headquarters. Especially significant during the ceremony was the unveiling of a magnificent bronze bust of AFA's first President, Lt. Gen. James H.

Doolittle, USAF (Ret.). General Doolittle accepted this tribute graciously. (For more on the dedication of AFA's National Headquarters Building, see "AFA's New National Home," p. 66.)

Membership

The Convention started off in high gear Sunday evening with the Annual Membership Awards and Delegate Reception in the Cotillion Room of

the Sheraton Washington Hotel. National President David L. Blankenship saluted the Association and the Membership Committee and cited the fact that AFA membership had grown over the past year to a total of 220,000, with the 1984 on-base membership drive alone bringing in a record total of more than 21,000 new AFAers. Perhaps one of the most significant statistics in this success story is the ma-

THE WHITE HOUSE
WASHINGTON

September 7, 1984

I am pleased and honored to send my warm greetings to the members of the Air Force Association as you gather for your 38th Annual Convention.

Your convention theme, "Global Access Through Aerospace," evokes in all of us a special pride in what America has accomplished in this important field. Our achievements stand as a shining example of what is possible when individuals are allowed to dream and to make those dreams come true. That is what the free enterprise system is all about. Indeed, General Wade's historic trip around the world in 1924, the 60th Anniversary of which you celebrate this year, was motivated by the same can-do spirit which inspired the Wright Brothers and guided our voyage to the moon. Today, this spirit is embodied in our Space Shuttle program, which dazzles the world with every mission.

We have been generously blessed as a nation and a people. Each of you is fully aware that our precious way of life must be defended vigilantly and, as a charter member of your fine organization, I have the greatest respect for your ongoing efforts to improve the security of our nation.

Nancy joins me in thanking you for your continuing devotion to a strong, peaceful America, and in sending you our best wishes for a successful meeting.

Ronald Reagan

for increase in Life Memberships to a total of more than 17,000.

Membership awards were presented to four regions, fourteen state organizations, and eighty-three chapters (see box). The success of AFA's two-pronged drive to emphasize both new-member recruitment and retention was testified to by the number of organizations recognized during this kickoff event. The awards honored the successful efforts of hundreds of volunteers.

Opening Ceremonies

As with last year, the Convention's Monday morning Opening Ceremonies and Awards presentations filled the Sheraton Hall to standing-room-only capacity. Rev. Richard Carr, the retired Chief of Air Force Chaplains and AFA National Chaplain, gave the invocation and paid memorial tribute to seventy-three aerospace and AFA leaders who passed away during the past year (see accompanying box).

Convention attendees then heard Col. George E. "Bud" Day, USAF (Ret.), deliver an eloquent keynote address. As the most highly decorated Air Force officer in history and a

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Medal of Honor recipient, Colonel Day challenged the Convention to look forward to the future while keeping an ever-vigilant eye to the past. He

concluded his remarks to an emotion-charged standing ovation.

AFA National President David L. Blankenship, with the able assistance of Chairman of the Board Judge John G. Brosky and senior Air Force officials, presented sixty-seven awards to individuals and units of the Air Force Association and Air Force (see box, p. 176). The AFA Special Award went to Hoadley Dean for his exceptional and long-term dedication to AFA. For only

Earl D. Clark, Jr., AFA Permanent National Director and Executive Committee member, accepts the 1984 AFA Man of the Year Award from Jimmy Doolittle, left, AFA's first President, and David L. Blankenship, right, immediate past President and current Board Chairman. Mr. Clark, an architectural engineer and builder, was Chairman of the AFA Building Committee.



1984 AFA Membership Achievement Awards

AFA Membership Achievement Awards are presented to those AFA chapters, states, and regions that achieve certain new member and total membership goals as established by AFA's Membership Committee. The following units achieved these objectives for the year ending June 30, 1984. AFA salutes them as pacesetters in the important work to enlarge and strengthen the Association.

REGIONS	VICE PRESIDENTS	CHAPTERS	PRESIDENTS	CHAPTERS	PRESIDENTS
North Central	Jan Laitos	Chautauqua (New York)	Richard U. Barkstrom	Lawrence D. Bell	Miles W. Hall
South Central	Charles E. Hoffman	Citrus Belt (Florida)	Thomas E. Newton, Jr.	(New York)	
Southeast	Lee C. Lingelbach	Cleveland (Ohio)	James Larkins	Llano Escalado	Gilbert K. St. Clair
Southwest	Joseph H. Turner	Colin P. Kelly	Gino J. Frate	(New Mexico)	
		(New York)		Lubbock (Texas)	Eldon Turner
STATE WINNERS	PRESIDENTS	Colorado Springs/	Thomas W. Raitterree	Mifflin County	Wesley L. Mountz
Alaska	William M. Mack	Lance Sijan (Colorado)		(Pennsylvania)	
Arkansas	Aaron E. Dickerson	Concho (Texas)	R. F. Durso	Montgomery-Delaware Valley	Jacob M. Kessler
Delaware	Joseph H. Allen, Jr.	David D. Terry, Jr.	Mike Wilson	(Pennsylvania)	
Georgia	Thomas E. Farr	(Arkansas)		Northern Connecticut	Herbert E. Flavell
Idaho	Stanley I. Anderson	David J. Price/Beale	Carl A. Estes	(Connecticut)	
Indiana	John Kagel	(California)		Panama City (Florida)	Don Gregor
Maryland	William L. Lyon, Jr.	Daytona Beach (Florida)	Larry H. Jackson	Pease (New Hampshire)	Robert C. Lilljedahl
Minnesota	Paul G. Markgraf	Delaware Galaxy	George J. Bundek	Pope (North Carolina)	James R. Warner
Mississippi	Clarence Ball, Jr.	(Delaware)		Razorback (Arkansas)	I. A. Shulkin
New Jersey	Frank Kula	Eastern Maine (Maine)	Harold I. Hill	Red River Valley	Paul A. Stenseth
North Carolina	Hal Davis	Enid (Oklahoma)	Terry Little	(North Dakota)	
North Dakota	James M. Crawford	Fran Parker (New Mexico)	Frank S. Gentile	Riverside County	Robert G. Kercheval
Oklahoma	Aaron C. Burleson	Front Range (Colorado)	James F. Clark	(California)	
South Dakota	Justin C. Burleson	Garden State (New Jersey)	Beverly Kuhrt	Robert H. Goddard	R. L. Griffin
		General David C. Jones	Ruth Ziegler	(California)	
		(North Dakota)		Rocky Mountain (Utah)	June V. Wallin
CHAPTER WINNERS	PRESIDENTS	General E. W. Rawlings	George Griebenow	Rushmore (South Dakota)	Jim England
Abilene (Texas)	John P. Russell	(Minnesota)		Sedona (Arizona)	John H. Germeraad
Air Capital (Kansas)	Russ Barrett	Gold Card (Utah)	Lee Mohler	Snake River Valley	Chester A. Walborn
Air Commando (Florida)	Robert Pinard, Sr.	Golden Triangle	Jack E. Terry	(Idaho)	
Airport Number One	Lee W. Niehaus	(Mississippi)		South Georgia (Georgia)	Troy W. Tolbert
(Pennsylvania)		Grand Strand (South	William B. Gemmill	Southeast Georgia	Hamilton F. Downing, Jr.
Akron (Ohio)	Augustus F. Stuhldreher	Carolina)		(Georgia)	
Alexandria (Louisiana)	Paul J. Johnston	Greater Amarillo	Jerry Kaiser	Steel Valley (Ohio)	Harry Barnett, Jr.
Altus (Oklahoma)	Jerry Howard	(Texas)		Swamp Fox (South Carolina)	Powell Black
Anchorage (Alaska)	Theron L. Jenne	Grissom Memorial	Don McKellar	Tallahassee (Florida)	Lacey F. Moore
Arc Light (Guam)	Allen A. Pickens	(Indiana)		Teterboro-Bendix	Jack Carnicelli
Atlanta (Georgia)	Robert F. Clayton	Gus Grissom (Indiana)	Bernard C. Hudgens	(New Jersey)	
Atlantic City Area	Leonard Schiff	High Desert (California)	Robert G. Graves	Thomas B. McGuire, Jr.	Marvin R. Jones
(New Jersey)		Hudson (New Jersey)	Joseph J. Bendetto	(New Jersey)	
Blytheville (Arkansas)	Donald E. Provallat	Jax (Florida)	Ed Teigeler	Thomas W. Anthony	James M. Kennedy
Boston (Massachusetts)	Mary Anne Gavin	Jerry Waterman (Florida)	Harry H. Winning, Jr.	(Maryland)	
Brandon (Florida)	John F. McGowan	Joe Walker (Pennsylvania)	Ron Chromulak	Union Morris (New Jersey)	Tom Gilbert
Carl Vinson Memorial	Janet Ferrand	John C. Stennis	Dean Todd	War Eagle (Alabama)	Henry Moreman III
(Georgia)		(Mississippi)		Wasatch (Utah)	George W. Jensen
Central Missouri (Missouri)	Earl D. Uhler, Jr.	Kitty Hawk (North	Gordon W. Cruickshanks	Weld County (Colorado)	Kenneth Holm
Central Oklahoma	Jim D. Oldner	Carolina)		Wichita Falls (Texas)	Charles E. White
(Oklahoma)		Lake Superior Northland	Lloyd E. Fairbanks		
Central Washington	Richard J. Kinder	(Michigan)			
(Washington)		Land of Lincoln (Illinois)	Gary L. Brinner		
Charles A. Lindbergh	John H. Griffin	Langley (Virginia)	R. D. Anderson		
(Connecticut)		Laurel Highlands	Donald H. Fyock		
		(Pennsylvania)			

the second time in AFA history, two units were recognized as co-winners of the Donald W. Steele, Sr., Memorial Award as AFA Unit of the Year. General Doolittle assisted in recognizing the Colorado Springs/Lance Sijan Chapter (Colo.) and the Scott Memorial Chapter (Ill.) with this prestigious award. General Doolittle also assisted in designating Earl D. Clark, Jr., as AFA Man of the Year. Past AFA Man of the Year honorees, as well as this year's Exceptional Service Award and Medal of Merit winners, were also cited.

Man of the Year Meeting

A new tradition took root during this year's Convention. The first-ever breakfast meeting of past AFA Men of the Year took place Tuesday morning of Convention week. Recognizing the invaluable AFA experience vested in this dedicated group, meetings have been planned for future AFA Conventions.

Those attending the first annual breakfast were George D. Hardy (1957); Jack B. Gross (1958); Carl J. Long (1959); William W. Spruance (1967); Sam E. Keith, Jr. (1968); Martin H. Harris (1972); Joe Higgins (1973); Victor R. Kregel (1976); Edward A. Stearn (1977); David C. Noerr (1980); Daniel F. Callahan (1981); Thomas W. Anthony (1982); Richard H. Becker (1983); and Earl D. Clark, Jr. (1984).

Business Sessions

Far surpassing all prior Convention totals, 417 registered delegates, representing forty-two states and the District of Columbia, unanimously adopted AFA's 1984-85 Statement of Policy (see p. 86), and two position papers: "Force Modernization and R&D" (see p. 88), and "Defense Manpower Issues" (see p. 104). These papers serve as the foundation for AFA programs and action for the coming year.

A highlight of the first Business Session was an address by Dr. George A. Keyworth, II, the Science Advisor to the President and Director of the Office of Science and Technology Policy—and one of the newest Life Members of AFA. (See p. 126 for the text of Dr. Keyworth's remarks.)

In support of previously approved actions of the Board of Directors, delegates amended AFA's National Constitution and By-Laws by voting to establish a Director Emeritus designation for qualifying Board of Directors members and to certify the previously planned dues increase, effective January 1, 1985, to \$18 per year. Additionally, delegates voted to affiliate all AFA members with local chapters. Details

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: SSgt. Edgardo L. **Acha**; Lt. Gen. Manuel J. **Asensio**, USAF (Ret.); Robert **Austin**; William A. **Barden**; Brig. Gen. Rollin M. **Batten, Jr.**, USAF (Ret.); Mrs. Fred **Bauer**; J. Raymond **Bell**; Douglas **Benefield**; Mrs. Carman **Berkeley**; Col. Jules M. **Blomberg**, USAF (Ret.); Lt. Gen. Robert M. **Bond**, USAF; Col. Arthur A. **Brackett**, USAF (Ret.); Brig. Gen. Joseph A. **Bulger**, USAF (Ret.); William **Burmester**; Mrs. Rosemary M. **Conaway**; Maj. Gen. Richard G. **Cross**, USAF (Ret.); Maj. Gen. Kenneth C. **Dempster**, USAF (Ret.); Ken **Ellington**; Gen. Frank F. **Everest**, USAF (Ret.); Owen M. **Ferry**; Brig. Gen. Harold F. **Funsch**, USAF (Ret.); Brig. Gen. Robert J. **Goewey**, USAF (Ret.); Charles A. **Hall**; Lt. Gen. William E. **Hall**, USAF (Ret.); Vern **Haugland**; Col. Sam **Henney**, USAF (Ret.); Jack R. **Hunt**; Elmer **Jensen**; Brig. Gen. Bertrand E. **Johnson**, USAF (Ret.); Sgt. Russell C. **Johnson, Jr.**; SSgt. Mark R. **Judy**, USAF; Brig. Gen. Charles E. **Jung**, USAF (Ret.); David **Katz**; Mrs. Catherine **Kerwood**; Maj. Gen. Larry M. **Killpack**, USAF (Ret.); TSgt. Harold R. **Leavitt**; William J. **Leavitt**; Edward C. **Leeson**; Brig. Gen. Cecil P. **Lessig**, USAF (Ret.); George M. **Low**; Brig. Gen. Joseph S. **Marriott**, USAF (Ret.); Col. Lowell **McAdoo**; Mrs. Wanda **McAdoo**; Mrs. Patricia **McCall**; Brig. Gen. Glen **McClernon**, USAF (Ret.); Brig. Gen. Everett A. **McDonald**, USAF (Ret.); Brig. Gen. George F. **McGuire**, USAF (Ret.); Irving **Mednick**; Michael **Monaghan**; Peter J. **Murphy**; Lt. Gen. Archie J. **Old, Jr.**, USAF (Ret.); Brig. Gen. Thayer S. **Olds**, USAF (Ret.); Martin M. **Ostrow**; Mrs. Kathryn S. **Paffel**; Maj. Gen. Romulus W. **Puryear**, USAF (Ret.); Edwin Wallace **Raabe**; MSgt. Refugio **Riveria**; Gen. John D. **Ryan**, USAF (Ret.); Brig. Gen. Richard **Sanders**; Maj. Gen. Gordon P. **Saville**, USAF (Ret.); Maj. Gen. Roy T. **Sessums**, USAF (Ret.); John T. **Shea**; Maj. Gen. Norman D. **Sillin**, USAF (Ret.); Gordon **Sinclair**; Maj. Gen. James W. **Spry**, USAF (Ret.); Col. Robert L. **Stephens**, USAF (Ret.); Jack E. **Terry**; Brig. Gen. Harrison **Thyng**, USAF (Ret.); Lt. Gen. Patrick W. **Timberlake**, USAF (Ret.); Brig. Gen. Frey A. **Treyz**, USAF (Ret.); Theodore F. **Walkowicz**; Maj. Gen. Lynn **Wassell, Jr.**; Mrs. Ruth Taylor **Zuckerman**.

Illinois's Scott Memorial Chapter was selected as a co-winner of the Donald W. Steele, Sr., Memorial Award as AFA Unit of the Year. Pictured are, from left, AFA's first president, Jimmy Doolittle, Chapter President Hugh L. Enyart, and then-AFA President David L. Blankenship.



Sharing honors as co-winner of the Donald W. Steele, Sr., Memorial Award as AFA Unit of the Year was Colorado's Colorado Springs/Lance Sijan Chapter. Here, Chapter President Thomas Ratterree accepts the award from Jimmy Doolittle, left, and then-AFA President David L. Blankenship.



INDIVIDUAL RECIPIENTS

AFA Man of the Year

Earl D. Clark, Jr., Kansas

Special Award

Hoadley Dean, South Dakota

Presidential Citations

Edward A. Dvorak, California
 Hugh L. Enyart, Illinois
 John B. Flaig, Pennsylvania
 Thomas J. Hanlon, New York
 Tillie Metzger, Pennsylvania
 William C. Rapp, New York
 William L. Ryon, Jr., Maryland
 Howard C. Strand, Michigan
 Joseph H. Turner, New Mexico
 Morgan S. Tyler, Jr., Florida

Exceptional Service Awards

Clarence Ball, Jr., Mississippi
 Robert J. Beatson, Maryland
 CMSgt. James C. Binnicker, USAF, Texas
 Jackie L. Bunn, California
 Robert L. Carr, Pennsylvania
 Jack G. Certain, Utah
 Horace W. Cook, Delaware
 Rev. Robert D. Coward, Florida
 Don J. Daley, Hawaii
 James A. Davidson, California
 Frank J. DePhillipo, California
 Joseph F. Ector, Jr., Texas
 Frank W. Elliott, Jr., Illinois
 Donald F. Flaherty, California
 Edward J. Fox, Texas
 Gilbert R. Freeman, New Jersey
 Mary E. Frey, Delaware
 H. Lake Hamrick, Florida
 Percy Haugen, California
 Betty A. Hazeleaf, California
 Thomas A. Hilquist, Illinois
 Charles E. Hoffman, Arkansas
 James M. Kennedy, Maryland
 Curtis N. Lancaster, Utah
 Jack P. Murrell, Texas
 Francis R. O'Clair, Maryland
 Allen A. Pickens, Guam
 Maj. Diana J. Pottter, USAF, Oklahoma
 Les J. Rose, Virginia
 Kenneth A. Rowe, Virginia
 Jean P. Schobert, Illinois
 C. W. Scott, Virginia
 Walter E. Scott, California
 Mary Ann Seibel, Missouri
 William A. Solemene, Texas
 Maj. Dana Spears, USAF, California
 Paul D. Straw, Texas
 Charles J. Tanner, Jr., Florida
 Andrew W. Trushaw, Jr., Massachusetts
 Maj. Gen. James L. Tucker, Jr., USAFR, Texas
 Jack K. Westbrook, Tennessee
 Nevena Whitaker, Maryland
 Charles E. White, Texas
 John F. White, Massachusetts
 Roy P. Whitton, Florida
 Evlyn Wilcox, California

Medals of Merit

Phillip A. Arvizo, California
 Floyd A. Asbury, California
 Walter J. Bacon, Tennessee
 Herbert G. Baker, California
 Robert C. Baldwin, California
 John D. Ballard, Oklahoma

Capt. Terry L. Barton, USAF, Alabama
 John R. Brown, Texas
 David C. Broxterman, Nevada
 George J. Bundeck, Delaware
 Aaron C. Burtleson, Oklahoma
 George J. Burrus, Florida
 Robert J. Cantu, Texas
 Joseph A. Carretto, Jr., California
 Emma S. Chapa, Texas
 James F. Clark, Colorado
 Donald C. Cook, Arkansas
 Harry E. Covert, California
 Ollie R. Crawford, Texas
 David R. Cumock, Massachusetts
 Roy Dart, Illinois
 Aaron E. Dickerson, Arkansas
 Capt. Dave Dingley, USAF, North Carolina
 Charles G. Durazo, Virginia
 R. F. Durso, Texas
 W. Stewart Evans, Tennessee
 Louie T. Evers, New Mexico
 Jack Fisher, California
 TSgt. Ron Flowers, USAF, Texas
 James L. Ford, Virginia
 Evelyn B. Fox, Texas
 Verne Fry, Nevada
 Donald H. Fyock, Pennsylvania
 Dr. Donald C. Garrison, South Carolina
 Frank S. Gentile, New Mexico
 Thomas M. Gilbert, New Jersey
 William M. Goldfein, Nevada
 Norbert Gonzales, Texas
 Lt. Col. Leon D. Gordon, USAF, New Jersey
 Peter J. Graybash, Pennsylvania
 Capt. James F. Guzzi, USAF, Texas
 Marvin L. Hale, Virginia
 Robert D. Haley, Texas
 William Hansen, Illinois
 Lydia A. Hartley, Maryland
 Ed Hawkins, Utah
 M. N. Heth, Texas
 John P. Hickey, Pennsylvania
 Edward R. Hicks, Texas
 John T. Hileman, Nevada
 Robert E. Holland, New York
 Larry H. Jackson, Florida
 David L. Jannetta, Pennsylvania
 Mary L. Johnston, California
 John R. Kagel, Indiana
 Maj. Timothy J. Kaufman, USAF, Washington, D. C.
 Frederick H. Klopper, Jr., Illinois
 Francis J. Kramer, Jr., Alabama
 Louis C. Kriebel, Florida
 Maximilian Lamont, Tennessee
 William Leary, Jr., California
 James P. LeBlanc, Louisiana
 Maurice LeBlanc, Oklahoma
 William Linton, Jr., California
 Glen M. Lusk, Utah
 Paul G. Markgraf, Minnesota
 Noboru Masuoka, California
 Maj. Gen. Edward L. McFarland, USAFR, Oklahoma
 Robert E. Mileham, Illinois
 Jerome L. Miller, California
 Lawrence A. Moody, New Jersey
 William R. Morris, Colorado
 Robert A. Munn, Arizona
 Timothy J. Myers, Tennessee
 John W. Newman, Illinois
 Thomas E. Newton, Jr., Florida
 George E. Nicklaus, Illinois
 Gary B. Patterson, Delaware
 Jim Patterson, Alabama

Howard L. Peckham, Florida
 George Peterson, Nevada
 Capt. John D. Petrilla, USAF, Washington, D. C.
 Col. John D. Phillips, Arkansas
 Robert N. Pinard, Sr., Florida
 John W. Proffitt, Tennessee
 Walter B. Putnam, Florida
 Lt. Col. Harold E. Rafuse, USAF, Virginia
 Billie Rau, California
 William J. Reslie, California
 Nancy A. Rhoades, California
 Kenneth Richardt, Illinois
 Maurice M. Rothkopf, North Dakota
 John P. Russell, Texas
 Ray H. Sanders, Kentucky
 CMSgt. Richard C. Schneider, USAF, Washington, D. C.
 Bishop Franklin H. Sellers, Illinois
 Joseph Sesto, California
 Stanley Shapiro, New Jersey
 Ray Sheehy, Oklahoma
 Eldon L. Shoffner, Texas
 Sam I. Sifers, Jr., Texas
 David J. Smith, Washington, D. C.
 Keri Spears, California
 Charles B. Spencer, Ohio
 Lewis Tanner, Illinois
 Lee R. Terrell, Florida
 Eldon Turner, Texas
 Al K. Wallens, Maryland
 June V. Wallin, Utah
 Spann Watson, Maryland
 David G. Whitney, Arizona
 Martin J. Wiegler, New Jersey
 Marcus C. Williams, Utah
 Tom P. Williams, Arkansas
 TSgt. Ken Wilson, USAF, Washington
 Sam B. Wiper, Nevada
 Valin R. Woodward, New Mexico
 Dr. Michael I. Yarmovych, California
 James Youngson, Jr., Texas
 Ruth May Ziegler, North Dakota
 Peter G. Zink, Delaware

Special Citations

William J. Becker, Nevada
 John G. Brosky, Pennsylvania
 Nellie Cullom, Oklahoma
 Lt. Gen. John P. Flynn, USAF (Ret.), Texas
 Edmund J. Gagliardi, Pennsylvania
 David Graham, California
 H. B. Henderson, Virginia
 Thomas W. Henderson, Arizona
 CMSAF Richard D. Kisling, USAF (Ret.), Washington, D. C.
 Alwyn T. Lloyd, Washington
 Nathan H. Mazer, Utah
 James M. McCoy, Nebraska
 Nation's Capital Chapter, Washington, D. C.
 Vincent F. O'Connor, New York
 Steve Seghetti, California
 2854th Security Police Squadron, Oklahoma
 Brig. Gen. Charles E. Yeager, USAF (Ret.), California

Storz Awards

South Central Region
 Mississippi State AFA
 Grissom Memorial Chapter, Illinois
 Capt. Winfred Graham, USAF

of this program should be finalized by January 1985.

Election of Officers

Two incumbent National Officers, Secretary Sherman W. Wilkins and Treasurer George H. Chabbott, were unanimously reelected, and two other individuals, Martin H. "Marty" Harris and David L. Blankenship, assumed newly elected positions as President and Chairman of the Board, respectively.

President Marty H. Harris is from Winter Park, Fla. An aerospace industry executive, he received his Bachelor of Aeronautical Engineering degree from New York University in 1953. He later earned his Master of Science degree in Systems Management from the University of Southern California. Having previously served on active duty with the Air Force, he is now a retired Air Force Reserve colonel.

Mr. Harris is active in community affairs and holds memberships in the American Management Society, the American Helicopter Society, the Army Aviation Association of America, and the Retired Officers Association. He has served as National Vice President of the American Defense Preparedness Association.

Mr. Harris was Chairman of the AFA/SAC Strategic Requirements Symposium in 1971 and was AFA's National Secretary and Chairman of AFA's Resolutions Committee for four years. He has also served AFA as State President, Chapter President, National Vice President (Southeast Region),

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and Organizational Advisory Council member. Currently, he serves as a permanent member of the Board of Directors, a member of the Executive Committee, a Trustee of the Aerospace Education Foundation, and a member of AEF's Finance Committee.

He received AFA's Man of the Year Award in 1972 and is a Life Member of AFA.

Chairman of the Board David L. Blankenship is also an aerospace industry executive. He received his bachelor's degree in economics from the University of Tulsa in 1955, where he also did graduate work in industrial psychology. Following college, he was commissioned in the Air Force, serving four years as a pilot with assignments in TAC, SAC, and ATC.

Mr. Blankenship's civic activities



Space Shuttle astronaut Col. Guion S. Bluford, USAF, is flanked by Dr. Don C. Garrison, left, President of the Aerospace Education Foundation, and John G. Brosky, AFA Chairman of the Board, during the reception held prior to the AEF luncheon. Colonel Bluford, who last year became the first black American in space, was among the round-the-world honorees at the Convention.



AFA Board Chairman John G. Brosky presents the Chief Red Maintenance Award to CMSgt. Gene A. Killilea, USAF, at the luncheon honoring the Air Force Chief of Staff on September 19. Chief Killilea is the organizational maintenance branch superintendent with the 121st Consolidated Aircraft Maintenance Squadron, Rickenbacker ANGB, Ohio. The award honors the memory of the late CMSgt. Dick Red, who died in 1982.



Hoadley Dean, left, accepts the AFA Special Award from then-AFA National President David L. Blankenship at the Opening Ceremonies and Awards presentations held on Monday of Convention week. Mr. Dean, who is a former National Director, National Vice President (North Central Region), and member of the AFA Audit Committee, was cited for his exceptional and long-term dedication to AFA.

have included service on the Board of Directors of the Oklahoma Chamber of Commerce; Board of Directors, National Conference of Christians and Jews; Advisory Board of the Tulsa Urban League's Business Development Center; Tulsa Public Schools' Vocational Advisory Council; and the Executive Board of the Indian Nations Council of Boy Scouts of America. In 1967, he was selected as one of the Outstanding Young Men in America.

In addition to serving AFA as the immediate past National President,

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Mr. Blankenship has served as Chairman of the Association's Executive Committee, as a member of the Organizational Advisory Council, and as State and Chapter President. He is an AFA Life Member.

AFA National Secretary Sherman W. Wilkins is a retired aerospace industry executive from Bellevue, Wash. An alumnus of the University of Connecticut and George Washington University, he is a graduate of the Army Command and Staff College and the Air War College. His active-duty career spanned nearly twenty-eight years before his retirement in 1968 as a colonel. He served during World War II, the Korean War, and the Vietnam War. He has received decorations that include the Legion of Merit, the Distinguished Flying Cross, and the Air Medal.

Mr. Wilkins is an active participant in civic affairs. He has served on the Seattle Chamber of Commerce, worked with the Pacific Air Museum, and is currently serving as a Trustee of the Air Force Historical Foundation.

In addition to serving as National Secretary, Mr. Wilkins has served as a member of the Executive Committee and as Chairman of the Resolutions Committee. He has also served AFA as a member of the Board of Directors, National Vice President (Northwest Region), and Chapter President. He is a Trustee of the Aerospace Education Foundation, a Jimmy Doolittle Fellow, and a Life Member of AFA.

AFA National Treasurer George H. Chabbott of Dover, Del., is a management consultant and real estate counselor. He served in the Air Force for twenty-three years, retiring as a colonel in 1973. He participated in fifty combat missions, flying B-26s in Korea, and flew 100 combat missions as a forward air controller during the Vietnam War. A graduate of Utah State University, he attended senior-level finance courses at the Columbia

Air Force Association's 1984 Activity Awards

UNIT RECIPIENTS

Donald W. Steele, Sr., Memorial Award AFA Unit of the Year

Colorado Springs/Lance Sijan Chapter, Colorado

Scott Memorial Chapter, Illinois

Outstanding State Organization

Texas State Organization

Outstanding Chapters

Donald W. Steele, Sr., Memorial Chapter, Virginia (more than 900 members)

General David C. Jones Chapter, North Dakota (401-900 members)

Charles A. Lindbergh Chapter, Connecticut (151-400 members)

Sedona Chapter, Arizona (20-150 members)

Exceptional Service Awards

Pennsylvania State AFA (Aerospace Education)

San Bernardino Area Chapter, California (Best Single Program)

Chicagoland-O'Hare Chapter, Illinois (Communications)

Tennessee State AFA (Community Relations)

Cape Canaveral Chapter, Florida (Overall Programming)



Mrs. Ira C. Eaker accepts a Jimmy Doolittle Fellowship plaque on behalf of her husband, Lt. Gen. Ira C. Eaker, USAF (Ret.), from General Doolittle as Dr. Don C. Garrison, left, Aerospace Education Foundation President, and Sen. Barry M. Goldwater (R-Ariz.), AEF Board Chairman, show their approval. The Fellowship, which was presented at the Foundation's annual luncheon on September 17, was sponsored by California State AFA.



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 free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves

and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights for all mankind.

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NATIONAL VICE PRESIDENTS

Information regarding AFA activity within a particular state may be obtained from the Vice President of the Region in which the state is located.



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5813 David Davis Pl.
Ocean Springs, Miss. 39564
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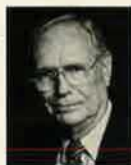
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MAGAZINE

The March issue of AIR FORCE Magazine will once again feature The Soviet Aerospace Almanac—a comprehensive examination of Soviet strategic and tactical aerospace forces, including organization, deployment, doctrine, and concepts . . . key military leaders . . . Soviet R&D . . . military space applications . . . analysis of total military related expenditures . . . statistical data on Soviet aerospace forces and budgets . . . a "Jane's" prepared Gallery of Soviet Aerospace Weapon Systems . . . plus other features . . . a must for military planners . . . a year-round reference issue . . . a great advertising opportunity.

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School of Bank Administration and Management and has been designated a Certified Commercial Investment Member (CCIM) by the National Real Estate Marketing Institute.

Mr. Chabbott has served as Chairman of the Finance Committee and as a member of the Executive Committee. He has also held the elective offices of National Director, National Vice President (Central East Region), and State President. This will be his fourth term as National Treasurer. Mr. Chabbott is an officer of the Aerospace Education Foundation's Finance Committee and is an AFA Life Member.

National Vice Presidents

Twelve National Vice Presidents were elected by delegates to represent their respective regions. Seven are serving in this capacity for the first time. They are Clarence "Cliff" Ball, South Central Region; Hugh L. Enyart, Great Lakes Region; Tim Glasgow, Southwest Region; Jack Kruse, Northeast Region; William L. Ryon, Jr., Central East Region; Phil Saxton, Northwest Region; and Morgan S. Tyler, Jr., Southeast Region.

Five National Vice Presidents were reelected. They are Charles H. Church, Jr., Midwest Region; Richard

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C. Doom, Far West Region; Karen Kyritz, Rocky Mountain Region; Jan Laitos, North Central Region; and Arley McQueen, New England Region.

Directors

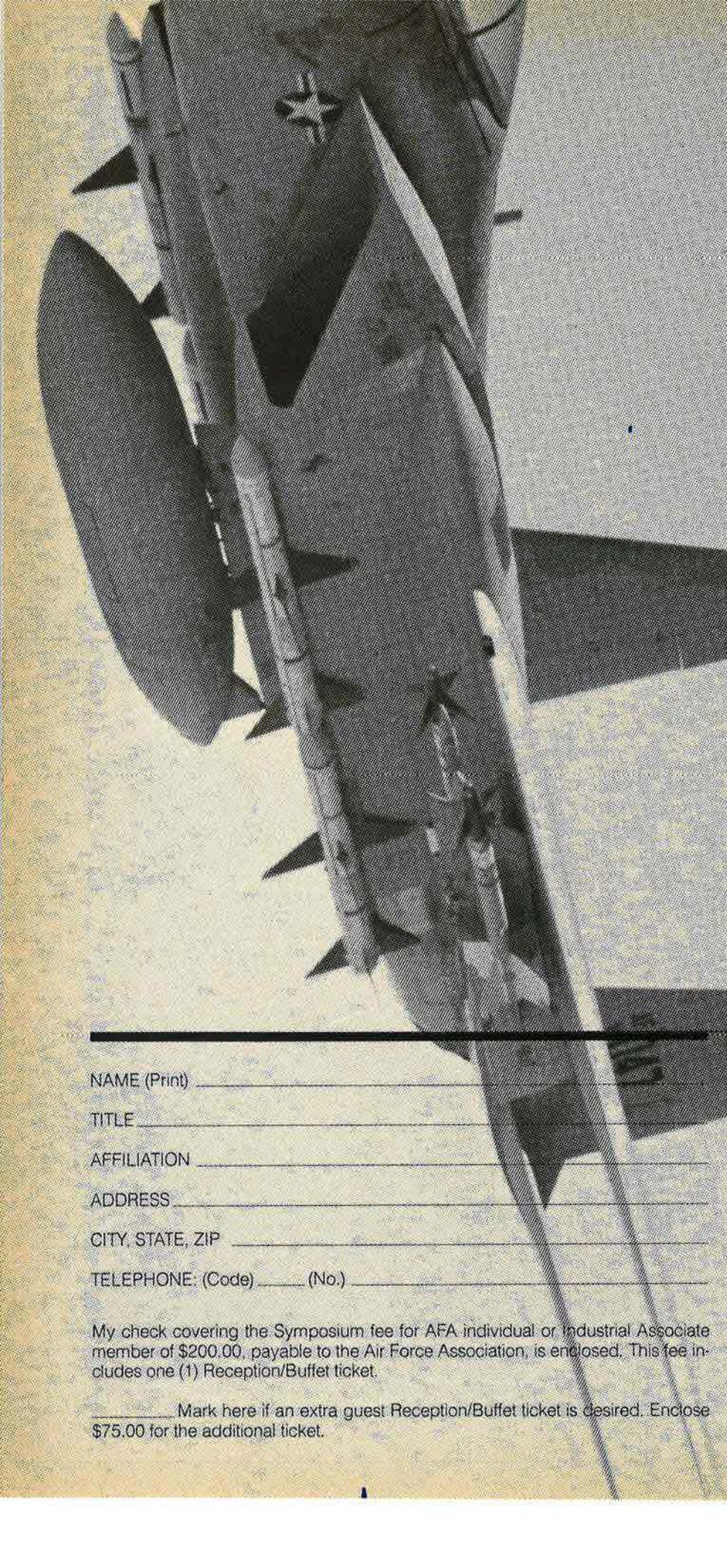
Six new individuals joined the Board of Directors. They are Thomas J. Hanlon, Buffalo, N. Y.; H. B. Henderson, Seaford, Va.; Lee C. Lingelbach, Warner Robins, Ga.; Walter Scott, Dixon, Calif.; Howard C. Strand, Marshall, Mich.; and Herbert West, Tallahassee, Fla.

Twelve Board Members were returned for an additional term. They are Richard H. Becker, Oak Brook, Ill.; Thomas O. Bigger, Tullahoma, Tenn.;

AFA's new National President is Martln H. "Marty" Harris from Winter Park, Fla. Mr. Harris, who has served AFA as State President, Chapter President, and National Vice President, is currently a permanent member of the Board of Directors. He was AFA's Man of the Year in 1972.



Far surpassing all prior Convention totals, 417 registered delegates, representing forty-two states and the District of Columbia, set the foundation for AFA programs and actions for the coming year by adopting the 1984-85 Statement of Policy and two position papers: "Force Modernization and R&D" and "Defense Manpower Issues." In addition, delegates and other Convention attendees heard an eloquent keynote address by Col. George E. "Bud" Day, USAF (Ret.).



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Acknowledgments

Ellis T. Nottingham, Jr., National Director, served as Convention Sergeant at Arms. Constitution Committee Chairman and National Director Jack C. Price served as Parliamentarian. Credentials Committee members were National Vice President of the Midwest Region Charles H. Church, Jr., Chairman; Charles E. Hoffman, past National Vice President, South Central Region; and Frank S. Kula, New Jersey State President. The Inspectors of Election were past National President, Chairman of the Board, and Permanent National Director George M. Douglas, Chairman; William N. Webb, a member of AFA's Finance Committee; and Morgan S. Tyler, Jr., Florida State President.

With heartfelt gratitude, AFA salutes the tremendous volunteer contributions by the following individuals: Cecil Brendle, Ron Flowers, Chuck and Mary Lucas, Paul McLaughlin, Dana and Kerry Spears, Wann Spence, Mike Underwood, Terry Wately, Ken Wilson, Chris Yurkiewicz, John Zipp, and the countless others who assisted in so many ways.

AFA also expresses its appreciation to all leaders, delegates, and spouses who attended the Convention, whose dedication and consistent, diligent efforts contributed to the success of the 1984 Convention. Your ongoing year-round efforts in the field assure the viability of our Air Force Association. Your willingness to expend per-

Spouse Activity Program

With deep gratitude, AFA acknowledges the support of the following companies that participated in the Spouse Activity Program.

The Boeing Company
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ka; William C. Rapp, Buffalo, N. Y.; and James H. Taylor, Farmington, Utah.

In addition, six Under-40 Directors joined the board for the coming year. Serving for the second consecutive year are Nancy I. Campbell, Nashville, Tenn.; Robert L. Gore, Las Vegas, Nev.; David L. Jannetta, Altoona, Pa.; Larry O. Oliver, Savannah, Ga.; and Mary Ann Seibel, St. Louis, Mo. The newest Under-40 Director is Robert G. McCullough, San Antonio, Tex.

Other members of the National Board of Directors are the Permanent National Directors, the National Officers, the National Vice Presidents, the immediate past Air Force Chairman of the Joint Chiefs of Staff, the immediate past Air Force Chief of Staff, the immediate past Chief Master Sergeant of the Air Force, the National Chaplain, the National Commander of the Arnold Air Society, the Chairman of AFA's Junior Officer Advisory Council, the Chairman of AFA's Enlisted Council, and the AFA Executive Director.

The full list of all National Officers, National Vice Presidents, and National Directors appears in "This Is AFA" on p. 179.



Rep. Sherwood L. Boehlert (R-N. Y.), left, has a word with Gen. Bennie L. Davis, USAF, Commander in Chief of Strategic Air Command, at a reception held prior to the luncheon honoring the Secretary of the Air Force on September 18. Representative Boehlert is a member of the House Science and Technology Committee.

sonal time and finances in support of this Association and its goals is the strength and promise of AFA. To all our members—our deepest, heartfelt thanks.

The 1985 National Convention will be held at the Sheraton Washington Hotel in Washington, D. C., September 15-18. See you there!

—By David C. Noerr

Largest Foundation Luncheon Ever Kicks Off Convention

The largest Aerospace Education Foundation Luncheon ever was held on Monday of Convention week. Nearly 750 people attended the luncheon, which was the "kickoff" event highlighting the Convention theme of "Global Access Through Aerospace." This year is the sixtieth anniversary of the first round-the-world flight, and the last surviving pilot of that flight, Maj. Gen. Leigh Wade, USAF (Ret.), was honored, along with others who have made major contributions to our nation's global access through aerospace by their round-the-world flights.

Many supporters of the Foundation, both individual and corporate,

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also received special recognition.

Several important groups were present at the luncheon. Among them were AFA's Enlisted and Junior Officer Advisory Councils, the Air Force's Senior Enlisted Advisors, the twelve Outstanding Airmen, AF-JROTC Aerospace Science Instructors, the Executive Boards of the Arnold Air Society and Angel Flight, and the Tuskegee Airmen, Inc.

Two very special guests were recognized: Foundation Trustee and first AFA National President Lt. Gen. Jimmy Doolittle, USAF (Ret.), and Foundation Chairman of the Board Sen. Barry M. Goldwater (R-Ariz.). General Doolittle, Senator Goldwater, and Foundation President Dr. Don C. Garrison assisted AFA and Foundation Executive Director Russell E. Dougherty in presenting corporate and individual Jimmy Doolittle and Ira Eaker Fellowships during the luncheon.

Other special guests at the luncheon included Col. Charles E. McGee, USAF (Ret.), National President, Tuskegee Airmen, Inc.; Medal of Honor recipient and AFA Convention keynote speaker Col. George E. Day, USAF (Ret.); Scott Crossfield, famed X-15 test pilot; and the Hon. Tidal W. McCoy, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations.

AFA National President David L. Blankenship presented AFA's Outstanding Civil Air Patrol Cadet of the Year Award to CAP Cadet Col. Peter L. Freeland, from Aumsville, Ore., "for consistently outstanding achievement across the range of Civil Air Patrol activities and for demonstrated leadership, airmanship, and devotion to duty." President Blankenship then presented AFA's Outstanding ROTC Cadet of the Year Award for "exemplary academic achievement, outstanding leadership, and inspiring military bearing" to an individual who had just entered the Air Force, 2d Lt. Roderick C. Zastrow of Columbia, S. D.

President Dave Blankenship then awarded AFA Citations of Honor to Maj. Salvatore Balsamo, USAF, of the Air Force Academy's Frank J. Seiler Research Laboratory, for demonstrating the feasibility of sophisticated laser gyroscope concepts and for developing a helium-neon laser-based clock; to John J. Ford, for his vital role for more than twenty-five years in maintaining the critical capabilities of US armed forces; to DeWitt S. Copp, for outstanding literary contributions to military history and biography; and to the Air Force Intelligence Service's Directorate of Soviet Affairs (represented by its Director, Col. George V. Wish, USAF), for dedication and professionalism in developing and conducting the highly regarded Soviet Awareness Program.

One of AFA's most prestigious awards, the Hoyt S. Vandenberg Award for the most outstanding contribution in aerospace education, was presented by President Blankenship to Lt. Gen. J. B. McPherson, USAF (Ret.), for his dynamic, personal role in ensuring that the Air Force experience is thoroughly recorded in valuable, authoritative literary works, thereby making a major contribution to aviation history and aerospace education.

The next event on the luncheon program was the presentation of the Foundation's individual and corporate Jimmy Doolittle Educational and Ira Eaker Historical Fellowships (see box).

Proceeds from the Doolittle Educa-



AFA Permanent National Director and past President Gerald V. Hasler addresses a question to Presidential Science Advisor Dr. George A. Keyworth, II, following Dr. Keyworth's speech to the first AFA Business Session on September 17.

tional Fellowship program are used to support the Foundation's new directions efforts, which include the outreach activities of the new Aerospace Education Center in its conduct of in-

depth forums entitled "Roundtables." These "Roundtables" will focus on timely aerospace, defense, and military-personnel issues. Proceedings of the "Roundtables" will be dis-

Aerospace Education Foundation Fellowships

(Presented at September 17 Luncheon)

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Mr. Dean Scheff
Lt. Gen. Ira C. Eaker, USAF (Ret.)
Colorado Springs/Lance Sijan Chapter
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Lt. Col. William L. Ryon, Jr., ANG
CMSgt. Thomas W. Anthony, USAF (Ret.)
Maj. Gen. Alfred K. Kalberer, USAF (Ret.) (in memoriam)
AFA National V. P. Karen M. Kyrityz
AFA National V. P. H. B. Henderson
Eglin Chapter
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Nation's Capital Chapter
Supreme Court Justice William Hubbs Rehnquist
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Lt. Gen. Andrew B. Anderson, USAF (Ret.)

Round-the-World Honorees

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Col. James G. Gallagher, USAF (Ret.)

Maj. Gen. Michael Collins, USAFR (Ret.)
Lt. Col. Donald P. Taylor, USAF (Ret.)

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Maj. John M. Durham, USAF
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Featuring a richly detailed three dimensional re-creation of the United States Air Force Coat of Arms.

Electronic quartz movement guaranteed accurate to within fifteen seconds per month.

Available in wrist watch and pocket watch styles.

Entire edition reserved exclusively for AFA members and patrons.

Satisfaction guaranteed, or returnable for full refund.

Full one year Seiko warranty.

For faster service, credit card orders may be placed weekdays from 9 a.m. to 9 p.m. (eastern time) by telephoning toll free 1-800-523-0124; Pennsylvania residents only should call 1-215-687-5277 collect. Please then request to speak to operator number 1124.



Illustration reduced. Actual diameters of watches are as follows; pocket watch 1-1/2", men's wrist 1-3/8", and ladies wrist 1 5/16".

Clip order form below. Mail orders should be sent to Air Force Association, c/o P.O. Box 511, Wayne, PA 19087.

Personal Reservation Form

OFFICIAL AIR FORCE ASSOCIATION WATCH

I understand that the Official Air Force Association Watch featuring a richly detailed re-creation of the United States Air Force Coat of Arms on the three dimensional dial is being made available for a limited time only. Please accept my order for the following Air Force Association Watch(es).

_____ Ladies' Seiko Quartz Wrist Watch @ **\$180*** each.
QUANTITY _____

_____ Men's Seiko Quartz Wrist Watch @ **\$180*** each.
QUANTITY _____

_____ Seiko Quartz Pocket Watch @ **\$195*** each.
QUANTITY _____

**Pennsylvania residents only, add 6% sales tax.*

I wish to pay for my watch(es) as follows:

By a single remittance of \$ _____ made payable to "Official AFA" Watch, which I enclose.

By charging the amount of \$ _____ to my credit card indicated below:

Full Account Number:

Expiration:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

 Mo. Year

MAIL ORDERS TO:
AIR FORCE ASSOCIATION
c/o Post Office Box 511
Wayne, Pennsylvania 19087

Please allow 8 to 10 weeks for shipment.

PLEASE PRINT PURCHASER'S NAME CLEARLY. IF "SHIP TO" ADDRESS IS DIFFERENT, PLEASE ATTACH SHIPPING ADDRESS TO ORDER FORM.

NAME _____

STREET _____

CITY _____ STATE _____ ZIP _____

SIGNATURE: _____

1124.

CREDIT CARD PURCHASES MAY CALL TOLL FREE 1-800-523-0124; PA. RESIDENTS ONLY SHOULD CALL 1-215-687-5277 COLLECT. CALL WEEKDAYS FROM 9 A.M. TO 9 P.M. (EASTERN TIME). ASK FOR OPERATOR 1124.

tributed in the hope that they can make major contributions to aerospace education efforts. Additional Center activities are being planned.

Resources garnered from the Eaker Historical Fellowship program allow the Foundation to make available dy-

INTERCOM



The Air Force's twelve Outstanding Airmen get a close-up view of aviation history at the National Air and Space Museum. In the background are the Spirit of St. Louis and an Apollo capsule. During their stay in Washington as guests of AFA, the Outstanding Airmen also visited the US Capitol, the White House, and Arlington National Cemetery.



Following his address to AFA's Advisory Councils on Tuesday of Convention week, USAF Chief of Staff Gen. Charles A. Gabriel met with Chief Master Sergeant of the Air Force Sam E. Parish, who is Advisor to AFA's Enlisted Council.

Special!

Now available for the first time a beautifully handmade wooden replica of the

F-15



length 10½"

This desktop display is carefully made to scale and painted with excellent detail and with current USAF markings. 4 missiles attached. Varnished wooden stand w/designation included. Perfect as a gift or for your own collection. Satisfaction guaranteed or your money back.

Great offer at \$29.95.
Shipping included.

Send check or money order to:

Toys and Models Corp.
222 River Street
Hackensack, N.J. 07601

Many other models also available.

Limited Offer!



10" Wingspan

Beautifully finished **Biplane** made of selected woods with varnish finish in rich natural colors with red, white and blue insignias.

Completely assembled.

Perfect for display or as a toy. An excellent gift for all lovers of flying. Satisfaction guaranteed or your money back.

Only \$14.95 Shipping included

Send check or money order to:

Toys and Models Corp.
222 River Street
Hackensack, N.J. 07601



**At Last!
The Aircrew Tie**

Silver on deep blue with light-blue-silver-light-blue stripes. 100% polyester.

Proceeds go to the Air Force Historical Foundation for Fellowships and Scholarships.

Send your check for \$15.00, name and address to:
AEROSPACE HISTORIAN
Eisenhower Hall
Manhattan, KS 66506, USA

INTERCOM

dynamic and extensive aerospace educational and historical training materials and programs to the nation's community leaders, opinion-makers, and governments officials.

To date, there are twenty-six corporate and 389 individual Jimmy Doolittle Fellows, while the newer Ira Eaker



Maj. Gen. Leigh Wade, USAF (Ret.), left, accepts a Jimmy Doolittle Fellowship plaque from General Doolittle while Aerospace Education Foundation Board Chairman Sen. Barry Goldwater (R-Ariz.) looks on. General Wade was one of several round-the-world flyers honored through investiture as Doolittle Fellows at the Foundation's annual luncheon.

BLACKBIRD™ AEROSPACE SHIRTS

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CHRISTMAS
GIFTS!**



B-1B

The First and only name in Aerospace shirts, around the world.

Electrifying high technology visual illustrations of the world's most exotic and advanced aircraft, screen printed in brilliant colors on the front and back of Black Hanes 100% Cotton Beefy-T's.

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Sizes: S (34-36), M (38-40), L (42-44), XL (46-48)

Shipping: Add the following

	First Shirt	Ea. Add'l
USA	\$1.50	\$.50
Canada	\$2.50	\$1.00
Others	\$5.00	\$2.50

Delivery: 2 to 3 weeks

\$15.00 ea.
Catalog \$1.00

ORDER TODAY!



If paying by credit card include card no. and exp. date.

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SCOTTSDALE,
ARIZONA
85252



Fellowship program has a total of three corporate and seventy individual Fellows. Each individual Fellowship represents a \$1,000 contribution; a corporate Fellowship represents a \$15,000 contribution. The Fellowships are excellent vehicles for honoring individuals, and many groups and individuals, as indicated in the listing of Fellows on p. 185, have taken the opportunity to sponsor Fellowships for this purpose.

The final event of the luncheon was the presentation of the plaque and cash award to the overall winner of the Foundation's annual AFJROTC contest. The overall winner, for the second year in a row, was the AFJROTC unit at Scotch Plains-Fanwood High School, Scotch Plains, N. J. The unit produced a color videotape on the contest theme of "Military Space Ventures." Representatives from the high school were special guests at the Convention and included Lt. Col. Leon D. Gordon, USAF (Ret.), the Aerospace Science Instructor for the unit; CMSgt. Robert Rybitski, USAF (Ret.), Colonel Gordon's assistant; Dr. Terry Reigel, school principal; and two of the AFJROTC cadets who were instrumental in producing the winning entry—Cadets Michael Mancini and Cos Lymperopoulos. Senator Goldwater and Dr. Garrison presented the winner's

plaque and the \$1,500 first-place prize to Colonel Gordon.

In a related matter, the Foundation's Board of Trustees met on Tuesday of Convention week. The Board approved changes in the Foundation's bylaws and elected officers for the coming year. Incumbent Chairman of the Board Sen. Barry M. Goldwater (R-Ariz.) was reelected unanimously; George D. Hardy, immediate past AEF Treasurer, former AEF Board Chairman, permanent AFA National Director, and former AFA National President and Board Chairman, will succeed Dr. Garrison as Foundation President; Dr. Eleanor P. Wynne, M. D., Foundation Trustee, nationally known educator, University of California professor, visiting professor to many large universities, and advisor to the President of the United States, was elected Vice President (a newly created position); Alton G. Hudson, Foundation Trustee, aerospace executive, and former USAF Outstanding Airman, was elected Secretary; and Jack B. Gross, Foundation Trustee and permanent AFA National Director who served as AFA's Treasurer for more than two decades, was elected Treasurer.

—By Michael J. Nisos

during 1950–56 will hold their reunion on February 22–24, 1985, at the Gunter Hotel in San Antonio, Tex. **Contact:** Bernie Gaus, 7609 Rustling Rd., Austin, Tex. 78731. Phone: (512) 345-2196.

613th Tactical Fighter Squadron

A reunion for members of the 613th Tactical Fighter Squadron who served at Torreon AB, Spain, will be held on January 18–20, 1985, at the Sahara Hotel in Las Vegas, Nev. **Contact:** Montgomery Green, 1 Daniel St., Chatham, N. J. 07928.

"Bombardiers"

Our association, known simply as "Bombardiers," is planning its first reunion for mid April 1985 on the site of the old Midland, Tex., Army Airfield where "Hell From Heaven" men graduated at regular intervals.

Please contact the address below.
Ned Humphreys
Box 254
Eagle Harbor, Mich. 49951
Phone: (906) 289-4440

13th Air Force Service Command

I would like to hear from members of the 13th Air Force Service Command (1943–45) for the purpose of planning a reunion.

Please contact the address below.
Thomas D'Elia
105-33 66th Ave.
Forest Hills, N. Y. 11375



FOR THE COLLECTOR . . .

Our durable, custom-designed Library Case, in blue simulated leather with silver embossed spine, allows you to organize your valuable back issues of AIR FORCE chronologically while protecting them from dust and wear.

Mail to: Jesse Jones Box Corp.
P.O. Box 5120, Dept. AF
Philadelphia, PA 19141

Please send me _____ Library Cases \$6.95 each, 3 for \$20, 6 for \$36. (Postage and handling included.)

My check (or money order) for \$: _____ is enclosed.

Name _____

Address _____

City _____

State _____ Zip _____

Allow four weeks for delivery. Orders outside the U. S. add \$1.00 for each case for postage and handling.

UNIT REUNIONS

Ordre Pour le Mérite

The Aerospace Honor Society will hold its annual muster on November 30–December 2, 1984, in Washington, D. C. **Contact:** Col. John A. Conover, USAF (Ret.), 435 N. Columbus St., Alexandria, Va. 22314. Phone: (703) 548-8475.

3d Squadron Alumni Ass'n

Members of the 3d Squadron will hold their reunion on December 1, 1984. **Contact:** MSgt. Alex Ketree, USAF (Ret.), Rte. 1, Box 1178, Ridgeville, S. C. 29472. Phone: (803) 688-5246.

20th Air Force Ass'n

The 20th Air Force Association of Southern California will hold its second reunion on March 22–24, 1985, at the Miramar Hotel in Santa Barbara, Calif. **Contact:** 20th Air Force Association of Southern California, 7811 Compass Lake Dr., San Diego, Calif. 92119.

61st Troop Carrier Squadron

Members of the 61st Troop Carrier Squadron "Green Hornets," including all former Hornet friends (37th, 50th, and 62d Troop Carrier Squadrons), who served in Korea

AFA JEWELRY



A selection of AFA jewelry complete with full color AFA logos, for all Members, Life Members, and Leaders—Past & Present.

ORDER FORM: Please indicate below the quantity desired for each item to be shipped. Prices are subject to change without notice.

- A. Tie Bar \$20 each _____
B. Member Lapel Pin \$15 each _____
C. Member Tie Tac \$10 each _____
D. Lapel Pin \$15 each (Please specify: President, Past President or Life Member) _____
E. Stickpin \$16 each (Please specify: Member or Life Member) _____

TOTAL AMOUNT ENCLOSED _____

Enclose your check or money order made payable to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. (Virginia residents please add 4% sales tax.)

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Please send me an AFA gift brochure.

When a Single Accident or Illness Could Cost You Thousands of Dollars, You Need AFA CHAMPLUS® . . . for Strong Protection against Costs CHAMPUS Doesn't Cover!

For military retirees and their dependents . . . and dependents of active-duty personnel . . . more and more medical care is being provided through the government CHAMPUS program.

And, of course CHAMPUS pays 75% of allowable charges.

But today's soaring hospital costs—up to \$500 a day in some major metropolitan medical centers—can run up a \$20,000 bill for even a moderately serious accident or illness.

Your 25% of \$20,000 is no joke!

AFA CHAMPLUS® protects you against that kind of financial catastrophe and covers most of your share of routine medical expenses as well.

HOW AFA CHAMPLUS® WORKS FOR YOU!

WHO IS ELIGIBLE?

- 1) All AFA members under 65 years of age who are currently receiving military retired pay and are eligible for benefits under Public Law 89-614 (CHAMPUS), their spouses under age 65 and their unmarried dependent children under age 21 (or age 23 if in college).
- 2) All eligible dependents of AFA members on active duty. Eligible dependents are spouses under age 65 and unmarried dependent children under age 21 (or age 23 if in college).

EXCEPTIONAL BENEFIT PLAN

(See chart at right)

FOUR YEAR BASIC BENEFIT. Benefits for most injuries or illnesses may be paid for up to a four-year period.

PLUS THESE SPECIAL BENEFITS . . .

- 1) Up to 45 consecutive days of in-hospital care for mental, nervous, or emotional disorders. Outpatient care may include up to 20 visits of a physician or \$500 per insured person each year.
- 2) Up to 30 days care per insured per year in a Skilled Nursing Facility.
- 3) Up to 30 days care per insured per year and up to 60 days lifetime in a

CHAMPUS-approved Residential Treatment Center.

- 4) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Special Treatment Facility.
- 5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

YOUR INSURANCE IS NON-CANCELLABLE

As long as you are a member of the AFA Force Association, pay your premiums on time, and the master contract remains in force, your insurance cannot be cancelled.

ADMINISTERED BY YOUR ASSOCIATION . . . UNDERWRITTEN BY MUTUAL OF OMAHA

AFA CHAMPLUS® insurance is administered by trained insurance professionals on your Association staff. You get prompt, reliable, courteous service from people who know your needs and know every detail of your coverage. Your insurance is underwritten by Mutual of Omaha, largest individual and family health insurance company in the world.

AFA OFFERS YOU HOSPITAL BENEFITS AFTER AGE 65

Once you reach Age 65 and are covered under Medicare, AFA offers you protection against hospital expenses not covered by Medicare through the Senior Benefit Plan of AFA Hospital Indemnity Insurance. Members enrolled in AFA CHAMPLUS® will automatically receive full information about AFA's Medicare supplement program upon attainment of 65 so there will be no lapse in coverage.

AFA CHAMPLUS® BENEFIT SCHEDULE

Care	CHAMPUS Pays	AFA CHAMPLUS® Pays
<i>For Military Retirees Under Age 65 and Their Dependents</i>		
Inpatient civilian hospital care	CHAMPUS pays 75% of allowable charges.	CHAMPLUS® pays the 25% of allowable charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a \$6.55 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS® pays the \$6.55 per day subsistence fee.
Outpatient care	CHAMPUS COVERS 75% of outpatient care fees after an annual deductible of \$50 per person (\$100 maximum per family) is satisfied.	CHAMPLUS® pays the 25% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.
<i>For Dependents of Active-Duty Military Personnel</i>		
Inpatient civilian hospital care	CHAMPUS pays all covered services and supplies furnished by a hospital less \$25 or \$6.55 per day, whichever is greater.	CHAMPLUS® pays the greater of \$6.55 per day or \$25 of the reasonable hospital charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a \$6.55 per day fee, not covered by CHAMPUS.	CHAMPLUS® pays the \$6.55 per day subsistence fee.
Outpatient care	CHAMPUS covers 80% of outpatient care fees after an annual deductible of \$50 per person (\$100 maximum per family) is satisfied.	CHAMPLUS® pays the 20% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.

NOTE: Outpatient benefits cover emergency room treatment, doctor bills, pharmaceuticals and other professional services. There are some reasonable limitations and exclusions for both inpatient and outpatient coverage. Please note these elsewhere in the plan description.

APPLY TODAY!

JUST FOLLOW THESE STEPS

Choose either AFA CHAMPLUS® Inpatient coverage or combined Inpatient and Outpatient coverage for yourself. Determine the coverage you want for dependent members of your family. Complete the enclosed application form in full. Total the premium for the coverage you select from the premium tables on this page. Mail the application with your check or money order for your initial premium payment, payable to AFA.



EXCLUSIONS

Coverage will not be provided for conditions for which treatment has been received during the 12-month period prior to the effective date of insurance until the expiration of 12 consecutive months of insurance coverage without further treatment. After coverage has been in force for 12 consecutive months, pre-existing conditions will be covered regardless of prior treatment.

EXCLUSIONS

- This plan does not cover and no payment shall be made for:
 - routine physical examinations or immunizations
 - domiciliary or custodial care
 - dental care (except as required as a necessary adjunct to medical or surgical treatment)
 - routine care of the newborn or well-baby care
 - injuries or sickness resulting from declared or undeclared war or any act thereof
 - injuries or sickness due to acts of intentional self-destruction or attempted suicide, while sane or insane
 - treatment for prevention or cure of alcoholism or drug addiction
 - eye refraction examinations
 - Prosthetic devices (other than artificial limbs and artificial eyes), hearing aids, thopedic footwear, eyeglasses and contact lenses
 - expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS)

PREMIUM SCHEDULE

Plan 1—For military retirees and dependents (Quarterly Premiums)

Inpatient Benefits

Member's Attained Age	Member	Spouse	Each Child
Under 50	\$19.03	\$23.30	\$14.85
50-54	\$26.16	\$32.01	\$14.85
55-59	\$36.16	\$44.28	\$14.85
60-64	\$43.62	\$53.41	\$14.85

Inpatient and Outpatient Benefits

Under 50	\$26.80	\$31.05	\$37.13
50-54	\$36.83	\$42.68	\$37.13
55-59	\$50.92	\$59.02	\$37.13
60-64	\$61.41	\$71.20	\$37.13

Plan 2—For dependents of active-duty personnel (Annual Premiums)

Inpatient Only	None	\$ 9.68	\$ 5.94
Inpatient and Outpatient	None	\$38.72	\$29.70

APPLICATION FOR AFA CHAMPLUS*

Group Policy GMG-FC70
Mutual of Omaha Insurance Company
Home Office: Omaha, Nebraska

Full name of Member _____
Rank _____ Last _____ First _____ Middle _____

Address _____
Number and Street _____ City _____ State _____ ZIP Code _____

Date of Birth _____ Current Age _____ Height _____ Weight _____ Soc. Sec. No. _____
Month/Day/Year

This insurance coverage may only be issued to AFA members. Please check the appropriate box below:

- I am currently an AFA Member. I enclose \$15 for annual AFA membership dues (includes subscription (\$14) to AIR FORCE Magazine).

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (Check One) AFA CHAMPLUS* PLAN I (for military retirees & dependents) AFA CHAMPLUS* PLAN II (for dependents of active-duty personnel)

Coverage Requested (Check One) Inpatient Benefits Only Inpatient and Outpatient Benefits

Person(s) to be insured (Check One) Member Only Member & Children Spouse Only Spouse & Children Member & Spouse Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Plan I premium payments are normally paid on a quarterly basis but, if desired, they may be made on either a semi-annual (multiply by 2), or annual (multiply by 4) basis.

Quarterly (annual) premium for member (age _____) \$ _____

Quarterly (annual) premium for spouse (based on member's age) \$ _____

Quarterly (annual) premium for _____ children @ \$ _____ \$ _____

Total premium enclosed \$ _____

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Dependents to be Insured _____ Relationship to Member _____ Date of Birth (Month/Day/Year) _____

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 12 months prior to the effective date of this insurance coverage will not be covered until the expiration of 12 consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 24 consecutive months.

Date _____, 19 _____ Member's Signature _____ 11/84

NOTE: Application must be accompanied by check or money order. Form 6173GH App.
Send remittance to:
Insurance Division, AFA, 1501 Lee Highway • Arlington, Virginia 22209-1198

"There I Was..."

HERE'S SOME FLOTSAM and JETSAM THAT FLOATED UP IN THE OL' IDEA FILE. ACTUALLY, WE WERE CLEANIN' OUT THE FOLDER and THOUGHT THESE WERE TOO GOOD TO PASS UP. ENJOY!

THE ORI (OR, A VISIT BY STARS and ZEBRAS)

"AN ORI IS A SITUATION IN WHICH YOU STOP DOING WHAT YOU'RE DOING IN ORDER TO SIMULATE DOING WHAT YOU WERE DOING SO THAT YOU CAN SHOW SOMEONE ELSE THAT YOU CAN SIMULATE DOING WHAT YOU WERE DOING AS WELL AS YOU WERE DOING IT BEFORE YOU WERE INTERRUPTED."



"AIRSICK & SCARED STIFF" (OR, THE FIRST JET RIDE)

TAKE A POOR SLOB OFF THE STREET and SLAP HIM IN A SMALL, HOT, DE-COMPRESSION CHAMBER THAT REEKS OF KEROSENE and SUBJECT HIM TO ...

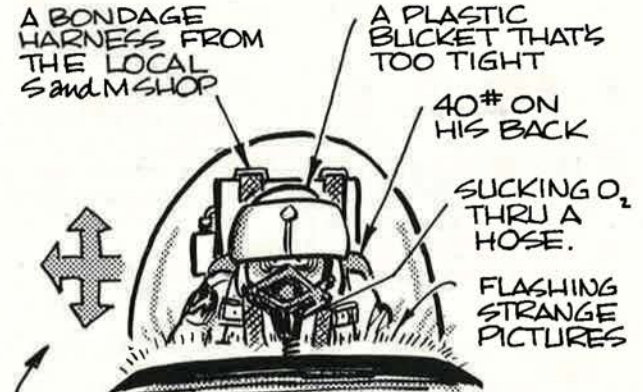
A BONDAGE HARNESS FROM THE LOCAL S and M SHOP

A PLASTIC BUCKET THAT'S TOO TIGHT

40# ON HIS BACK

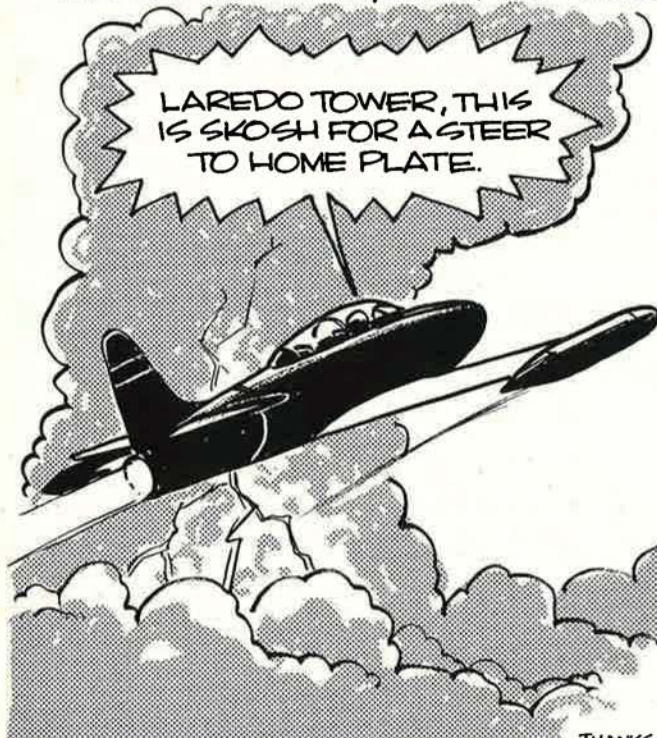
SUCKING O₂ THRU A HOSE.

FLASHING STRANGE PICTURES



NOW, JERK HIM AROUND IN 3 DIRECTIONS WHILE HE HEARS BEEPS, HUMS, THUMBS, and FOREIGN BABBLING VOICES ... CONVINCE HIM IF HE LOSES THIS GAME OF SPACE INVADERS, HE'LL BE FRIED ALIVE ... Think he'll be scared?

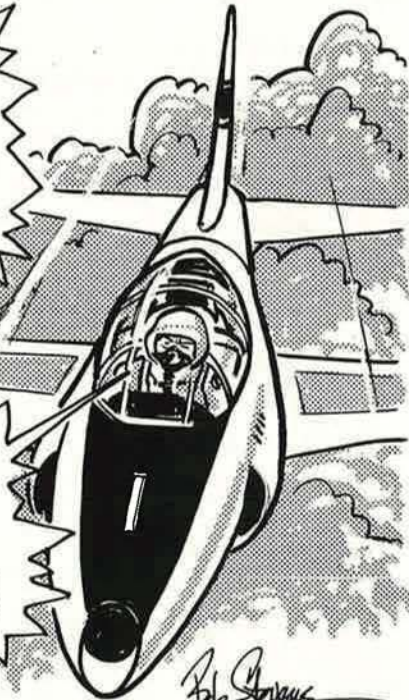
SCENE: DARK and STORMY NIGHT OVER TEXAS. IP IS LOOKING FOR WANDERING CADETS AT 37,000 FT. IP BECOMES SURROUNDED BY LOSTNESS-



LAREDO TOWER, THIS IS SKOSH FOR A STEER TO HOME PLATE.

THIS IS LAREDO TOWER... IS THIS A PRACTICE STEER?

LISSEN, LAREDO... I DON'T PRACTICE AT NIGHT!



THANKS TO COL. CHARLEY DAVIS, OAKTON, VA.

Bob Stevens

Neither heat, nor EMI, nor massive Gs can keep fluidic controls and sensors from their appointed mission.

There's a definite limit to how far you can depend on certain types of sophisticated electronic sensing and control systems for operation in hostile environments.

But at Garrett's Pneumatic Systems Division, our low-cost fluidic sensors and controls — operating with a wide variety of gaseous and liquid media — are performing with high reliability in even the most demanding operational environments.

- A low-cost land navigation system that replaces expensive inertial devices.
- A high-response, low-cost projectile

stabilization system that withstands 16,000 G launch forces.

- A gun stabilization system for armored vehicles that provides high-reliability despite severe shock loads.
- A Gatling-gun firing rate control system, unaffected by EMI or high G forces.
- A re-entry vehicle stabilization system, impervious to EMI, EMP, and radiation.
- A simplified turbofan fuel mass-flow meter with no moving parts.
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that senses up to 2,000° F gas temperatures.

- And coming soon: A low-cost, light-weight back-up control system for fly-by-wire aircraft.

If conventional control and sensing systems could keep you from your appointed mission, contact: Advanced System Sales, Garrett Pneumatic Systems Division, P.O. Box 5217, Phoenix, AZ 85010. Or call: (602) 231 3805.

GARRETT

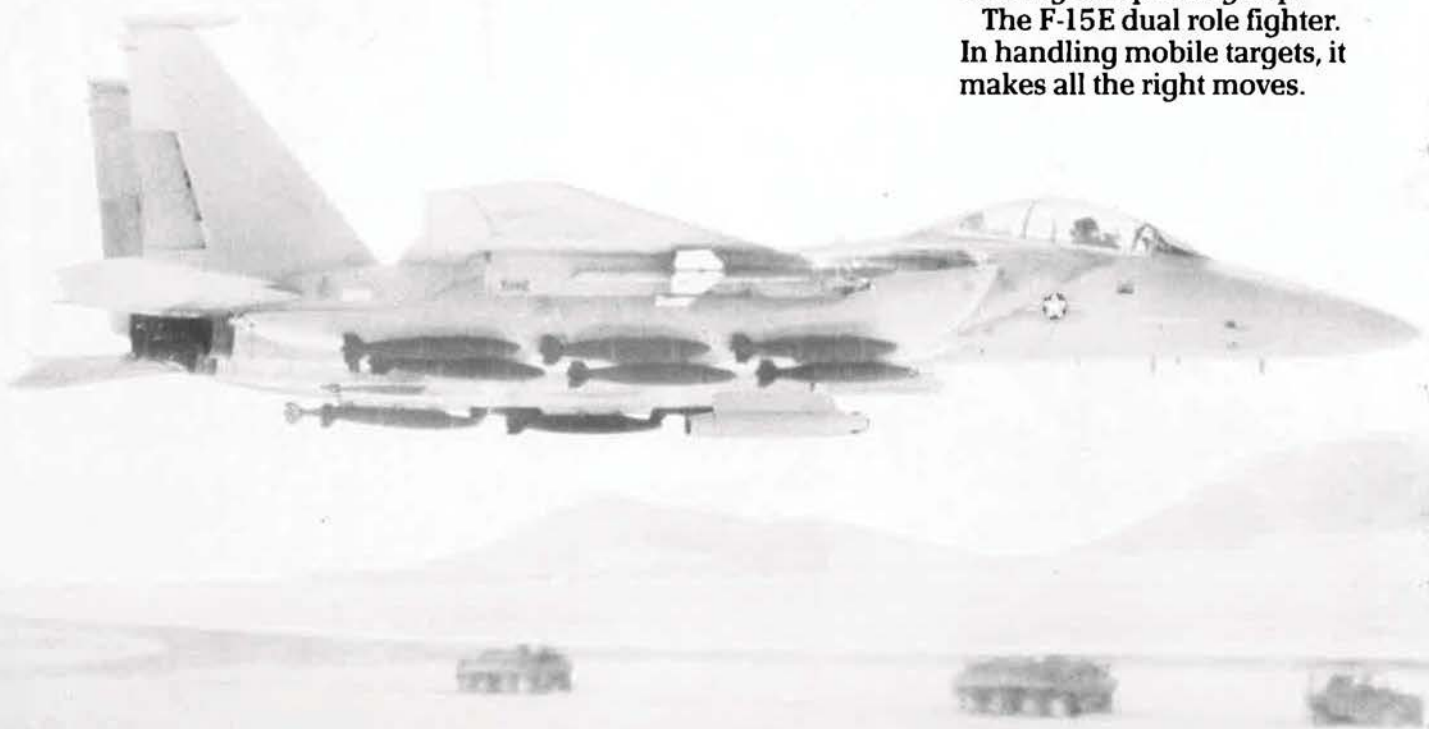
WHEN A TARGET'S ON THE MOVE, IT'S TOUGH TO STAY ON THE MARK.

Interdiction missions against moving ground targets demand precision.

Only manned aircraft have the flexibility to succeed against mobile targets—to hit the enemy where he is, not where he was. Global defense calls for very capable aircraft—aircraft not only with range, endurance and survivability, but also with accurate navigation, sighting and weapons delivery.

That's why the F-15E dual role fighter is the plane for the job. Its Hughes APG-70 precision mapping radar is the world's most capable, showing the crew with photographic clarity exactly where the target is. LANTIRN sensors guide them to the target and let them pinpoint it precisely in bad weather, day or night. So nothing escapes the eyes of an Eagle. And thanks to superior speed and maneuverability, nothing escapes its grasp.

The F-15E dual role fighter. In handling mobile targets, it makes all the right moves.



**MCDONNELL
DOUGLAS**

