

NOVEMBER 1985/\$2

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

## ***Slick Six at Vandenberg***

***The Straight Story  
About the Defense  
Industry***

***AFA Convention  
Reports***







**Know thine enemy...  
and respond.**

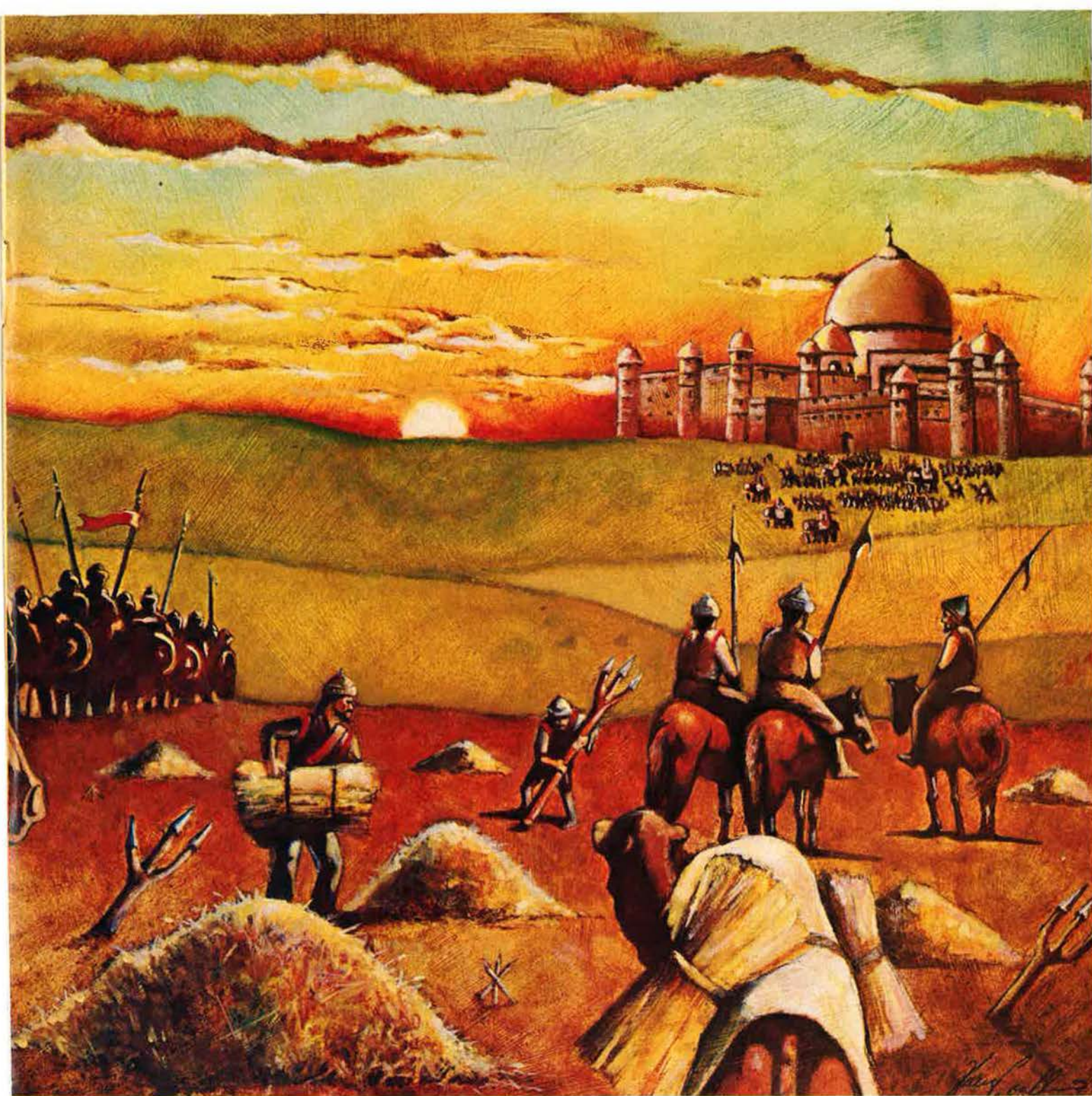
**T**imur-the-Lame crossed the Indus from the wastes of Afghanistan and headed for Delhi. He and his followers had no logistic support. Their supply line was as long as a dagger. Slaughter and pillage provided food and drink.

Ahead, Mallu Khan scoffed at the Mongol threat. His empire was secure. Well-trained cavalry and elephants bearing crossbow experts defended the prosperous city where even the poor wore jewels. His generals made no effort to determine or thwart the invaders' intentions. Underestimating the Mongol strength, they launched an attack.

Timur, meanwhile, planned to turn Mallu's strength against him by wounding and frightening the elephants. Ahead of his position he planted stakes with three-pronged spikes. In the path of the charging elephants, his troops, pretending to flee, scattered caltrops consisting of four sharp prongs arrayed so that one always faced up.

In addition, bundles of dry grass, attached to the Mongol beasts of burden, were set afire as these animals were driven toward the elephants. The panicked pachyderms crushed enormous numbers of Khan's horses and men. The survivors surrendered.





Timur's preparations could have been observed in advance by Delhi's defenders and commands issued to respond effectively. Instead, the city was plundered for five days, and the accumulated wealth of generations carried off to Samarkand with large numbers of women and skilled artisans.

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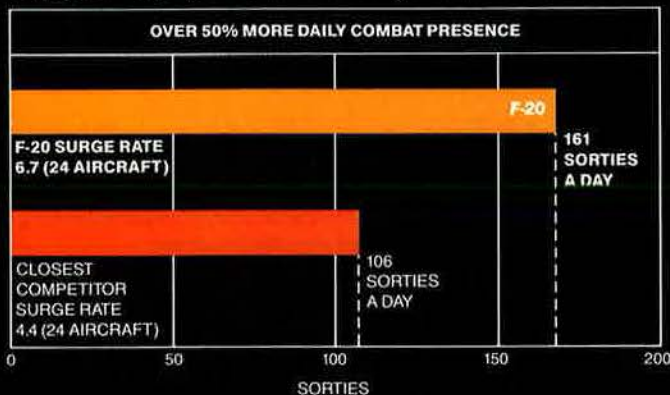
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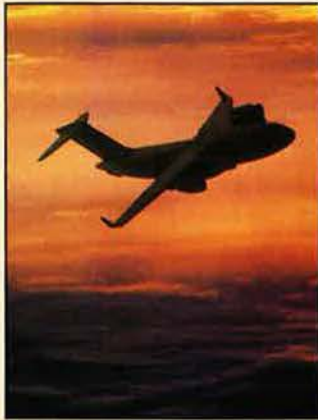
Making advanced technology work

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**About the cover:** Shuttle *Enterprise* perches on the launch mount at Vandenberg AFB, Calif., for facility checkout in preparation for the inaugural Vandenberg launch of *Discovery* next March. See "Slick Six" on page 46 for more about Vandenberg Shuttle operations.

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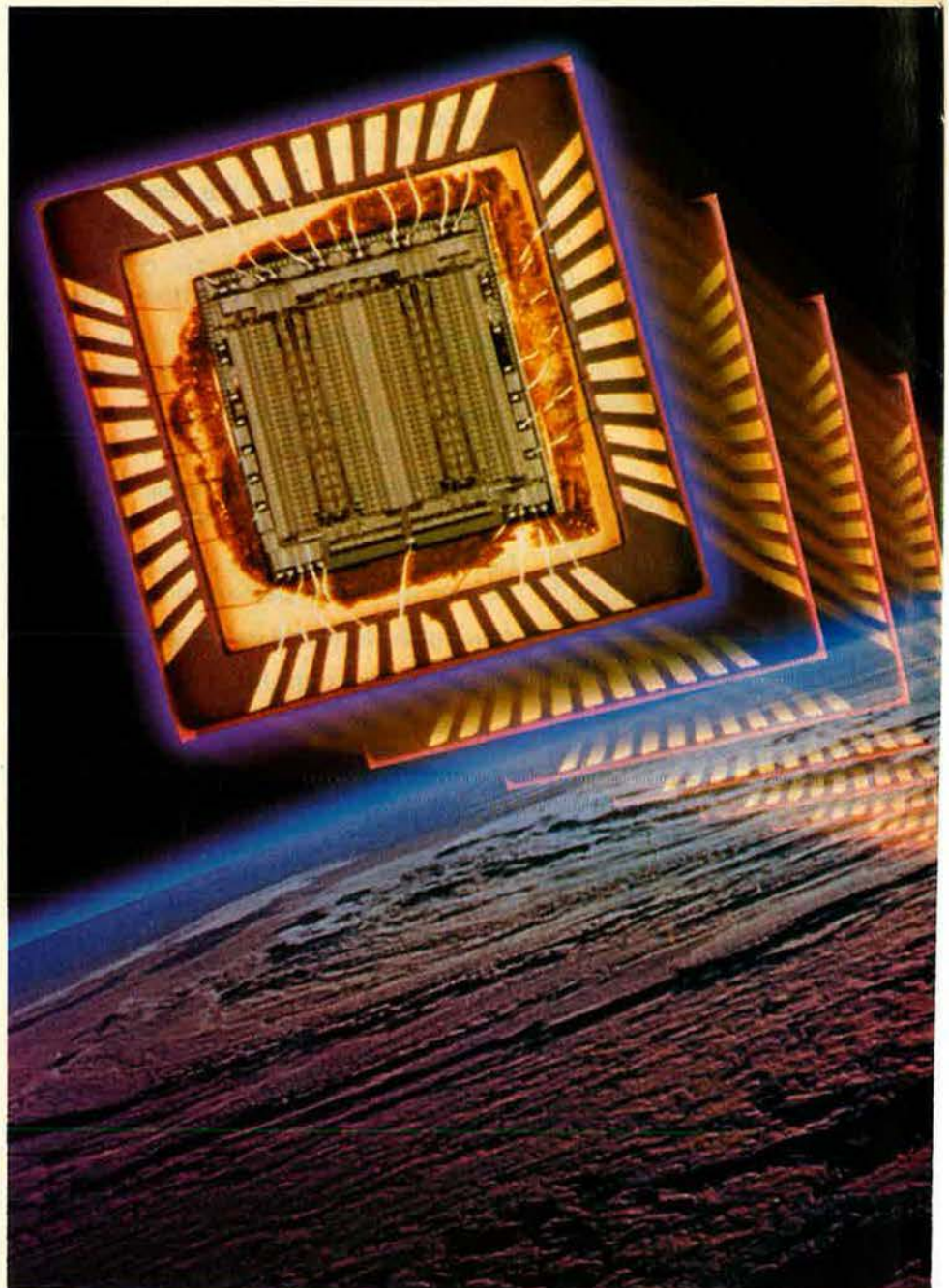
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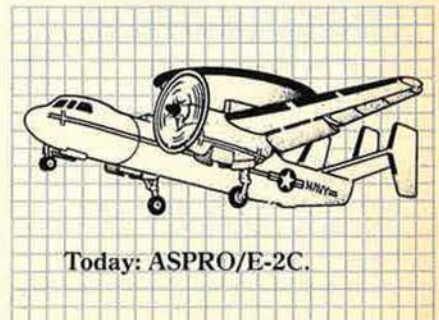


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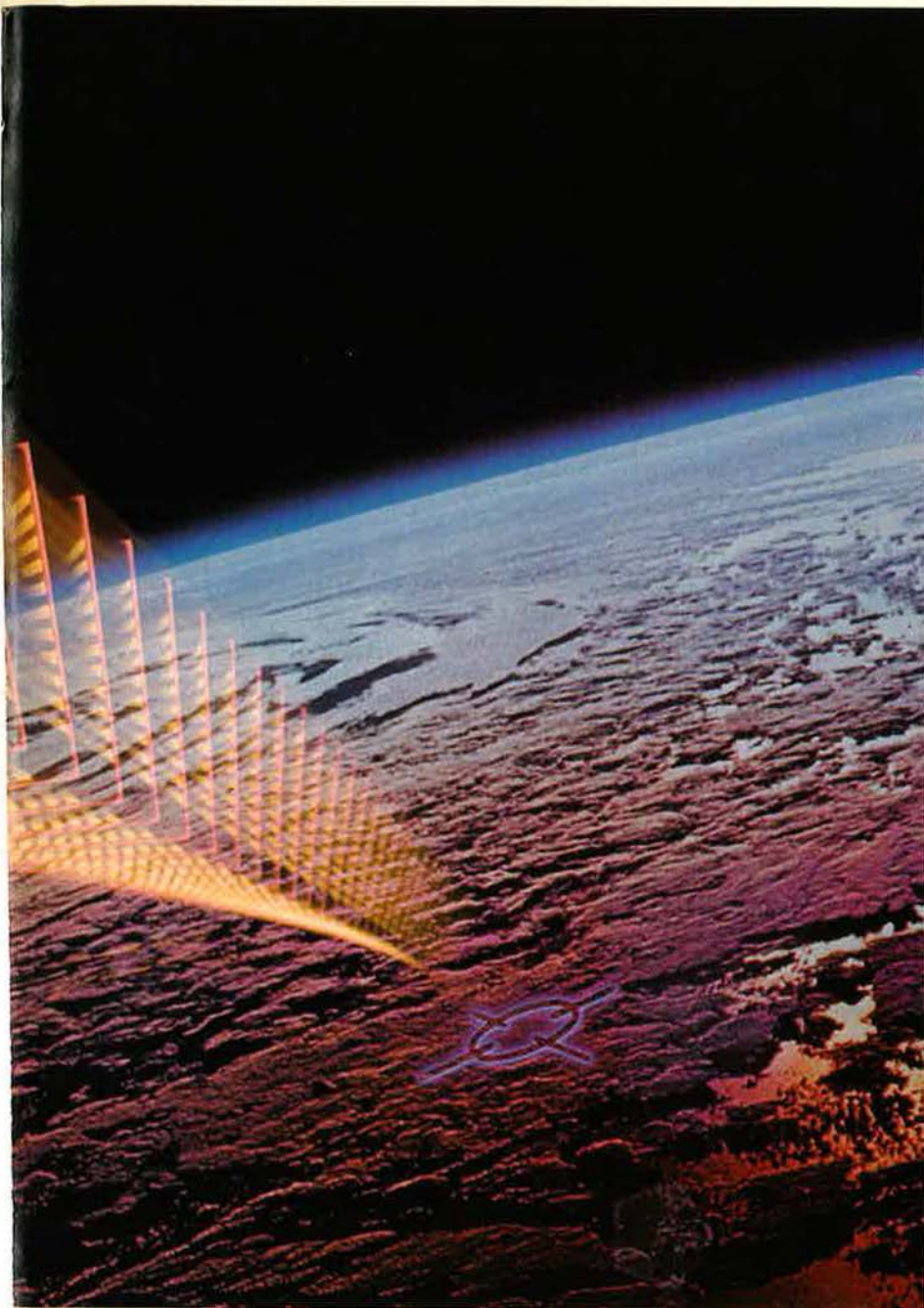
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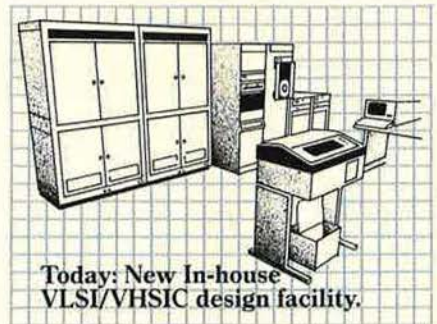
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# AN EDITORIAL

## The Essential Priorities

*The 1985-86 Statement of Policy, adopted by delegates to AFA's National Convention on September 16, 1985.*

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**A**MERICA'S ability to safeguard peace, liberty, and the pursuit of vital national interests hinges on one central factor: The clear recognition by any potential aggressor that military aggression cannot succeed. We must convince an aggressor that this country's armed forces—in concert with those of our allies—can thwart his military objectives, can countervail his strategies, and, if necessary, will prevail in war. US deterrence works only if this country's military forces maintain a quality edge that offsets quantitative and other advantages of our principal adversary, the Soviet Union. Maintaining that crucial quality edge is becoming increasingly difficult. The funds available for advanced technology weapons are limited and finite. The growing costs of these weapons can be accommodated only by rigorous adherence to frugal management standards and prudently set priorities that receive cohesive support from the executive and legislative branches of government.

At the core of the problem is the relentless growth in Soviet military capabilities that reaches across the entire spectrum of strategic, theater-nuclear, and conventional warfare. The Soviet Union devotes about seventeen percent of its Gross National Product to the military sector, compared to about six percent for this country. The USSR's drive toward expansion and modernization of its military arsenal is marked by the introduction of new, advanced technologies that in some instances are superior to corresponding US capabilities.

In no area is this Soviet drive more intense and more consequential than in the strategic nuclear sector. By the mid-1990s, almost all of Moscow's currently deployed land- and sea-based ballistic missiles and heavy bombers will be replaced by new and improved systems. New mobile ICBMs, advanced ballistic missile submarines, and a variety of large, long-range cruise missiles are entering the Soviet operational inventory. The number of deployed Soviet nuclear warheads is increasing steadily and already exceeds levels that reasonably can be associated with defensive requirements and deterrence.

The pace of long-standing Soviet efforts in the field of strategic defense is quickening. Included are comprehensive measures to protect the Soviet leadership, options to deploy, relatively quickly, nationwide defenses against ballistic missiles, and extensive efforts in high-energy laser weapons and other directed-energy technologies. This single-minded commitment to the expansion of its military power has made the USSR the world's largest weapons producer.

Even more fundamental than the visible evidence of the Soviet threat is Moscow's unchanging view of the

world: Socialism and capitalism, two diametrically opposed socioeconomic systems, are destined for conflict, the outcome of which will be in favor of Soviet Russia. These facts cannot be wished away. Soviet communism with a human face remains a mirage, in spite of sixty-eight years of Western concessions and attempts to modify Soviet behavior by political and economic means. Until the Kremlin demonstrates by concrete deeds—not merely by rhetoric—that the Soviet Union is committed to a just and lasting peace, America and her allies must enforce peace through deterrence.

Terrorism, a form of warfare that is directed against the very heart of civilization, is challenging the free world in a new dimension. In the struggle for world dominance, Soviet policy is linked to terror, subversion, and irregular warfare. America understands more readily the threat of conventional conflict and the importance of our strategic and conventional forces in deterring war. However, there seems to be a lack of understanding that another war of serious consequences is being waged in a less understandable arena. This Association urges the Administration and Congress to reemphasize the seriousness of this threat to freedom everywhere and to initiate actions to create intelligence services, appropriate technologies, and military capabilities to counter and discourage actions by the Soviets and their surrogates against order and stability in areas of the world targeted for Communist expansion. In addition, preventive measures to thwart terrorism and protect Americans in and out of uniform from being victimized by terrorists must be comprehensively implemented.

At the center of this Association's concerns is the human factor. The Soviets have shown that they can "reverse-engineer" even our most sophisticated and modern weapon systems. But they can't "reverse-engineer" the ingenuity, the devotion to duty, and the professionalism of the men and women who serve in the United States Air Force and the other services. People truly are the underpinning of this country's military edge. The nation cannot afford to put at risk this fundamental advantage. Steps have been taken and others are contemplated that could have pervasive, negative impact on end strength; this, in turn, would send dangerous ripple effects throughout the force.

Manpower authorizations have not matched requirements. Over the last two years, the Air Force's military manpower request was denied some 13,000 spaces that had been programmed. Manpower increases are essential to man such new weapon systems as the B-1B and the Ground-Launched Cruise Missile (GLCM). The Air Force's total peak wartime shortfall is in excess of 35,000



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spaces. The consequence of adding new missions and weapon systems without corresponding increases in the force level degrades readiness and erodes mission effectiveness. Superior weapon systems are relegated to inferiority when they are not manned by adequate numbers of properly qualified personnel.

Shortfalls in the required force levels are especially acute in the European theater. Such requirements as the manning of the recently fielded GLCMs had to be met at the expense of other missions vital to NATO's defense



posture. This imposition of arbitrary ceilings flies in the face of the threat posed by the Warsaw Pact's growing capabilities. Introducing deliberate vulnerabilities into the US force structure in Europe—and recurring congressional threats to widen these gaps—as a means for stimulating increased defense spending on the part of the European NATO members is, in the view of this Association, a gamble that weakens both the Alliance and peace.

America's qualitative edge, today and in the future,

depends on a superior technology base. The superiority of this nation's technology has been a "given" ever since World War II. We now see reasons for serious concern. The decade of the 1970s saw a steady decline in investment in basic research and technology. That decline at last is being arrested. But a substantial turnaround is yet to be effected. Similarly, this country's science and engineering education programs have been badly eroded over the past two decades. Science and mathematics are seriously neglected in our secondary schools. Our colleges and universities are suffering from a lack of science and engineering staffs and from inadequate, outdated laboratory facilities. The net result is a shortage of high-quality scientific and engineering manpower to build tomorrow's technology base.

Moreover, while this nation's technological momentum has been slowed, our adversary's has been accelerated. Recent Soviet progress, as evidenced by new, sophisticated, and highly capable weapon systems, is dramatic—and a matter of profound concern to this Association. A broad national effort is required to reinvigorate our science and engineering education as well as our basic research and technology programs. Without such an effort, our technological lead is in jeopardy. An obvious and disastrous consequence would be the inability to maintain the qualitative edge in our weapon systems.

This Association will strengthen its efforts to inform the public of these needs. We strongly support the Air Force's program to increase technology base efforts and to continue strong emphasis on science and engineering education. This Association commends the Air Force for launching "Project Forecast II," a comprehensive long-term road map to guide both the users and the research and development community in optimal, cost-effective exploitation of science and technology.

At the present time, the US defense effort is critically dependent on strategic minerals beyond our national boundaries. The African continent is one of these vital areas. Notwithstanding the political turbulence, and regardless of the outcome, this Association urges steps that ensure continued free world access to the resources essential to our survival. This Association firmly supports work on advanced materials technology that will reduce or eliminate this country's dependence on foreign resources.

A question that clearly and understandably weighs heavily on the public's mind is whether or not the process by which the nation buys the weapons and tools for the common defense is working. This Association believes unequivocally that we, as a nation, cannot tolerate the perception of wrongdoing or incompetence any more than we can live with actual waste, fraud, or abuse. The taxpayer is entitled to a full return on every dollar invested in the national defense. The acquisition process must be kept "lean and mean" by industry as well as by the executive and legislative branches of government.

We know that a limited number of mistakes has been portrayed as the rule rather than the exception, but we also know that there is room for improvement. Overregulation is inhibiting the defense industry's creativity, and a flood of new laws is engulfing program offices and industrial managers in more and more paperwork. We commend the Air Force for setting priorities wisely and



austerely, with the emphasis on sustaining essential programs at the required, most effective pace and level. We urge Congress to provide responsible oversight and to authorize and appropriate funds on a sustained basis in phase with cost-effective program management. Above all, we believe that the development, acquisition, and maintenance of our weapons and supplies must be treated as a team effort by government and industry. This nation must recapture the spirit of partnership that made America the arsenal of democracy in past, trying times. This partnership works best when the responsibilities for and contributions to our national security requirements become a common challenge; adversarial relationships hinder the process.

The reliability and maintainability (R&M) standards of any weapon or support system that industry produces and that the Air Force buys and operates must be treated as an all-encompassing requirement by both partners of the government-industry team. Aircraft, missiles, and other weapon systems that can't fly or fight when needed cripple combat effectiveness. Furthermore, systems that are deficient in terms of R&M drain the Air Force's most valuable resource, its combat and support personnel. Adequate R&M is a "force multiplier"; inadequate R&M depletes the force. This Association commends the Air Force for taking the lead in making R&M a make-or-break criterion in systems acquisition.

Two related requirements, in this Association's view, are imperative for retaining this country's qualitative edge in the operational field. Aging and obsolescent weapons and equipment must be replaced expeditiously; also, the force structure has to be tailored to the growing, changing threat. Nowhere is this need more pronounced than in the strategic sector, where both offensive and defensive capabilities must be modernized or expanded.

The Administration's five-pronged strategic program—consisting of ICBMs, strategic bombers, the Trident force, survivable command and control systems, and revitalized strategic defenses—is the categorical imperative of effective US deterrence in the years ahead. Its individual elements are sized and structured to work in concert with one another and to provide in the aggregate an unambiguous response capability essential for successful deterrence of nuclear war. Congress's recent curtailment of individual components of this integrated program tends to weaken all of them and puts at risk this country's ability to deter nuclear war in a cohesive, sustained fashion. We urge Congress to support specifically the development and deployment of new, capable ICBMs that are the bedrock of our nuclear deterrence. We simply can't afford to be wrong in maintaining the tools that are essential for the prevention of nuclear war. This Association believes that ballistic missile and strategic air defenses represent important deterrence capabilities. We must not let them atrophy.

The Administration's Strategic Defense Initiative (SDI) is a prudent, timely effort to gauge the technical feasibility and cost effectiveness of a layered, comprehensive ballistic missile defense system. SDI, this Association believes, is not escalatory; this research and development initiative represents a critically important, initial response to massive Soviet programs that have placed the USSR in the position of a clear-cut front-

runner in strategic offensive missiles and in the field of strategic defense. If technically feasible, strategic defense systems could provide an active means for protecting the American homeland—and our allies—should deterrence fail.

The Air Force Association remains convinced that the need for successful deterrence extends across the spectrum of conflict, including theater-nuclear, chemical, and conventional warfare. In cases where deterrence fails, we must respond by the flexible and sufficient



application of force to ensure that no area of vital interest is lost by default. If war is forced upon us, we must win—we cannot allow aggression to benefit the aggressor.

In summary, the Air Force Association sees clear evidence that the Soviet challenge and threat to our interests are global and mounting; deterrence requires, therefore, that we maintain the qualitative edge across all of America's global response capabilities. Anything less would jeopardize peace and liberty. ■





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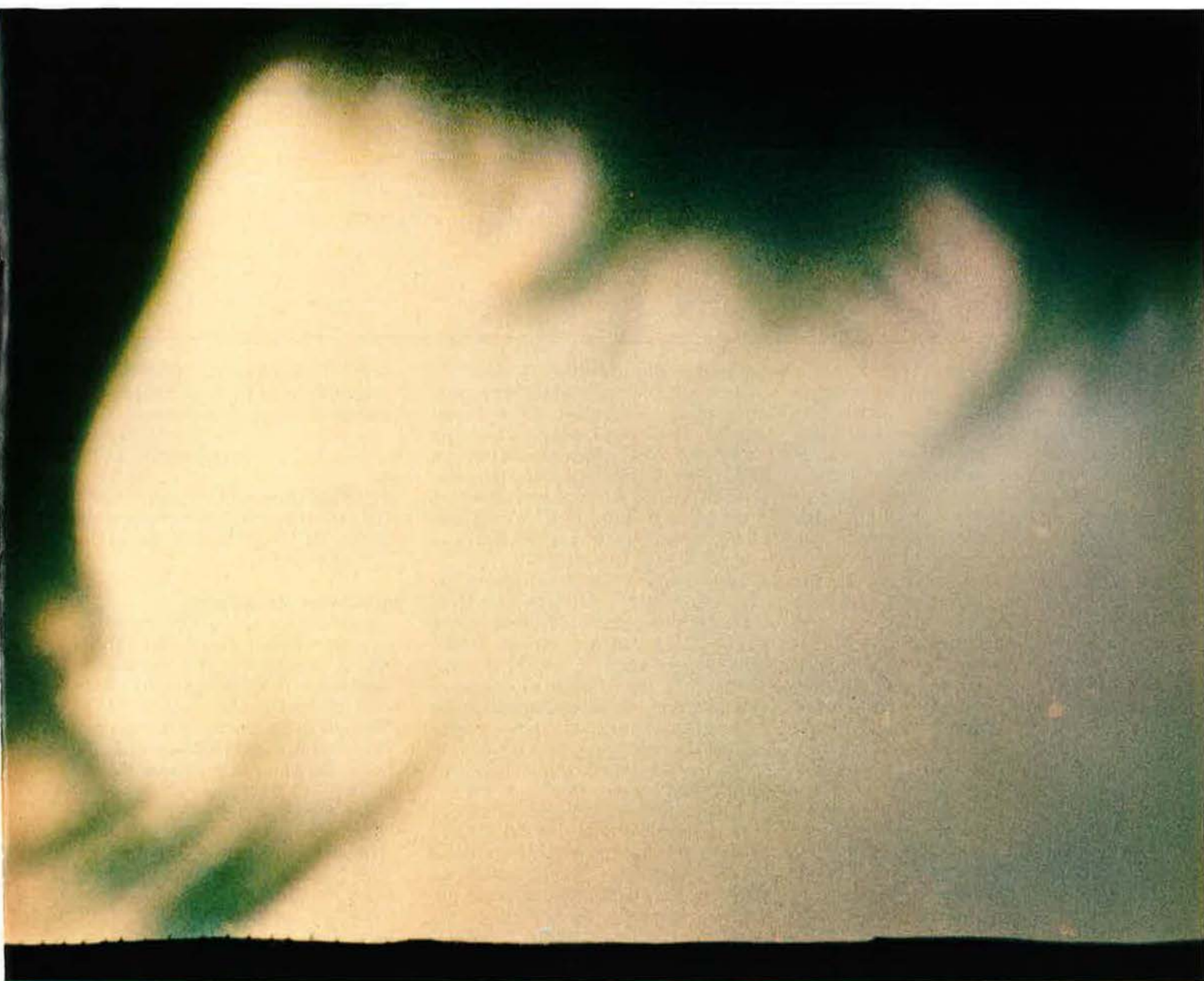
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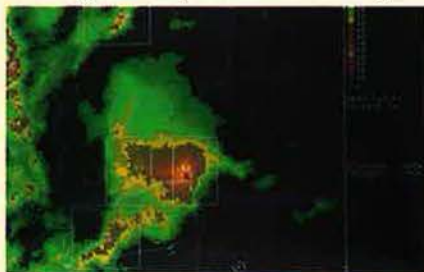


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# AIRMAIL

## Incomplete Analysis?

"The Soviets Below" by Norman Polmar in the September '85 issue (p. 102) is an interesting historical piece that complements his earlier articles on the same subject. There are a number of issues, however, that need to be discussed in order to give the readers and members of the Association a more complete picture.

Mr. Polmar states that, "under the terms of the SALT I and unratified SALT II agreements, the Soviet Union is limited to sixty-two modern strategic missile submarines with 950 missiles." In fact, SALT does *not* regulate the number of missiles carried aboard such submarines. Only the number of missile launchers is regulated. Furthermore, SALT II does *not* regulate the numbers of submarines or place explicit restrictions on numbers of SLBM launchers, except as they contribute to MIRV launcher sublimits and total numbers of strategic nuclear delivery vehicles.

Mr. Polmar also writes that "surviving Golf (diesel) and Hotel (nuclear) submarines armed with older SLBMs" are not included in SALT constraints. In fact, SALT I does count older SS-N-5 launchers aboard Hotel II. SALT II also counts these "older" Hotel launchers as well as newer ones found on the diesel Golf IIIs, IVs, and the lone Golf V. When Mr. Polmar states that "should the Soviets decide to 'break out' of the SALT agreements," one wonders about his interpretation of the President's Reports to Congress and numerous articles contained in AIR FORCE Magazine. The President stated on February 1 that the USSR "has violated" legal SALT II encryption and missile limitations. Does not SALT II Treaty violation constitute SALT "breakout"?

Another arms-control consideration that Norman Polmar should have more squarely addressed is that of the relationship of newer submarines and missiles to the imbalance in sea-launched systems codified by SALT I. That imbalance was due in part to the United States accepting the Soviet argument that Yankee submarines had to travel farther distances and re-

quired additional time in order to reach station. That argument does not apply to the Delta/SS-N-8 and newer long-range weapon systems that were under development even as SALT I was being negotiated. This situation will be more of a problem as the Soviets continue to replace Yankee with newer submarines and continue MIRVing the fleet.

The use of the term "strategic" by Norman Polmar reflects a US bias that is not at all reflective of Soviet use and view of the concept. Soviet "strategic" forces perform "strategic" missions that can change situations in vital sectors or theaters and influence the attainment of "strategic" goals. These, by definition, allow a nation to attain military success in a theater or victory in a war.

Characterizing the SLBM force as "Moscow's 'strategic' reserve" leaves the reader with the impression that it is the *only* reserve. Complete analysis should also explore or at least acknowledge the reserve role of ICBMs and air-breathing systems. The Politburo's fleet of some eighty ballistic missile submarines serves multiple Soviet "strategic" purposes. This fleet of submarines is virtually twice the size of the ballistic missile submarine forces found in the entire rest of the world.

Cmdr. James J. Tritten, USN  
Springfield, Va.

## Project Forecast

Your item on Forecast II was most heartening to me. (See "In Focus . . ." September '85 issue, p. 25.)

I always had the feeling that Fore-

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

cast I represented my most durable accomplishment in the Air Force. I appreciate your assessment.

Eugene M. Zuckert  
Washington, D. C.

● *Project Forecast I* was launched in 1963 at the direction of then Secretary of the Air Force Eugene Zuckert.—  
THE EDITORS

## Erroneous Designation

Your item on the GBU-15 precision guided weapon in the "Aerospace World" section of the September 1985 issue (p. 37) contained an error. The infrared seeker version of the GBU-15 glide bomb is designated GBU-15(V)2/B, not AGM-130. The nomenclature for the TV seeker version is GBU-15(V)1/B.

The AGM-130 designates the rocket-powered version of the GBU-15 and is presently in full-scale development. Like the GBU-15, we are developing the AGM-130 to use interchangeable TV and IR seekers. The AGM-130 will have several times more standoff range than the GBU-15, greatly increasing the tactical air forces' operational flexibility and aircrew survivability.

Col. Paul D. O'Connor, USAF  
Director, GBU-15/AGM-130 SPO  
Eglin AFB, Fla.

As a support equipment project officer with the GBU-15/AGM-130 program at Eglin AFB, Fla., I enjoyed reading about the success of our program in the "Aerospace World" section of the September '85 issue of your magazine.

However, it should be pointed out that both the TV and infrared versions of the weapon are designated GBU-15. The AGM-130 is essentially a GBU-15 with a rocket motor attached for increased range.

2d Lt. David Hughes, USAF  
Eglin AFB, Fla.

## The "Boys" Reply

I must reply to Mr. Joseph Rifkin's letter in the "Airmail" section of the September '85 issue (p. 10) in which he referred to the "boys" assigned to



the B-17 aircraft. I don't know about Mr. Rifkin, but I had the advantage of flying both aircraft. I took transition in the B-17 at Amarillo, Tex., and immediately fell in love with that big bird. It was all the superlatives you can find in the dictionary.

I took transition in the B-24 at Keesler Field, Miss., and while the airplane handled well, there was no immediate love affair. The first time I took off, I didn't know one had to tap the brakes, and the airplane started vibrating so much that I got scared, but the instructor told me why. The B-24 was a great airplane (the Ploesti mission proved that), but it could operate as well as—not better than—the B-17 with one engine out. I sighed a great sigh of relief when I was assigned after leave to MacDill Field, Fla., where I rejoined a B-17 crew as copilot.

One last item: Above many another picture from World War II, there is one that stands out. The picture shows a B-17, #124406, returning from a mission in North Africa. The B-17 was literally cut in half on a line diagonally from the waist position down to the tail section. The pilot flew it for an hour and a half this way and landed it. The back hatch was opened, and the airplane broke in half.

I doubt if there was a B-24 anywhere that could fly with that kind of damage.

Maj. Robert E. Donegan, Sr.,  
USAF (Ret.)  
Charleston, S. C.

● See page 42 of the June '85 issue for a copy of the photograph to which Major Donegan refers.—THE EDITORS

Re: Joseph B. Rifkin's letter "King of the Skies?" in the September 1985 issue:

Although the B-17's higher service ceiling was certainly an advantage over that of the B-24, it was not the only one: The Fortress carried twice the bomb load of the Liberator and, when measured against payload, outranged the latter.

In contrast to the B-17's legendary ability to absorb punishment, the B-24 was notoriously vulnerable to enemy guns, particularly in the wing structure area. Due to its double fin and rudder, I'm not sure that it was "better able to defend itself."

The exploits of the gallant Liberator crews, however, will forever remain indelible in military aviation history. They were the real glamor boys of the heavies!

George H. Keeney  
Abilene, Tex.

Re: The letter "King of the Skies?" in the September 1985 issue:

The B-24 was a good ship. A few of them landed at our Ninth Air Force field in France after being shot up too much to make it back to England and their own field.

The Eighth Air Force's B-17s and B-24s might have been queen and king of the skies, but the unsung advance Ninth Air Force boasted the A-20—the ace of the skies!

How about a story on the Ninth Air Force sometime?

Jerry Bingen  
Racine, Wis.

#### Airmen and Citizenship

This letter responds to the letter "Blue-Suit Aliens" in the "Airmail" section of the August '85 issue (p. 13):

The Airman Citizenship Effort (ACE) was established to work the problems facing the Air Force and its non-US citizen members. Through ACE, we are helping airmen to become US citizens by removing various limitations. We've been working with Immigration and Naturalization Service (INS) officials in Washington, D. C., to make it easier for airmen to apply and qualify for naturalization processing. INS officials have pledged their full support.

Regarding the writer's comment about security risks, there was no intent to imply that noncitizens are security risks. Becoming a US citizen is an affirmation of national allegiance, without which security clearances are not normally granted.

We in the ACE coordination office at the Air Force Manpower and Personnel Center (AFMPC) have been monitoring the progress of our airmen in becoming citizens. We will continue working with other Air Force offices and INS to ensure that our airmen will have every opportunity to become US citizens.

SMSgt. Joseph K. Beck, USAF  
ACE Coordinator  
Skills Management Div.  
Randolph AFB, Tex.

#### Training on the O-2

The story about the Cessna O-2 in the July 1985 issue of AIR FORCE Magazine was most interesting (see "The Duck Lives," July '85 issue, p. 128). The long service of the O-2 speaks well for our general-aviation industry, for the O-2 was purchased as an off-the-shelf civilian airplane with few modifications and planned only to be an interim FAC airplane. This time next year will mark its twentieth year of continual service.

I do wonder about the statement by the two majors that training for duty

in Vietnam consisted of a half day of academics, a few aircraft familiarization flights, etc. They must have gotten in the back door some way.

I was among the first to fly the O-2 in I Corps beginning in August 1967, and the FAC program that I started in began with seventy-two hours in the F-100 at Luke AFB, Ariz., to become century series fighter-qualified so as to understand the fighter-bomber pilot's perspective in air-to-ground weapons delivery. The many groups in this pipeline then went to Hurlburt Field, Fla., and the Special Air Weapons School for five weeks, which included twenty-six hours in the O-1s at Holly Field for FAC qualification, i.e., transition, pilotage navigation, target marking, etc.

En route to Vietnam, when processing through Clark AB in the Philippines, there was the ten-day Jungle Survival School, then to Binh Thui AB for O-2A checkout. This lasted for two weeks and consisted of twenty-three hours checkout and operational training before reporting to the TASS for duty.

Reflecting back on this, as a general rule, our Air Force gave the best of training before sending a person into combat.

Robert C. Mikesh  
Temple Hills, Md.

#### Military Management

The military is being maligned on all sides for alleged poor management practices. I have had the good fortune of having spent thirty years in the military—a good deal of it in management positions. I was the first comptroller in the Air Force and, in fact, in the Department of Defense. Upon retirement from the service, I had the good fortune of spending ten years in executive positions with major industrial companies. A number of these years were spent as CEO.

Actually, in many respects, the services are ahead and in fact leading the industrial parade in management organization and techniques. For example, the US Army Air Corps had the first comptroller in the services. The services have found many applications for computers, including their use in weapons as well as for management purposes.

Another area where the Air Force and maybe the other services lead is in the area of the utilization of the skills of retired senior officers. For example, in most cases in the business world when a senior executive or director retires, he is given a great send-off, thanked for his contributions, and promptly forgotten—dropped like a "hot rock." In contrast, the Air Force



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## AIRMAIL

Chief of Staff brings together his retired four-star generals and gives them a briefing on the current situation, problems, and proposed solutions and seeks the advice of the retired "old-timers." Obviously, not all of their suggestions are adopted, nor are they all relevant, but in this way a lot of good advice is brought into focus in considering solutions.

I think the Air Force deserves kudos for this and other such management advances. Retired executives and board members are a great source of knowledge that can readily be available to management.

Gen. Edwin W. Rawlings,  
USAF (Ret.)  
Steamboat Springs, Colo.

### F-4 Upgrade?

In the US, there are still more F-4 Phantoms flying than F-15s and F-16s combined. Replacing all F-4s in the next fifteen years while expanding the tactical fighter force to forty wings is unlikely.

Recognizing this situation, the Department of Defense has directed the Air Force to proceed with flight demonstrations of an upgraded F-4. This upgrade would give the F-4 the capabilities of newer fighters at a fraction of the cost. One proposed modernization package includes avionics from the F-16, F-18, and F-20, high-thrust smokeless engines, structural modifications to lengthen the service life, and a conformal fuel tank to increase the combat range. These improvements would make the F-4 a viable weapon system through the year 2005.

Depending on the avionics installed, the complete modification would cost between \$5 million and \$8.5 million. Maintenance costs would be greatly reduced, since much of the maintenance is currently performed on systems that would be replaced. Additional savings would be accrued by incorporating more fuel-efficient engines. These savings, combined with the extended service life, result in a life-cycle cost that is very attractive when compared with the life-cycle cost of new fighters.

One concern voiced is that the F-4 is not as maneuverable as newer fighters. Modern radars and reliable all-aspect missiles have changed air combat tactics. Today, aircraft can

often be detected and destroyed before maneuverability becomes a factor. When a dogfight does occur, it is no longer necessary to position a fighter behind the enemy aircraft or put its nose on the target to employ missiles. Prolonged maneuvering must be minimized to decrease the probability of being shot down by an undetected threat.

The improved performance of the upgraded F-4, combined with modern radar and missile capability, would produce a potent fighter against any air threat.

Currently, the F-4 provides an important capability lacking in the F-16. Specifically, the F-4 can destroy enemy aircraft beyond visual range by using radar missiles. The F-16 still cannot because of serious problems with the AMRAAM missile. If the AMRAAM becomes operational, the upgraded F-4 will also be able to employ it.

The F-4's air-to-ground capability would also be greatly improved by the upgrade. A modern weapons computer and new avionics would allow the F-4 to navigate and deliver ordnance as accurately as the F-16. New engines and the conformal fuel tank would permit large weapon loads to be carried on longer-range, high-speed interdiction missions.

Japan, Israel, Germany, and Korea are upgrading their F-4 fleets. Theirs is a pragmatic decision that incorporates the numerically superior threat, modern weapon system technology, finite defense budgets, and life-cycle costs.

AFA would be wise to support this proposed modernization strongly. It may not have the attractiveness of buying "shiny new aircraft"; it does, however, represent a *realistic* solution to the need for stronger airpower.

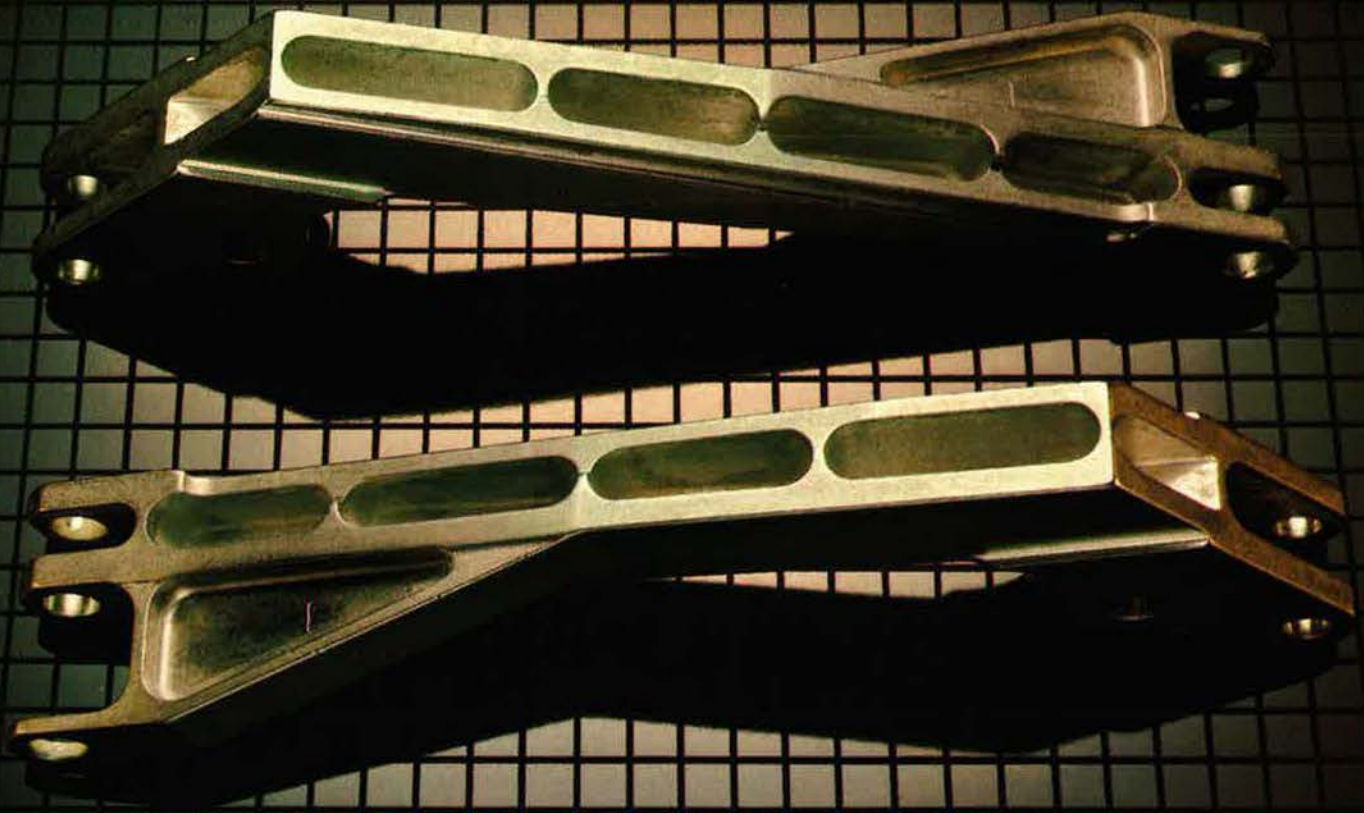
Jeffrey G. Canclini  
Dayton, Ohio

### Calling All Navigators

Recently at Fairchild AFB, Wash., the Inland Empire Chapter of the Air Force Navigator Association was established. Our organization is an extension of the larger organization that operates out of Castle AFB, Calif. The Inland Empire Chapter is currently seeking interested men and women who wear navigator wings (active duty or retired) and who would like to get involved in what is rapidly becoming an active, energetic group here in the Northwest.

We are also soliciting correspondence from anyone who has information, pictures, or personal stories about navigators who have made a mark in the Air Force (such as recip-





## What's the big difference between these two aerostructure components?

Actually, the biggest difference is in how they were manufactured. The one on top was manufactured by the "Factory of Tomorrow" at Vought Aero Products Division of LTV Aerospace and Defense—and it accounts for the big differences in cost and quality and time. It's called the Flexible Machining Cell, and it's the largest, most sophisticated and advanced manufacturing facility of its type in the world.

The Flexible Machining Cell is a remarkably versatile integration of automated machining centers, cleaning and inspection stations, parts carousels and chip collection system—all served by a robot transportation system and controlled entirely by computers.

Vought Aero Products uses it to help turn out advanced aerostructures at tremendous savings in time and money. Time and cost and quality. Those are the differences our contract partners look for in a team member.

The B-1B project is a prime example. We're one of the members of the B-1B team, producing the aft and aft-intermediate fuselage sections of the advanced bomber. A portion of that task, which would require 200,000 hours using conventional machining methods, will be done in 70,000 hours in our Flexible Machining Cell. That's a 3-to-1 productivity improvement, which cuts millions off the cost of the B-1B program.

LTV Aerospace and Defense Company, Vought Aero Products Division, P.O. Box 225907, M/S 49L-06, Dallas, Texas 75265.

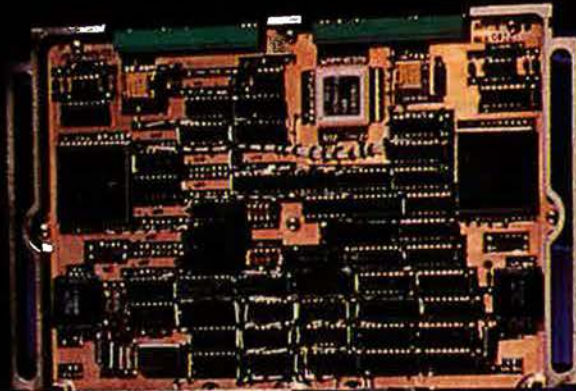


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# SINGER



ients of the Medal of Honor or the Distinguished Flying Cross or even just someone with a unique contribution). Our organization is compiling data on these distinguished navigators in order to create a detailed, historical presentation about them.

We need your help and will answer any and all correspondence. Please send all letters to the address below.

Michal Chick  
E. 2508 Casper Dr.  
Spokane, Wash. 99203

#### **Fifth Air Force**

A drive has been started by World War II veterans of the Fifth Air Force to place memorials at the Air Force Museum at Wright-Patterson AFB, Ohio, and elsewhere in commemoration of the role of the Fifth Air Force during World War II. Nineteen combat and service reunion associations representing units that served with the Fifth have banded together to form a nonprofit, tax-exempt war veterans organization for this purpose. Membership is open to individual veterans as well as reunion organizations.

For more information, contact the address below.

Fifth Air Force Memorial  
Foundation, Inc.  
P. O. Box 764  
Columbus, N. C. 28722

#### **S-1 Bombsight**

The Cradle of Aviation Museum on Long Island and an interested group of Sperry people would like to obtain for the museum an intact Sperry S-1 bombsight used in B-17s and B-24s during World War II. We are also looking for major units of the K-series bombing navigation system installed in B-36s, B-47s, and early B-52s.

We've been unable to locate any of these important analog computing systems, and we hope that AIR FORCE Magazine readers may be able to help. Please contact us at either of the addresses below.

W. K. Kaiser  
Cradle of Aviation Museum  
Mitchel Field  
Garden City, N. Y. 11530  
or

D. H. Keyes, MS 1T102  
Sperry Corp.  
Great Neck, N. Y. 11020

#### **352d Fighter Group**

A unit history of the 352d Fighter Group during World War II is in the early stages of preparation at this time.

Any members of the group or their families and relatives, friends, or anyone knowing the whereabouts of former members is asked to contact us.

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## **AIRMAIL**

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We need your stories and especially photographs so that the book will be as complete and detailed as possible.

If you can help, please contact me at the address below.

Tom Ivie  
115 Graden Way  
Fort Thomas, Ken. 41075

#### **373d Fighter Group**

On or about November 7, 1945, the 373d Fighter Group was inactivated. On May 24, 1946, the inactivated 373d Fighter Group was redesignated the 146th Fighter Group and was assigned to the California National Guard. Federal recognition of the 146th Fighter Group was extended on September 14, 1946.

As an Air Guardsman assigned to the present 146th Tactical Airlift Wing, I am interested in corresponding with former members of the 373d Fighter Group about the group's history with Ninth Air Force during World War II.

Please contact me at the address below.

TSgt. William J. Bennett,  
CalifANG  
146th TAW/HO  
Van Nuys ANGB, Calif.  
91406-1195

#### **44th Bomb Group**

I am in the process of writing my thesis for my master of arts degree. The subject of my thesis is the 44th Bombardment Group (H). The period of history that I am concerned with is January 15, 1941, to June 15, 1945.

I would be most interested in hearing from any surviving members of the 44th or from any readers who may have information that would aid my thesis. Anyone who can help is asked to contact me at the address below.

William K. Tolar  
3570 Cromart Ct., N.  
Fort Worth, Tex. 76133

#### **AFROTC Det. 800**

The Arnold Air Society of AFROTC Detachment 800, University of Tennessee, is conducting a search for alumni of this detachment. We would like to receive information concerning the past and present activities of graduates in order to commemorate the upcoming anniversary of our squadron's charter.

All alumni of Detachment 800 are invited to send a short biography and

photograph, if possible, to the address below.

AAS Alumni Search  
AFROTC Det. 800  
University of Tennessee  
Knoxville, Tenn. 37996

#### **AFROTC Det. 215**

If you are an alumnus of AFROTC Detachment 215, Indiana University, you are invited to join a new Detachment 215 alumni organization.

Many Detachment 215 alumni have lost contact with the detachment, and we have lost contact with many alumni. Our alumni organization hopes to bridge this gap.

If you are interested in our alumni organization, please contact us at the address below.

AFROTC Det. 215  
Rawles Hall 320  
Indiana University  
Bloomington, Ind. 47405

Phone: (812) 335-4191

#### **Collectors' Corner**

I am seeking complete uniforms or any uniform items that can be used to help boost the Project Warrior program.

I spoke to a Project Warrior audience concerning the AAF and the Air Force from 1947 to the onset of the Vietnam War and took along my OD Class A uniforms from the 1947-48 era. The uniforms turned out to be the highlight of the evening's program. While conversing with the participants, I noted that while we speak a great deal about our past warriors, we come up short on what they looked like. I'd like to remedy that to some degree. . . .

I need anything from the 1941-60 era, but especially khaki poplin shirts, long-sleeve khaki uniforms, any uniform items for pinks and greens (especially a fifty-mission crush hat and eagle), khaki socks, khaki ties, khaki and OD officer and enlisted overseas caps (especially with enlisted piping), "Jungle Jim" shorts and knee socks, any Shade 193 silver/tan uniform combinations, a set of gunner's wings, a khaki service cap cover, one-piece fatigues, Air Force blue "Ike" jackets, khaki belts, and issue or PX brown low quarters.

I need the name, grade, unit, year of use, and present or retired grade of any persons who can donate any of these items so that proper display plaques can identify past warriors. Donations will be welcomed.

CMSgt. William S. Stetson,  
USAF (Ret.)  
3015 Los Robles  
Alamogordo, N. M. 88310

Phone: (505) 437-5858





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# AIRMAIL

I am a military decoration history buff. Over the past years, I have collected different medals associated with each military decoration and am in the process of building displays for these medals that will trace their history. After completion, I plan to display them and give anyone the opportunity to discover and enjoy the history of military decorations.

However, there are quite a few that I don't have. In order for my display to be successful, I need help from readers. If anyone has a medal or medals that they would like to make a part of this historic display, please send them to me. The display will include the donor's name along with the medal and a brief history of the decoration.

If any readers have any medals that they can donate or any information concerning military decoration history, I would like to hear from them. Please contact me at the address below.

1st Lt. Michael E. Cooley,  
USAF  
204 General Arnold Blvd.  
Fort Worth, Tex. 76114

I have a World War II coverall that was standard issue to Luftwaffe flight crews. It is a full coverall made of horsehide, and it's in excellent condition.

It has zippers at the cuff and ankle and is wool-lined. It also has a German ID at the back of the neck. I used it for open cockpit flying a few times, and it fits me perfectly—I'm six feet three inches.

I would like to see it in a serious collector's hands. My price is reasonable.

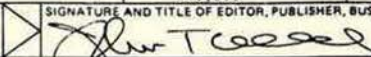
Please contact me at the address below.

Kenneth R. Barton  
P. O. Box 3235 WVS  
Kamuela, Hawaii 96743  
Phone: (808) 883-9018

I am a cadet technical sergeant in the Civil Air Patrol and have recently started a military patch collection. I would appreciate any donations of spare patches that readers might have.

Please send any donations to the address below.

Erik Jones  
4915 SW Pendleton  
Portland, Ore. 97221

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I am a keen collector of anything relating to the McDonnell Douglas F-4 Phantom.

I would like to collect any photographs, slides, etc., of the F-4 in service with the US Air Force—past and present. I am willing to buy or trade for any F-4 items.

Please contact me at this address:

Flt. Lt. T. J. Carter, RAF  
Officer's Mess  
RAF Leuchars  
St. Andrews  
Fife KY16 OJX  
Scotland, UK

I am starting to collect Army Air Forces and Air Force insignia,

patches, and uniform items from World War I, World War II, Korea, and Vietnam. I would appreciate any donations of such items, but I am willing to pay low prices for any items for my collection.

I will write back to all contributors. Please contact me at this address:

Benjamin Grier  
W5220 Pinedale Ct.  
Spokane, Wash. 99208  
Phone: (509) 466-5060

I am a San Francisco police officer and a member of the Air Force Association. I am starting a collection of military patches.

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Central Police Station  
766 Vallejo St.  
San Francisco, Calif. 94133

### Roll Call

I am seeking information on John Hickman, author of the book *For God, Country and the Hell of It*. He was an internee in Switzerland during World War II. He served in the 67th Group, Ninth Air Force, as a fighter pilot and was shot down over Germany in 1944. He subsequently escaped to Switzerland.

We are forming a Swiss Survivors Association of Internees, comprising all Allied airmen who were shot down and interned in Switzerland during 1942-45. We are seeking as many former internees as possible for the organization.

If any readers know the whereabouts of John Hickman or are interested in the internees association, please contact me at the address below.

Forrest S. Clark  
220 Fairmount Ave.  
S. Plainfield, N. J. 07080

I am seeking information on my father, SSgt. James Walter Hathaway of Cordell, Okla.

He was a flight engineer in B-29s with the 345th Bomb Squadron, which was commanded by Col. Winston R. Close and operated out of Yokota, Japan, during the Korean War. My father was killed on August 6, 1952, when two engines failed on takeoff from Yokota. Two other crew members died in the accident—Orval Funk and Howard M. Higley. Other crew members included James I. Solomons, Howard L. Bowman, Charles R. Westfall, Robert B. Quackenbush, William R. Steele, Jr., Stephen Rotolo, Edward A. Calligan, and Kerrin H. Coyne.

Anyone having any information about this incident or my father should contact me at the address below.

Scott Hathaway Madry  
101 Oleander Rd.  
Carrboro, N. C. 27510

Phone: (919) 942-5825

Did you know Bert Stiles?

I am a writer seeking information and photos on 1st Lt. Bert Stiles, a native of Denver and author of the posthumously published book *Serenade to the Big Bird*. He flew as a B-17 copilot with the 401st Bomb Squadron, Eighth Air Force, and later flew P-51s with the 505th Fighter Squadron, all in 1944.

Any veterans with firsthand acquaintance with Lieutenant Stiles should contact me at the address below.

Mike Minnich  
86 Milverton Blvd.  
Toronto, Ontario M4J 1T8  
Canada

I am trying to locate my copilot from World War II. His name is Tom B. Stewart.

Tom probably retired in the early 1960s as a colonel (or possibly as a brigadier general). He was a native of Texas. We were assigned to the 389th Bomb Group of the Eighth Air Force in England. I last saw him at Loring AFB, Me., in 1955.

I would like to hear from anyone knowing the whereabouts of Mr. Stewart.

Anthony J. John  
110 Lexington Ave.  
N. Dartmouth, Mass. 02747

I am looking for any information that readers might be able to pass on concerning Clarence Bernard Johnson, last known stationed at Mount Laguna, Calif., in 1958.

Please contact me at the address below.

Rebekah Gallaway  
71 Dongan Blvd.  
Manorville, N. Y. 11949

I am trying to locate a Maj. Earl Fletcher who was stationed at Offutt AFB, Neb., between 1955-59.

If anyone has any information about Major Fletcher, would they please contact me at the following address?

A. J. Eyre  
2444 Charlestown  
Toledo, Ohio 43613

I am trying to locate members of a B-25 crew who flew with pilot William Rushworth. The crew flew with the 499th Bomb Squadron, 345th Bomb Group, Fifth Air Force. Crew members include Leroy Puthoff, John Knerr, and Nick Prassos.

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Sam K. Brown  
P. O. Box 214471  
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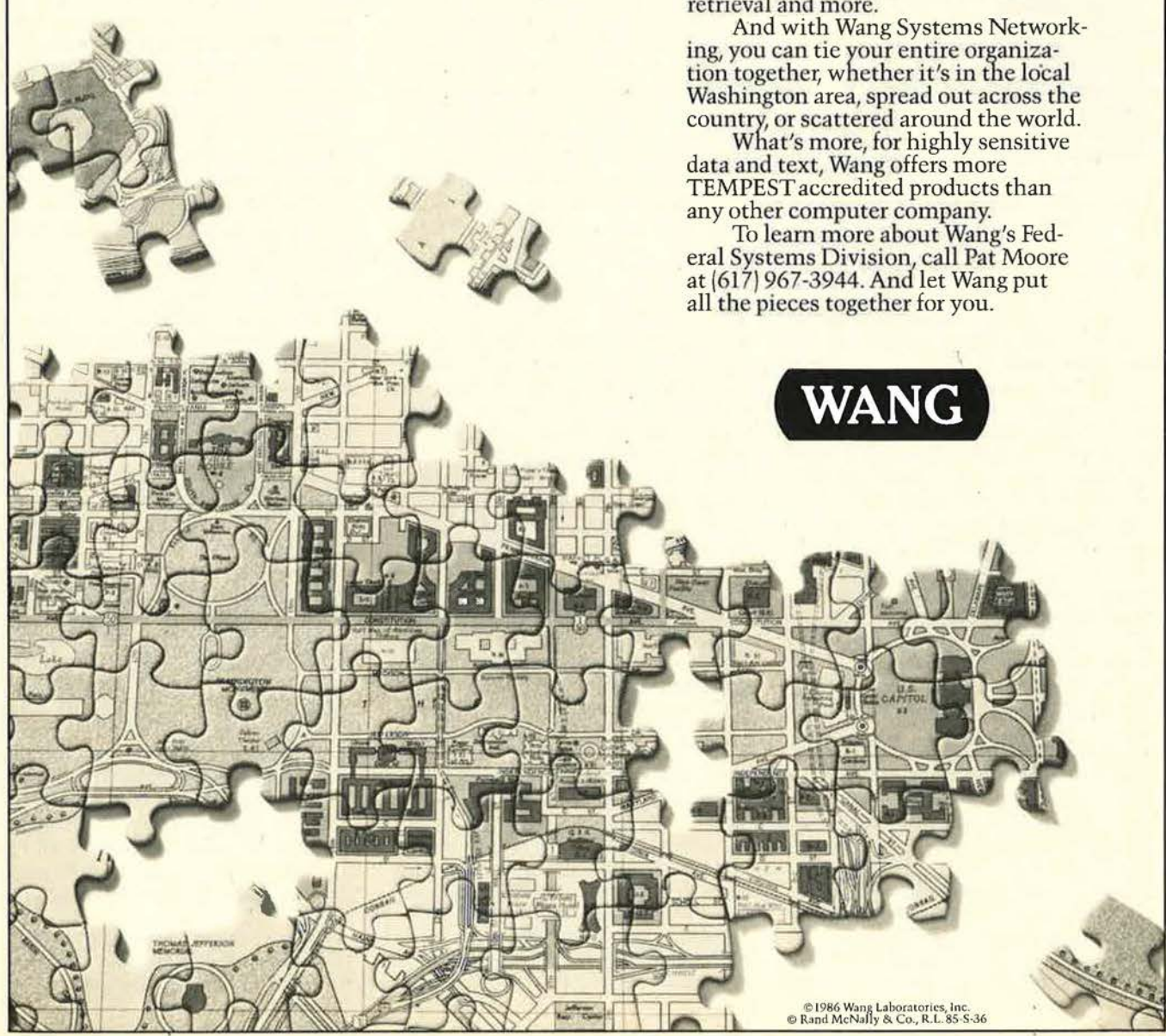
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## IN FOCUS...

# Where the Money Went

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

*Substantial cuts in defense have not helped reduce the federal deficit. Congress used every penny to fund increases in other programs and to cover underestimates in its budget calculations.*

Washington, D. C., Sept. 26



Floated by witch-hunting budget analysts and gleefully amplified by the "gotcha" instincts of influential media, two fundamental misstatements of fact are acquiring the facade of unassailable dogma: Defense funding is so lavish that—in spite of wasting funds—the Pentagon is falling behind more and more in spending the available money; conversely, even drastic congressional cuts won't impair essential defense needs in either the manpower or the hardware sectors.

These myths are music to the ears of liberal and conservative elements of Congress alike, for they hold out the hope—falsely—that here is a magic wand for either "plussing-up" spending on social causes or reducing the budget deficit. It can be argued that Defense Department tactics in response to budget cuts in some recent instances have been less than politically brilliant. A case in point was the "discovery" early this year of about \$4 billion in unspent funds at precisely the moment defense spending was taking a \$4 billion hit.

Congress seems bent on siphoning off this imaginary backlog in Pentagon spending, with the result that even many traditional defense supporters tend to favor "zero-growth" appropriations over the next few years. The Administration, in turn, responded defensively by ordering the services to come up with a variety of options for long-term budget cuts in line with anticipated lower funding

levels. The result was a series of "decrements," a euphemism for program cuts and terminations.

In a welcome break from this spirit of accepting the allegedly inevitable, Deputy Secretary of Defense William H. Taft IV recently went on a noteworthy offensive when he told a Los Angeles Townhall meeting that these myths were a "fraud on the public," covered up by political rhetoric. Arguing that the defense budget is ultimately a "national security issue, not an economic one," Secretary Taft urged that "the national security effects of different budget levels should be given far more consideration than is currently the case in a Congress obsessed with the need at least to appear to be cutting the budget."

Over the past eighteen months, he asserted, about \$300 billion has been cut through FY '89. He provided this itemization: \$55 billion was excised from the defense request as a result of the so-called "Rose Garden" compromise between the White House and the Pentagon in March of 1984. Later that year, Congress cut \$29 billion by dint of a budget resolution. This year's budget resolution inflicted a \$132 billion cut on top of last year's. Finally, cuts in the "out-years" over the past year and a half came to \$64 billion in FY '87, \$74 billion in FY '88, and \$85 billion in FY '89. In the aggregate, these reductions lowered defense spending by sixteen percent from the original request.

A particular irony attends these cuts and demolishes a shibboleth treasured by conservative as well as liberal defense critics—to wit, the notion that lower defense spending is the key to cutting the federal deficit. The facts tell a different story, as Secretary Taft pointed out. Defense cuts have not produced corresponding reductions in the deficit, and, in fact, in 1985 and 1986, "the deficits have unfortunately increased from the projections made before the defense budget was cut." He added that the contention that the larger defense budgets of recent years are the principal cause of the deficits is *not* borne out by the historical record: "First, deficits were

large and rose significantly during the 1970s, when defense budgets were declining."

Another fact that makes hash of convenient, plausible, and invalid theorems about lower defense spending leading to lower deficits is that relatively large recent defense budgets represent a substantially smaller portion of current federal spending and Gross National Product levels than was the case in the 1950s and 1960s. During that period, "balanced budgets were not uncommon, and the deficits were trivial by current standards. Since 1969, when we had our last balanced budget, nondefense, nonpurchase spending has risen by 0.4 percent of GNP per year in real terms—from about six percent to almost twelve percent—while defense spending has barely changed at all."

Other things being equal, it would seem logical to assume that a reduction in the defense budget would pay off over time in a reciprocal cut of the deficit. But this arithmetic doesn't hold water in practice. One of the reasons why it doesn't, Secretary Taft claimed, is the legislative branch of government: "Congress has used every penny of the \$66 billion it has cut out of defense outlays for 1985 and 1986 in the last eighteen months—and \$31 billion besides—to fund increases in other programs and to cover underestimates in its budget calculations."

Unambiguous statistics back up this argument. The projections of January 1984 compared with those eighteen months later disclose that defense outlays (actual spending) were cut by 23.4 percent in 1985 while the deficit shot up by \$30.9 billion; the 1986 figures reflect a \$42.4 billion cut in defense outlays from the original level while the deficit went up by \$700 million. The lesson from these figures, Secretary Taft suggested, is that "the public has been seriously misled by those politicians who promised to cut the deficit by cutting the defense budget."

As for the widely held view that even though large dollar cuts may have been made, no harm has come to real



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defense capabilities and that more painless reductions can be made in the future, Secretary Taft said, "It would be nice [if this were] true. Unfortunately, however, it is nonsense. And it is dangerous nonsense, [for] it hides the very real and substantial impact that these reductions have had and will have on our defense forces." While the Pentagon has tried to ameliorate the effects of the recent cutbacks through spartan management measures, "the Defense Department simply cannot absorb, and has not absorbed, funding cuts on this scale without translating those figures into fewer aircraft, fewer ships, less capable weapon systems, and a smaller force—[or] simply put, less security and more risk."

The toll in terms of airpower is likely to be a twenty percent-plus reduction in tactical aircraft for the Air Force and a fifteen percent reduction for the Navy. Compounding this cutback in aircraft are concurrent reductions in weapons available for use by these platforms. He cited, by way of an example, "almost 24,000 fewer infrared Maverick missiles, [which are] designed to give our forces the technological edge needed to overcome our adversary's numerical superiority." In the field of airlift, the cumulative effect of the recent budget cuts will likely lead to cutbacks in the acquisition of heavy lift aircraft, "making it even more difficult to meet the congressional goal of 66,000,000 ton-miles per day in [intertheater airlift capacity]—a goal essential to meeting our worldwide commitments."

The Navy and the Army don't get off unscathed either: The Pentagon's shipbuilding plan suffers major setbacks because of spending cuts imposed over the past year and a half. The effects are similar in the case of the Army and the Marines. Secretary Taft cited specifically a twenty percent cut in Bradley fighting vehicles, a reduction by almost thirty percent in Patriot air defense missiles, curtailed helicopter procurement, and a twenty percent plunge in helicopter antitank missiles "at a time when Soviet armor is widely recognized as a major threat to our forces." The Navy loses twenty warships, including six Aegis ships, which equates to a decrease in "fleet anti-air warfare capability of about fifteen percent." Attack submarine and support and auxiliary ship construction also had to be cut back significantly to accommodate the budget reductions.

In the field of force structure and manpower, the budget cuts mean that "more than 175,000 active and more than 85,000 reserve personnel have

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## IN FOCUS...

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been dropped from our plans. Compensation and quality of life improvements for our service men and women have been deferred," according to Secretary Taft.

The severity of the risks that ensue from these program stretchouts and terminations might compel the Defense Department and the White House to "recommend larger budgets" in the future, Secretary Taft said. "I don't think it is unfair to say," he added, "that the programmatic impact of the cuts was not considered in any depth when the [reduction] levels were decided on by Congress."

The central point made by Secretary Taft deserves everybody's attention, on Capitol Hill and off: "The pattern of the last eighteen months—lower defense budgets and rising deficits—is one the country can no longer tolerate."

### The High Risks of a Comprehensive Test Ban

The picture of gushing bonhomie projected abroad by Mikhail Gorbachev's Kremlin seems to have created a mirror image in the US Congress: Hoary arms-control initiatives and nuclear freeze schemes dropped long ago as infeasible, unenforceable, and insipid are being dusted off and trundled out as serious legislative proposals. One of these is HR 3100, a scheme to freeze nuclear and space weapons acquisition, test, and deployment across the board on a reciprocal basis with the Soviet Union. DoD's Assistant Secretary for International Security Policy Richard N. Perle termed HR 3100, which is being cosponsored by 103 House members, "perhaps the silliest piece of legislation I have seen in almost twenty years of observing Congress."

A related measure, Joint Resolution 3, sponsored by the Democratic caucus and scheduled for floor action in the near future, calls on the President to seek Senate ratification of the interrelated Threshold Test Ban and Peaceful Nuclear Explosions Treaties (TTBT and PNET, respectively) and, in addition, to negotiate a Comprehensive Test Ban Treaty with the Soviets. The Carter Administration had dropped efforts to seek a comprehensive test ban for a variety of technical and political reasons.

Nuclear testing, the Department of

Energy's Assistant Secretary for Defense Programs William H. Hoover recently told Congress, is necessary to modernize and modify nuclear explosives for new weapon systems; to maintain the performance of deployed weapons; to make weapons safer, lighter, more tamperproof, and more sparing in the use of special nuclear materials; to investigate the effects of nuclear detonations on military systems and communications; and to gain basic information about the physical phenomena associated with nuclear explosions.

Secretary Hoover, along with many other expert witnesses from the Defense Department, the Department of Energy, and the national laboratories, expressed grave reservations about both CTB and TTBT in recent hearings before the House Armed Services Committee's Subcommittee on Arms Control and Disarmament: "We are concerned that a test ban could greatly limit our ability to respond to varying military challenges. We are concerned that, by casting doubt on the reliability and effectiveness of our nuclear deterrent, a test ban could make world war more likely rather than less."

DoD's Assistant for Atomic Energy Richard L. Wagner added that CTB "could lead to greater instabilities and would, therefore, not serve the interests of deterrence or of world peace. The peace sought so genuinely and earnestly by the proponents of [a test ban] would be more in jeopardy, not less."

The expert witnesses agreed that a test ban, contrary to the contentions of proponents of a nuclear freeze or test ban, "could be neither mutual nor fully verifiable." The Soviet Union, Secretary Hoover suggested, could conduct clandestine nuclear weapons tests in space: "Such tests would not be exorbitantly expensive and would then be virtually unrestricted in terms of yield. If it were masked by the sun, for example, a test of many megatons could go undetected."

But the Soviets wouldn't even have to go to outer space to circumvent a test ban, according to Mr. Wagner: "Tests could be conducted in cavities, [such as salt domes], thereby decoupling the energy from the surrounding area." Such a technique enables a determined violator to test at militarily significant yields—in the ten-kiloton range—"without producing seismic signals that we could detect or distinguish from earthquakes." Other ways of cheating, he said, might involve the use of earthquakes to mask covert tests, thereby enabling the Soviets to "test several times a year, and



once or twice a year at appreciable yields."

There also is no way of pinning down clandestine Soviet nuclear tests in remote ocean areas or in the atmosphere above remote parts of the world because "even if we collected samples of debris from the event, we would find that nation-of-origin stamps are not embossed on radioactive debris." The Soviets, Mr. Wagner said, "have at least experimented with partially decoupled tests."

The Soviet track record on compliance with TTBT and PNET clearly does not inspire confidence: "Several Soviet tests since 1976 [when both countries pledged to abide by the unratified treaty that outlaws underground tests with a yield greater than 150 kilotons] had yields estimated by the US to be above [that value]," the DoD official pointed out.

The folly of halting nuclear weapons tests and deployments on the basis of an unverifiable accord as proposed by HR 3100 was spelled out further by Secretary Hoover: "Contrary to the statement of that bill that a freeze would 'improve the deterrent effectiveness of existing nuclear forces,' we are convinced that such a freeze would have a significant detrimental impact on the very existence of the deterrent."

Because the same people and facilities that are used to develop weapons also check and maintain the nuclear stockpile, shutting down one operation would affect the other, he argued: "Without being able to produce new components or remedy reliability problems that may appear in the future, we cannot avoid increasing degradation in performance and, ultimately, loss of weapon capabilities altogether."

Mr. Wagner conceded the appeal of the specious theory that if nuclear weapons can't be tested, they would lose their utility and wither away: "But in the real world, what would happen is that both sides would compensate for worst-case estimates of unreliability by using higher yields and deploying more warheads." Any decreased warhead reliability increases instability. Relying on uncertainty to accomplish nuclear disarmament amounts to "literally rolling dice for the future of the world."

All witnesses agreed that no new nuclear weapons should be fielded without testing. A comprehensive test ban, thus, would hinder the development of the US Navy's new D-5/Trident II SLBM, in effect rule out development and deployment of survivable, mobile ICBMs, and preclude other weapons required in the future by

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## IN FOCUS...

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changes in the Soviet threat. These requirements might include using maneuverable reentry vehicles to penetrate sophisticated Soviet ballistic missile defenses, earth-penetrating weapons to hold at risk extremely hard, buried targets, and completely new nuclear weapons optimized for the generation of microwave radiation to cope with mobile Soviet strategic weapons and associated support systems.

Soviet responses to US invitations to participate in measures that could assist in mutual verification of nuclear test ceilings have so far been negative. On July 29, 1985, for instance, the US formally invited the Soviet Union to send technical experts to this country's nuclear test site in Nevada and to bring any equipment they deemed necessary to verify US nuclear test yields. The Soviets declined, presumably because of apprehensions that they might have to reciprocate in one form or another.

The US, meanwhile, is working toward narrowing the wide span of uncertainty associated with gauging the yield of Soviet nuclear weapons tests. Recent efforts include the development of advanced seismic arrays and the use of the deep-ocean drill ship *Glomar Challenger* to implant sensors and recording devices deep beneath the seabed in international waters to monitor Soviet tests in the Kurile-Kamchatka region.

Possibly the best counsel that could be given to the supporters of HR 3100 and Joint Resolution 3 are the words that President Kennedy uttered on the heels of a flagrant Soviet testing violation in 1962: "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." The question is, will history repeat itself?

### Washington Observations

★ Far and away the biggest Soviet success story in the technological arena is the masterfully orchestrated purloining of US and other Western technologies. In releasing an updated report on Soviet acquisition of free world, mainly US, technology, Secretary of Defense Caspar W. Weinberger complained, "We are subsidizing the military buildup of the Soviet Union, and the costs have been staggering.

By systematically acquiring Western secrets from high technology manufacturers, research centers, universities, and defense contractors, the Soviets are advancing their military programs by several years and saving themselves several tens of thousands of man-years of scientific research each year. At the same time, they are requiring us to spend far more for our own defense than would otherwise be the case."

★ The SDI's first laser weapon lethality test on September 6, 1985, was a resounding success. A Mid-Infrared Advanced Chemical Laser (MIRACL) irradiated and pulverized the second stage of a Titan I booster missile in a static ground test at the White Sands Missile Range, N. M.

★ The White Sands Missile Range was also the site of a tough, highly successful test of AMRAAM, USAF's new Advanced Medium-Range Air-to-Air Missile. An F-15 of the Armament Division's 3246th Test Wing, flying at Mach 0.9 at about 16,000 feet, shot down a QF-100 drone as it traveled at high subsonic speed some 1,000 feet above the desert floor. The missile flew the first leg of its flight course under control of its inertial reference unit and then homed in on the target with its on-board active radar. The launch-and-leave weapon's radar easily filtered out the ground clutter to lock on the drone. The test marked the third "bull's-eye" in a row for the AMRAAM program.

★ One of the more daring concepts under consideration by the Pentagon for dealing with the rapid increase in the number of mobile targets in the Soviet Union involves the linkup of ATB and JSTARS. The idea is to use a derivative of the Advanced Technology (Stealth) Bomber as the platform for the Joint Surveillance and Target Attack Radar System to spot and designate moving targets with the latter's moving target indicator.

★ Another advanced technology concept under preliminary, tentative consideration involves the use of transatmospheric vehicles (TAVs) as fractional or multiple orbital bombardment systems (FOBS/MOBS). Such a weapon system could be based flexibly and survivably at literally thousands of airfields and—since it is recallable—launched under crisis conditions or on warning. Whether or not such vehicles could survive sophisticated surface- or space-based interceptors or directed-energy weapons is not clear at this time. ■





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A team our aircrews can bet their lives on.

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# but them together: found a whole new way to piece by piece, Gutenberg y taking words apart

For centuries scribes had to hand-letter words slowly, stroke by stroke, until a page could finally be completed. Then about 1450 an ingenious craftsman named Johannes Gutenberg was struck by a simple yet profound idea. Each individual letter of the alphabet could be cast in metal. The letters then could be arranged into words, sentences and paragraphs. Now pages of writing could be reproduced faster than any scribe had ever imagined.

Gutenberg had the vision to take the metalworking technology of his time and apply it in a way that revolutionized communication forever. At IBM Federal Systems Division we know it takes the same kind of ingenuity and vision to design and integrate today's complex systems. And that's exactly what we're doing in our Very Large Scale Integration programs. We've created a flexible system similar to Gutenberg's movable type, to piece together VLSI designs. So now we can design circuits in days instead of months.

What's more, we're combining this design technology with our pioneering efforts in semiconductor lithography. We've also produced the fastest and densest signal processing chip available today. And we're working on more advanced designs to process larger volumes of vital information faster than ever before.

In every project we undertake, we start with a myriad of individual elements, often as separate as the letters of the alphabet. And we integrate them for unique new applications.

It's challenging work. But at IBM Federal Systems Division it's what we thrive on. Maybe that's why the more complex the task, the more we manage to make it happen.

Federal Systems Division

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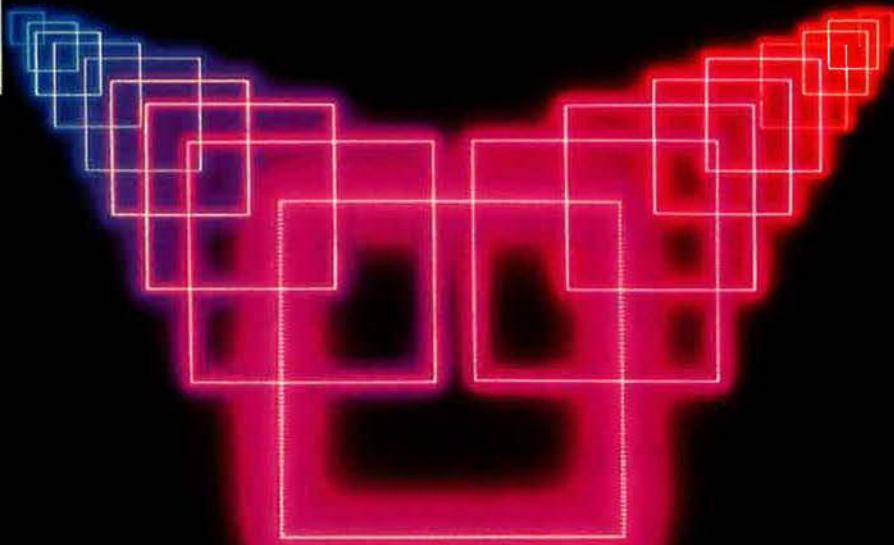
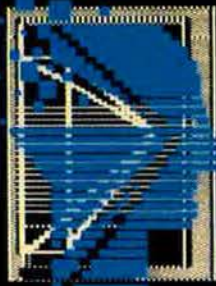
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Federal Systems Division





## TRW Rapid Prototyping

**Problem:** I know you believe you understand what you think I said, but I am not sure you realize that what you heard is not what I meant.

**Solution:** TRW Rapid Prototyping.

The systems TRW builds today differ markedly from those of even the recent past. The strength of these new systems derives from their interactive nature, supporting human users, automating a variety of data processing tasks. Yet it is this human component which makes these systems so complex. Requirements are often subjective, vague, unknown or incompletely defined. Our best methodologies fail to grapple fully with the intricacies of the human/machine relationship. Yet it is upon this point that ultimate success or failure turns.

TRW solves this problem by rapidly building system prototypes to allow user/designer interaction. State-of-the-art man-machine interface technology combined with a vast library of applications software modules serve as a sketchpad for system designers. The process is called user engineering.

Very early in the design phase an interdisciplinary team of software engineers, system designers and psychologists meets with users to analyze their tasks, define scenarios of operation and build prototypes which look and feel like the real thing. The prototypes become vehicles for communication with users who help determine how the system must function.

With user guidance the prototype is refined, step-by-step, until it closely reflects the final proposed system design. TRW is dramatically reducing the risks of system development through rapid prototyping and user engineering. We can quickly discover and validate user needs, make better tradeoffs among alternatives, and much increase the probability of users' ultimate satisfaction.

Yes, now that's what I meant.

**TRW Defense  
Systems Group**



# CAPITOL HILL

By Brian Green, AFA DIRECTOR OF LEGISLATIVE RESEARCH

## Washington, D. C., Sept. 16 Defense Funding Controversy

Controversy continues to swirl around the compromise defense authorization bill, which, at this writing, has not passed the House. The bill was passed by the Senate on July 30 by a vote of 94-5.

Many House members are upset that the joint authorization conference adopted the Senate defense spending figure of \$302.5 billion rather than the \$292.5 billion approved by the House. There is also concern that the House conferees yielded to the Senate too often on other issues, particularly those related to procurement reform. Thus, the House vote on the conference report, originally delayed from late July to early September, has been delayed again. A House rejection of any portion of the compromise package would send the bill back to conference.

To avoid that complication, an arrangement is being worked out to save the authorization compromise. Rather than permit separate votes on specific parts of that bill—a proposition that House Republican leader Rep. Robert Michel (R-Ill.) likened to "the first crack in the dam . . . [leading] to a deluge of separate votes"—its opponents would be allowed to express their opposition in the appropriations process. Passage of the authorization bill, according to well-informed sources, will be accompanied by a vote on a "sense of the House" resolution stating that no more than the \$292.5 billion should be funded by the Appropriations Committee. A provision would be made to allow any member to challenge any higher figure coming out of the Senate-House appropriations conference.

Another special rule would permit the language of the House authorization bill on procurement reform to be attached to the House appropriations bill. Attaching such riders to appropriations bills is prohibited by current House rules. If approved in the appropriations process, the proposed House reform provisions would supersede the compromise language of the authorization bill.

This maneuvering has been compli-

cated by the illness of the chairman of the Defense Subcommittee of the House Appropriations Committee (HAC), Rep. Joseph Addabbo (D-N. Y.). His absence clouds the date of the defense appropriations bill markup, originally scheduled for mid-September. Either Rep. Bill Chappell (D-Fla.), the second ranking Democrat on the Defense Subcommittee, or Rep. Jamie Whitten (D-Miss.), the chairman of the HAC, could run the Defense Subcommittee in Representative Addabbo's absence. There are, however, some reports of resistance to either of them taking an active role in marking up the defense appropriations bill prior to Representative Addabbo's return.

Because of these complications, the defense appropriations bill is unlikely to be approved by October 1, the start of the new fiscal year. Passage of a continuing resolution (CR) is thus probable. The CR would provide funds to continue currently authorized programs until an appropriations bill is passed and signed into law.

## MX Controversy Eased

A simmering dispute between Chairman of the House Armed Services Committee Les Aspin (D-Wis.) and Secretary of Defense Caspar Weinberger concerning the future of the MX missile has been eased by a conciliatory letter written by the Secretary to the Chairman.

Secretary Weinberger had contended that the authorization bill, which limited the number of MX ICBMs housed in Minuteman silos to fifty, did not rule out the possibility of further MX deployments in a more survivable, congressionally approved basing mode. Chairman Aspin objected strongly to the tenor of these remarks, stating that the fifty MX cap was permanent, barring a new basing mode or a change in the international situation.

Secretary Weinberger, in a September 4 letter to Representative Aspin, stated that "we have no problem with the conference decision . . . that puts a limit of fifty MXs to be deployed in existing Minuteman silos" and that DoD plans include no funding for any

additional MX deployment in Fiscal Year 1987. He added, however, that studies and field testing of various basing modes would continue throughout the next year.

## ASAT Opponents Hold Hearings

Opponents of the US antisatellite (ASAT) weapon test against an object in space (successfully conducted on September 13) strongly criticized the US ASAT test and the certification submitted by the Administration to Congress at hearings before a subcommittee of the House Foreign Affairs Committee.

Arms Control and Disarmament Agency Director Ken Adelman defended the Administration position at the hearing. He argued that "[we] are seriously exploring, with the USSR, arms-control arrangements intended to prevent an arms race in space," but that "[we] have been unable, to date, to identify a specific ASAT proposal [that is] verifiable and consistent with US national security."

Rep. George Brown (D-Calif.), a leading opponent of US ASAT development, harshly criticized this view in his testimony before the subcommittee. He claimed that the certification failed to meet the congressional mandate that the President attest that the US is negotiating in good faith with the Soviets. He noted that the certification only attested that the US is continuing "to study possible ASAT limitations in good faith." He described the certification as a whole as "less than candid" and "disingenuous."

Representative Brown suggested that the real significance of the continued ASAT testing was to influence the November summit meeting between President Reagan and Soviet leader Mikhail Gorbachev. He also contended that continued ASAT testing is a "subterfuge" to allow tests of strategic defense technologies that would otherwise be prohibited by the ABM Treaty. The ABM Treaty controls the development, testing, and deployment of ballistic missile defenses, some of which, he alleged, are technically similar to the US ASAT being tested. ■



# AEROSPACE WORLD

## News, Views & Comments

By James P. Coyne, SENIOR EDITOR

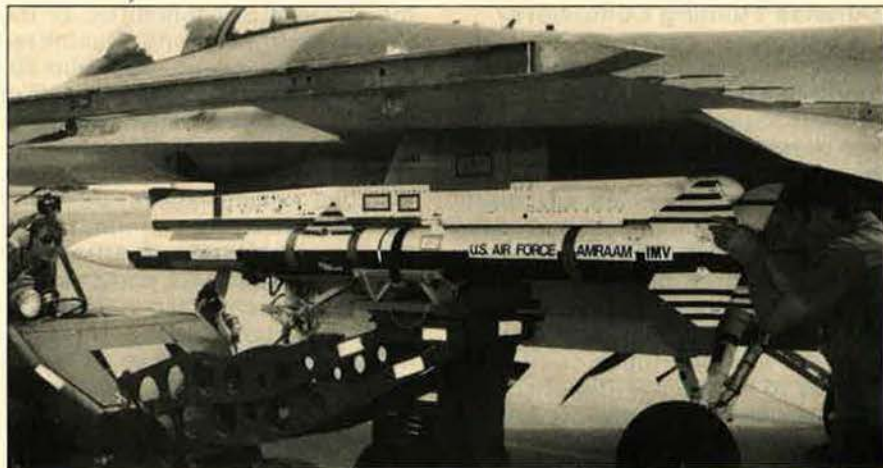
Washington, D. C., September 23  
★ The Advanced Medium-Range Air-to-Air Missile (AMRAAM) is moving ahead and completing major program milestones, notwithstanding reports to the contrary in some other publications. Gen. Lawrence A. Skantze, Commander of Air Force Systems Command, summed up the situation this way: "The AMRAAM program is technically sound and is progressing in a positive direction, and the weapon will be ready for low-rate production in the near future."

The missile demonstrated its look-down/shoot-down capability in a demanding test in August (see "Aerospace World," October '85 issue, p. 32). In September, AMRAAM passed another flight test by responding to a command from the launch aircraft that updated the missile's inertial guidance system.

The Air Force presented a revised AIM-120A AMRAAM program plan to the Defense Systems Acquisition Review Council (DSARC) that laid out new schedules for full-scale development and production. Development would end in mid-1988, production would start with FY '87 funds, and the first operational capability would be attained in mid-1989.

Cost-reduction proposals have been submitted by Hughes Aircraft Co., the primary supplier, and Raytheon Co., which has been proposed as a second manufacturer for the missile. To qualify as second manufacturer, Raytheon must build fifteen missiles for test purposes. Secretary of Defense Caspar Weinberger has proposed a ceiling cost for the entire planned production run of 24,000 missiles. The cost cap would be \$7 billion in 1984 dollars, with a missile unit cost of \$288,000. To ensure that costs remain as low as possible, General Skantze says that "we propose to buy ninety-five percent of the missiles through competition, which is unparalleled in major weapon systems acquisitions."

General Skantze points out that the need for a new, improved medium-range missile was documented by the Air Force in the mid-1970s: "The ca-



An Air Force weapons crew uploads an inert AMRAAM (AIM-120A) on an F-16. This missile and its launcher are made by Hughes, but Raytheon has been proposed as a second manufacturer. The planned production run is for 24,000 missiles.

pabilities of the numerically superior Soviet fighter force are improving to the point where the initial engagement will likely result in unacceptable losses to our aircraft and pilots."

"Enter AMRAAM," says General Skantze. "With its active radar, longer range, and greater speed, it will allow us to launch and leave before entering the enemy's lethal zone. Despite the Soviets' improved capability and greater numbers, AMRAAM will enhance our survivability and maintain our essential air superiority.

"To kill the program now, in the face of the ever-widening US-Soviet capability gap, would be foolish. To slow it down would only add to the cost."

★ During the first eight months of 1985, airline companies worldwide compiled the worst safety record in airline transport history, according to the Flight Safety Foundation in Washington. In 1982, there were twenty-three fatal accidents, with a death toll of 732. In 1983, there were nineteen fatal accidents, with 640 lives lost. In 1984, the toll declined again as fifteen fatal accidents claimed 224 lives.

But in the first seven and a half months of this year, there have been fifteen fatal accidents claiming more than 1,400 lives, said Foundation President John H. Enders. "Each of

these major accidents appears to have been due to different causes," he said, "and there is no evident common pattern running through this current rash of accidents."

With the attention of the worldwide aviation community focused on the accidents and their investigations, he added, the affected countries are hard at work sifting through the debris and data to arrive at carefully considered conclusions regarding causes.

But "prudent air carriers," he says, "pay special attention to operational and maintenance factors that appear to be relevant, over and above the normal high standards required by national authorities." In spite of the accident record, passenger totals carried by the airlines remain at all-time high levels.

In an unrelated report, the Federal Aviation Administration announced that near midair collision reports for the first seven months of 1985 increased over the same period last year. Reports of near midairs involving only airlines showed no increase.

Almost all the increase in near midair collision reports was accounted for by general aviation operators, most of whom operate under visual flight rules, which means they are responsible for maintaining their own





**An F-15C from Edwards AFB tests the navigation pod (under left intake) of the Air Force's Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. This test is an important step in the development of the F-15E dual-role fighter.**

separation from other traffic. Total near misses increased from 313 to 439.

The number of near midair collision reports involving only airliners remained the same at twelve. The number of incidents involving at least one air carrier increased slightly from 114 to 121. "It is important to keep these statistics in perspective," says FAA Administrator Donald D. Engen. There are approximately 200,000 flights every day in US airspace. This means there is "about one report of a near miss for every 122,000 flights."

He pointed out that general aviation aircraft accounted for 373 of the reported near midairs through July, as compared with 251 in the same seven-month period last year. Military aircraft figured in 177 incidents, up from 132 last year.

The Administrator said the FAA is

continuing efforts to reduce the number of incidents by providing pilot education, enhancing controller skills, and upgrading automated radar terminal systems at 120 airports. FAA has also proposed establishing Airport Radar Service Areas (ARSAs) at thirty-six airports, thus providing more complete traffic information to air traffic controllers. (For more on the ARSAs, see "Aerospace World," October '85 issue, p. 34.)

★ The McDonnell Douglas F-15, already established as one of the finest fighters in the history of the Air Force, is constantly being enhanced and improved under a series of contracts awarded to the manufacturer and other companies.

Litton has announced that a variation of its LN-93 ring laser gyro inertial navigation unit (INU) has been

chosen for use in the F-15E dual-role fighter. The first units will be delivered to USAF before the end of the year.

The LN-93 uses the same ring laser gyro and much of the same electronics as the LTN-90 inertial reference system now in commercial use and the LN-92 system currently being developed for the US Navy. "The LN-93 is a fourth-generation system, representing more than a decade of development and use," says Alton G. Brann, a Litton vice president and President of Guidance and Control Systems.

The \$11.8 million production award is for a "form-fit-function alternative" to the AN/ASN-141, currently manufactured by Litton for the F-16, A-10, FB-111, and other Air Force and Army aircraft. Besides the F-15E, other aircraft to receive the new system, which will be the standard ring laser gyro INU for the Air Force, will be the C-130, RF-4C, HH-60A, and EF-111. The LN-93 will provide extreme accuracy and reliability with low initial and life-cycle costs.

In other F-15 news, Goodyear Aerospace has won a \$28 million contract for development of a new F-15E weapon systems trainer. The twenty-four-month contract covers hardware and software development, including major radar, infrared, and electro-optical sensor systems simulating those in the new F-15E two-seat cockpit.

In the new simulator, aircrews will practice penetrating enemy ground defenses at low altitudes to detect and destroy both fixed and moving targets. It will include the Low-Altitude Navigation and Targeting Infrared system for Night (LANTIRN), which allows treetop penetration of enemy airspace at night or in weather.

Other major F-15E advancements that the simulator must duplicate include cockpits with multipurpose displays, a wide-field-of-view head-up display, high-resolution radar, electro-optical mapping, and digital flight controls. The first F-15E simulator is slated for delivery in 1988.

Under another contract, McDonnell Aircraft Co. has been directed to go into full-scale development of a new tactical electronic warfare system (TEWS) for the entire F-15 fleet. Honeywell has been awarded a sub-contract for a tactical electronic warfare intermediate support system (TISS) to test the F-15's electronic warfare system. The TISS will minimize downtime, reduce maintenance costs, and improve overall mission effectiveness. The entire TISS development and production program may be worth \$500 million, a Honeywell spokesman said.



**In late August, the fuselage of the first T-46A trainer was loaded aboard a C-5A at the Fairchild Republic plant in Farmingdale, N. Y., for its flight to Edwards AFB, Calif. The T-46 will begin ground and flight tests in the near future.**



And at Nellis AFB, Nev., the F-15's new Digital Electronic Engine Control (DEEC) is undergoing extensive operational testing. The program utilizes seventeen F-15s powered by DEEC-equipped Pratt & Whitney F100 engines.

"Initial reports on this evaluation program are extremely gratifying," reports James G. O'Connor, President of Pratt & Whitney's Government Products Div. Improvements first noted by pilots are the quicker acceleration and unrestricted throttle movement throughout the flight envelope. "Another key advantage is the smoother ignition of the augmentor [afterburner] under all flight conditions."

Besides controlling engine operation, the DEEC can isolate faults in engine operation and identify the specific components that require attention. It has a continuous trim feature that automatically adjusts the engine's thrust at all altitudes and airspeeds to compensate for the gradual aging of hardware and engine components during the engine's life. This eliminates the need for a periodic "trim check," one of the most common tasks performed by maintenance crews, thereby reducing the number of man-hours required to keep the engine operating at peak performance.

The DEEC will also be installed on the advanced F100-PW-220 engine, which Pratt & Whitney expects to begin delivering to the Air Force before the end of this year. All F100 engines now in service are equipped with an electronic engine control (EEC), which is computerized, though the computer is not now digital.

★ Hughes Helicopters, Inc., which was launched on February 14, 1934,

## AEROSPACE WORLD

by Howard Hughes as the aviation division of his Hughes Tool Co., has changed its name to the McDonnell Douglas Helicopter Co. The company became a subsidiary of McDonnell Douglas on January 6, 1984, in its fiftieth anniversary year.

The McDonnell Douglas Helicopter Co. employs more than 7,000 persons in California and Arizona. The company's worldwide sales were approximately \$800 million in 1984. Corpo-

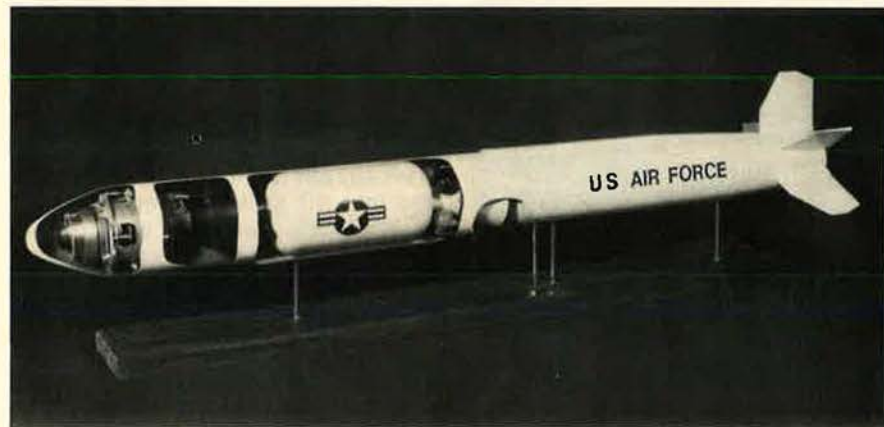
rate headquarters will be moved from Culver City, Calif., to Mesa, Ariz., by late 1986. A manufacturing and ordnance center will remain in California.

The company's leading products are the AH-64A Apache attack helicopter for the US Army, Model 500 light commercial and military helicopters, and ordnance systems.

★ The 405th Tactical Training Wing at Luke AFB, Ariz., was the first Air Force unit to surpass 200,000 flying hours in the F-15 Eagle. Col. T. C. Skanchy, 405th Wing Commander and the pilot on the record-breaking flight, was also the first pilot to log 1,000 hours in the Eagle. He passed that mark in December 1979.



Col. Thomas C. Skanchy, Commander of the 405th Tactical Training Wing at Luke AFB, Ariz., was the pilot when his unit achieved the milestone of being the first F-15 wing to pass 200,000 flying hours.



On September 13, an antisatellite (ASAT) missile recorded the first confirmed "kill" in space. This cutaway model of the ASAT shows the miniature vehicle and the missile's upper stage, which are made by LTV's Vought Missiles and Advanced Programs Division. The upper stage uses a Thiokol Altair III rocket, while the lower stage is a modified version of Boeing's SRAM missile.

★ Boeing Military Airplane Co. has received a contract to continue installing CFM56 engines on KC-135R in-flight refueling aircraft. The company will reengine twenty-eight USAF aircraft and two belonging to the French Air Force.

The contract pays Boeing \$14 million for the thirty aircraft, but includes options for another 165 KC-135Rs over the next five years, for a possible total of \$60 million. Thirty-seven tankers had been reengined under previous contracts—thirty-six by Boeing and one by Hayes International, Birmingham, Ala.

With the newer, quieter, more fuel-efficient engines, two KC-135Rs can do the work of three KC-135As, according to Boeing.

Under another contract, Boeing



will sell two 707 tanker/transport aircraft to Spain. These will be the first aircraft sold under a new Boeing program in which 707 commercial jetliners are converted into tankers.

The modification includes wingtip hose and drogue refueling systems capable of refueling such Spanish-owned fighters as the F-1 Mirage and the F-18. New avionics and updated flight instruments and navigation systems will also be provided.

Each tanker will have an executive interior and accommodate about sixty-six passengers. The Spanish will receive their first modified tanker/transport in early 1987. The contract price was not announced.

★ The Air Force's Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio, has awarded \$10.753 billion in multiyear funding to three associate contractors in the B-1B program.

Rockwell International's North American Aircraft Operations, Los Angeles, Calif., received contracts totaling \$8 billion for the production of the final eighty-two of 100 strategic bombers that USAF plans to acquire. The contracts cover associated weapons delivery equipment and support data.

A contract for \$1.8 billion was awarded to Eaton Corp.'s AIL Division, Deer Park, N. Y., for ninety-two shipsets of defensive avionics equipment, and Boeing received a contract for \$953 million for eighty-two shipsets of offensive avionics. Multiyear contracting for the B-1B is expected to save some \$1.2 billion over the life of the tightly managed program, an ASD spokesman says, and enable the Air Force to meet its budget of \$20.5 bil-

## AEROSPACE WORLD

★ The first C-5B to be rolled out by Lockheed-Georgia Co. made its first flight at Dobbins AFB, Ga., on September 10. The flight, the first of a fifty-five-hour production flight-test program, lasted just over three hours.

Although there was a nine-man



*On September 10, the Lockheed C-5B made its first flight over Marietta, Ga. The flight, which was two days ahead of schedule, went so well that the crew extended the planned two-hour trip by an hour. The C-5B will be turned over to the Air Force later this year.*

lion (FY '81 dollars) for the 100-aircraft program.

The first B-1B was delivered to Dyess AFB, Tex., on June 29—thirty years to the day after the first B-52 was delivered. Strategic Air Command plans to base twenty-nine B-1Bs at Dyess AFB, thirty-five at Ellsworth AFB, S. D., seventeen at Grand Forks AFB, N. D., and seventeen at McConnell AFB, Kan. Two B-1Bs will be stationed at Edwards AFB, Calif., for flight testing.

flight-test crew on board, normal manning for the C-5B in operational use will be four crew members. The aircraft was flown to an altitude of 15,000 feet and a speed of 300 knots. Maximum cruise speed for the C-5B is 350 knots indicated airspeed (KIAS). Systems checks were performed as each of the giant airlifter's four General Electric TF39-1C engines were alternately shut down and restarted.

Included in the balance of the test program will be evaluations of an improved onboard computer for detecting systems malfunctions that is called MADAR II (Malfunction Detection Analysis and Recording), an improved automatic flight control system, and an improved landing gear actuation system.

Other improvements in the C-5B over the C-5A are a new wing now being retrofitted on A models, updated engines, stronger aluminum alloys, and latest state-of-the-art avionics. Lockheed expects to deliver the first C-5B to USAF before the end of the year.

★ The Precision Location Strike System (PLSS), mounted on a trio of TR-1 high-altitude reconnaissance aircraft, has successfully passed its flight testing, Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio, has announced.

In the test, which took place high



*The Boeing Military Airplane Co. has received a contract to continue installing CFM56 engines on KC-135R tankers. With the newer, quieter, more fuel-efficient engines, Boeing claims that two KC-135Rs can do the work of three KC-135As.*



over the central California desert, PLSS successfully zeroed in on a pre-positioned radar emitter the moment its signal started. A ground station, using PLSS data, instantly computed the exact position of the emitter. If the source had been an enemy site for radar-directed missiles, a USAF fighter would have quickly been directed to attack it.

Lt. Col. Dayl Donahey, ASD's PLSS program director, called it "a giant leap forward" for future warfighting capabilities of US tactical forces. "The system performed better than expected at this point in its development testing," he said.

Lockheed Missiles and Space Co., Austin, Tex., is developing PLSS. In an operational scenario, the TR-1s will fly racetrack patterns behind the forward edge of the battle area (FEBA). Despite dense electromagnetic interference, they will pick up enemy radar pulses and instantly retransmit those signals' characteristics, direction, and time of reception.

Ground stations in friendly territory will analyze and correlate the data, identifying the radar by type and pinpointing its position. A fighter would then be dispatched to destroy the target before the enemy could move it or emplace additional defenses.

★ The Air Force has decided that the new Short-Range Attack Missile (SRAM II) will be rocket-propelled, enabling three SRAM II study contractors to proceed with more detailed concept design and risk-reduction testing of the missile's subsystems.

It is now expected that the concept design phase under way by Boeing

## AEROSPACE WORLD

Aerospace Co., Seattle, Wash., Martin Marietta Aerospace, Orlando, Fla., and McDonnell Douglas Astronautics, St. Louis, Mo., will be completed by the end of December. This means that a full-scale development request

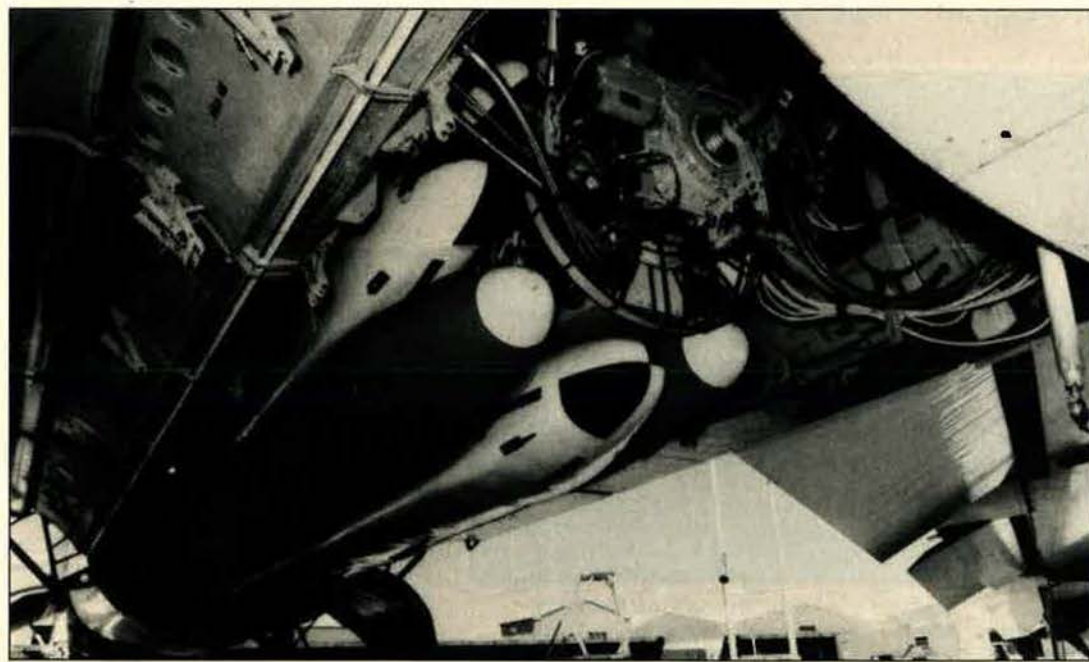
*This is not the inside of a new disco, but Martin Marietta technicians cleaning the interior of the Space Shuttle's fuel tank after pressurization tests. Through design improvements, such as reducing the number of slosh baffles (in rear) from eight to four, the weight of the 154-foot long, twenty-eight-foot diameter tank has been reduced by 10,000 pounds.*



for proposals (RFP) to industry will probably be released in January. A source selection and contract award is expected next summer.

The SRAM II will be an air-to-ground strategic missile with a nuclear capability. It will be carried by penetrating strategic bombers to attack heavily fortified, high-value targets. It will be about two-thirds the size of the current SRAM, enabling an increase in the number of missiles to be carried in the B-1B bomb bay.

Production of SRAM II is expected to begin in 1989, with an initial opera-



*The Air Force's new Common Strategic Rotary Launcher is currently undergoing flight testing at Edwards AFB, Calif. The launcher, shown here in the bomb bay of a B-52H with six Initial Operational Test & Evaluation models of the ALCM, is compatible with the B-52, B-1B, and any future bomber. The launcher is designed to accommodate existing and projected nuclear bombs, cruise missiles, and Short-Range Attack Missiles. (USAF photo)*



# OSHKOSH TECHNICAL REPORT



## Improved Performance With Articulated Design

The Oshkosh Model DA series crash truck represents a revolutionary engineering achievement in aircraft rescue and firefighting design. The advancements the DA series offers over conventional vehicles are the result of four major design innovations:

- AN ARTICULATION JOINT AT THE VEHICLE'S CENTER WITH YAW AND ROLL CAPABILITY
- SYNCHRONIZED YAW AND FRONT AXLE STEERING
- FRONT AND REAR TANDEM DRIVE AXLES WITH LOW PRESSURE TIRES
- BALANCED SIX-ROD SUSPENSION SYSTEM

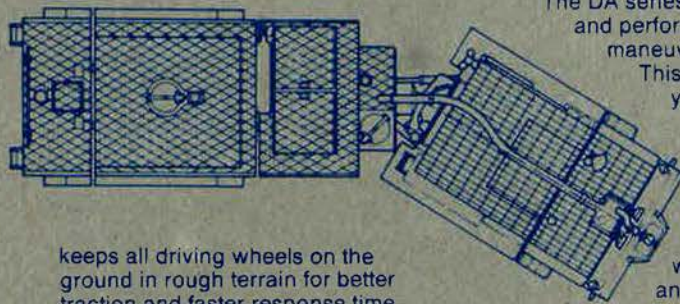
These design features provide the benefits of faster speeds off-runway, better obstacle avoidance and greater mobility.

### FASTER SPEEDS OFF-RUNWAY

A balanced six-rod suspension on tandem front and rear axles reduces frame rise by 50% when traveling over bumps and uneven terrain. This provides a far superior ride, allowing a faster response time than a vehicle with single axles, or a vehicle with tandem axles independently suspended.

Because the DA series has eight driving wheels, 24R21 tires can be used at a low inflation pressure of 25 psi (1.72 bar). Tires operating at this low pressure act as shock absorbers, further improving the ride quality and permitting faster speeds off-runway.

The combined yaw and roll action of the articulation joint, along with the superior wheel travel of the suspension system, keeps all driving wheels on the



keeps all driving wheels on the ground in rough terrain for better traction and faster response time.

### BETTER OBSTACLE AVOIDANCE

Maneuvering around obstructions with the center articulated DA series is a key factor in the higher performance of this vehicle. The articulation joint provides yaw steering which is synchronized with a steering front axle. This combination provides a 26% tighter wall-to-wall clearance circle when turning than a straight-frame vehicle with the same wheelbase. It also results in 38% less tire wear.

The balanced six-rod suspension provides sufficient wheel travel to climb obstacles up to 24 inches (610 mm) saving the time of going around them.

### GREATER MOBILITY

In soft ground conditions, where a conventional vehicle would be immobilized, the DA series can "duck walk" its way to the crash scene with articulated steering.

The low tire inflation pressure of 25 psi (1.72 bar) reduces ground contact pressure and optimizes the self-cleaning action of the tire tread. Three different tire tread patterns are available that can be matched to soil conditions for maximum performance.

The DA series can turn out of deep ruts and perform complex turning maneuvers in poor soil conditions.

This is made possible by the yaw and roll capability of the articulation joint, and the 50% reduction in the steering axle cramp angle, which reduces cornering forces.

A conventional vehicle with full steering cramp angle may not be capable of turning out of its ruts.

The ability of any vehicle that is used in a hostile environment to self-recover is its single most important feature. In most situations, the DA series has the ability to self-recover in seasonally poor soil conditions. When temporarily immobilized in soft ground, it self-recovers by "duck walking," allowing the wheels to seek firmer ground and better traction.

The DA series is the culmination of an extensive development and test program. Its superior mobility, speed and fire suppression capability will greatly improve the security of aircraft and crew.



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tional capability (IOC) in the early 1990s. The Air Force is expected to buy 1,900 of them to enhance the effectiveness of existing bombers well into the twenty-first century.

★ A full-scale hard mobile launcher test vehicle for the small intercontinental ballistic missile (SICBM) was demonstrated in September for the Air Force by a team made up of Martin Marietta Corp. and Caterpillar Tractor Co. The team is competing with another team, which includes Boeing and Goodyear, under a \$46.9 million design contract.

## AEROSPACE WORLD

The full-scale vehicle demonstrated is representative of the size and weight of an actual hard mobile launcher. Ninety-one feet long, the hard mobile launcher will protect, transport, and launch the single-warhead SICBM and be capable of both

on- and off-road operation, traveling at speeds of up to fifty miles an hour.

The full-scale vehicle consists of a missile module trailer built by Martin Marietta and a crew module built by Caterpillar. The vehicle is undergoing testing at the Caterpillar plant in Peoria, Ill., and will also be tested at the Caterpillar proving grounds in Arizona before being turned over to the Air Force in January.

★ A new aircraft windshield now being tested by the Air Force shows promise of providing pilots almost two and a half times greater protection from bird strikes than that provided by existing windshields. This improvement should prove significant. In 1984 alone, Air Force aircraft experienced 2,300 bird strikes that caused \$19 million in aircraft damage.

During low-level flying, aircraft traveling at a high rate of speed literally run into small, slow-flying birds before the pilots have a chance to see them and take action to avoid collision. The possibility of bird strikes is increasing, because USAF aircraft are being flown more at lower altitudes, where the birds also fly, to simulate actual combat flying.

Strikes frequently shatter aircraft windshields. Sometimes, the bird carcass penetrates into the cockpit, injuring or killing crew members.

The new windshield is being tested on F-4s of the 131st Tactical Fighter Group of the Air National Guard in St. Louis, Mo. About one inch thick, it is composed of two layers of polycarbonate material sandwiched between two layers of acrylic. It can withstand a strike by a bird weighing four pounds at aircraft speeds of up to 500 knots. The current F-4 windshield can resist strikes at speeds up to only 200 knots.

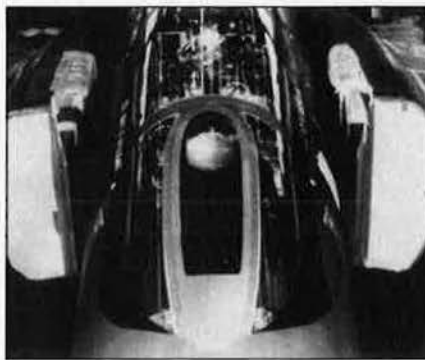
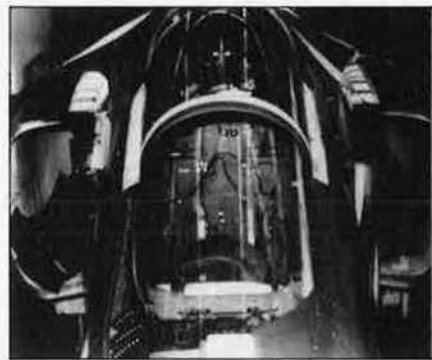
Testing under the \$250,000 contract will continue for about a year. Studies are under way to improve bird-strike resistance for windshields on other aircraft, including the F-16, A-7, and T-38.

★ An era has come to an end. After twenty-eight years of continuous use, the last Air Force BOMARC missile was launched from Eglin AFB, Fla. BOMARC dates from a 1949 concept developed by Boeing (BO) and the Michigan Aeronautical Research Center (MARC) of the University of Michigan for a defensive interceptor missile system for the northeastern United States.

BOMARC was launched September 10, 1952, but the missile's full propulsion system, which included ramjet



The full-scale hard mobile launcher test vehicle for the small ICBM (or "Midgetman") developed by Martin Marietta and Caterpillar maneuvers over a test course in Peoria, Ill. The Martin Marietta/Caterpillar design will be in a competitive "runoff" with a launcher developed by Boeing and Goodyear over the next year.



Aeronautical Systems Division's Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio, has developed a new bird-strike-resistant windshield that is designed to withstand strikes at up to 575 mph. The old windscreen (right) could only provide bird-strike resistance up to 230 mph. The new windscreen weighs less and provides better visibility than the old model. (USAF photo)



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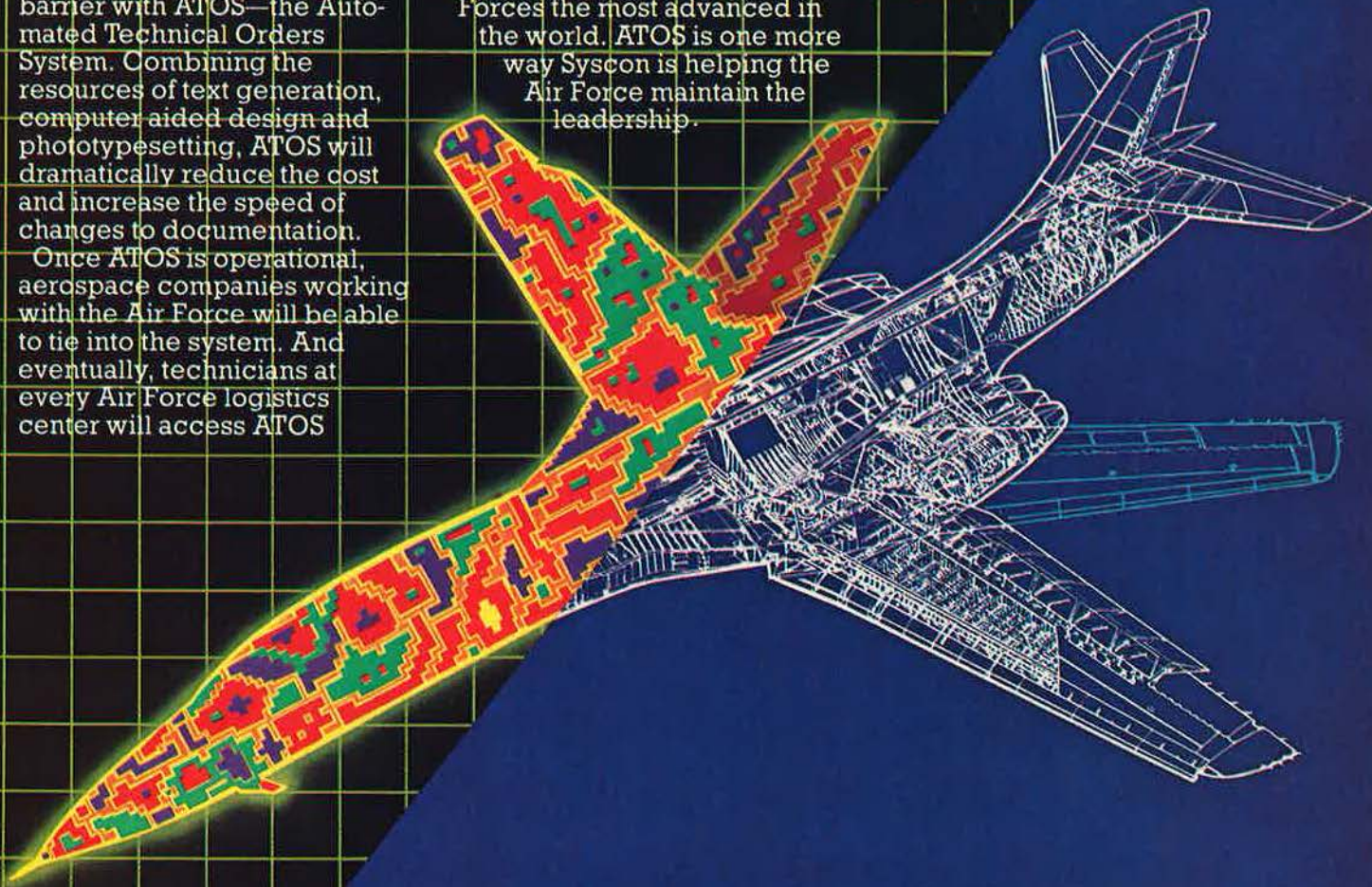
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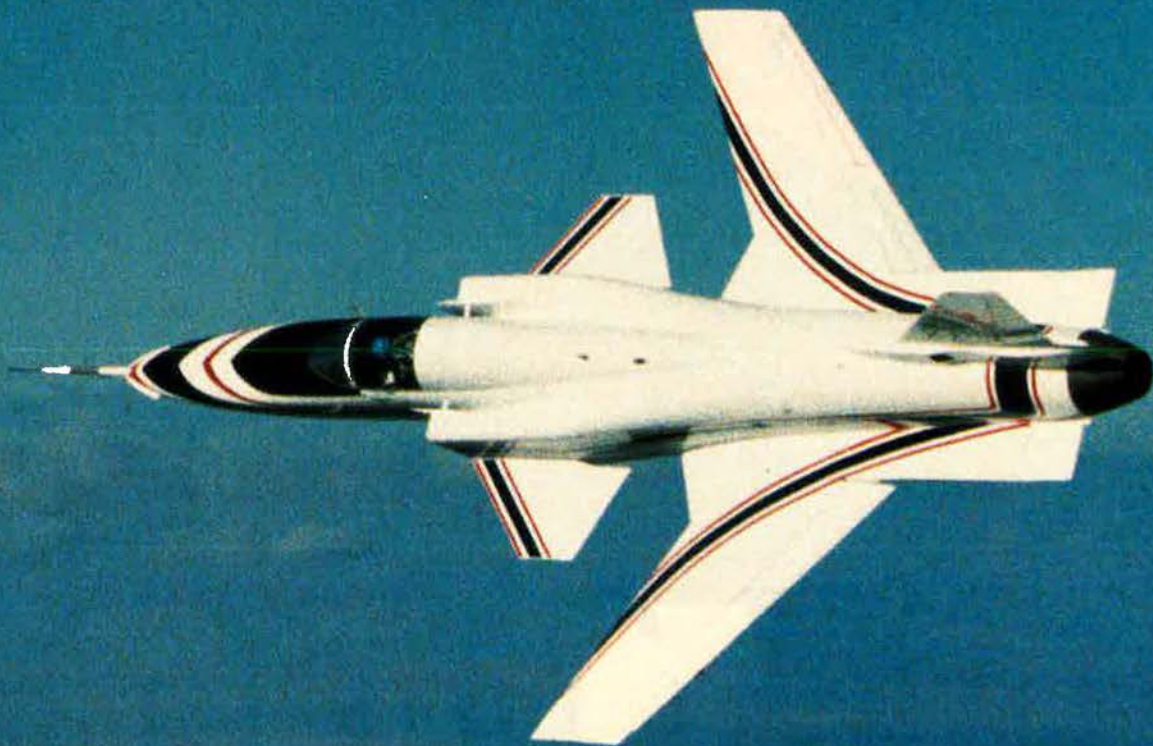
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sustainers, was not successfully fired until 1955. The first BOMARC, the CIM-10A, was launched out over the Gulf of Mexico in 1959 from Site A-15 on Eglin's Santa Rosa Island. An improved version of the missile, the CIM-10B, was tested successfully at Eglin in 1964 and was then placed on operational alert status that year. For eight years, US and Canadian air defense units would deploy to Eglin periodically to participate in launch evaluations.

Eventually, as the B versions replaced the A versions, the BOMARC-As were converted to high-altitude supersonic targets. In 1972, the Air Force decided that it would convert

# AEROSPACE WORLD

all BOMARCs to targets. More than 100 were launched.

Although nonrecoverable, the missile made an excellent target because it could fly at altitudes between 35,000 and 80,000 feet and at speeds up to Mach 3. It had a range of 300 miles. It was powered by twin ramjet engines located below the fuselage and a rocket motor in the body of the missile.

BOMARC proved useful as a threat representative target for testing and operational evaluation of air-to-air weapons launched from such aircraft as the F-4, F-106, F-15, and F-14. Armament fired at the BOMARC included the AIM-4F, AIM-4G, AIM-7E, AIM-7F, AIM-9L, and the Navy's long-range Phoenix air-to-air missile.

BOMARC has been replaced by Firebolt, an air-launched target drone capable of speeds of up to Mach 4.

★ The first production model of the laser-guided Maverick missile being built by Hughes Aircraft Co. for the US Marine Corps has rolled off the assembly line. The missile, the AGM-65E, is intended primarily for close air support. The missile's seeker guides on the reflection of a laser beam aimed precisely by a laser designator. This precise designation enables the Laser Maverick to be launched safely at targets located near friendly troops, a Marine Corps spokesman said.

The AGM-65E is the latest Maverick air-to-surface missile to go into production. The first versions, the AGM-65A and -B, were television-guided. More than 30,000 of these were built at the Hughes plant at Tucson, Ariz., for the Air Force and overseas customers who purchased the weapon from the Air Force through the Foreign Military Sales program.

Currently in production at Tucson is the Air Force's AGM-65D Maverick. It utilizes an infrared seeker that senses minute temperature differences, which the missile uses to guide itself to the target selected by the pilot.

The Laser Maverick has successfully passed accuracy tests for the Marines. During 1982 operational testing, the weapon was successful fifteen times out of fifteen launches. The AV-8B Harrier II, the F/A-18, the A-6E, and the A-4M are the Marine Corps aircraft designated to carry the Laser Maverick.

The missile's 300-pound blast/fragmentation warhead has a selectable delay fuze that can be set prior to launch to detonate on impact or after target penetration.

The producer currently has \$120 million in contracts for the Laser Maverick program. In addition to support equipment and spares, the contracts call for delivery of 275 tactical missiles by the end of May 1986. Long-lead funding for an additional 600 missiles is included in the total. Additional Marine Corps purchases of the Laser Maverick are anticipated, a Hughes spokesman said.

The AGM-65E's laser seeker is supplied by Rockwell International. ■

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Space Launch Complex Six at Vandenberg AFB begins a new chapter in Shuttle history.

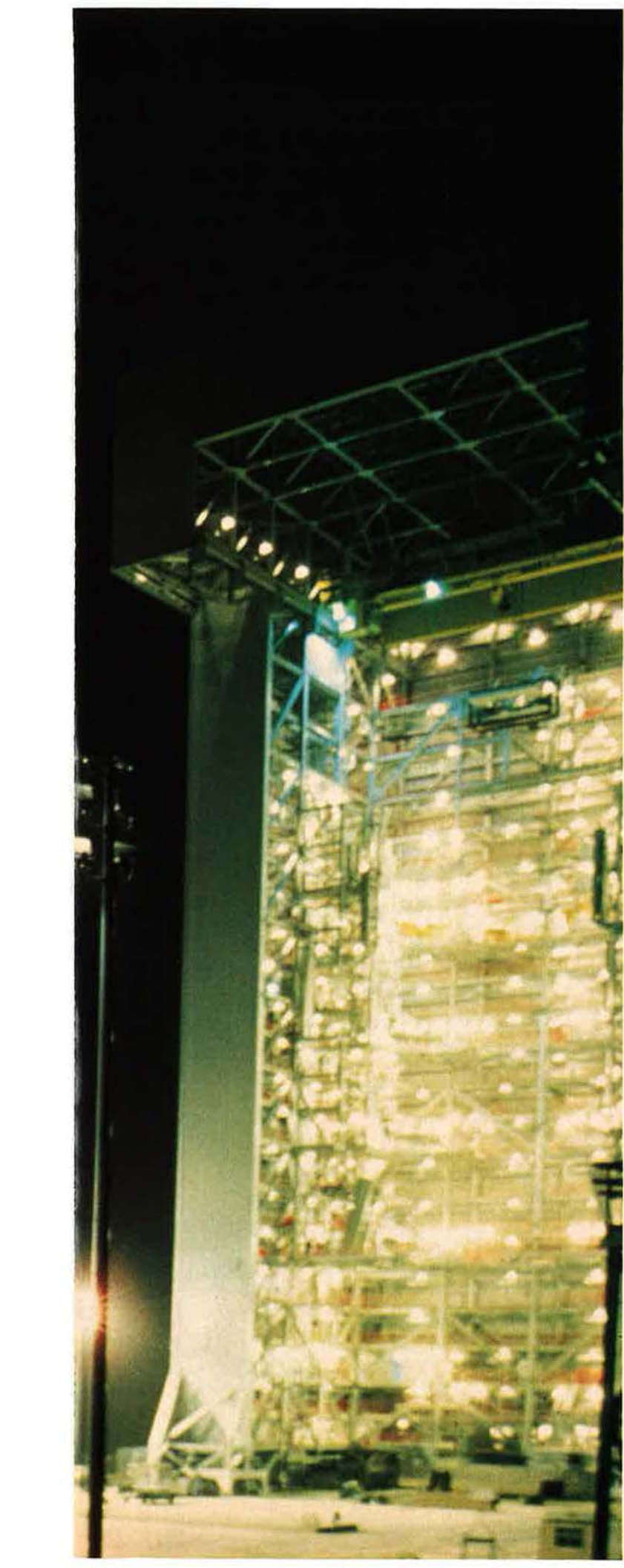
# SLICK SIX

BY EDGAR ULSAMER  
SENIOR EDITOR (POLICY & TECHNOLOGY)

*Space Shuttle Orbiter Enterprise at USAF's Space Launch Complex Six (SLC-6), Vandenberg AFB, Calif., amid preparations for launching the Orbiter Discovery into near-polar, low-earth orbit next March 20. Under Secretary of the Air Force Edward C. Aldridge, Jr., will be aboard Discovery as a DoD "payload specialist." (USAF photo by TSgt. James Pearson)*







**O**N MARCH 20, 1986, Orbiter 103 (known as *Discovery*) is to deliver a uniquely important national security payload worth about half a billion dollars into low earth orbit from Space Launch Complex Six (SLC-6) at Vandenberg AFB, Calif. The key element of the payload is Teal Ruby, a new staring infrared mosaic sensor that can spot and track aircraft and cruise missiles under all weather conditions. The event will start a new chapter in the history of the US Space Shuttle: The manned space-launch vehicle will now be able to operate in, and to deliver payloads to, near-polar, retrograde-azimuth as well as equatorial orbits. Polar missions can't be flown efficiently and safely from NASA's Kennedy Space Center in Florida. Polar orbits are required for a variety of military space missions because they make possible regular overflights of geographic areas of particular interest.

Another first that goes with the March 20, 1986, launch is that it will take place from a thoroughly secure Air Force facility and be under control of the Space and Missile Test Organization (SAMTO) of AFSC's Space Division, albeit with assistance from NASA.

This newfound capability is of major military importance. Its price tag is about \$3 billion in facility costs, about \$400 million a year in operating expenses, and the as-yet-not-fixed flight charges the Air Force will have to pay NASA for using the Shuttle. It can be argued that most of these expenditures could have been avoided if the government had decided to continue to fly national security payloads on expendable launch vehicles (ELVs) rather than to make the Shuttle the principal joint military-civilian space-launch vehicle for the US. This argument disregards the fact, however, that a manned system can be used in ways that ELVs can't.

### **Shuttle Shortcomings**

It is also clear that it will take time before the Shuttle matures to the performance levels that can cover all foreseeable military payload requirements. Some of these requirements were paced by what NASA said the Shuttle would be able to do. In the case of the first flight from Vandenberg AFB, for instance, the Shuttle's initial inability to meet NASA's forecast performance specifications reportedly will lead to degradations in terms of the makeup of the payload, the altitude that the payload is delivered to, and the length of the mission.

The Defense Department and the Air Force agreed with NASA on a number of performance compromises—in the main, a lowering of the Orbiter's altitude, payload, and "cross range"—in order to make the mission's primary goal, which is start-up of Shuttle operations from Vandenberg AFB (VAFB). In spite of these shortfalls, the Air Force considers the Shuttle's performance for polar missions "acceptable." NASA is working a number of fixes into the system to bring it up to the agreed-upon performance standards by 1990.

The current shortfalls mean that, flying from VAFB, the Shuttle is unable to deliver a full payload—32,000 pounds to low-earth polar orbits—and that the Orbiter's cross range is held to about 700 miles rather than the 1,100 miles that the Air Force counted on. The payload weight limits include safety margins that could conceivably be relaxed over time. These limits affect the weight that can be orbited, the altitude of the payload, and, as a



function of the latter, the length of time the payload stays up before the earth's gravity pulls it down.

In the case of Teal Ruby, *Discovery* won't be able to take this sensor to the altitude it was to be tested at. The present constraints on the Shuttle won't permit it to fly up to Teal Ruby's optimal altitude. The sensor, therefore, can't be tested exactly as planned.

The Shuttle's cross range is the area the Orbiter can maneuver in following reentry into the atmosphere before it has to land. In practical terms, cross range determines the number of landing sites the Orbiter has access to after reentry. Cross range is generally more important for polar than equatorial flights, especially in case the mission has to be aborted after the first orbit. The original Air Force plan, based on an 1,100-mile cross-range capability, called for a return of the Orbiter to VAFB following a once-around abort. (The main runway at the base has been brought up to Shuttle standards, meaning a concrete-covered runway 15,000 feet in length.)

The limiting factor in the Shuttle's cross range is structural loading, according to Under Secretary of the Air Force Edward C. Aldridge, Jr., who will fly as a DoD "payload specialist" on the first Shuttle flight from VAFB. This loading problem is caused mainly by the effects of engine heat on the structure. Given the Orbiter's weight, the vehicle won't be able to perform some maneuvers essential for an 1,100-mile cross range while staying within the G loading dictated by safety considerations.

The increases in structural loading needed to make the original cross-range goal of 1,100 miles would require beefing up the vehicle's wings. Technically, there appears to be no major problem with such a modification. NASA reportedly knows how to make the necessary design fixes. But so far there is no fix for the sticky question of who pays for the wing strengthening. NASA contends that the Air Force should pay the extra money for the fix; the Air Force maintains that the Shuttle program was launched to meet basic national security launch requirements and that, to boot, the Air Force and other Department of Defense elements designed Shuttle-related facilities and Shuttle-compatible payloads to the system's performance specifications as furnished by NASA. DoD, at least for the time being, appears unwilling to pay the Shuttle's "get-well" costs.

### Landing and Payload Constraints

The consequences of the cross-range deficiency are far from trivial. Because the Orbiter won't be able to fly back to VAFB in case of emergencies, it has become necessary to provide for alternate landing sites, especially in the South Pacific. Depending on launch azimuth, aborts could lead to emergency landings at Easter Island owned by Chile or at the French atomic test site near Tahiti. Chile has agreed to the use of Easter Island as an alternate landing site for the Vandenberg Shuttle operations. The French government, according to Secretary Aldridge, has agreed in principle to the use of its facility in the Southern Pacific. A search is also under way for other alternate landing sites in Alaska, which may be required under certain abort conditions.

The extent of the shortfall in payload weights that the Orbiter will be able to take into space in the first few missions is not yet completely clear. Assuming the avail-

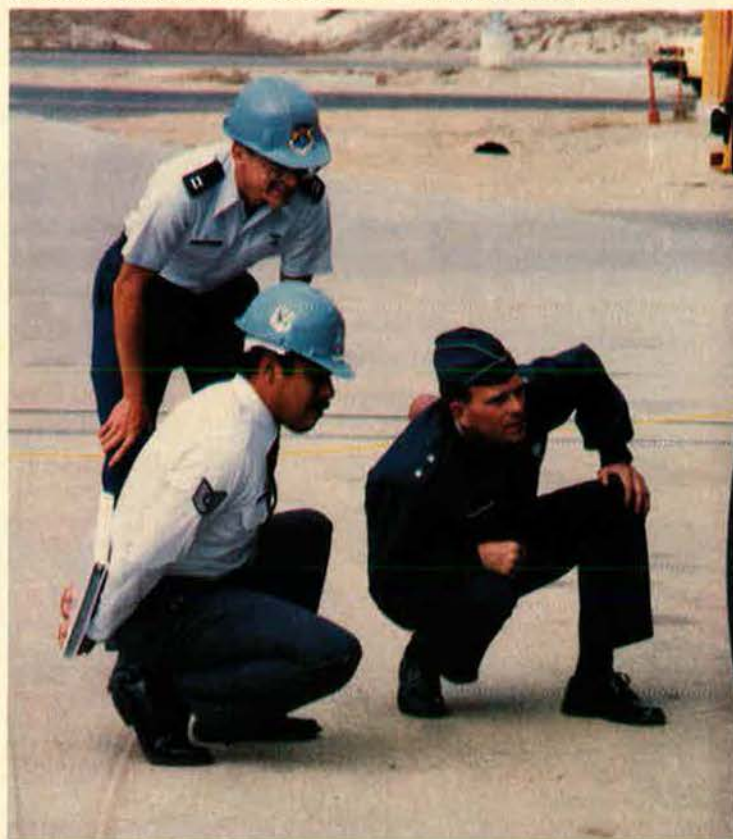
ability of abort sites in the South Pacific and running the Orbiter's three main engines at 109 percent of rated power, the maximal payload could be somewhat above 28,000 pounds. But running the Shuttle engines at 109 percent of rated power causes rapid wear, and engine durability could plummet to unacceptably low levels.

NASA has agreed to a series of "step functions" that will bring the Shuttle's payload capability up to 32,000 pounds within five years, according to Secretary Aldridge. These step functions include cuts in the "margins"—such as reduction in contingency fuel reserves as the operational experience levels go up—and the retrofit of weight-saving, filament-wound engine cases. Not all VAFB Shuttle missions require a 32,000-pound payload capability, with the result that they can be flown with no or only a partial upgrade of currently available Shuttle systems. Officials are averse to flying the system at 109 percent power, because this cuts into "the life cycle of the engines and eats up too many spares," according to Secretary Aldridge.

### Frequency of DoD Shuttle Flights

The Defense Department and NASA agreed—with full White House blessing—that the Pentagon will fly at least one-third of all available Shuttle flights over the next ten years. These flights—probably an average of eight a year—will be dedicated national-security missions. About half of the dedicated military missions will be flown out of VAFB, while the others will be launched from NASA's Kennedy Space Center in Florida.

Launches involving the delivery of payloads to geosynchronous (22,300 miles altitude) and other high-energy orbits will continue to be flown from the Kennedy Space Center (KSC). Launches from the Florida facility are in an east-west direction and usually result in orbits





that crisscross the earth's equator. This leads to a fringe benefit: These launches take advantage of the earth's rotation, which at the latitude of KSC is about 900 mph. The additional momentum enables flights of this kind to carry a larger payload—about 60,000 pounds—than can polar orbit flights from VAFB. This is important in case of payloads that have to be delivered to geosynchronous or other high orbits from the Shuttle's lower altitude by means of Centaur or the Inertial Upper Stage (IUS).

The ability to launch four flights per year from VAFB—with the option to surge to five—will be developed gradually, according to SAMTO Commander Maj. Gen. Donald W. Henderson. With some expansion of the existing hardware and personnel, the VAFB Shuttle launch capacity could surge to as many as eight flights a year, he said. Current mission forecasts top out at four flights a year. Some early projections of the Vandenberg Shuttle utilization rate, however, had envisioned up to twenty flights a year.

The current NASA flight manifest lists two firm flights beyond the first Vandenberg flight next March—one scheduled for September 29, 1986, and the other for March 18, 1987. Up to nine flights could possibly occur between August 1987 and January 1990 from the Vandenberg Shuttle launch facility.

#### Launch Requirements and Cost

Counting both Vandenberg and KSC flights, the Defense Department's known Shuttle launch requirements through the mid-1990s average about ten launches per year. According to Secretary Aldridge, this rate will probably remain even to the year 2000, except for the as yet unknown space-launch requirements associated with the Strategic Defense Initiative (SDI). Until about 1995, the current fleet of four Orbiters appears capable

of meeting foreseeable civilian and military Shuttle launch requirements as well as of accommodating perhaps up to five launches per year associated with SDI, according to Secretary Aldridge. Expendable launch vehicles, such as Titan II and CELV (a Titan 34D-7), will augment the Shuttle for the time being.

NASA and the Pentagon are working on pricing arrangements for military Shuttle flights in the 1990s. As Secretary Aldridge told Congress recently: "First, we want the pricing agreement to be based on what is fair; that is, DoD will pay its fair share of hardware costs and the Shuttle-institutional costs, but DoD must be given consideration for its contribution to the institutional support of the STS [Space Transportation System, meaning the Shuttle plus its upper stage program]. Secondly, DoD must not subsidize, through expenditure of its defense budget, support for non-DoD requirements."

The actual cost to the Air Force of flying on the Shuttle, at present, is about \$114 million (FY '85 dollars) per flight, consisting, according to Secretary Aldridge, of DoD's "contribution to the fixed operating costs of the Shuttle, such as the VAFB launch and landing site, as well as the marginal cost of \$54 million . . . which we reimburse to NASA for STS missions."

#### From MOL Site to Shuttle Port

SLC-6, America's dramatic western space port, started life as the launch facility of the defunct Manned Orbiting Laboratory (MOL). After cancellation of the MOL program, the facility—consisting of a mobile service tower, a launchpad, a flame duct, and a launch control center—was mothballed in 1969. In 1971, an intergovernmental group, the Shuttle Launch and Recovery Board, started a review of possible operating sites for the Space Transportation System and selected Kennedy Space Center and Vandenberg AFB as the two Shuttle sites. Following extensive cost analyses that showed that at least \$100 million could be saved in construction costs by using the existing facilities, SLC-6 was picked in 1975 as the nucleus of the West Coast space port.

Actual construction got under way in 1979. Various Shuttle-related facilities are located in separate parts of the base. The expanded runway, the Orbiter Maintenance and Checkout facility, and a majority of the support personnel, for instance, are located on North Vandenberg. SLC-6, which includes the Launch Control Center, Payload Preparation and Changeout facilities, Shuttle Assembly Building, access tower, launch mount, Mobile Service Tower, and three exhaust ducts, is located at South Vandenberg. So are the Solid Rocket Booster Refurbishment and Subassembly Facility, the area for handling the Shuttle's external fuel tank, and a harbor where the external tanks are received.

The pattern for the first three Shuttle missions at VAFB is reasonably firm. The Orbiter, already prepared for flight at the Kennedy Space Center, is delivered to VAFB by the Shuttle Carrier Aircraft, a modified Boeing 747. Support teams lift the Orbiter off the carrier aircraft and tow it to its maintenance and checkout facility. (Beginning in 1987, the Orbiter will land on VAFB's 15,000-foot runway, eliminating the need for delivery by the 747 carrier aircraft.)

Following maintenance and checkout, the Orbiter



*Maj. Gen. Donald W. Henderson, Commander of USAF's Space and Missile Test Organization (SAMTO), inspects the seventy-six-wheel, Italian-built Orbiter Transporter at Vandenberg AFB. SAMTO, an element of Air Force Systems Command's Space Division, will control Discovery's launch, with assistance from NASA. After that, Johnson Space Center will take over.*





*The Orbiter Enterprise inside Vandenberg AFB's Shuttle Assembly Building, where Discovery will be mated with its solid rocket boosters and its external tank. The boosters are 149 feet high, twelve feet in diameter, weigh about 1,300,000 pounds each, and are assembled at Vandenberg.*

travels to SLC-6 over seventeen miles of base and public roadways aboard a special seventy-six-wheel transporter. Sections of that route have been modified to accommodate the Orbiter's seventy-eight-foot wingspan. Special security police details on the ground and in the air will guard the Orbiter's passage, according to General Henderson. Under wartime conditions, however, there is no reliable way to protect the Shuttle from hostile actions, either at VAFB or KSC. The same is true in space, where the Shuttle could be attacked by Soviet ASAT weapons.

### **Shuttle Integration**

Once at SLC-6, the Orbiter is integrated with the other components of the Shuttle—the external tank and the solid rocket boosters. The Vandenberg approach to Shuttle assembly differs from the procedures used at the Kennedy Space Center. Because VAFB lacks KSC's Vehicle Assembly Building, components of the Shuttle are brought piece by piece to SLC-6 and assembled on a stationary launch mount. Two huge mobile structures move toward each other on railroad-like tracks from their parked positions to enclose the launch mount in the fashion of clam shells. After the clam shells close, the two solid rocket boosters are stacked on the launch mount. The boosters are 149 feet high, twelve feet in diameter, and weigh about 1,300,000 pounds each. Each booster consists of four segments. The individual boosters are assembled at Vandenberg, following shipment of the individual segments from a manufacturing facility in Utah. Each booster generates about 2,600,000 pounds of thrust on liftoff.

Once the solid rocket boosters are in place, two huge cranes place the external tank between them. The tank is 154 feet high and has a diameter of 27.8 feet. It provides fuel for the Orbiter's three engines during liftoff and ascent through the atmosphere. These tanks are shipped

to Vandenberg in sea-going barges from a plant in Louisiana. They are routed through the Gulf of Mexico and the Panama Canal and offloaded at a former Coast Guard facility south of SLC-6. They are then towed to a special facility near the launch site. Up to five tanks can be housed there. The ability to store spare tanks could prove important in periods of crisis when passage through the Panama Canal might be in question.

The tank flies with the Orbiter into space, where it is released. Eventually, the discarded tank's orbit decays, it reenters the atmosphere, and it finally breaks up. In normal Shuttle missions, a significant amount of fuel is left in the tank at the time the Orbiter discards it. There are tentative long-term plans somehow to use these tanks, which may contain as much as 25,000 pounds of unused fuel, as a fuel reservoir in space.

The final action at the launch mount is to place the Orbiter vertically beside the external tank. The Orbiter is about the size of a DC-9 and stands 122 feet tall. Its empty weight is approximately 150,000 pounds—or 185,000 pounds fully loaded. Total weight of the Shuttle ready for flight is about 4,400,000 pounds. The Orbiter's three main engines combined with the two solid rocket boosters generate a sea-level thrust of about 6,300,000 pounds. The two boosters are equipped with parachutes. The spent boosters drop into the ocean about 120 miles south of VAFB, where a special Air Force recovery ship, the *Independence*, recovers the chutes and takes the boosters in tow. They are then returned to VAFB where they go through a gigantic "car wash" that removes salt from the ocean dunking as well as toxic residue from spent propellants.

Prior to launch, the two halves of the "clam shell," the Mobile Service Tower and the Shuttle Assembly Building, roll back to their parking positions several hundred feet away from the launch mount. The two huge buildings move at speeds up to forty feet per minute. At lift-



off, the exhaust from the solid rocket boosters and the Shuttle's main engines is channeled underground and then vented through three ducts at the sides of the pad. To prevent damage to the Orbiter and its payload from the acoustic energy unleashed during liftoff, some 760,000 gallons of water are pumped onto the pad and into the exhaust ducts in less than thirty seconds. This "flash flood" acts as a sound suppression system. As a precaution in case of problems immediately prior to launch, the pad is equipped with a lifeline slide to get the crew out of harm's way.

Up to three Shuttle systems can be stored at the VAFB facility. This could provide a safety margin under certain conditions. The facility's "clean rooms" also make it possible to keep critically important payloads on standby status for periods of up to six months.

### Security and Support Arrangements

While the security arrangements at KSC and the Johnson Space Center have been upgraded to meet DoD requirements, the Pentagon, Secretary Aldridge said, feels "more comfortable" with the VAFB facility "because we control the range and access." According to present plans, the first launch from VAFB will not be completely closed to the public and will include some media coverage. Thereafter, all payload details will be classified, and only the launch day, but not the specific launch time, will be announced. VAFB's security arrangements for Shuttle payloads are stringent. Individual elements that emit electromagnetic radiation that could provide clues about the payload's nature are kept in secure "cells" that are emission-proofed to a level of 100 decibels. These three cells can be staffed in ways that keep the crew working in one cell from knowing about what goes on in the other cells.

The number of SAMTO people assigned to Shuttle operations at VAFB is about 300, according to General Henderson. Another group of about 100 SAMTO personnel performs support functions. About forty-five NASA people are assigned to SAMTO's 6595th Shuttle Test Group on a more or less permanent basis. NASA and Air Force staffs are fully integrated into the VAFB Shuttle operation to the extent that "I have got NASA people working for Air Force people and the other way around. We function as a team," according to the SAMTO Commander. Also working with SAMTO is a small contingent from Air Force Space Command that provides contingency rescue and recovery resources.

SAMTO's responsibility for Shuttle operations from VAFB extends from receipt of flight hardware to the time the Shuttle completes liftoff. After that, the Johnson Space Center takes over. If the proposed Shuttle Operations Center at Colorado Springs is funded and put into operation, that organization would exercise flight control over all military Shuttle flights. The Johnson Space Center would remain in charge of nonmilitary operations. The pending formation of a Unified Space Command can be expected to affect organizational arrangements on military Shuttle operations, but the specifics have not been worked out at this writing.

Major contractors associated with the VAFB Shuttle operation at this time are Martin Marietta, which is handling installation and checkout with about 1,300 people; Lockheed Space Operations, which is in charge of

Shuttle processing and involves a staff of about 2,000; Ford Aerospace, which is responsible for the ground communications systems and 225 contractor personnel; and Rockwell, which handles the Orbiter (Phase II) and involves 150 civilian technicians. The present contingent of about 4,000 industry support personnel at VAFB will shrink to a total of under 2,000 as Shuttle operations achieve routine status, according to General Henderson.

The grand total of staff—civilian government, military, and contractor personnel—required to support a Shuttle flight, according to Secretary Aldridge, is about 6,000 people. But it takes only one-tenth of that—about 600 people—to launch an expendable launch vehicle with comparable payload capabilities.

### Backing Up the Shuttle

When the concept of the Space Transportation System (the Shuttle) began to take shape in the 1960s, the initial intent was to make this system an addition to, rather than a replacement of, the nation's ELV fleet. Budgetary pressures subsequently derailed this double-track approach, with the result that, beginning in 1987, all national security payloads were to be launched by the Shuttle. This notion presupposed acquisition of a fleet of at least six Orbiters and failed to allow for the possibility of a "generic standdown" of the Shuttle that would leave the US without a space-launch capability.

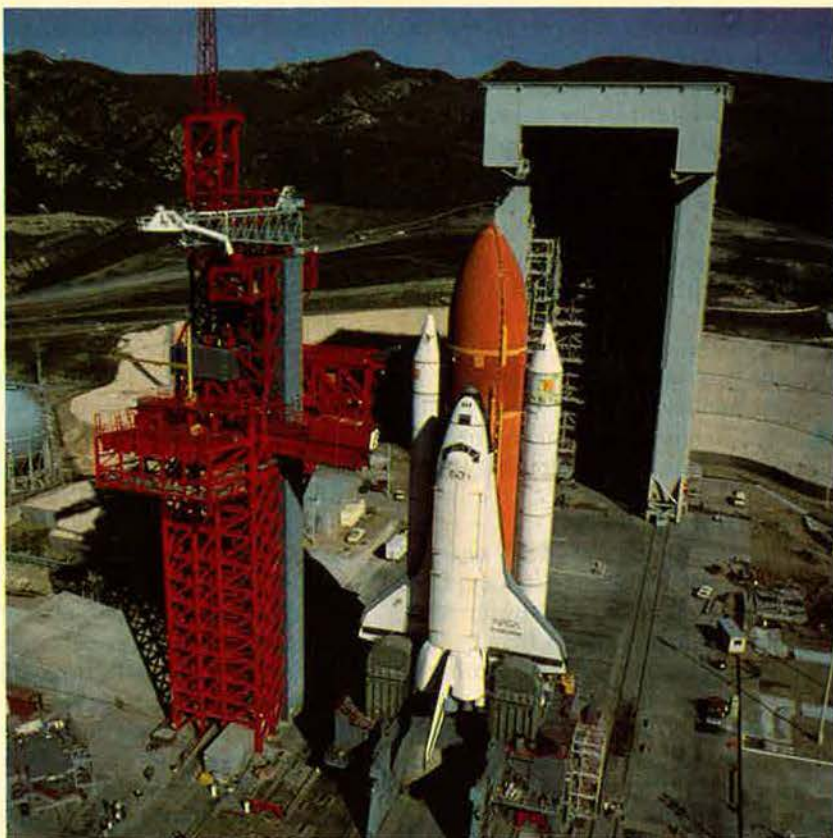
As a result, the Air Force was authorized to buy ten CELVs (Titan 34D-7s, or complementary ELVs that can deliver a payload of 10,500 pounds to geosynchronous orbit). These CELVs, according to calculations by the Congressional Budget Office, have slight overall cost advantages over the Shuttle. They will be flown by the Air Force at a rate of two per year between 1989 and 1993. These CELVs also offer some other advantages over the Shuttle. For one, under crisis conditions, they can be readied for flight more quickly than can the Shuttle. It would require just a few days to ready a standby Titan booster at the Vehicle Assembly Building at KSC for launch, compared to weeks for the Shuttle.

Another advantage over the Shuttle is that manned crews would not have to be exposed to the risks associated with overflying the Soviet Union. As Gen. Robert T. Herres, CINCNOAD and Commander of Space Command, told Congress recently, "Without the CELV program, a problem with the Shuttle could severely limit our ability to put satellites in space. Moreover, during an intense 'non-CONUS' conflict, it is quite possible that we would want to turn to unmanned vehicles, considering Soviet antisatellite capabilities and other [factors] which could lead us to not want to use a manned system." He also pointed out that CELVs offer considerable growth potential. It is possible, for instance, to increase the CELV's geosynchronous payload capability—in steps to 14,000 pounds, 25,000 pounds, and even 37,500 pounds—relatively quickly and economically.

For smaller payloads, the Air Force plans to use at least thirteen Titan IIs that were decommissioned as ICBMs and that are being refurbished as space launch vehicles. These "recycled" launch vehicles—which can deliver in excess of 3,000 pounds into polar orbit—are ideally suited to launch Navstar GPS replacement satellites under emergency conditions, according to Secre-



*The fully assembled Space Shuttle Enterprise in position at the SLC-6 launch mount, Vandenberg AFB. A Shuttle weighs about 4,400,000 pounds when ready for flight. Its boosters generate a sea-level thrust of about 6,300,000 pounds. Up to three Shuttle systems can be stored at the VAFB facility. (USAF photo by TSgt. James Pearson)*



tary Aldridge. The eighteen satellites of the operational Navstar constellation are in different orbits; replacing a single defunct Navstar satellite probably could not be done on a "share-the-ride basis," thus making the limited-payload, low-cost Titan IIs well-suited for such missions. Other ELVs used for military missions include a small number of Titan 34Ds that can deliver payloads of up to 32,000 pounds into polar orbit, some Atlas boosters, and some Scout launchers that NASA operates for the Defense Department. (Test targets for the Air Force's ASATs will be launched by NASA from Wallops Island, Va., on Scout rockets. SAMTO is the launch agent for the F-15s that, operating from Edwards AFB, Calif., test-fire ASAT space interceptors.)

### **The Next Generation**

An intergovernmental task force, meanwhile, has been convened to report by mid-1986 to the President on proposed approaches to a second-generation space transportation system. This effort, known as the National Space Transportation and Support Study, concentrates on requirements for manned and unmanned space launch vehicles in the years beyond 1995—and in the preceding transition period—for use by the Defense Department as well as NASA.

Secretary Aldridge, a member of the study group, explained that the key requirements associated with the second-generation space transportation system is the ability to handle "greater payloads at an 'order-of-magnitude' lower cost." This translates into the need to look for basic concepts that are "less people-intensive" than the Shuttle as well as to pursue such technical challenges as new propulsion approaches. Included here are cheaper engines, solid propellants that can be poured directly, the elimination of nozzles, new heat-resistant

materials that eliminate the need for the Shuttle's costly and fragile thermal tiles, and simpler avionics, he added. The need for delivering more weight for less cost into space is already pronounced; it will become even more acute as the survivability of satellites and other spacecraft reaches the level of a categorical imperative. The survivability of spacecraft "means more weight," according to Secretary Aldridge.

Spacecraft survivability would be especially important if SDI leads to the deployment of operational strategic defenses. As Secretary Aldridge pointed out, "If, by the year 2000, in the context of SDI, we need to launch fifty satellites a year, we can't afford to pay between \$100 million to \$200 million a copy for them." At this time, more than half the cost of a satellite stems from launch costs.

As General Herres told Congress, long-term launch capabilities need to be made "more survivable and less costly when compared to the satellites they are designed to launch." Both he and Secretary Aldridge suggest that DARPA's hypersonic aerospace vehicles present interesting technological opportunities as second-generation space launchers. "Should the technology prove feasible, a hypersonic aerospace vehicle could be of significant military utility. I believe a program should be structured with specific developmental milestones to see if the technology could be exploited," according to General Herres. If DARPA's hypersonic aerospace plane "works, it would reduce launch-to-orbit costs by two orders of magnitude," Secretary Aldridge predicted.

But until that happens, the Air Force's new Shuttle operations at Vandenberg will go a long way toward enhancing the national security mission in space, emphasizes the first senior Pentagon official slated to venture into orbit. ■



The command moves toward the  
airlift cargo-carrying goal.

# MAC's Magic Number

BY JAMES P. COYNE, SENIOR EDITOR



**I**N A fiscally constrained world, sixty-six is Military Airlift Command's magic number.

That is the goal—66,000,000 ton-miles per day (MTM/D) of cargo airlifted to support US forces in combat—established in a Congressionally Mandated Mobility Study (CMMS) carried out by DoD in 1981. "We can attain that goal," said Gen. Thomas M. Ryan, Jr., MAC Commander in Chief, shortly before his October 1 retirement. "With capability improvements in recent years and enhancements like the C-5B and future procurement of the C-17, we will attain it before the end of the century."

In any conflict, the bulk of supplies for US forces will travel by ship, but important equipment needed to support them in the early days of the fighting can only be provided by air. As the conflict continues, troop replacements and certain materiel will continue to go into the battle area on aircraft. The CMMS produced the sixty-six MTM/D requirement after examining possible scenarios that included Soviet invasions of Iran or Saudi

*A big part of MAC's shortfall in strategic airlift will be made up when the C-17, still in development, comes into the force in the 1990s.*



Arabia, a Warsaw Pact attack on NATO, and a combination of a conflict in Southwest Asia followed by a Warsaw Pact attack. The airlift requirement is a fiscally attainable goal.

By 1986, the study predicted, MAC would have a shortfall of twenty MTM/D; today, there is a shortfall of about thirty MTM/D. But this shortfall is down from 1984, when it was 33.6 MTM/D, and from 1983, when it was 37.3 MTM/D. It will continue to drop as C-5Bs and C-17s come into the inventory, General Ryan said.

The sixty-six MTM/D goal is for intertheater airlift, also called long-range or strategic airlift, between the US and overseas theater locations. In addition, MAC has the mission of providing intratheater airlift within a theater of operations. The requirements for this mission are not clear-cut. The Army, with its new AirLand Battle doctrine, will need more airlift than ever before to support its new lightweight infantry divisions in combat. More troops will move more often in a war, and more equipment will have to be airlifted to support them than before.

Right now, the Department of Defense is finishing the Worldwide Intratheater Mobility Study to determine airlift and other mobility needs in typical combat theaters. Results are not yet known. Previous studies indicate, however, that fully two-thirds of what is airlifted into a theater must be forwarded to specific battle areas by airlift. MAC can currently haul nearly 9,000 tons per day in C-130s. The new intratheater goal established by the study will probably be well above that, perhaps as high as 16,000 tons per day. A growing portion of this will be outsize cargo the C-130s can't carry.

### The MAC Delivery Trucks

MAC provides airlift with its own aircraft as well as those possessed by the Air National Guard, the Air Force Reserve, and the Civil Reserve Air Fleet (CRAF). CRAF was formed in 1951 when several civil air carriers agreed to provide specified numbers of aircraft to the government in times of crisis or national emergency. Participating airlines today include Northwest, Pan American, United, American, Trans World, Flying Tiger, Transamerica, World, American Air, Arrow, and Continental. In a full-scale national emergency, these airlines and others would provide about 300 long-range overwater commercial airliners for military airlift. Aircraft include the Boeing 747, McDonnell Douglas DC-10, Lockheed L-1011, Douglas DC-8, and Boeing 707. Over the years, the civilian airlines have provided CRAF aircraft during many crisis situations. The government has never had to invoke the agreement and call them up involuntarily. CRAF aircraft constitute up to forty percent of MAC's intertheater airlift capability during times of crisis.

MAC's own resources include seventy C-5As, 234 C-141Bs, and 216 C-130s. More than 300 additional C-130s are available from the Air National Guard and the Air Force Reserve. C-5s are just starting to enter the reserve forces inventory. Varying numbers of SAC KC-10s are available to transport cargo in the MAC airlift system.

The queen of the intertheater force is the C-5 Galaxy. Designed to lift more than 130 tons of cargo, it is the only US aircraft that can carry outsize cargo—including the

*Army troops board a C-130 during Exercise Team Spirit in Korea. They had flown from the United States aboard strategic airlift aircraft into a main operating base, where they transferred to C-130s for the leg into a forward airfield in the "battle" area.*



Army's main battle tank, the M1 Abrams, and larger equipment. Still the world's largest operational aircraft (the new Soviet An-124 is not yet in the active force), the C-5's "drive-through" cargo hold and truckbed-height floor permit rapid loading and unloading of rolling stock and up to thirty-six cargo pallets. It has an in-flight refueling capability.

Workhorse of the force is the C-141 StarLifter. With in-flight refueling to give it a worldwide range, it can also carry thirty-five tons of oversize (but not outsize) cargo more than 2,900 miles without refueling. It can accommodate 200 fully equipped troops or thirteen cargo pallets, or it can air-drop thirty-five tons of cargo or 155 troops. In an aeromedical role, the C-141 can fly 103 patients on stretchers with an appropriate number of medical attendants from overseas to US hospitals.

The C-130, after more than thirty years in the inventory, is still the mainstay of the intratheater airlift force. With its truckbed-height floor, it can be loaded and unloaded rapidly and can carry up to six cargo pallets from feeder fields to forward bases in combat zones. The C-130 can air-drop sixty-four fully equipped troops or up to seventeen tons of supplies. It can also deliver cargo on the surface, without landing, using the Low-Altitude Parachute Extraction System (LAPES). Seventy-four litter patients can be carried on medevac missions.

MAC also has MC-130 Combat Talon aircraft for the Special Operations Forces (SOF). With special navigation and other equipment, Combat Talon aircraft put SOF teams into unmarked drop zones in enemy territory at night and in adverse weather. AC-130 gunships,





with a variety of machine guns, cannon, and other combat equipment, provide close air support, armed reconnaissance, and interdiction. Gunships were the principal fire support for Army troops on the ground during the Grenada rescue operation in the Caribbean.

MAC provides emergency and scheduled aeromedical airlift with the C-9 Nightingale. The CT-39, leased C-21s (Learjets), and C-12s are used to provide expeditious airlift of aircraft parts and support people in wartime situations. While doing this, these smaller aircraft offer low-cost seasoning of recent pilot school graduates. They are sometimes used to provide executive transportation for high-ranking government officials from the services, DoD, and Congress. And at Andrews AFB, outside Washington, D. C., the 89th Military Airlift Wing provides air transportation for the White House and other executive agencies aboard several types of aircraft, including the President's aircraft, *Air Force One*.

In the European theater of operations, the command operates a fleet of C-23 Sherpas, manufactured by Short Brothers, Ltd., of Belfast, Northern Ireland, for its European Distribution System. These small, twin-engine cargo aircraft give greater combat readiness and sustainability to units of United States Air Forces in Europe (USAFE) by providing fast, usually overnight, delivery of spare parts and engines. The eighteenth and final aircraft of the fleet will be delivered before the end of this year.

Not primarily for airlift but nevertheless a unique MAC resource is the HH-53 Pave Low helicopter. With special navigation equipment and terrain-avoidance ra-

dar, it can land troops in hostile territory and reinforce and resupply SOF units. Operating in total darkness, at low altitude, and with no outside references, it can extract troops with minimum risk of detection.

Aerospace Rescue and Recovery Service teams combine helicopters, HC-130s, and attack aircraft for rescue efforts in hostile areas. The HC-130 provides airborne command and control and can refuel the helicopters. Teams like these also operate in peacetime rescue missions, but without attack aircraft support. MAC forces have participated in the rescue of more than 21,500 people worldwide since the establishment of the Air Rescue Service in 1946.

### Airlift Enhancements

Regardless of the wide variety of MAC aircraft and the diversity of their missions, General Ryan says, "Our primary missions are deployment, employment, and resupply. Everything we are doing now enhances our ability to carry out these missions."

At center stage in this enhancement process is the program for strengthening C-5A wings. The center, inner, and outer wing boxes—the lengthwise sections between the leading and trailing edges—are being replaced, providing an additional 30,000 flying hours for each aircraft at a cost of \$19.6 million per aircraft. Since the new C-5Bs coming on board will also have the new wing, MAC will eventually have a total of 127 C-5s with a 30,000-flying-hour life expectancy. In the intratheater fleet, the outer wing boxes of C-130s are being replaced to increase each aircraft's flying life from 18,000 hours to

*A C-5 Galaxy, largest operational aircraft in the world, opens its visor-type hinged nose to allow loading of palletized cargo for a long-range deployment. Loading is facilitated by adjusting the height of the cargo floor, which is normally at truck-bed level.*





as much as 40,000 hours. The cost per aircraft is \$1.05 million.

CRAF aircraft are being enhanced. In 1982, MAC offered to pay for the modification of civilian aircraft so that they could continue to carry passengers commercially but would be sturdy enough to carry heavy military cargo. The floor would be strengthened, and a new cargo door would be installed in each aircraft. Pan American World Airways responded with a proposal to modify nineteen 747s. The first of these was completed last summer, and twelve more aircraft have been put under contract. MAC has now made a new proposal to continue the program and pay half the modification cost per aircraft. Participating airlines will also be offered MAC cargo contracts. The new program will cost the command less than \$10 million per aircraft, while the average unit cost under the old contract was \$26.7 million.

A significant enhancement to the airlift force will be the procurement of sixty KC-10s jointly for MAC and SAC. The KC-10 is extremely versatile and can serve as an in-flight refueler and a cargo plane at the same time. For example, during the recent annual deployment to Cairo, Egypt, for Exercise Bright Star, one KC-10 escorted eight F-111s from Pease AFB, N. H., refueling them on the way. As passengers, the big tanker carried spare aircrews for the F-111s as well as their ground crews. And in the cargo hold was all the ground-support equipment for the aircraft. Within a few hours of landing at Cairo, the F-111s were flying their first sorties with the spare crew members, who had rested en route.

KC-10s will continue to be flown by SAC crews, but when used overseas in the airlift role, they come under the operational control of MAC. In a full-scale national emergency, KC-10s would be used in a dual role. Initially, they would be employed as tankers, carrying cargo and support people for the fighter units they are deploying.

But in lesser contingencies, depending on circumstances, some would be allotted to MAC. KC-10s in the cargo role have the same drawback as the civilian DC-10—the cargo floor is not uniformly capable of taking the weight of some military cargo, and it is well above truckbed level, requiring special cargo-handling equipment.

### **Hauling Cargo Into the Next Century**

Eagerly anticipated by MAC is the C-5B. It has the changes made in modernizing the C-5A, as well as some additional ones. The General Electric TF39 engines, rated at 41,000 pounds of thrust, have been improved and made more responsive. The troop compartment includes flame-retardant seats that are thirty percent lighter than the old ones. The saving in weight, according to a Lockheed spokesman, is expected to cut fuel consumption costs by \$13 million over the life of the C-5B fleet. New carbon brake assemblies will have double the life of the A model's beryllium brakes. Total fleet savings on brake replacement and maintenance costs over the life of the fleet are estimated at \$20 million.

The first C-5B rolled out of the Lockheed plant in Marietta, Ga., on July 12. Speaking at the ceremony, Secretary of the Air Force Verne Orr noted, "The C-5B will add 7,500,000 ton-miles per day of outsize airlift

capability toward our goal of 66,000,000 ton-miles per day." This first production aircraft started flight testing at Dobbins AFB, Ga., in September and will be delivered to the Air Force in December. The Air Force has contract options to buy fifty C-5Bs at a cost of \$7.187 billion. Delivery of the final C-5B is expected to occur in mid-1989.

At that point, with all programs involving aircraft now in the inventory virtually complete, the programmed intertheater airlift capability will be 48.5 MTM/D, still 17.5 MTM/D short of the sixty-six MTM/D goal, according to the Air Force's Airlift Master Plan. The Airlift Master Plan was issued in September 1983 and remains the valid "roadmap" for the airlift program. (*For details on the Airlift Master Plan, see AIR FORCE Magazine, May '84 issue, p. 58.*) Furthermore, that capability will decline somewhat as older C-141s reach the end of their projected service lives in the late 1990s.

Originally designed to achieve 30,000 flying hours, each StarLifter was subjected to a durability and tolerance assessment when the entire fleet was converted to the C-141B stretched configuration. That assessment, provided that a life-extension program was implemented, put the economic service life of each aircraft at 45,000 hours. MAC plans to retire fifty-four C-141s beginning in 1996 and to reduce the use rate on the remaining airframes. This will extend the service life of the fleet to the year 2016. However, without a replacement aircraft, the airlift capability, supported by C-5A/Bs, KC-10s, and CRAF aircraft, would fall to about thirty-four MTM/D.

Fortunately, the answer to the problem, the C-17, is already in full-scale development (although no money has yet been requested from Congress for production). This new aircraft will have about the same wingspan as the C-141, but it can carry more and bigger Army equipment because its cargo compartment is eighteen feet wide (the C-5's cargo compartment is nineteen feet wide). It will be able to operate from short fields in the battle zone, where only the C-130 can operate now. "It carries between three and a half and four times what a C-130 carries," General Ryan pointed out. "In terms of size, it can carry anything the Army would want in the battle area—bridges, tanks, infantry fighting vehicles, artillery like the self-propelled 155-mm, really big stuff the C-5 can carry but the C-130 cannot." So, in the C-17, the country is getting an intertheater, long-range aircraft (more than 3,500 miles without refueling, and it can be refueled in flight) with an intratheater capability.

The capability to operate from small fields not only enhances battlefield performance, it also dramatically improves opportunities for airlift deliveries anywhere. For example, the C-5 is expected to operate out of strips no smaller than 5,000 by 150 feet. Only fifty-six of these runways are available in Central Europe. The C-17, able to operate from strips as small as 3,000 by ninety feet, will have 436 available runways. An additional limiting factor is taxiways—for many airfields a C-5 or C-141 can land on, taxiways are so narrow or congested that the aircraft must be unloaded, loaded, and serviced on the runways, in effect closing the airfield. The C-17, with a narrower landing gear track, a much smaller turning radius, and the capability to taxi backward on unpaved surfaces, will be able to use small taxiways and ramps.



The C-17 has built-in survivability. Besides redundant systems, its maximum ingress and egress speed for the battlefield is high—410 knots at low altitude. It is almost tailor-made to support the Army on its new AirLand battlefield, where troops will often operate in isolated pockets as much as 150 kilometers behind the enemy's lines, surrounded by hostile fire. In this situation, the C-17 can approach the field at 10,000 feet and, using in-flight reverse thrust, descend at 410 knots and land in less than two minutes out of an extremely steep descent. After offloading, it can take off—with some cargo and

this, the Air Force asked Congress for 22,000 more active-duty Air Force people in 1984 than were already in service in order to keep pace with new manpower requirements. Congress increased the active-duty force by only 2,000 people. Reading the handwriting on the wall, MAC planners realized ways must be found to add the new equipment to the force without significantly increasing the active-duty force size. One way to do this is to transfer some in-being systems to the reserve forces.

So, aircraft are being transferred to the Air National

*Scale models of the C-17 show its size in relation to equipment it would be hauling. About the size of a C-141 or a KC-10 but with a cargo hold only a foot narrower than the C-5's, it will airlift outsize cargo across oceans and into forward strips in combat areas.*



enough fuel to fly 500 miles—and climb to 10,000 feet at 410 knots in only 160 seconds. The C-17 will be powered by four Pratt & Whitney PW2037 turbofan engines, which have already been proven in worldwide airline service. It will have a three-man crew—two pilots and a loadmaster—compared to the five-man crew in the C-130.

MAC plans to acquire 210 C-17s. The first one will enter the Air Force in 1990. An Initial Operating Capability—twelve aircraft on board—will be reached in the fourth quarter of FY '92. With the addition of the C-17, the sixty-six MTM/D goal will be reached in 1998 and will be maintained thereafter, even though C-141s retire. The C-17, with its small-field capability, can also contribute to alleviating the intratheater cargo-carrying shortfall. Its predicted contribution, added to the C-130 force, will bring intratheater airlift to about 15,500 tons a day, just under the 16,000 tons a day requirement expected by the Worldwide Intratheater Mobility Study.

#### **The Guard, The Reserve—And the Airlines**

The C-5B and the KC-10 are new systems that add to the force. They are not replacements. This means more people must be added to the total force to operate and maintain them. The same is true for other new systems like the Ground-Launched Cruise Missile. Recognizing

Guard and the Air Force Reserve. The first of forty-four C-5As to be transferred to the reserve forces was assigned for training to the 433d Military Airlift Group, Kelly AFB, Tex., in December 1984. The unit will have three before the end of this year. Other C-5s are being transferred to Guard and Reserve outfits this year at Stewart IAP, N. Y., and Westover AFB, Mass. There will be three C-5 reserve forces groups in all. These transfers not only benefit the Air Force but have a salutary economic effect on the community as well. At Stewart, for example, a \$125 million construction program was begun, including increased hangar space, new warehouses, improved taxiways and ramps, as well as a new air traffic control facility. The size of the Guard organization jumped from 800 to 2,000 people.

C-141s are also being transferred to the reserve forces. Sixteen planes will leave the active force in 1986—eight will go to the Guard at Jackson, Miss., and eight to the Reserve at Andrews AFB, Md. A total of eighty C-141s will be transferred by 1995. MAC is cautious about moving aircraft, especially C-141s, to the reserve fleet too fast, before the reserve forces have had time to recruit and man their organizations properly. Experience shows that, in a nonmobilized contingency, about twenty percent of Reserve Associate Unit crews are available to fly full time. This is not a big problem



because the Reserve Associates are collocated with active-duty units flying the same aircraft, and additional crews as needed are provided by the active-duty wing. But in a reserve unit not collocated with an active-duty unit, there would be no backup active-duty crews. Still, the demand for C-141s in a contingency would be very high. So MAC is moving carefully, making sure that receiving units are fully manned when they receive their C-141s.

MAC is also facing aircrew retention challenges, General Ryan said. All commands lose pilots to the airlines, but the demand for MAC pilots is very high because their experience in large, multiengine aircraft suits them well for airline flying. Right now, with the economy in good shape, demand is at a peak.

MAC tracks retention by projecting what percentage of officers entering a given year group would complete a designated period of service if current retention patterns remained constant throughout that period. For pilots, the critical period is from six to eleven years of commissioned service. This is the period during which MAC pilots enter their most productive career phase in terms of flying experience. In FY '85, approximately half of the MAC pilots entering their sixth year of service are projected to have left active duty by the end of eleven years. This is close to MAC's average over the past nine years. Getting replacements for people who leave is not a problem. The problem is the cost of providing the new aircrews with the required experience to make them productive in their weapon systems.

Lt. Col. Allen A. Pichon, in the office of the Special Assistant to CINCMAC for Mission Effectiveness, explains: "A captain who has completed aircraft com-

mander upgrade in the C-5 has cost the taxpayers \$12 million. But if he leaves the service, the experience and knowledge he has are lost, and the taxpayers have to spend another \$12 million training a replacement." For the same person in a C-141, the cost is \$4 million, and in a C-130, \$2 million. MAC is doing something about retention, Col. Donald Post, DCS/Personnel, says. "We are trying to understand the young officers' concerns better. They don't leave simply because an airline offered a job. They have problems first, and then they look for an airline job. We're doing something about it."

### Keeping the Troops Happy

Family Support Centers (FSCs) have been set up to help Air Force families cope with situations encountered in the service. "We recognize that most career decisions an Air Force member makes are family decisions," says Colonel Post. "In fact, we know from recent Air Force surveys that spouses play an integral part in approximately seventy percent of all retention decisions. FSCs show these families the Air Force is serious about meeting family needs; consequently, they are more likely to stay with us."

The centers provide services like short-term counseling for depression, maintaining spouse job data banks, helping spouses write résumés for job hunting, and training and language skills for foreign-born spouses of American airmen at overseas bases. There are four Family Support Centers in MAC and thirty-four throughout the Air Force. During FY '86, MAC will open FSCs at Lajes Field in the Azores and at Altus AFB, Okla. Bases with the centers have retention rates two to three percentage points higher than other bases, and formal IG complaints are significantly down, Colonel Post points out.

Permanent change of station moves are particularly difficult for many modern families, he says. In a majority of these families, both spouses are employed. When a two-income family moves, the relocation can cost more than \$5,000, says Colonel Pichon. The loss results because the nonmember spouse is out of work for a period of time looking for a job, and then, as a new employee, must work for a time at a lower wage. Most young Air Force families need a larger weight allowance for PCS moves. This is logical, Colonel Post says, because the Air Force mirrors the general population of the country—members are better off financially than previous generations, and they have more material possessions.

Encouraging news is that bills have been introduced in Congress to increase the weight allowance for PCS moves, and some congressmen have expressed support for providing compensation for loss of spousal employment.

Congressionally mandated studies calling for changes in the present retirement system are perceived by many Air Force people as attacks on the basic entitlement programs, which originally helped them decide in favor of a military career, says Capt. Randy Martinez, MAC's retention specialist. Young people may come into the Air Force primarily for patriotic or altruistic reasons, he says, but they are nevertheless very aware of the retirement program and other benefits. They view them as promises from the government. They interpret attempts to change them as a lessening of appreciation for what



*Airlift of Army troops like these during Exercise Reforger in Europe places ever greater transportation requirements on MAC as the Army gears up to fight under the AirLand Battle doctrine. Fast lift in forward areas is the key to meeting changing battle scenarios.*





**Military travelers and their dependents use the newest gateway terminal at Charleston AFB, S. C. The terminals have proved to be efficient for passengers and economical for the Air Force. (USAF photo by TSgt. Doug Hamilton)**

## MAC's Commercial Gateway Terminals

Military Airlift Command is improving passenger service around the world. An example is the Commercial Gateway Terminal program. Gateways have been opened at five commercial terminals in the United States: Oakland and Los Angeles, Calif., Charleston, S. C., Philadelphia, Pa., and St. Louis, Mo.

Before gateways were used, most military passengers traveling to and from overseas assignments flew in and out of such military terminals as Travis AFB, Calif., and McGuire AFB, N. J. MAC studies showed that more than seventy percent of these passengers first traveled by commercial airliner to civil airports near the military terminals. From the civil airport, a military traveler would have to lug his baggage to a bus for the trip to the military terminal. Passengers traveling out of McGuire AFB to overseas destinations, for example, would first fly commercially to Philadelphia or New York. The surface trip to McGuire could be expensive and time-consuming.

With the gateway system, the passenger simply "buys" a ticket at his base Transportation Management Office (TMO), from his departure point through the gateway to his overseas destination. He checks his baggage all the way to his destination. His final leg is on a MAC contract airliner, leaving from the gateway. The only surface trip he must make is from one concourse to another in the same civilian terminal.

MAC rents space for the gateways. All are equipped with the computerized Passenger Automated Check-in System (PACS), which, as far as the passenger is concerned, works just like a commercial airline ticket counter (MAC also has PACS at eight of its military terminals). All gateways have comfortable waiting lobbies or modern USO facilities nearby.

The first gateway opened at Los Angeles in 1980. Since then, more than three-quarters of a million passengers have been served by these terminals. They benefit the Air Force, too—in one recent six-month period, a General Accounting Office study of the St. Louis terminal showed that \$2 million was saved that would have been spent by commercially flying military passengers from centrally located US military bases to military terminals on either coast or directly overseas. —J.P.C.

they are doing and the sacrifices they are expected to make.

"The retirement system is a big reason I'm staying in the Air Force," one young officer told Captain Martinez. "But what guarantee do I have that Congress won't change it? They want a commitment from us, yet we can't seem to get one from them."

## Helping to Tailor Careers

Another perception many young people have, Colonel Post says, is that the assignment system is impersonal, selecting people for jobs by computer. In MAC, this perception is being countered by delegating much assignment responsibility and authority to squadron commanders. It is a six-month test program and, if successful, may be adopted Air Force-wide. In the program, Hq. AFMPC provides MAC with a seven-month projection of all known Air Force requirements. The MAC personnel people tabulate all forecast MAC vacancies and "fair-share" the total requirements to the wings. The wings, in turn, "fair-share" to the squadrons, and at this point the squadron commander becomes responsible for making the person-job match. MAC arms each squadron commander with computer products that identify his people's overseas and Stateside assignment vulnerability. He is counseled regarding any unique assignment situations.

The squadron commander best knows his people's immediate assignment potential and the unit's operational requirements. He can assert a decisive influence that could preclude an individual's assignment to a job solely because of his standing on an eligibility list. "Aside from the mechanics of the program's information flow, which we are constantly striving to streamline, feedback has been 100 percent positive," Colonel Post says. Air Force members are happy with the new system, he adds, because they can talk to someone they know—the squadron commander—about their assignments and career opportunities, and the commander can influence the system.

General Ryan was pleased with the quality of the people in his command and with the efforts to make Air Force life even better than it is today. Overall, he said, most people in MAC are not dissatisfied with the system. "They are producing as hard as they can," he said. "These people are solid gold. They have to be, to do what they do as well as they do it. Their efforts become more important as each day we move toward our goal of sixty-six MTM/D."

But the retiring CINCMAC had one final word of caution. "I don't believe we can sustain our excellent retention rates in the face of an improving economy and increased hiring by civilian industry unless we can continue support for pay comparability and a decent retirement program. Replacing the highly-trained troops who would be the first to leave is a painful experience."

Summing up, General Ryan said, "While we are currently short of the airlift capability we need to satisfy all our requirements, nevertheless, we have made substantial progress along an ever-steepening upward curve and are better off than we were in 1980. Higher readiness and sustainability have greatly improved MAC's overall war-fighting capability, enabling us to deliver fighting forces quicker and more efficiently than ever before." ■



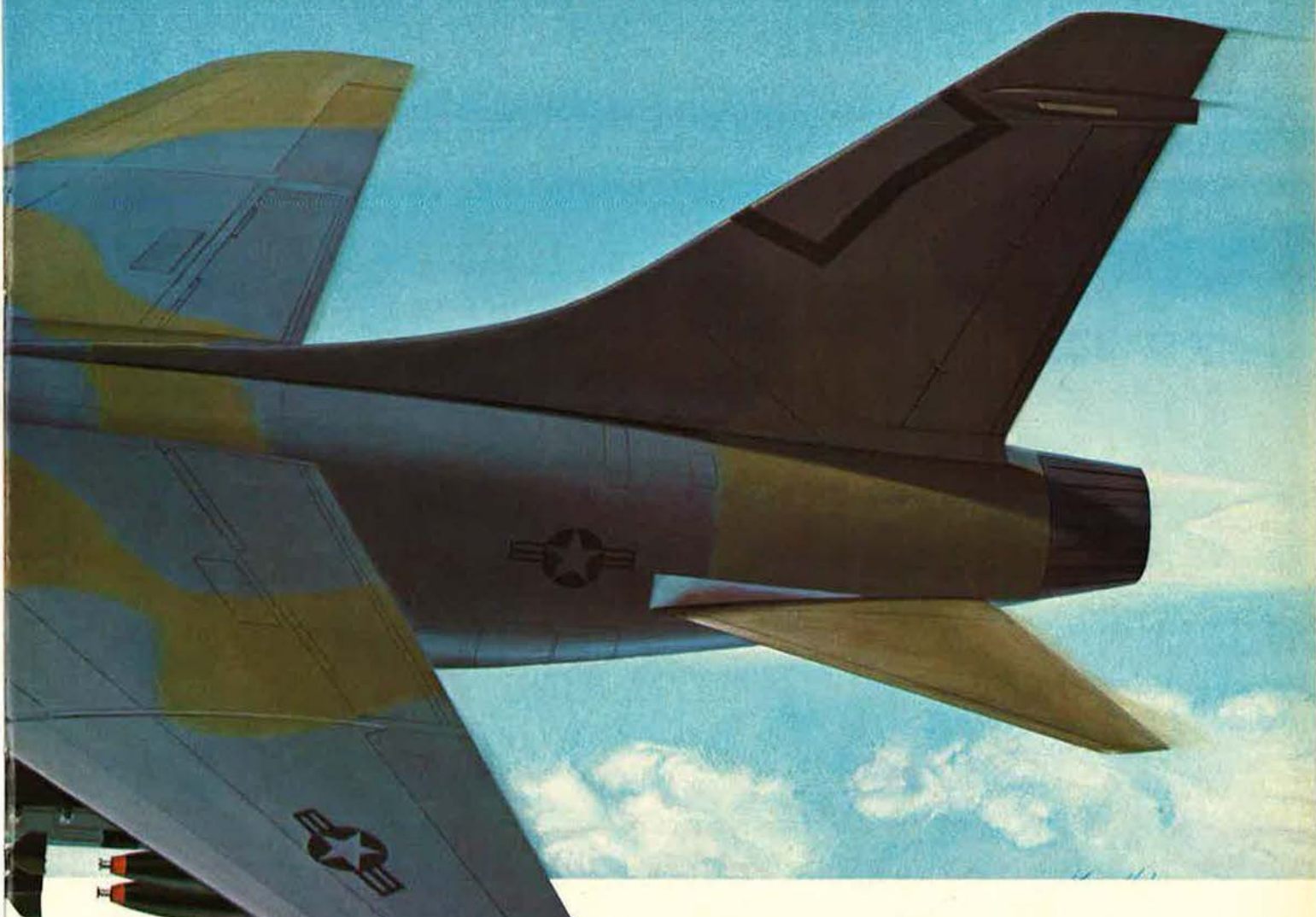


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**Defense contracting is different—making comparisons difficult—but a major Pentagon study says that profits are not out of line.**

# THE PROFITABILITY OF DEFENSE

BY JAMES W. CANAN, SENIOR EDITOR

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**T**HE US defense industry is riding high. It faces leaner years ahead as a result of the current sharp cutback of the defense budget's annual rate of growth. Right now, however, its business has never been better.

According to the latest Pentagon statistics available at this writing, the defense industry was awarded a whopping \$84.6 billion in prime contracts in just the first six months of Fiscal Year 1985, which ended last September 30.

At that record-setting pace, the value of defense prime contracts awarded throughout Fiscal Year 1985, when finally tallied, will far outstrip the value of such contracts in the previous fiscal year, which itself wasn't bad.

The \$146 billion in prime contracts racked up by the industry in Fiscal Year 1984 was almost exactly \$100 billion more than the value of such contracts ten years ago in Fiscal Year 1976, \$63 billion more

than in Fiscal Year 1980, and \$21.3 billion more than in Fiscal Year 1982.

Amid this boom, the industry has a "fat cat" image, fair or not, and is susceptible to allegations of waste, fraud, and abuse in the performance of its contracts with the Pentagon.

Its profits, too, attract a stronger spotlight. The more affluent the industry appears to be, the more its critics question whether its profits are excessive and whether Department of Defense contracting policies help make them so.

DoD is sensitive to such questions and raises them itself.

## The DFAIR Report

In December 1983, DoD began a study of its prime contractors' profits in relation to those of contractors for durable goods in the commercial sector. Seventy-six companies were involved.

DoD set out to determine whether its contract negotiation practices

were accomplishing what they should: enabling it to buy the best possible military systems at the lowest possible prices while enabling contractors to make fair but not excessive profits.

The eighteen-month study culminated in a report, "Defense Financial and Investment Review" (DFAIR), that the Pentagon made public last August. Its broad conclusion was that "our current contract pricing, financing, and markup [profit negotiation] policies are balanced, are protecting the interests of the taxpayer, and are enabling US industry to achieve an equitable return for its involvement in defense business."

The DFAIR report noted that profits from defense contracts have been higher, by and large, than those from contracts for durable goods in the commercial marketplace. But defense profits "have not been unreasonable," the report declared.







*F-16 fighters take shape in the mile-long General Dynamics Corp. plant at Fort Worth, Tex. GD invested heavily in modernizing this forty-three-year-old factory.*

According to the report, defense contractors have done a good deal better than their commercial counterparts over the long haul. It showed that from 1970 to 1979, defense contractors averaged a 6.5 percent profit; commercial companies, a 5.8 percent profit.

But then, from 1980 to 1983, a period that the DFAIR team characterized as covering "the most severe recession in fifty years," the bottom dropped out of profits in the durable goods business.

This caused companies in that business to average a 3.65 percent loss, even as defense prime contractors maintained profits averaging 4.7 percent.

The main reasons defense contractors held their own during 1980-83 were the Reagan Administration's defense buildup and the decline of inflation, said the report.

In selling to the Pentagon, some companies clearly have done better than others.

DFAIR analysts reported that from 1977 to 1983, manufacturers of military aircraft and aircraft engines realized an 11.8 percent average annual profit; manufacturers of vehicles, ammunition, and electronics, a 9.1 percent profit; and makers of missiles and space systems, an 8.4 percent profit.

#### **Financing for Defense Contractors**

The DFAIR team, headed by Air Force Col. Ronald Finkbiner, did not define profits in the usual terms of return on sales or investment. The team used an accounting method that instead calculated what it described as "economic profit" comparisons of defense and commercial contractors.

The reason for this, Colonel Finkbiner explained, was the need to "make an apples-to-apples comparison" in what is essentially an "apples-to-oranges situation."

He was referring to the big differ-

ence in the way defense contractors and commercial contractors finance their operations.

Commercial manufacturers borrow their working capital from banks. They factor the cost of such financing directly into the prices of their products and set those prices as high as the commercial marketplace will bear.

They can begin amortizing their loans in expeditious fashion because their production, sales, and deliveries follow their financing in relatively short order.

Defense contractors also borrow from banks. However, if their contracts with the military exceed \$1 million (\$100,000 in the case of small businesses), DoD provides them with progress payments to keep them supplied with working capital against the day when their products start earning them cash on deliveries.

That day can be a long time coming. In defense manufacturing,



three years can elapse between the signing of a contract and the initial delivery of hardware. Moreover, rates of deliveries are often low and unprofitable for some time.

Thus, the defense manufacturers would be badly strapped for working capital and would be at a bad cash-flow disadvantage unless they received progress payments from the Pentagon to compensate them for the costs of labor and materials that they incur right off the bat.

In order to reconcile the financing disparities of commercial contractors and defense contractors, the DFAIR team conceived an economic model with a common denominator.

It arbitrarily added to the operating profits of the defense contractors the "imputed value" of the financing that DoD provided them. It then subtracted their costs of capital and of fixed assets from their imputed operating profits.

The bottom line was what the DFAIR report described as "before-tax economic profit" and as "economic return on assets."

Critics of the DFAIR report take exception to this. Some claim that

while the DFAIR team did a thorough job of comparing profits, it should have concentrated more, as one congressional staffer put it, on "the raw stuff—the actual returns on sales" of defense contractors.

Such critics suspect that, by that standard, some defense contractors are realizing profits of as much as twenty percent above costs.

### A Taxing Situation

The DFAIR study did not take into account two important factors—the impacts of inflation and of federal income taxes (or the lack of them) on the contractors' profitability. Financial reports that the companies made available to the DFAIR analysts had not been adjusted for inflation.

The DFAIR report noted, moreover, that "it has long been DoD's policy to maintain a neutral stance on tax laws applicable to the economy as a whole" and that "the accurate tracing and/or allocation of tax benefits to DoD negotiated contracts would have been exceedingly difficult, if not impossible, since the contractors do not maintain records on that basis."

Critics acknowledge those points. They claim, however, that many defense contractors have been making much bigger money than meets the eye because they have been paying little or no federal income taxes.

At this writing, the Treasury Department was considering tax moves that would make it much tougher for defense contractors. As part of its tax-reform package, the Administration has already proposed cutting out many types of expenses that defense contractors now can deduct.

One step considered by the Treasury Department would constrain the "completed contract" method of accounting whereby defense contractors can now defer payment of taxes on all income from contracts until the contracts have run their long-term course. Another step would enable the government to recapture much of the money that the companies have been able to husband in the form of liberal depreciation write-offs in recent years.

All such moves would be direly counterproductive for the US economy, contractors claim, because they would crimp investments in





new plant and equipment that enhance productivity and cut labor-intensive production costs.

Even so, Congress, which is inveighing against alleged industry waste and overcharges and is clamping down on defense appropriations, seems in a mood to endorse any and all measures aimed at making industry pay the piper.

Congressional sentiment against the defense industry was exacerbated earlier this year by the publication of an internal report by DoD's assistant inspector general. It claimed that DoD is lax in monitoring and punishing companies that overcharge it and that overcharges are causing many millions of dollars of excess profits in the defense industry.

Some DoD officials claimed that the report went too far, but its authors stuck by it.

The defense industry seems damned if it does and damned if it doesn't.

### **Erosion of the Defense Industrial Base**

Ten years ago, the defense industry was in the doldrums. The mili-

tary services, saddled with funding the war in Vietnam, had put off the long-term weapons modernization programs that are flourishing, for the most part, today. Production runs of many new weapon systems now taken for granted did not begin until the mid to late 1970s and did not come on strongly until the early 1980s.

Halfway through the 1970s, there was great concern that defense contractors would diversify and move away from doing business with the Pentagon. Their profits from such business were barely enough to justify their hanging on to it.

Defense subcontractors, suppliers, and vendors were departing in droves. This shrank the US defense industrial base and obliterated the defense industry's capability for wartime surge production of weapons.

So the Defense Department undertook a study called "Profit '76" to see what it could do about making life better for its prime contractors and for the subcontractors with which they dealt.

(Many subcontractors complained in those days that the prime contractors weren't giving them a fair shake on profits. The new DFAIR study suggests that this may still be the case.)

The Profit '76 study resulted in a reorientation of Pentagon policy for negotiating the markup (profit) provisions of its prime contracts by putting a premium on contractors' willingness to take some financial risks.

Previously, the predetermined profit that a contractor could make had been pegged closely to the costs he would incur. The lower he kept his costs, the higher the profits he could expect.

In the aftermath of the Profit '76 study, much additional weight was given in the markup negotiations to contractor investments in plant and equipment. The greater the investment, the higher the profit could be.

Here again, Congress entered the picture. With Sen. William Proxmire (D-Wis.) in the forefront, it endorsed the Pentagon's new emphasis on encouraging contractor investment. But it also ordered the Pentagon to counterbalance this by giving proportionally less weight to contractor costs in determining contractor profits.

Consequently, this new policy did nothing to increase the aggregate profitability of defense contracts; rather, it shifted it somewhat more toward return on investment (ROI) as compared with return on costs.

This was a Catch-22 situation for the defense industry.

Its profit margins were too small for it to invest heavily in new capital equipment. It had been in the habit of making a decent return on investment by the simple expedient of not making much investment.

So even though the new Pentagon policy encouraged additional investment, it did not hold out the promise of profits that would be high enough to warrant the companies' plunging big money into new capital assets.

### **Matching Industry With New Technology**

The defense industry appears to have made great progress in overcoming that dilemma.

"Significant capital investments have been made by defense contractors," noted the DFAIR report.

The report also noted, however, that "the rate of change in [industry's] capital investment has been driven by factors other than DoD markup [profit] policy" in negotiating prime contracts.

One such factor, as Colonel Finkbinder puts it, "surely was the industry's anticipation of the buildup in demand for defense goods. It had to go out and invest to be able to meet that demand."

Another factor was the liberalization of US tax laws that has permitted defense contractors to plow income back into capital facilities instead of into the US Treasury.

Still another factor was the establishment of such programs as the Air Force's Technology Modernization program and Manufacturing Technology program, aimed at inducing contractors to shoot for big savings by shaping up their production equipment.

This method came strikingly into play in the case of General Dynamics Corp.'s production of USAF's F-16 fighters.

Air Force negotiations with General Dynamics on F-16 production contracts began just about the time of the Profit '76 report and were conducted in its spirit.



*With great precision, a robot at GD's Fort Worth plant drills holes in F-16 horizontal stabilizer skins made of graphite composites. US aerospace companies have sunk big money into facilities for such composites as part of their emphasis on investments in plant and equipment.*



General Dynamics was preparing to build F-16s at Air Force Plant No. 4, which the company operated at Fort Worth, Tex. That plant had been built in 1942 to produce World War II aircraft. It had the equipment for building F-16s, but the equipment was old and outdated, and the production clearly would not be optimally efficient.

General Dynamics was reluctant to sink big money into new equipment because the return on investment just didn't seem to be there. The Air Force recognized this. So the Air Force and General Dynamics struck a deal. The Air Force would put up \$25 million of seed money for General Dynamics to determine what kinds of new equipment were needed to make F-16 production a model of modernity. In return, the company would invest \$100 million in such equipment.

Both parties figured out the savings that would ensue on production costs and came to terms on sharing those savings—General Dynamics in the form of profits; the Air Force, in the form of lower F-16 budgets.

Both also had a long-term stake in this arrangement that extended well beyond the anticipated period of F-16 production.

By upgrading the Fort Worth plant, mostly by means of automated tooling and controls, General Dynamics moved into a much more advantageous position to compete for the production of USAF's Advanced Tactical Fighter (ATF) in the 1990s.

### Gearing Up for the Future

The allure of prospective ATF production, and of Navy Advanced Tactical Aircraft (ATA) production, has indeed been responsible for a great deal of the US aircraft industry's willingness to invest in new capital assets in recent years.

Rockwell International Corp. is another case in point.

Rockwell's North American Aircraft Operations has invested more than \$550 million since 1981 on plants and equipment in California, Oklahoma, and Ohio to build the B-1B bomber. But the B-1B is only the near-term justification of such investments.

Rockwell does not expect to realize a superrich return on investment from its presently planned produc-

tion of 100 B-1Bs. It is building the bombers under stringent fixed-price contracts with USAF, and B-1B critics are poised to pounce on the company and on the Air Force the minute a dollar's worth of B-1B contract overrun crops up.

Rockwell's return on investment would take a sharp turn upward, however, if B-1B production were extended or if Rockwell were eventually to get a major share of ATF or ATA production.

Earlier this year, North American Aircraft Operations established its Advanced Tactical Systems Organization to apply the company's B-1B development and production capabilities to "new fighter programs." Those capabilities are the direct result of the company's latter-day investments, and the fighter production programs of the 1990s are the prospective prizes that prompted them.

McDonnell Douglas Corp., too, has been putting big money into new equipment. It built a whole new plant at Mesa, Ariz., for production of the Apache attack helicopter for the Army and "for all future helicopters," a company spokesman said.

It also has invested generously in plant and equipment for production of the Navy F/A-18 and USAF's F-15 and C-17, for turning out composites that are the order of the day in advanced fighter aircraft, and for the semiconductors that are the *sine qua non* of advanced military avionics.

Throughout the defense industry, and especially in its aerospace segment, it is now axiomatic that the company with the most modern technologies in plant and equipment is the one most likely to be a winner in competition for Pentagon contracts that emphasize top productivity and bottom costs.

Northrop Corp. has been banking on this for quite some time.

Since 1980, Northrop has invested some \$1.3 billion in new plant and equipment for development and production of aircraft and electronics. The lion's share has gone to the company's Advanced Technology Bomber (ATB) program and F-20 fighter program and to Northrop's forty percent share of F/A-18 production as well.

Northrop's stakes in these invest-



ments are very high. The company stands to win big or lose big in returns on them, depending on whether the ATB does indeed succeed the B-1B in production in a timely and copious manner, on whether USAF winds up buying profitmaking quantities of the F-20, and on whether Northrop enters the ATF or ATA winners' circles.

Northrop owns or leases ninety-seven percent of the plants and equipment it uses to fulfill or to compete for military contracts, compared to an industry-wide average of fifty to sixty percent ownership.

Much defense production takes place in government-owned, contractor-operated (GOCO) plants. They are a burden on their military owners. In order to modernize them (most of them badly need it), the services must go through the laborious and politically charged process of adding big money to their military construction budgets.

Thus the Air Force, for example, is pushing its contractors ever harder to build or buy their own modern plants.

To that same end, the Defense





*Workers at McDonnell Douglas Corp.'s St. Louis, Mo., plant splice the center and aft fuselage sections of an F-15 fighter. McDonnell Douglas has made major capital investments in plants and equipment for fixed-wing aircraft, helicopters, semiconductors, and simulators in order to maintain its competitive position.*

Department set up its Industrial Modernization Improvement Program (IMIP). It is patterned after USAF's Technology Modernization and Manufacturing Technology programs, but is much more comprehensive in its inducements to contractors to cut costs and raise productivity through modernization.

At this writing, the services were working out IMIP arrangements with about forty defense manufacturers. The going is a little rough. In the main, the companies still tend to care about the bottom line of profits that they report to stockholders each year more than they do about profits they hope to make in the future from today's capital investments.

### **Progress Payments and Profits**

Profit negotiations between military customers and prime contractors are apparently not all that persuasive in influencing contractors to invest, as the DFAIR report suggests.

Even so, in the same spirit as the Profit '76 report, the DFAIR team advocated "increased emphasis on

investment and decreased emphasis on cost in the [contract] markup policy."

At the same time, the DFAIR analysts proposed that DoD become a bit more generous in its progress payments to contractors.

As a measure of protection against a contractor's possible default, the Pentagon does not make progress payments in the full amount of the costs the contractor is incurring.

Last April, Secretary of Defense Caspar W. Weinberger announced his decision to lower such payments from ninety percent of costs down to eighty percent and from ninety-five percent down to ninety percent for small businesses.

The DFAIR team demurred. It recommended keeping the rate the same for small businesses but raising it to eighty-five percent for all the rest, the great bulk, of Pentagon prime contractors. The increase is needed to give the contractors more help in defraying operating costs, said the DFAIR report.

It said that its recommended level of progress payments would enable contractors, on the average, to

avoid paying out more than two percent of their profits for financing and that the two percent level is as high as it should be.

The proper levels of DoD progress payments and of industry-only financing have long been controversial.

Contractors contend that because of time lags in their recording of costs, submission of billings, and receipt of payment, progress payments are untimely and provide them with much lower percentages of their actual costs than the Pentagon reckons. Moreover, contractors cannot recover from the government the interest on the loans that they themselves borrow to make up the difference.

Such arguments have become more muted in recent years, however, as commercial interest rates have dropped.

The DFAIR study also dealt with another highly controversial topic, that of allowable overhead costs. Contractors' billings of some general and administrative (G&A) costs to the Pentagon have raised many an outcry on Capitol Hill and in the Pentagon itself.

The DFAIR analysts proposed that the Defense Department omit overhead costs as a factor in calculating contractors' profits in order to "remove any incentive . . . for contractors to increase these costs just to obtain higher markups."

The main problem with the Defense Department's regulations defining allowable costs is that some are easy to apply while others require selective judgments.

For example, it is clear that contractors cannot include their federal income tax payments or their interest payments on loans as allowable costs in negotiating profit margins based on costs. But the contracting regulations are open to interpretation as to the allowability of some costs incurred by the companies for public relations, advertising, employee morale measures, recruitment, and labor relations.

All such issues are being examined by the President's Commission on Defense Management, which is headed by David Packard, chairman of Hewlett Packard Co. and a former Deputy Secretary of Defense. The blue-ribbon commission began meeting last August 16. ■



Valid or not, perceptions of waste and fraud threaten to destroy the national consensus on defense.

# Industry Under the Gun

BY JOHN T. CORRELL  
EDITOR IN CHIEF

**I**T began in 1983 as a trickle of stories about ridiculously priced spare parts for military systems. The trickle developed rapidly into a flood. And after that came the series of revelations about falsified claims and improper charges by defense contractors.

Consequently, by 1985, waste and fraud had become defense issue number one for many Americans. According to current polls, a majority of citizens believes that the government is being cheated left and right in military procurements. Valid or not, that perception now threatens to destroy the consensus, built by Ronald Reagan in the election campaign of 1980, to revitalize national defense.

Mountains of data have been accumulated on all this. A detailed study on parts pricing was run by the Air Force (see "Scoping the Spares Problem," January '84 issue), and a zealously active Defense Department Inspector General has conducted 68,000 audits since 1981. The evidence turns up some waste and some fraud, but nothing approaching the level imagined by the public. Data released so far indicates that parts overpricing is con-

finied to a fraction of one percent of the defense budget and that fraud is even rarer. The services, the Defense Department, and industry have put extraordinary effort into rooting out waste and fraud.

The public, however, understands little of the broader context, and its indignation about the abuses is intense. Much of the anger has centered on the defense industry. It was against this backdrop that an Aerospace Education Foundation Roundtable met in Washington on August 15 to talk about the integrity of the defense industry in perception and reality.

"There are two pertinent questions that we should ask ourselves," said Stanley C. Pace, chief executive officer for General Dynamics Corp. since June 1. "First, has the industry done anything wrong? Has it made any mistakes? And the answer to that question is yes. The second question is, is the industry managed by corrupt, immoral people? And the answer to that is no."

Mr. Pace said that contractors have not taken enough care to follow the precise letter of regulations on submission of cost claims. "We in industry can argue that the defini-





**PACE: Industry has made mistakes—but it isn't corrupt.**

**SKANTZE: Too much legislation to absorb and implement.**

tion of the unallowables is not crystal clear, and that's true," he said. "But we should have done then what we are doing now—that is, define those unallowables ourselves in accordance with the spirit of the regulation. Because we didn't do it, we've left ourselves open to criticism, which is valid. And we've left ourselves vulnerable to charges of fraud and corruption, which are not valid. We as an industry could have anticipated this, and if we had, we could have avoided it."

Panelist Charles W. Corddry of the *Baltimore Sun* zeroed in on Mr. Pace, whose company was one of those most prominently accused of making improper claims on its defense contracts. Mr. Corddry said that beyond the money recovered by the government and the ensuing clarification of what's allowable, the controversy has probably had a salutary effect on the ethics of General Dynamics.

"It was traumatic for us at General Dynamics," Mr. Pace said, "but I think we've taken some corrective action at a high rate of speed, and it's my understanding that others in the defense industry have analyzed what happened to General Dynam-

ics and have taken parallel or similar actions."

#### **Is the Perception Wrong?**

Although the defense procurement process could stand improvement, Gen. Lawrence A. Skantze, Commander of Air Force Systems Command, said that "it is better today than it's ever been since I started in it twenty years ago. But because of the particular perspective that's been put forth in the last couple of years, there is an enormous groundswell in the public opinion, catastrophically represented by falling support for the defense process, which has resulted in an overwhelming urge on the part of anybody and everybody to do something, to swat at something, to make it better, to fix something, to fire somebody."

General Skantze said that a distorted picture of weapons acquisition is created when people seize on overpriced hammers and ignore the many—and the more important—success stories.

He said the quality of US weapons sets the standard for the rest of the world and cited a list of systems that have performed well beyond

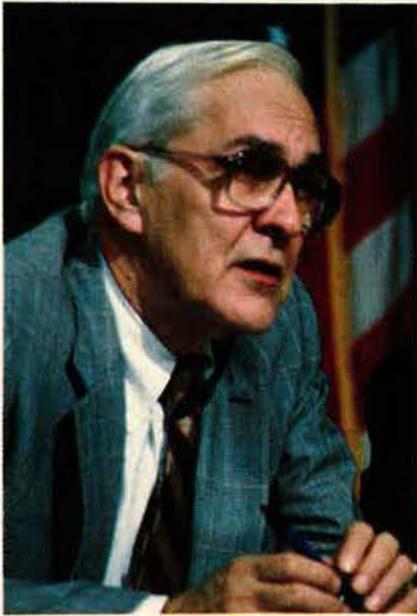
their specifications. He also noted that the Air Force's newest major system, the B-1B bomber, is being delivered ahead of schedule and under cost.

Alan C. Chase, professional staff member of the House Armed Services Committee, agreed that the furor is being driven more by impressions than by facts. He said that he has not found reason to question the integrity of the defense industry as a whole and believes that those guilty of wrongdoing are "the great exception to the rule." He said that defense-minded legislators are concerned that the 1980 mandate has been lost or is being lost because of public perceptions about waste and fraud.

"When you add up all this effort that the President and his Administration have put into modernizing our forces and all the money that goes into this, it's really inevitable that the defense sector would come in for increased attention and pressure," Mr. Chase said. "It didn't take many revelations of waste, fraud, and abuse to focus national attention on the Pentagon and its shortcomings.

"To a lesser extent, the defense





**CORDDRY:** *The public rightly wants its money's worth.*



**DANIELL:** *Realities are dull, so the sensational gets attention.*

**CHASE:** *Wrongdoing is the great exception to the rule.*

sector has been a lightning rod to those who oppose the policies of the Administration on political and philosophical grounds. Perhaps the only accessible chink in the President's armor are these abuses, both alleged and real, relating to the centerpiece of the Administration—that is, a strong defense.”

Robert F. Daniell, president and chief operating officer of United Technologies Corp., observed that the realities of defense procurement are complex and dull for the layman. “That may explain,” he said, “why the focus of the attention by the news media and others on the overall subject of defense spending has been on the sensationalism side of it rather than on that very complex, dry subject of procurement policy.”

In response, newsman Corddry said, “Some of the things that have happened *are* sensational, and we have simply reported them. We reported them straight.” About General Skantze’s point that success stories go unnoticed, Mr. Corddry said the total picture is a mixed one. “It isn’t all successful B-1s, and it isn’t all successful this, that, or the other,” he said.

Various panelists took the news media to task for reporting bad news but not good news.

“I am not impressed when a defense contractor does exactly what the contract calls for him to do and the public gets its money’s worth,” Mr. Corddry said. “I don’t think that’s anything for the press to go around waving the flag about. I think the only time we should wave the flag is when it’s a red flag, saying, ‘Hold on there, let’s have a look.’”

Thomas V. Jones, chairman and chief executive officer of the Northrop Corp., said it appears that “the problem’s of great interest and the solution is of no interest. I would ask the learned people of the press how we can make people interested in their security, because that’s what we’re talking about.”

“I think that the people are interested in security,” Mr. Corddry replied. “Otherwise, they would not have put the defense budget on a higher plateau than it’s customarily been on—and where it will stay. Reagan has won the defense battle. Now it will stay on a high plateau. Nobody is talking about cutting it back. But I think the people are also

quite rightly interested in getting their money’s worth.” Mr. Corddry added that “good news from the point of view of industry does make the front pages. General Dynamics returning to the good graces of the Navy was on the front page of a couple of papers that are occasionally mentioned in this town, and also [on the front page of] mine.”

#### **The Problem of Confidence**

“I consider the key problem in front of us to be gaining back the confidence of the American people in our system,” said Dr. James P. Wade, Jr., Assistant Secretary of Defense for Acquisition and Logistics. “We’ve got to be able to demonstrate to them that we are providing the product that is worthy of the resources that we put into it.”

It is important, he said, “that we all recognize that business as usual is not a condition that we can accept or maintain.” When a defense contractor is out of line, Dr. Wade said, “then there has to be an appropriate level of pain. Otherwise, discipline will break down, and the whole process will fail.”

Sometimes it is an arcane feature of the acquisition rules that leads to





**WADE:** *We must regain the confidence of the American people.*



**JONES:** *The problem's of great interest; the solution's of no interest.*

misunderstanding and the loss of public confidence. For example, a statutory provision new this year—use of a “standard work hour” in billing labor costs—seems almost certain to generate the sort of misinterpretation that has so often enraged the taxpayers. General Skantze pronounced it “an enormous club with which we could be beaten continuously.”

“Very few people on the Hill really understand what a standard hour is and how you arrive at it,” he said. “It is the calculation made by an industrial engineer who picks out a point in the production cycle where changes have slowed down, where there’s stability in the design, and where the people are trained. He says that under these ideal circumstances, [a given job] should take  $x$  number of hours.”

Used properly, the standard hour is a handy tool for estimating and pricing. Applied as an absolute yardstick at the beginning of production, though, it may be off by a factor of five or ten, General Skantze said.

“So someone will take that data, as they have over the past six months, and say the industry is only

one-third or one-fifth or one-tenth as efficient as it should be and that they’re wasting all the taxpayers’ money,” General Skantze said. “We’re going to have a terrible problem with it, because we’ve got to provide the data, and it will be interpreted by those people who want to use it for their own purposes.”

As the defense procurement community knows well by now, it is difficult to explain the peculiarities of the process when citizens see an obvious low-value item with a high price tag on it. When a contractor gets an order to custom-manufacture a small number of parts, the cost of producing them inherently leads to a terrible price. That sequence of events set up many of the overpriced parts scandals of the past three years.

Finally recognizing this, the government now tries to avoid placing small orders for custom manufacture. And in some instances, industry is choosing to eat the cost of parts it has made rather than risk another public-relations disaster.

Mr. Pace said that General Dynamics was asked by the Navy recently to reprice an order for twelve

items, including three gaskets, two bearings, and a pin, that came to \$1,300. “Compared to what people on the street would understand about the value of those parts, the price we have to put on them was too high,” Mr. Pace said. “We refunded the whole \$1,300. We said, ‘You’ve got them for free.’ Now that bypasses the process. It bypasses the issue.”

The trend in industry, he said, is to examine a parts price list and ask, “Is there anything here that *looks* wrong?” If there is, the contractor reprices it to a level that looks right, even if it involves selling at a loss.

Media commentaries on comparative inefficiency in defense contracting are often based on inaccurate assumptions. On July 16, columnist Jack Anderson—quoting a Pentagon memo he said he had “obtained”—reported that twenty-five procurement professionals in France do the job that requires “tens of thousands of bureaucrats” in this country. How Mr. Anderson figured that twenty-five bureaucrats of any nationality could handle the Defense Department’s 15,000,000 contract actions a year, he did not say. In any case, his source seems to





**WOOLSEY: Legislative chickens come home to roost.**

have miscounted. "I assure you [the French] do it with 85,000, not twenty-five," General Skantze said in response to a question from the Roundtable audience.

### **Solutions and Nonsolutions**

Ten years ago, Mr. Jones said, the scrutiny was concentrated on cost overruns; today, it is on elements of programs. "The focus should be on military effectiveness and the cost of getting it," he said. This end is not served by excessive attention to the pieces of the problem without considering the process as a whole. It is wrong, he said, to look at one element of an acquisition, such as cost or military capability, in isolation.

"If we can justify every cost but the price doesn't give *value*, then it's the wrong system," Mr. Jones said.

Most of the panelists agreed that the acquisition process should be simplified—the incredible complexity of it being a significant source of error and misunderstanding—and that additional legislation is not the answer to the Pentagon's procurement problems.

"In the final analysis," said Mr.

Daniell, "this is a people-intensive business. They are not robbers. They are not going to respond to total legislation. They're not going to be able to manage appropriately in accordance with that."

General Skantze said that there are already 4,000 military procurement laws on the books. (In a speech last summer, he said that those statutes, along with the implementing directives, constitute a "regulatory swamp.")

"Our ability to just do the ongoing job is being severely constrained by all the legislation we have to absorb and implement," General Skantze said.

Mr. Chase said that some members of the House Armed Services Committee are acutely aware that "today's procurement solutions may be tomorrow's problems" and share the concern that some requirements dictated by Congress may prove counterproductive in the long run.

Roundtable moderator R. James Woolsey—Washington lawyer, member of the Scowcroft Commission on strategic forces, and now a member of the Packard Commission on defense management—cited a

personal example of legislative chickens coming home to roost. Mr. Woolsey has held many posts in public service, and from 1970 to 1973, he was general counsel to the Senate Armed Services Committee.

He recalled that later, while he was Under Secretary of the Navy, the day came to award a major contract, but at the last moment a sad-looking lieutenant commander appeared. ("I knew right away it was bad news. In the Navy, bad news is brought by sad-looking lieutenant commanders. Good news is brought by smiling admirals.")

The contract had to be held up because of a complicating provision of law that the staff had just found.

"I pulled out my copy of the US Code and looked it up," Mr. Woolsey said. "Gritting my teeth about how Congress continually interfered in sensible procurement decisions in the executive branch, I started to read it. Slowly as I read, it began to sound more and more familiar.

"And as I got down to the bottom line and saw, in the legislative history footnote, that it had been passed as a rider on the authorization bill in 1973, I remembered drafting it." ■



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## USAF's departing Secretary gives his assessment of how things stand.



*In his last AFA Convention address, retiring Secretary of the Air Force Verne Orr addressed a number of topics ranging from retention to competition, but all with the underlying theme of the need to keep the Air Force strong.*

# The Greatest Force in The World

**BY THE HON. VERNE ORR**  
SECRETARY OF THE AIR FORCE

From a speech on September 17 at  
AFA's 1985 National Convention.

**Y**OU can't talk about the United States Air Force without talking about its people—our first priority. In our enlisted ranks, ninety-eight and a half percent are high school graduates. Thirty thousand people today are already signed up in the job bank, waiting to come in. That's about half of all the people we're going to recruit in the next fiscal year. This morning, Gen. A. P. Iosue, Commander of Air Training Command, told me that "recruiting is going bonkers" in spite of the fact that employment is up—and we thought that might hurt us—and in spite of the fact that the number of nineteen- to twenty-two-year-olds is diminishing—and we thought that also might hurt us.

In the officer corps, forty-three percent of our officers have master's or doctorate degrees. Among brigadier generals over the past two years, eighty-five percent of all those promoted to that rank have an advanced degree. I suspect it will only be a matter of five or ten years until you will scarcely see a general officer in the Air Force who doesn't have an advanced degree.

Morale is extremely high. Our people are proud.

There are some warning clouds on the horizon, however, and one is a rather ill-conceived attempt to change retirement. Defense Secretary Caspar Weinberger recently wrote a letter to the troops telling them it wouldn't affect those who are now in. I've carried the same message out to our bases, but there is skepticism because they have seen retirement computations go from "high one" to "high three." They've seen their cost-of-living adjustments (COLAs) capped, and they wonder if this, indeed, will hurt them further.

One of our major commanders interviewed eight pilots who were leaving, and six of them said that among the reasons—not necessarily the only reason—they were leaving



was that they no longer felt the retirement they would get when they serve out their time will be as good as they hoped and thought it would be. We have not been helped by a [former] member of this Administration, who had the sanctuary of divinity school during the time his comrades were dying in Vietnam, calling the military pension system a scandal and an outrage.

Recently there was an article by Howard Kurtz in the *Washington Post* that stated that "there are three essential statistics to know about the military pension system. The average person retires at age forty-two, he receives half pay, and the program will cost the taxpayers \$18.3 billion next year." Now there is only one statistic you need to know about Howard Kurtz, and that is that he is wrong on all three counts.

In the first place, the average person doesn't retire from the military—the average person leaves long before retirement. Only thirteen percent of service people stay in to retire. That's one out of eight. And if retirement is the great bonanza people talk about, how come about eighty-seven percent of our smart young Americans don't think it's good enough to stay around for?

In the second place, the average retiree doesn't retire at half pay; he retires at half base pay, which is about thirty-seven percent of pay.

And in the third place, it does not cost the taxpayers \$18.3 billion. That is the amount we have to set aside in the Department of Defense budget, the only executive department budget that has to include retirement. But our actuaries were born and bred in the dark ages of economics and allow us to plan on only 1.6 percent real interest over and above inflation. That's all we can take advantage of. Last year our investments earned us eight percent over inflation, so it is not costing the taxpayers \$18 billion, although it is costing the Department of Defense that much.

We are debating about aid to one of our allies that will amount to \$6,000 for every family of four in that foreign country. And that's fine—I'm glad that we can approve that. I hope we can. But the same congressmen who may vote to give that much aid to one of our allies

may also vote to say that a tech sergeant who retires after twenty years is not entitled to \$8,800. Now I think that if we can give \$6,000 for a family of four to friends but we can't give \$8,800 to a tech sergeant who has made a dozen moves for his country, has gone to remote locations, and has put his life on the line, then I think our priorities need to be reexamined.

#### **Four Keys of Retention**

We're losing officers and enlisted personnel at a little greater rate than we'd like—greater than in 1983, but far less than in 1979. Why are these people so dedicated, and why are they staying in? I'd like to offer you four reasons.

The first, of course, is the leadership of the President of the United States and the Secretary of Defense. Never that I can remember have we had two stronger citizens more dedicated to rearming America and more willing to take the barbs and the ridicule from the liberal press and cartoonists and the media. The second is pay and the raises of 1981 and 1982 that put pay up into comparability. Although we haven't done any better, we are barely holding our own with inflation.

The third is the quality of life. I've worked harder on this than any other issue, as it is something near and dear to my heart. It's so foolish for us to spend \$10,000, \$15,000, or \$20,000 to train an enlisted person, or up to \$1,500,000 to train a pilot, and then put them in housing where the spouse says, "How much longer, honey, do we have to live in this kind of environment before we can get out?" We've been so penny-wise and pound-foolish. And so on every base you visit, I think you'll see our infrastructure improving. You'll find family housing and dorms; you'll find hangars and headquarters buildings. From nonappropriated funds, you'll see exchanges and commissaries, and from appropriated funds, you'll find gymnasiums—all designed to make this difficult life a little more bearable for our people.

But the fourth and the most important reason why people want to stay in the military is that citizens have such a different view of our military and our uniformed people than they did just ten or fifteen

years ago. Our uniformed people are respected when they wear their uniforms. When they leave basic training and go home, people crowd around them and say, "How was it?" Appreciation for their sacrifices is the best recruiting tool that the armed services have.

When I became Secretary, we offered regular commissions only to the graduates of the Academy. It bothered me. It seemed to me that the lowest man or woman on the end of the totem pole at the Academy couldn't be a better regular officer than the highest graduate of ROTC. And I'm pleased to say today that about ten percent of all ROTC graduates, including all the distinguished graduates, are offered regular commissions, as are the top ten percent of all the OTS graduates.

We're stressing foreign language more than ever before, because this is a worldwide Air Force, and we desperately need the friendship of our allies and the understanding of those who are not friendly. One way to do this is to speak their language.

We have steadily expanded opportunities for women, and this year we are recruiting seventeen percent in the enlisted ranks. We have more than 400 women pilots and navigators either actually flying or in training. On January 1 of this year, we opened up the security police specialty to women, which, in turn, opened 26,000 new jobs in the Air Force, and we have now trained 145 for that job. Two years ago, we put women in AWACS crews, and it was only recently that an all-women crew took a C-141 across the Atlantic.

The situation for nonrated officers has been improving, too. Of the candidates considered by the most recent brigadier general officers board, thirty-six percent were nonrated colonels, and thirty-eight percent of those nonrated officers were selected for promotion. It is now becoming accepted that everybody can look up, rated or nonrated, and know there is an opportunity to be a general officer in this Air Force.

#### **State of the Hardware**

I have just a few words about hardware. I had the opportunity to fly in the first B-1B delivered to Strategic Air Command. It is ironic that, four years ago, when I stood



here and said, "We'll produce this plane on schedule for \$20.5 billion," the critics said, "Oh, you're way off; it'll cost \$28 billion." And now we are producing it—not for \$20.5 billion but for \$19.8 billion. Congress has cut \$700 million out of our program. And the critics—and some of them are the same critics who were

shots out of nine, and we have had four successful AMRAAM test firings out of four. We're doing well in fighters. Our capability is so much better today than it was five years ago.

Space is really an Air Force domain—we are the executive agent for DoD on space launches. We

gy Bomber, the Advanced Cruise Missile, the C-17, the C-20, the lease of the C-12, the lease of the C-21, what we call the "Great Engine War" between Pratt & Whitney and General Electric, the T-46, and, as you know, we're trying to get competition between the F-20 and F-16 and any other planes that want



**Secretary Orr learns the details about the proposed reconnaissance version of the F-16 from General Dynamics representatives. The Secretary toured the Aerospace Briefings and Displays at the AFA Convention.**

saying we couldn't do it for that little—are now saying that that's too much money; you can cut another billion dollars out of it—and maybe we will! Hopefully, we can. But the B-1 is clearly one of our success stories.

I will also, at this time, make our position clear on B-1 production, as Chief of Staff Gen. Charles A. Gabriel and I have tried to do on several occasions. The United States Air Force has no plans for a 101st B-1 bomber. We are content with 100 B-1s. We are also content with fifty C-5s. We hope to go from here to the Advanced Technology Bomber and the C-17. We have good planes, and more technically up-to-date planes are coming.

We're doing well on airlift. We stretched the C-141. We're rewinging the C-5. We are engaged in a Civil Reserve Air Fleet (CRAF) program to bring our civilian fleet heavy carriers on board in an emergency. I'm also pleased to announce that we're doing pretty well on some of our other programs, in spite of some of the things you may read. We've had nine successful MX

have sixty-nine percent of the total DoD space budget in the Air Force budget. The Air Force manning for space is more than 12,000 people. And very recently, the first Air Force general was named to command a unified command—CINCSPACE—and we're very proud of that. I hope it will always be an Air Force commander, because I think that's our field.

### **Competition and the Defense Industry**

Let's talk a minute about competition. We hear so much about it. Sen. Charles Grassley (R-Iowa) recently wrote an article for the *Wall Street Journal* in which he referred to "horror stories" and stated that this situation can occur only because competition is alien to the defense world. There are a lot of contractors out there today who don't think it is alien. He goes on to say that only five percent of our defense dollars are truly competitive; the rest are negotiated.

Since I have been Secretary, I have personally seen the source selection on the Advanced Technolo-

to enter into that competition. But except for the prospective F-16/F-20 competition, these programs I have mentioned have been competed. And Senator Grassley feels there is no competition in defense!

I was recently in on the source selection for ISA AMPE, an electronics program. The chairman of one of the most influential committees in Congress called me three times personally—his staff called every day—to speak for his state's firms. The senator from that state, who is a strong defense advocate, called six times. They know there's competition. They wanted the contracts for their firms. But, unfortunately, in Iowa there appear to be very few defense firms, so Senator Grassley doesn't have the opportunity to call me to plead for his firms. So he may truly think there is no competition—but I promise you there is.

We could have done better, and we're now doing better in spare parts competition. We are saving hundreds of millions of dollars. But let me tell you—it's not net savings by any means. The first thing we did



was add a thousand additional people. It takes only five minutes to go through a catalog to pick out an item and order it, but if you want to order the item competitively, you have to learn where in the United States there are firms that build it, make a bid package and send it out to all interested firms, wait forty-five to sixty days for answers, open them, make sure the product is in accordance with what you wanted, make sure that they comply with OSHA and women's hiring and all the other requirements we have, wait for protests, and then, hopefully, get a product that's up to our quality standards. Sometimes we don't. So the delivery period has now climbed from fifty to 150 days because we're going competitive.

We have made other mistakes. Boeing told me one time a year ago that eighty-five percent of all the orders they got from us were for five items or less. Isn't that ridiculous? We should do better than that, and we are doing better now. But just as sure as God made little green apples, CBS and NBC and ABC will have television shows in ten years showing us shoveling out parts that we didn't need but ordered in larger quantities to keep the price down. If you order in quantity, you run that risk.

### **R&M and Defense Spending**

The Chief and I are working very hard on reliability and maintainability. We've had some horror stories there, too. Some of the avionics on the F-111 don't last for two sorties. I've mentioned the radio in the F-4, which is under the rear seat. When it goes bad, as it does about every two sorties, we have an explosives expert take the ejection seat apart, another technician take out the seat, yet another to take out the radio, and then reverse the whole procedure. Defense contractors will know we're serious about reliability and maintainability when the time comes and we make a source selection based on reliability and maintainability rather than price or better technology. We are really sincere about reliability and maintainability.

You know, overspecification is a problem with every government agency. One time I was foreman of the Los Angeles Grand Jury, and

the jurors decided that we would contribute a swimming pool to a halfway house for delinquent girls who were working their way back into society. Pools in those days in California sold for about \$3,500, which would have been about \$150 a grand juror. We were quite willing to do that, but when we went to the county, they said, "Oh no, you must build a pool according to our specifications." We said, "How much would it cost?" And they said \$20,000. The girls didn't get their pool. So it's a constant fight to keep government agencies like ours from overspecifying. But we're working on it.

In spite of all our horror stories, the poll I saw last week showed that confidence in the military had climbed from fifty-three percent to sixty-one percent from 1983 to 1985. So not everyone thinks we're doing everything wrong.

In previous talks before the Air Force Association, I mentioned the fact that the defense budget is not large in spite of all you hear. It's six and a half percent of the Gross National Product. It was eight to nine percent under President Kennedy and ten to eleven percent under President Eisenhower. Nobody at that time said it was backbreaking.

I've also pointed out that defense spending has increased by thirty-eight percent in the last twenty years, but nondefense spending has increased by 216 percent. Yet they try to tell you that defense is driving the deficit. Defense now accounts for twenty-eight percent of the federal budget, when only a few years ago it accounted for fifty percent. Still, they want to cut defense.

We have not, however, discussed the federal deficit, and I'd like to say a word because you hear so much about it. On the last day of President Roosevelt's last full term, the deficit was 110 percent of the Gross National Product. Of course, we were fighting a war, and we were doing it as all countries do—on our grandchildren's money. On the last day of President Truman's first term, with the war ended, it had dropped only to ninety-eight percent of the Gross National Product, and yet we recovered.

And where was the deficit on the last full day of President Reagan's first term? Forty-three percent! You

hear frequently that the deficit is climbing, but you don't hear very often that the Gross National Product is climbing at a greater rate. So we're not as bad off as some of our detractors would have us, and it's your job and mine to keep things in balance and point these facts out.

A few years ago, all of us heard a very emotional speech that went, "Old generals never die, they just fade away." I want to tell you that that's not true of Air Force Secretaries. When the President appointed me to this position nearly five years ago, Mrs. Orr and I took it on as a partnership, as team players, like we've taken on everything we've done for forty-five years. I've been to more than 200 bases, and she has accompanied me to between a third and one-half of them. When I go out on the flight line and talk to our personnel and get briefings on the missions, she goes to enlisted housing and officer housing and particularly child-care centers. She looks at the parts of the base I don't see and then makes me a written report, so that for every base we visit, I know the side I couldn't see.

When we leave here on November 30, she and I are going to leave here with our heads high with pride. But, more important than that, we're going to leave with hearts that are filled with gratitude, because for the five most magnificent years of our lives, we've had the opportunity to associate with Charlie Gabriel and his group of officers, with Pete Aldridge and my Assistant Secretaries, with strong secretarial support, and with enlisted personnel who are so great.

We've associated with some of the 200,000 dedicated civilians, many of whom spend their lives working for the Air Force, and with defense contractors who very honestly want to give us a good product at a fair price and have a profit at the end of the year—that's the American system.

And we've associated with AFA members, all of you, and with people everywhere who've worked with us and who have given us the chance to participate and be a part in the building of what I leave feeling strongly in my heart is the greatest fighting force in the world today.

For that, Joan and I thank you very much. ■



**Today's Air Force is still building on the heritage of victory in World War II.**



*Air Force Chief of Staff Gen. Charles A. Gabriel and Col. Friedrich P. Busch, Air Attaché from the Federal Republic of Germany, discuss the Roland missile system at the Aerospace Development Briefings and Displays during the AFA Convention.*

# The Innovative Spirit

**BY GEN. CHARLES A. GABRIEL, USAF  
CHIEF OF STAFF**

**From a speech on September 18 at  
AFA's 1985 National Convention.**

**I** ALWAYS look forward to the annual AFA Convention as we celebrate the Air Force's birthday—our thirty-eighth this year. The theme, "World War II—Victory in the Air," couldn't be more appropriate. It commemorates the fortieth anniversary since the Allies brought the most devastating conflict in history to a successful close.

Because of this anniversary, stories that came out of the war have been dusted off and retold. A favorite of mine is one Gen. Pete Quesada used to tell. Pete was at a small dinner with about a dozen people who would be involved in the Normandy invasion. The dinner was being held at the country home of Sir Winston Churchill, and the Prime Minister was present. Conversation around the table was moving along at a pleasant pace until Sir Winston's son-in-law, obviously basking in the reflected glow of his famous relative, called out from the far end of the table, "Pops!" An uneasy silence fell over the place. Sir Win-



the legacy left by the war is very much with us. In fact, the Allied victory in World War II was a great turning point for airpower. Airpower, as we know it today, has grown from the lessons we learned and the innovations we made while achieving victory in the air.

### **Foundations of Today's Airpower**

Airpower was not a new idea in those days, but it wasn't until the war years that the concept of air supremacy came to full development. Theory gave way to practice, and airpower was used to support land warfare on a large scale, defend against enemy air attack, fight naval battles, and fly strategic bombardment missions—ultimately with nuclear weapons. Many of you will recall the mistakes we made, the lessons we learned, and the innovations that grew from pure necessity during the war—lessons and innovations that formed the framework for airpower that we have been building on ever since.

The tactical air element of this framework developed considerably both offensively and defensively during the war. We didn't pay much attention to "tac air" in the 1930s, so we went into the war without a good concept of how to fight. Our doctrine split tactical air forces in half—Air Defense Command protected our rear areas, while Air Support Command worked directly with the ground troops. The problem was that air defense fighters were chained down far from the front and support command airplanes were farmed out to Army divisions. The net result was that we couldn't launch decisive, hard-hitting attacks.

The Allies limped along like this until Air Marshals Sir Arthur Tedder and Sir Arthur Coningham found there was a better way. They believed that airpower should be centrally controlled and employed by an air commander and that air superiority had to be established over the battle area. In their view, the inherent flexibility of airpower was its greatest asset, and this flexibility made it possible to throw the whole weight of available airpower against selected objectives.

Gen. Dwight Eisenhower agreed and completely reorganized his air

command to align with this new approach. Proof of the new principles came in Field Marshal Sir Bernard Montgomery's hands-down victory over Field Marshal Erwin Rommel at El Alamein. By mid-1943, all Allied air forces were operating under the new doctrine, with outstanding results. Gen. "Tooe" Spaatz summed it up pretty well when he said:

"There was no hope of making an invasion of Europe if we were going to be met by a strong German Air Force. They had to be subdued or forced back, and we did it. The net result was that there were only about three or four German airplanes at the Normandy invasion. If they'd had two or three hundred airplanes there, that thing would have been a shambles."

The airplanes we had when the war broke out weren't the best, either. For example, the P-36 [the Curtiss Hawk], our best fighter of the prewar years, maxed out at about 300 miles per hour, but it didn't have the armament to engage bombers, let alone go head-to-head with enemy fighters.

Necessity soon drove the development of better equipment. The P-51 fighter is a good example. The airplane was designed in a crash effort that went from preliminary drawings to a flight-ready prototype in just 120 days.

The Mustang's most famous modification was one that added fuel capacity so that it could escort heavy bombers on deep raids. During the early war years, we put guns on our bombers and sent them in without fighter protection. But unescorted bomber losses continued to mount. The raid on Schweinfurt in October 1943 proved to be a watershed—the ball-bearing works were heavily damaged, but we lost sixty B-17s. The modified P-51s were rushed into service and first used in December 1943 to escort a raid on the German city of Kiel. The raid was highly successful—the rest is history.

In every war, we've been behind the power curve at the start. We've had to learn our lessons the hard way. That's why we're doing things now that will put us in much better shape for future fights. The best example is Red Flag, which will be ten years old in November. It gives our

ston calmly looked up and responded, "Yes, my son?" The son-in-law then asked, "Would you give us a hand at this end of the table? We are trying to decide who is the greatest living statesman of our time." Without a moment's hesitation, Sir Winston responded, "Mussolini!" The son-in-law, shocked by this, then asked, "Well, why do you say that, Pops?" Sir Winston calmly responded, "Because he is the only statesman of our time with sufficient courage to murder his own son-in-law."

Events of the war and the major players still seem very real. Forty years have passed since hostilities ended, and only a few who were on the front lines then are still in harness. Gen. Jack Vessey is one of those—the only four-star still on active duty who fought in the war. He will retire at the end of this month, after forty-six years of distinguished service—truly a soldier's soldier. We'll miss him.

But while the guard is changing,



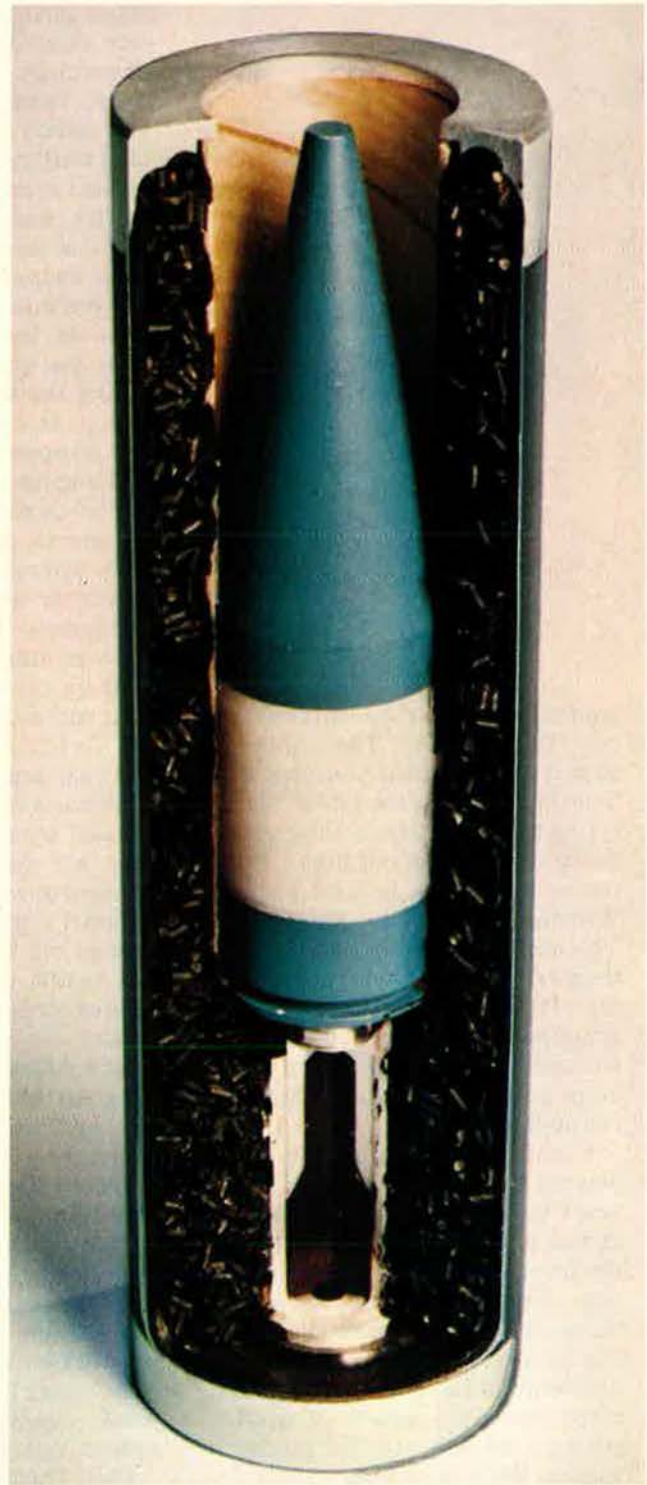
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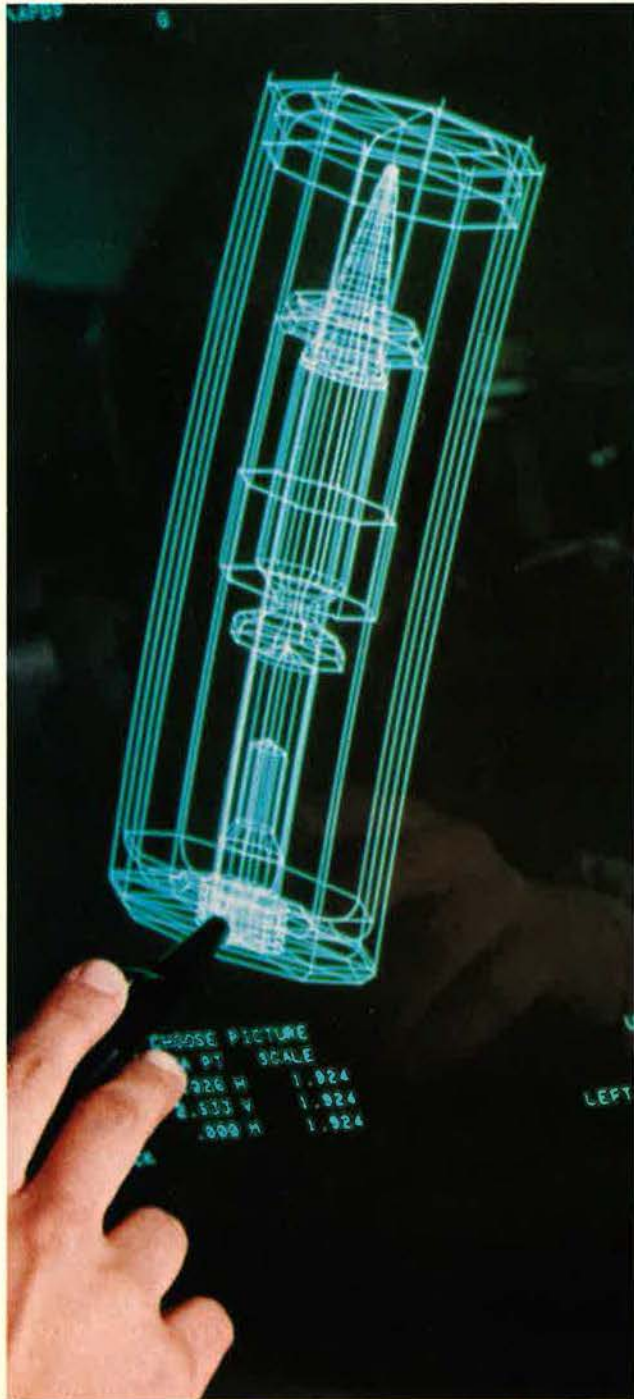
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air crews training under the most realistic conditions possible in peacetime. Forces of all combat commands and all services plus many allies will come out of the blocks at full speed in the next conflict because of this great program.

Strategic airpower was effective in drawing down enemy military and industrial capacity. We got off to a shaky start. Arguments raged over whether hitting area targets would destroy the will of the enemy to wage war. But then our tactics and our precision bombsights allowed us to concentrate bombing efforts in Europe on war-supporting targets—oil production, transportation, and lines of communication. This took a heavy toll on the German war effort.

We also saw the ancestors of our modern ballistic missiles, German V-2 rockets, used for the first time near the end of the war. But they didn't work very well. These words from a wall plaque at Peenemünde captured the mental attitude of the V-2 launch crews pretty well. Their objective was "to make it more dangerous at the predicted impact point than at the launch site." But from these beginnings, ballistic missiles have become a key factor in our strategic deterrence today.

Finally, the arrival of atomic weapons in the closing days of the war opened up a major new role for airpower—a role that has led to its becoming the backbone of our deterrent posture.

### **Changing Roles and Strategies**

After the war, we started building on the framework I just described. The increase in destructive power provided by atomic weapons brought with it deterrence as our national strategy. For some time, it looked like these developments would push conventional forces into the background. Even Tactical Air Command fought for a piece of the action in strategic nuclear bombing. But Korea and Vietnam, coupled with the Soviet military buildup, showed us the need for broad, flexible combat capabilities across the full spectrum of conflict.

In Korea, as in World War II, air superiority gave us a big edge over the enemy. By destroying his air bases as fast as they could be built and by shooting down his airplanes

when they came south of the Yalu River, we kept North Korean airpower from playing in the ground war. During the Korean action, jet airplanes came into full use. We had to come up with new tactics for the increased speed and tempo of combat—and we did a pretty good job. The kill ratio for our F-86s against the North Korean MiGs was more than ten to one.

Then, in Vietnam, we had to fight where the battle lines were foggy and hard to identify. Airpower faced difficult challenges in Vietnam, and we learned a lot. We learned how to use airlift as a warfighting tool, not only in moving people and equipment to the fight but in supporting tactical operations.

The C-141s and C-5s allowed us to move things overseas quickly, and tactically we moved forces and supported ground units as never before. Holding our position at Khe Sanh would have been impossible without the heroic efforts of the tactical airlift crews who kept the ground troops resupplied.

We also picked up a renewed appreciation for the conventional side of strategic airpower and learned some hard lessons about how not to use it in a heavy surface-to-air missile environment. On the first missions, a number of B-52s were lost before we changed our tactics to concentrate our target arrival times. As a result, B-52s helped bring an early end to the war.

The point I want to bring home with this brief historical review is that we are involved in a process of evolutionary development that has roots in the framework that emerged from our victory in the air in World War II. More important, this process continues today, sparked by technology, a rapidly changing threat, and the innovative spirit of our people.

Air Force Secretary Verne Orr gave you a full rundown yesterday on our current status. He is, in large part, responsible for the excellent posture of our forces today. Teaming up with the Secretary has been most rewarding for me—this is the last year for the "Verne and Charlie Show"—and he will be remembered as one of the greatest and most enthusiastic Secretaries the Air Force has ever had. I will miss him, as I know all of you will.

### **Challenges of Today**

Those of us who have inherited the legacy of airpower must continue to improve it. Every year the Soviets prove again just the kind of nation they are. In 1979, they invaded Afghanistan. In 1982, we discovered that they were using chemical weapons in Afghanistan. In 1983, they deliberately shot down KAL 007. This year we saw the brutal murder of Maj. Arthur Nicholson, and a little over a week ago, two of our people were threatened and held at gunpoint for nine hours in East Germany by the Soviets. Our people were legally there, doing their duty.

Against this backdrop, the Soviets are continuing their unprecedented military buildup. This buildup covers the waterfront from nuclear forces through chemical weapons.

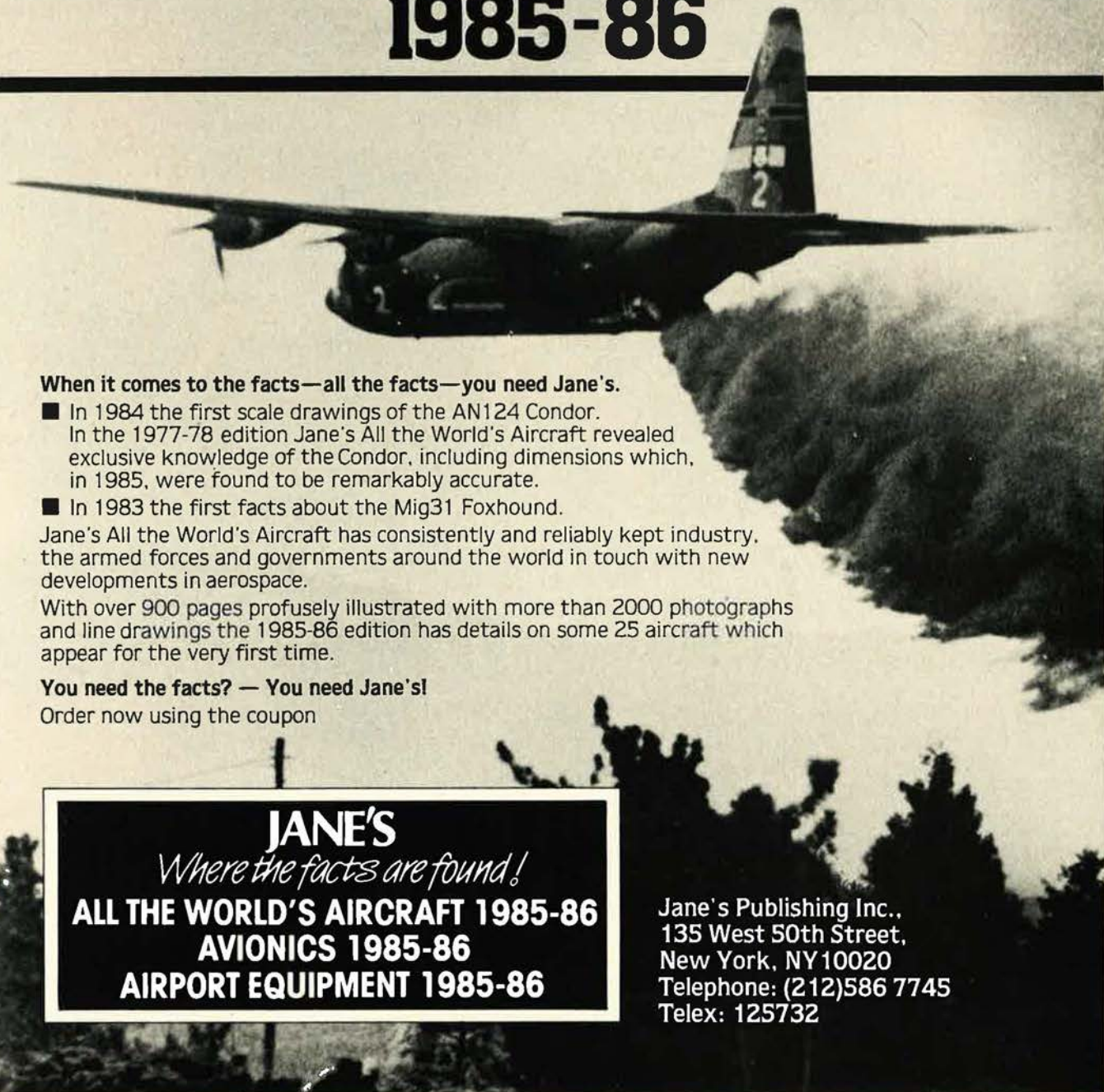
The greatest challenge we face is continuing to deter Soviet aggression across the conflict spectrum—from conventional through strategic nuclear. On the conventional side, we're strengthening deterrence by improving the readiness and capability of our forces. As the Secretary told you yesterday, the gains in combat capability we've made in the 1980s are impressive, but we haven't done a good job of telling this story.

Last year, I told you about the problems we have with the C-rating system. It does not measure overall combat capability from one year to the next. Congress and the public should know what they're getting for their money. The Joint Chiefs of Staff have come up with a good system to do that. For example, our first report shows that the combat capability of our fighters in the air-to-air role has almost doubled since 1980; in the air-to-ground role, capability has almost tripled. Also, we have increased the bombing accuracy of our B-52s by fifty percent with new offensive avionics, and our strategic lift capability is up thirty percent through added capacity, modifications, and increased spares. These improvements are a direct result of investments we've made in new airplanes, spare parts, and modern munitions.

Another way to keep deterrence strong is by getting maximum combat power from our forces. We are



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working to do this in a number of ways, but two deserve special attention—more joint cooperation and continued development of the Total Force.

### **Total Force and the Sister Services**

To get more joint cooperation, we are now working a total of thirty-four initiatives with the Army, and more are on the way. Gen. John Wickham and I began this effort last year, and it's been a great success. These initiatives will lead to cost avoidance of hundreds of millions of dollars because we have taken on missions for each other instead of duplicating our efforts. While this was initially an Army/Air Force undertaking, the Navy and Marines have since become involved in several selected initiatives. To help implement these agreements, the service programmers have signed a four-party Memorandum of Agreement that coordinates our program and budget processes. This will help us target our dollars where they count the most.

The Air Reserve Forces—the Guard and Reserve—also make a big contribution to our combat power.

Present strength of the Air National Guard and Air Force Reserve totals more than 175,000, an all-time high, and more growth is planned at a faster pace than the active force. They fly our best airplanes and are full partners on the Air Force team. In fact, the Guard just received their first F-15s, and the Reserve began receiving F-16s last year. The job couldn't get done without the Guard and Reserve. I want to give special thanks to all of the employers who support our Guard and Reserve people.

### **Need for Continued Modernization**

Now I want to turn to a subject that worries me and that has serious implications for deterrence—modernization of our chemical warfare capabilities. Today, the Soviets can exact a heavy price by merely threatening to use their substantial offensive chemical inventory. This is because our chemical protective gear is cumbersome and fatiguing—once our people are suited up, their effectiveness falls off. The only way

we will deter Soviet use of chemical weapons is to replace our old, ineffective systems with modern, more capable ones. This is why congressional approval of binary weapon production is so urgently needed—to ensure our military will never have to face this terrible kind of warfare.

Finally, my greatest concern is keeping strategic deterrence strong. Strategic deterrence is, of course, based on our triad of nuclear forces—our long-range bombers, ICBMs, and submarine-launched ballistic missiles.

During the 1970s, we didn't keep up our commitment to a strong, capable, and ready triad. We cut back on our modernization programs, but the Soviets didn't follow suit. A bad trend set in that would have become a serious threat to world peace and stability if we hadn't taken action to reverse it.

We are now working to restore balance through a three-pronged effort that includes modernization of our strategic offensive forces, research on strategic defense, and arms reductions.

Yesterday, Secretary Orr highlighted the progress we're making to improve the posture of our strategic offensive forces. Such systems as the B-1B, the Advanced Technology Bomber, new air-launched cruise missiles, the Peacekeeper, and the new small ICBM are badly needed improvements.

As you know, a cap has been placed on the Peacekeeper beyond the fifty approved missiles. Since the Scowcroft Commission's recommendations were based on deploying 100 Peacekeepers, we will have to take a fresh look at the triad force structure. We are carefully studying more survivable basing for the second fifty Peacekeeper missiles, variations in missiles and basing modes for the small ICBM, and future strategic bomber force structure needs.

Our goal is to bring these studies together over the course of the next year into a comprehensive strategic forces roadmap that will ensure deterrence into the next century.

I want to stress that we continue to believe in a force of 100 Peacekeeper missiles. This is still the best bargain and the most urgent requirement in the deterrence equa-

tion. Missile test results have been phenomenal. The Soviets know they could never attack us without unacceptable damage to the Soviet Union. That's deterrence.

### **Defense as a Strategy**

But simply relying on the threat of nuclear retaliation isn't smart. Down through history, nations have counted on a strong defense as well as a strong offense to guarantee their security.

We've been working the defense side of the problem in two areas—improving our air defenses against the Soviet air-breathing threat (their bombers and cruise missiles) and defense against ballistic missiles. Ballistic missile defense dropped from the scene in the late 1960s and early 1970s. The Soviets deployed a system around Moscow under the Antiballistic Missile Treaty of 1972, while we chose not to field a system.

Now, the President has directed that we reopen the issue and examine technologies that might someday be used in systems that could protect against ballistic missile attack. The goal is a strategy based on defense, rather than sole reliance on the threat of nuclear retaliation as a deterrent.

The shift to a defensive strategy depends on successful research and development of several technologies in the Strategic Defense Initiative program and is well into the future. Until these technologies are explored and demonstrated and capabilities developed and proven, we have to keep a strong triad to deter Soviet aggression. By balancing carefully our strategic modernization programs with effective arms control, we can work toward a strategic defense posture and keep deterrence strong.

SDI has great potential to give us a safer and more stable world, and we should take care not to be fooled by the current Soviet propaganda. When the Soviets were deploying their ABM system in the early 1970s, they continually harped on the basic goodness of "defense" over the evils of "offense." Now, when we propose to accomplish vigorous research on defensive methods, they cry "space weapons." They are engaged in a comprehensive research and development effort on advanced defensive sys-



tems and have been for some time. This can't get lost in the noise.

I think the American people are for strategic defense; the problem is that the way questions are asked in polls often slants the results. Last February, one poll found that ninety percent of respondents approved of "defending Americans against Soviet missiles." In contrast, a Washington *Post*/ABC News poll taken in July showed that fifty-three percent of those asked disapproved of "developing space-based weapons." Differences like this create unnecessary confusion and divert attention from the real issues.

### American Ingenuity

In my mind, the most critical strategic initiatives for several decades ahead will be strengthening our offensive capabilities—deployment of the Peacekeeper is an important part of this—keeping up the momentum in SDI research, and working to achieve effective arms control. The Air Force Association can help us with these initiatives. You understand the issues and the urgency of laying them out for better public understanding.

The job ahead is a big one, but we are in much better shape to take it on than ever before. Two things the Soviets understand and respect the most are our people and our technology. The innovative spirit that brought us through in the past—the spirit that led to our victory in the air in World War II—is even stronger in the outstanding people who are making the Air Force work today. It's amazing to watch them in action.

Gen. George Patton once said, "Never tell people how to do things. Tell them what to do, and they will surprise you with their ingenuity." This describes perfectly the kind of people we have. Combine this spirit with strong support from industry and the American people, and no job is too big—no challenge too tough. A good example is last week's ASAT success. Who else would have the guts to try something like that on Friday the thirteenth? A piece of cake!

As in the past, I know the Air Force Association will lead the way in helping us build the capabilities we need. We are counting on you to do this. ■

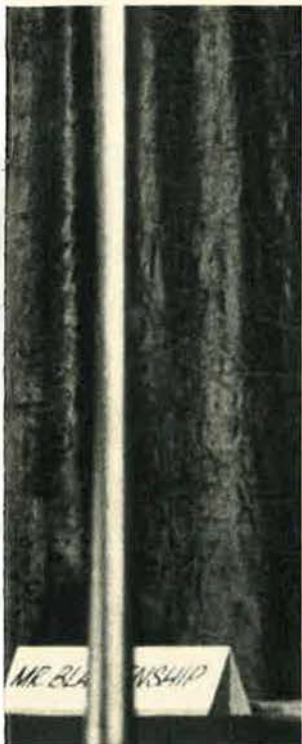
## The military balance is the key to the US-USSR relationship.



# The Policy of Realism

BY JAMES W. CANAN  
SENIOR EDITOR





*National Security Advisor Robert C. McFarlane addressed the AFA Convention on President Reagan's belief in a "policy of realism" toward the Soviet Union.*

**P**RESIDENT Reagan has restored the confidence and the optimism of the United States and is dealing from strength in his "policy of realism" toward the Soviet Union. Restoring the military balance between the US and the USSR is the key to making that policy work.

This was the main message conveyed by Robert C. McFarlane, the President's National Security Advisor, at the Air Force Association's 1985 National Convention last September in Washington.

The thirty-eighth annual AFA Convention took place in the midst of Reagan Administration preparations for the summit meeting between President Reagan and Soviet leader Mikhail Gorbachev in Geneva, Switzerland, later this month.

"In working toward the session coming up in Geneva, the President believes that at the core of our relationship with the Soviet Union is the military balance," Mr. McFarlane declared.

To President Reagan, Mr. McFarlane continued, the essential ques-

tion is "how, together, we [the US and the USSR] can ensure that a military balance is restored at the lowest possible level of nuclear weapons, in a stable way, and that it will endure into the next century."

In this context, Mr. McFarlane set forth the rationale for the President's Strategic Defense Initiative (SDI) program without mentioning it as such. He claimed that the "very vigorous offensive and defensive efforts by the Soviet Union" in the strategic arena have upset the balance of strategic forces on which US deterrence policy had long been predicated.

"It is in this climate," Mr. McFarlane said, "that the President has proposed that we seek stability by a return, first, to an offensive balance at much lower levels of force. He believes it is high time that the two countries stop talking about the pace at which we would build offensive power and turn, for a change, to the idea of reductions. He also believes that these reductions can be carried out over time in a stable way.

"Separately, but as a matter which can reinforce the stability of deterrence, the President believes that technology has given us the possibility of being able to rely more heavily upon defensive systems and that it is important at a time of growing nuclear power to look to the non-nuclear possibilities of defense."

The President is pursuing "a less threatening strategy, [one] which no longer relies upon the ability to threaten the other side but upon systems which cannot threaten," Mr. McFarlane explained.

"We have the means at hand to do so, and apparently the Soviet Union agrees," Mr. McFarlane asserted, "for, surely, they have put more into research on defensive systems than the United States, and their programs in every area have a history of greater vigor than our own."

The President's National Security Advisor strongly emphasized to AFA Convention delegates that President Reagan seeks peace with the Soviet Union and is taking a

resolute but noncombative approach to the summit.

"We have fundamental differences with the Soviet Union," Mr. McFarlane said. "Different ideas as to the role of government. Different ideas as to the role of the individual and the importance of human rights. And we have no illusions that the differences in these two systems will change. Surely ours will not."

"But we also accept that with enormous power on both sides, as we engage in that competition, we have a responsibility to assure that the competition remains peaceful."

The prospect of "enduring competition" with the Soviet Union leaves the US undaunted, Mr. McFarlane said, because "the United States is ready and self-confident, with isolationism behind us, with a strong economy and a strong commitment to freedom [and] to helping other like-minded people to defend their own freedoms."

President Reagan has rigorously addressed himself to the question of "how we can ensure that this competition of ideas goes forward into the twenty-first century in peaceful fashion," Mr. McFarlane said, adding:

"That's important, because it represents his very serious and thoughtful review of United States policy towards the Soviet Union, particularly in the past forty years."

During that period, Mr. McFarlane said, "we have seen our country swing too often between extremes in our expectations of the Soviet Union," from "confrontation and cold war" to "false détente that induced the expectation that there would be fundamental change in the Soviet Union—that we could expect them to turn away from their global ambitions and that the millennium was at hand. . . ."

"The President believes that it is time that we embarked on a policy founded upon realism—acceptance that it is unlikely the Soviet Union will change, but that we can compete successfully, confidently, and peacefully with them," Mr. McFarlane declared. ■



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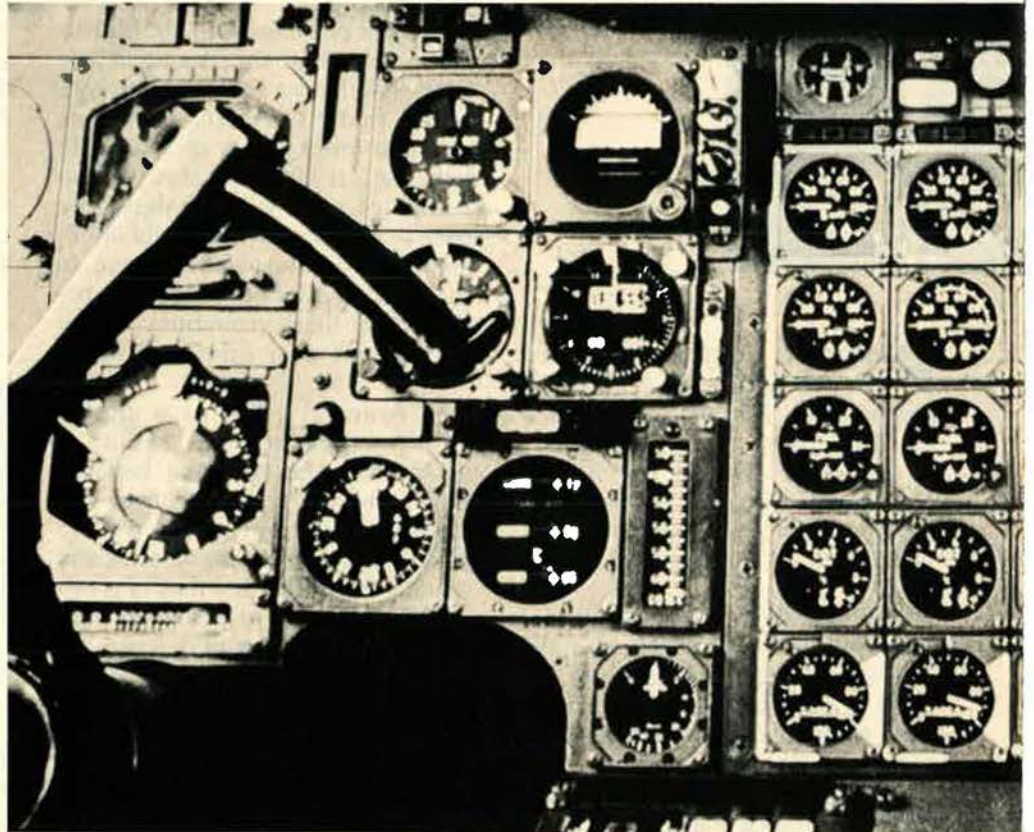
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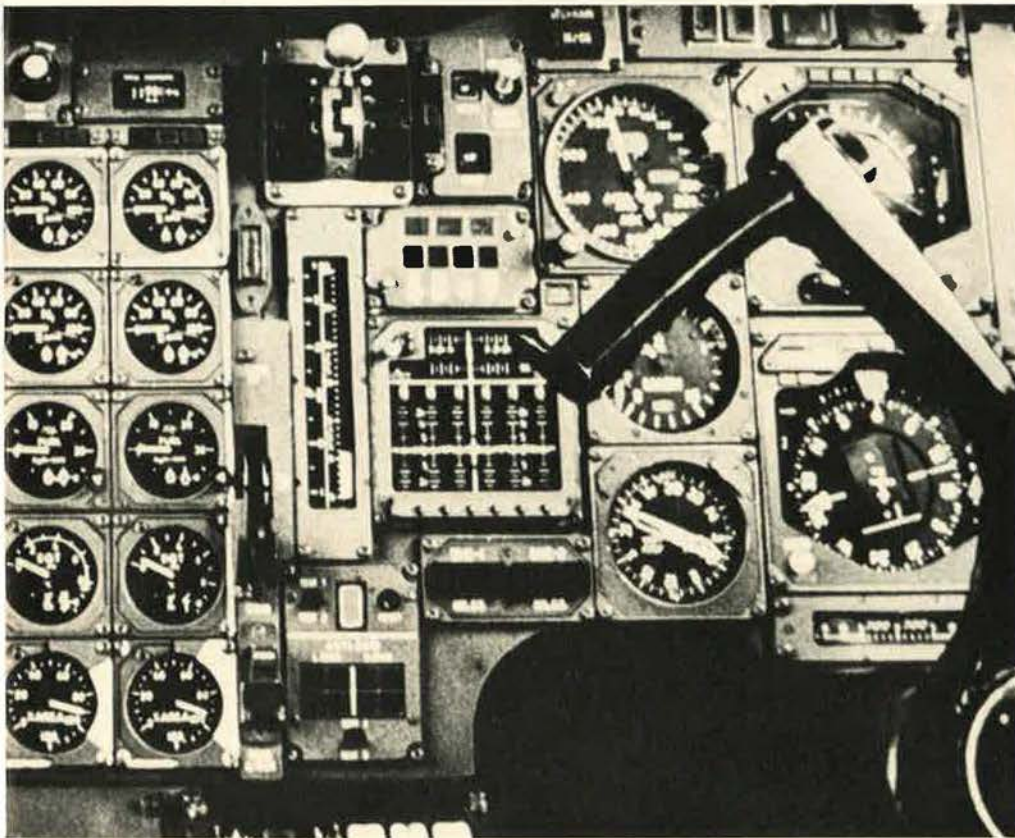
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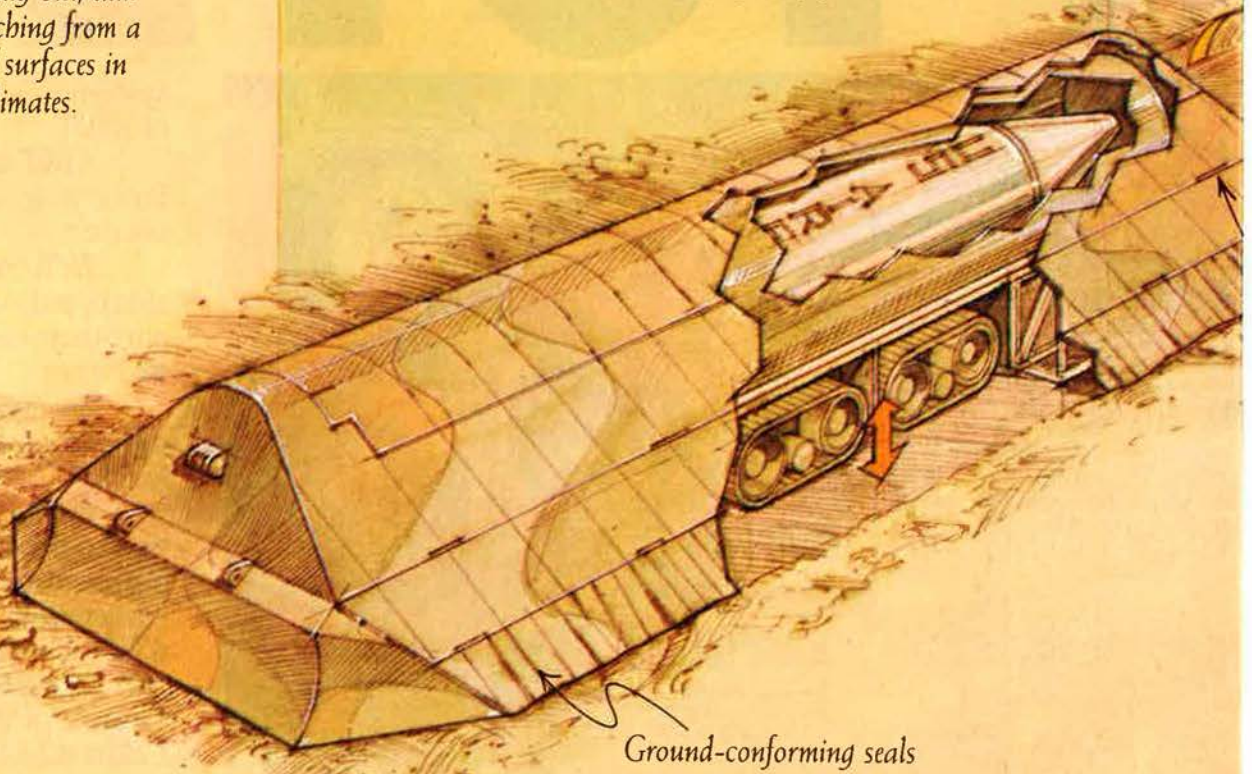
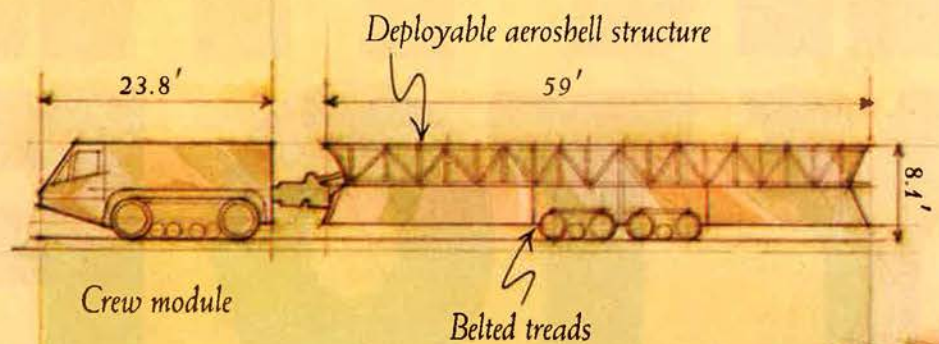
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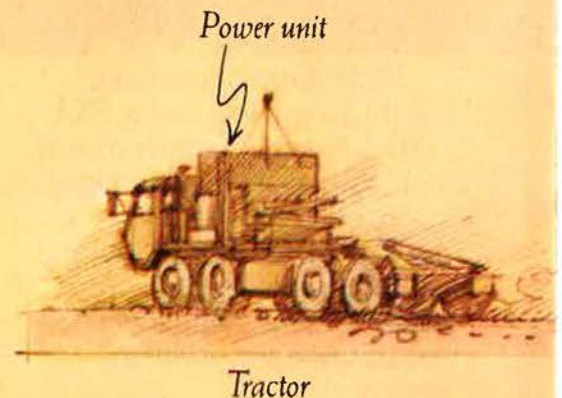
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### Hard Mobile Launcher

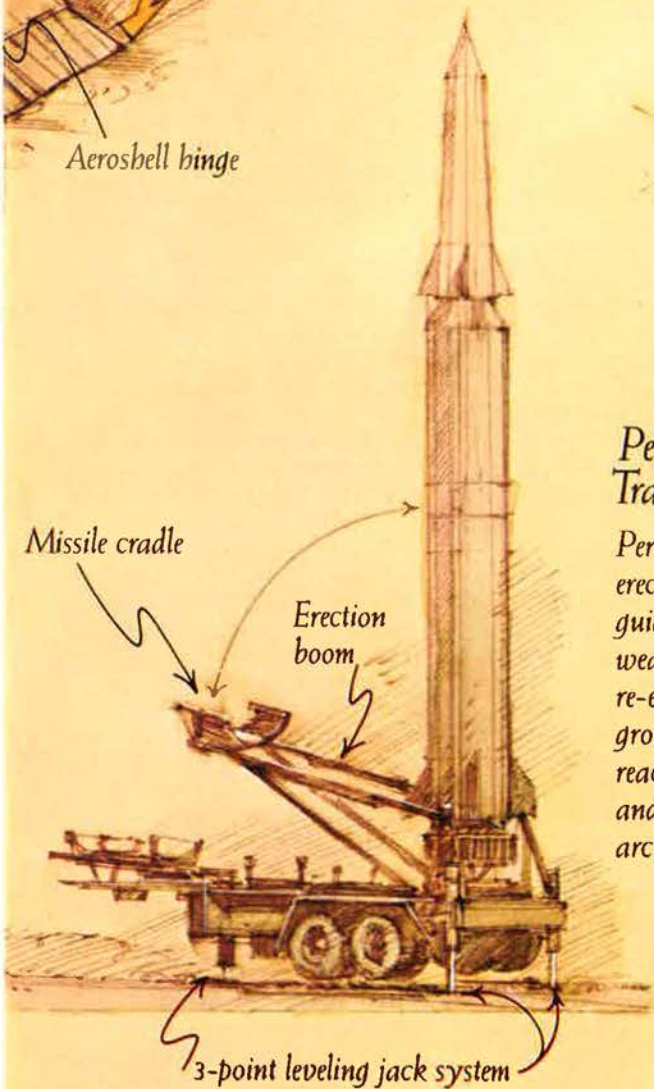
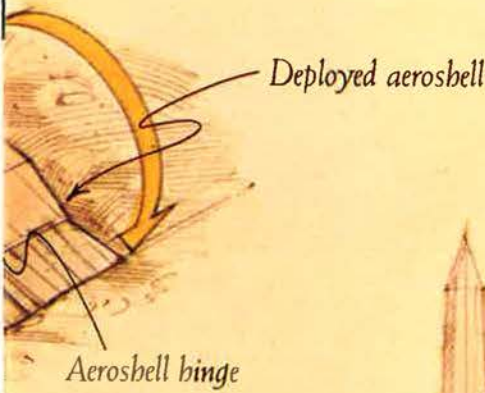
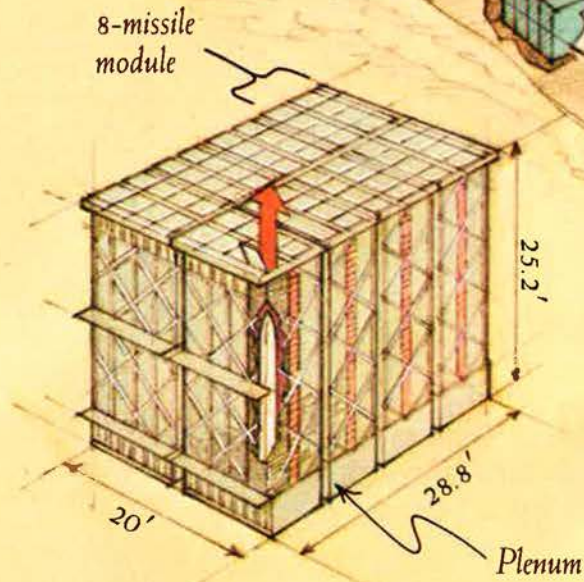
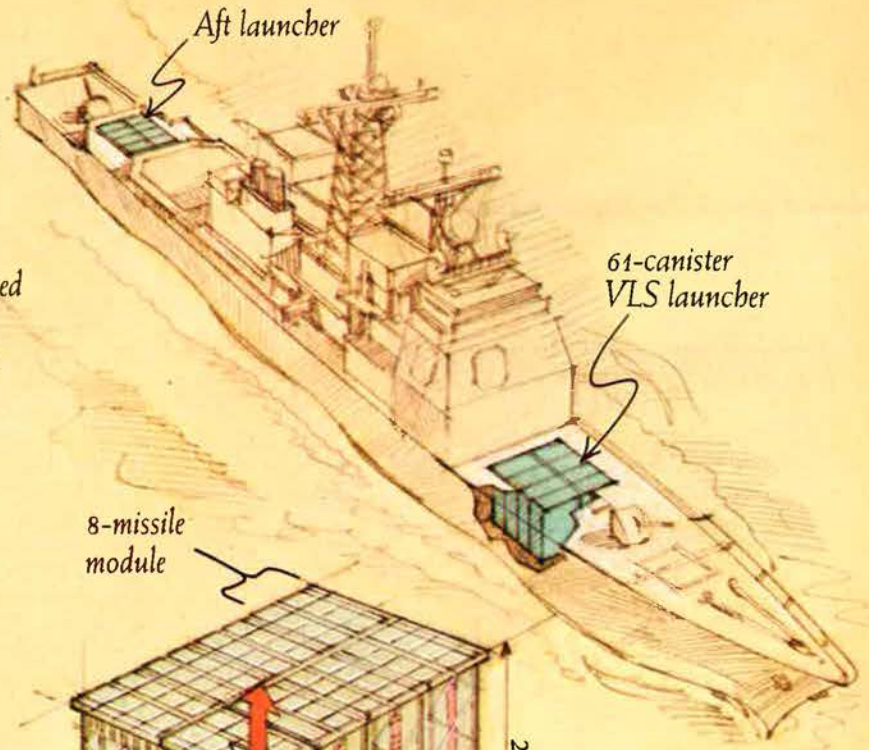
With belted treads for maximum on/off road, all-weather mobility, this launching system for the Small ICBM requires no site preparation.





## Vertical Launching System

A mix of canister-stored missiles, stowed in protected below-deck locations, combats surface, air and underwater threats.



## Pershing II Transporter/launcher

Pershing II, with its mobile erector/launcher, inertial guidance system and all-weather terminally guided re-entry vehicle, provides ground forces with quick-reaction firepower in terrain and climates ranging from arctic to desert.

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# Deterrence Across the Spectrum

A policy paper titled "Force Modernization and R&D," adopted by delegates to AFA's annual National Convention on September 17, 1985.

Over the past several years, significant progress has been made in restoring the effectiveness and credibility of the deterrent power and military capabilities of the US military. In the case of the Air Force, continued modernization with many superior weapon systems and stepped-up realistic training have led to dramatic increases in combat capability. The overdue addition of 100 B-1B bombers and the pending limited deployment of the Peacekeeper ICBM in 1986 will go a long way toward shaping up our strategic capabilities. Deterrence across the spectrum of combat has been reinforced in the process. So have the prospects for peace.

Yet there is evidence that the consensus behind the momentum of this restoration is waning. Congress has rebelled against recent defense budget requests, pointing to large defense expenditures in the past and substantial federal deficits. The Peacekeeper, cornerstone of the Administration's strategic modernization program, has been caught up in constant and disruptive debate over the merits of the missile and its basing mode. The results are much slower than expected production rates, increased costs, and a potential deployment "cap" of just fifty missiles—a mere one-quarter of the original plan to deploy 200 missiles.

The Air Force Association believes that restoring a healthy defense consensus is a task of vital importance, particularly in the context of the unparalleled Soviet military expansion of the past twenty years. However much progress the US armed forces have made in the recent past, the Soviets have continued to expand on their already massive military base at an even faster pace. They show no sign of slowing that rapid pace. In 1979, the Soviets had approximately 4,500 strategic offensive war-

heads. Today they have more than 9,000; allowing for deployment programs in process, that total, at a minimum, will grow to above 12,000 by 1990. After deploying a new generation of ICBMs in the 1970s, they are now preparing to deploy two improved ICBMs—the initially single-warhead but potentially three-warhead SS-X-25 and the ten-warhead SS-X-24. By 1990, they are expected to flight-test three more new ICBMs. The recent resurgence of US interest in strategic defenses notwithstanding, the Soviets spend far more than the US on research, development, and deployment of ballistic missile defenses. They apparently have prepared the basis for a nationwide ABM defense. Soviet aircraft production continues to far outstrip that of the US, in spite of recent US production boosts.

Aerospace systems provide unique advantages in meeting these mounting Soviet threats. The speed, range, flexibility, and power of aerospace systems are essential in deterring Soviet aggression and defeating it wherever it might occur. These traits provide necessary mobility and support for naval and ground forces, without which natural Soviet geopolitical advantages could be decisive.

The Soviets do not make the US task easy. They build an increasingly higher degree of technical sophistication into their huge arsenal of weapons. Continuous innovation in research and development is imperative to achieve and maintain the US technical edge. Some R&D programs, such as the Stealth bomber and the Strategic Defense Initiative, show promise of providing technologies that could change "the rules of the game" by offering quantum leaps in a wide variety of military capabilities. But US technological prowess, while vitally necessary, cannot alone redress the numer-



ical imbalance in forces. Technical superiority must be backed up by sufficient quantity as well.

The Air Force Association believes that the argument that we just can't afford defense modernization anymore rings hollow in the face of the tremendous Soviet buildup. We must be clear about the choices we face. Strong defenses tend to deter war; weak ones tend to invite it. The fact is that the Soviet threat is not diminishing, however much some might want to economize on defense spending. Lower deficits will not deter the Soviets from military adventurism; what will is the realization by potential adversaries that US armed forces are ready, willing, and able to defeat attacks on our interests and those of our allies anywhere in the world.

### **Economies and Efficiencies**

The vast scope of Air Force programs requires constant, aggressive management to prevent the possible misuse of tax dollars. Mistakes have been made, and some waste has resulted; however, this Association believes that the Air Force is pursuing vigorously and has in place sound management programs to meet national security needs and provide prudent fiscal stewardship.

Competition and the related issue of "dual sourcing" are high priorities for the Air Force. The Competition Improvement Program and efforts to increase competition in the production phase of major weapon systems and spare parts are producing excellent results. Competition is being increased by dual sourcing and component "break-out"—competition at the systems parts level—as well as by encouraging prime contractors to expand competition among suppliers. The Air Force fosters competitive approaches at each of its fifteen major commands

and separate operating agencies. Also, the Air Force has assigned 200 Competition Advocates at more than 160 contracting locations to improve competition in the acquisition process. A new office of the Competition Advocate has been established and is manned by a general officer and staff.

Whenever the projected quantities and economic return justify it, programs are competed. At the prime

generally reasonable. The vast majority of contractors prices spares fairly; in turn, most instances of overpricing are not deliberate attempts to defraud the government. The Air Force, of course, must continue its aggressive efforts to prevent overpricing of spare parts. The recommended actions of Air Force Management Analysis Groups have been implemented, resulting in strong Zero Overpricing and Competi-



contractor level, the Air Force is using a second source to produce such major weapon systems as the AIM-7 Sparrow and AIM-9 Sidewinder air-to-air interceptor missiles, the Imaging Infrared (IIR) Maverick, the Ground-Launched Cruise Missile (GLCM), and the Advanced Medium-Range Air-to-Air Missile (AMRAAM).

Air Force spare parts acquisition and management programs have received national attention—mostly adverse. The Air Force discovered and reported the great majority of the flaws in its procurement practices and has instituted corrective measures. The sheer size of this program justifies much of this interest—the Air Force manages more than 835,000 different types of spare parts, with the total inventory worth more than \$38 billion.

Media claims to the contrary, spare parts pricing is

tion Advocacy Programs. The Air Force is adding new civilian manpower to its Logistics Command (AFLC) and Systems Command (AFSC) to provide closer supervision of spare parts pricing and acquisition. The Air Force's new Spare Parts Retention Program halts the disposal of usable spare parts temporarily declared excess. This program should result in substantial annual savings. Continued emphasis on spares program management must remain a top Air Force priority to ensure that the American taxpayer gets the most cost-effective defense possible.

Another significant area of cost savings, keyed to improving defense industry productivity, is a series of acquisition initiatives. Specifically, AFA endorses Air Force goals to enhance program stability, expand multiyear procurement, and achieve economic and stable production rates. These

*Wave of the future? Not really, but the technology that produced this graphite composite speed brake is. Light, but very strong, composite materials will play an important role in future aircraft construction.*



efforts offer significant potential for controlling the escalating high cost of modern weapon systems. The Air Force is encouraged to review specifications carefully and continue the 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. We also encourage the Air Force to challenge industry to improve productivity, direct and indirect cost effectiveness, and quality. Finally, the Association applauds efforts by the Defense Department and the Air Force to streamline the acquisition process.

### **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 and under certain circumstances, they represent the best buy for the dollar to boost 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 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-three percent of the tactical fighter capability, fifty-eight percent of the tactical airlift capability, and twenty-one percent of the strategic aerial refuel-

ing capability. In addition, the Air National Guard provides sixty-eight percent of the air defense mission and twenty-nine percent of the tactical air support capability. The Air Force Reserve provides fifty percent of the strategic airlift and KC-10 tanker/cargo aircrew capability.

The pivotal contribution of the Air Guard and Reserve to the Total Force mandates continuing equipment modernization. In this context, the need to bolster this nation's air defense capability is especially pronounced. Aircraft of the Guard and Reserve are being upgraded to improve US air defense capability by replacing F-4 and F-106 aircraft with F-15s and F-16s. Obsolete Guard and Reserve aircraft and mission support equipment should be replaced or modernized apace. 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 (concurrent with the regular Air Force) 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 fully interoperable with that of the active force.

### **Nuclear Force Imperatives**

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 need of modernization.

Massive Soviet investments in strategic nuclear systems have brought 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 major advantages. The momentum of Soviet strategic modernization programs, if not countered by a vigorous US response, will lead to widening Soviet superiority in the years ahead.

*ICBM Modernization:* The most destabilizing aspect of the Soviet strategic buildup has been the vast improvement in ICBM capabilities. In contrast to US reliance on a balanced triad of strategic nuclear delivery systems, more than fifty percent of Soviet strategic delivery capability and available warheads are concentrated in their ICBM force. USAF's newest missile—Minuteman III—entered the force in the early 1970s. Since then, the USSR had deployed more than 800 modern SS-17, SS-18, and SS-19 ICBMs, most armed with multiple warheads. Moreover, the Soviets are continuing to upgrade their arsenal and are flight-testing two new solid-propellant ICBMs that may be deployed in silo and mobile modes. The SS-X-24 is a medium-sized missile that may be silo-deployed at first, but appears designed for mobile deployment. The SS-X-25, about the same size as Minuteman, is designed for deployment on a road-mobile launcher.

The US ICBM modernization program is vital to offset the unilateral Soviet growth in counterforce capability and ultimately to provide the assured credibility of US retaliatory forces. These challenges must be met by a broad, flexible approach to ICBM modernization to provide this nation with a highly accurate, flexible, and responsive deterrent capability.

A threefold approach to ICBM modernization, as recommended by the White House Commission on Strategic Forces and approved by the President and Congress, will provide such a force. This Associa-

tion endorses this approach.

First, the planned 100 Peacekeeper (MX) missiles must be deployed. The Peacekeeper is needed to redress the significant and growing asymmetry between US and Soviet strategic forces in their capability to place hardened targets at risk. The decision to deploy the Peacekeeper missile recognizes the importance of retaining the unique characteristics of the land-based ICBM: prompt, flexible response; high alert rate; dependable and proven command control and communications; high accuracy; and low operating cost.

Second, these characteristics should be enhanced through the development of a small ICBM that could be deployed in a variety of more survivable basing modes. This missile, in conjunction with the deployed Peacekeeper and Minuteman forces, could provide a diversification of systems capable of checkmating Soviet war plans. Concept definition of this program 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 ICBMs 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 Air Force Association strongly supports negotiations aimed at arms-reduction agreements that directly improve our national security. Arms control can help maintain the US deterrent, but is not a substitute



for US military preparedness. Sound arms-control measures, however, can help reduce uncertainties, increase stability, and make allocating critical resources more manageable. The small missile enhances this objective by permitting the US and encouraging the Soviet Union to move toward less vulnerable and therefore less destabilizing weapon systems. On the other hand, Peacekeeper provides the leverage needed to persuade the Soviet Union to negotiate seriously 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 maintain these aging systems properly and to provide flexibility to counter continuing Soviet advances in strategic capability.

*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 needs to complete production of 100 B-1B bombers, which will achieve initial operational capability in 1986, and proceed with the development of the Advanced Technology Bomber at the fastest prudent pace.

The manned bomber can be used across the entire spectrum of conflict. As reusable, multipurpose delivery systems, long-range bombers can deliver large



nuclear or conventional payloads accurately in any potential wartime scenario. 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 fully evaluate strategic warning indications. 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. Bombers provide the only capability for immediate, on-the-spot damage assessment of the primary target using the crew and aircraft sensors; if the situation dictates, they have the capability to attack assigned alternate targets.

Bombers can provide an important conventional supplement to US naval forces—such as 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 by day or night and under all weather conditions. This will allow designated B-52s to be employed for the cruise missile carriage mission. 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 low-observables technology, the acquisition of Advanced Technology Bombers (ATBs) should start in the 1990s. A combined force of B-1Bs and ATBs incorporating low-observables technology provides the most effective bomber modernization program for long-range combat missions (nuclear or conventional) well into the twenty-first century. Both systems are needed.

***The manned bomber is crucial to America's defense now and in the future. The B-1B will achieve initial operating capability in 1986 and will serve well into the next century. (Photo by Erik Simonsen)***



In the meantime, the Air-Launched Cruise Missile (ALCM) and avionics modification program will help maintain the effectiveness of the B-52 force through the 1980s. This modification program transforms the B-52 from a penetrate-then-shoot role to a standoff role. The ALCM, which achieved an initial operational capability on the B-52 in 1982, provides 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 its 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 and well beyond its expected service life, 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 the maximum flexibility of the bomber. The improved SRAM II missile is planned to replace the venerable SRAM in the post-1990 period.

*Strategic C<sup>3</sup>I*: Nowhere is the need for modernization more critical than in the area of strategic command control communications and intelligence (C<sup>3</sup>I). In the case of conflict or crisis, C<sup>3</sup>I systems must provide the national leadership with a real-time picture of what is going on, when and where, and provide the means for initiating the necessary responses. Failure to modernize and years of underfunding have resulted in a gravely weakened C<sup>3</sup>I system,

while Soviet capabilities to attack and disrupt US strategic networks have greatly increased. For US forces to realize their full potential, C<sup>3</sup>I must be designed to give the NCA flexible operational control and the ability to incorporate innovations as the strategic force changes.

Improvements and further developments are needed in ground- and space-based radars for our C<sup>3</sup>I network to operate in all phases of nuclear conflict. Current deficiencies render C<sup>3</sup>I network survival following a first strike, let alone endurance through a prolonged nuclear conflict, doubtful at best. It is imperative that Congress support the upgrading of our warning and communications network. The triad's ability to perform its mission ultimately depends on reliable, secure, 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 techniques; higher power transmitters; redundancy, proliferation, and incorporation of information security measures in critical C<sup>3</sup> nodes; and employment of new satellite, airborne, and ground-based systems. Key requirements include:

- Upgrading the World-Wide Airborne Command Post (WWABNCP) C<sup>3</sup> systems and hardening them against nuclear effects.

- Upgrading the Air Force's worldwide high-frequency (HF) radio stations to provide required coverage and higher power. Airborne HF radio equipment should be replaced with modern equipment.

- Upgrading existing attack warning and assessment systems.

- Modifying the very-low-frequency/low-frequency (VLF/LF) systems with a new processor to improve transmission in a stressed environment. VLF/LF receiv-

ers must be expeditiously installed in bombers.

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

- Improving, over the long term, satellite capabilities at frequency ranges that sustain communications in a nuclear-disturbed atmosphere. The Satellite Communications Program needs to be developed and deployed to provide highly jam-resistant, secure, 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 wide-band 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) comprised of Pershing II missiles and 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 sites in England, Italy, West Germany, and 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 operational 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. The GLCM and Pershing II deployments are proceeding despite a Soviet propaganda campaign keyed to Western European sensitivities.

### **Strategic Defense**

US 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 an undetected attack. Today, the US lacks adequate strategic air defenses due primarily to limitations of existing surveillance systems in range and gaps in the 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 the look-down/shoot-down capability necessary to defeat 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 sea-



ward with minimal range penalty, and its radars are increasingly costly and difficult to maintain. Some seaward surveillance is provided by the Joint Surveillance System (JSS); however, this system is line-of-sight limited and also has numerous medium- and low-altitude gaps. The DEW Line must be upgraded by deploying the North Warning System. Also, Over-the-Horizon Backscatter (OTH-B) radars must be deployed on both East and West Coasts, in Alaska, and in a south-looking site in order to provide coverage of these approaches. The OTH-B 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, interceptor modernization is one of the Air Force's most pressing needs. Active and Air National Guard F-106 squadrons should continue to be converted to modern fighters, such as F-15s, F-16s, and F-20s. The USAF/FAA (Federal Aviation Administration) JSS will provide the command and control capability required for limited peacetime surveillance and control and, in conjunction with the E-3 Airborne Warning and Control System (AWACS), will provide some wartime capability.

**Ballistic Missile Warning:** To detect modern missiles with multiple independently targetable reentry vehicles (MIRVs) 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. Replacement of the missile impact predictor computers has already been completed at all three sites, but upgrades to the detection and tracking radars are yet to be completed at two sites.

Also, two additional phased-array SLBM missile warning sites (PAVE PAWS) are needed 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.

**Space Defense:** Space surveillance systems maintain a catalog of space objects to support satellite attack warning and potential antisatellite (ASAT) targeting. Deployment of the last two ground-based electro-optical deep-space surveillance (GEODSS) sites must be completed to ensure continuous coverage of geosynchronous orbits. Improvements to ground-based space surveillance radars are also necessary for timely detection and mission identification of newly launched space objects.

Finally, an ASAT system is needed to deny the Soviets a sanctuary in space, deter use of their deployed ASAT, and counter space-based threats to our terrestrial forces. Development, flight testing, and deployment of this country's first nonnuclear space defense weapon, the F-15 miniature vehicle ASAT system, must continue.

**Strategic Defense Initiative:** 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. The result is the Strategic Defense Initiative (SDI), a proposed multitiered system of space and ground weapons and communications, surveillance, and support assets. The Air Force's main participation will focus on the space segments of a defense technology effort and the critical battle management, C<sup>3</sup>, and system survivability considerations as a major partner in the OSD lead program. Air Force

Systems Command and Space Command support SDI 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 strongly supports 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 investment 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 with the resources available at the beginning of a conflict. It is achieved through realistic operational training, maintaining the elements of the force at high proficiency, 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 allocation of resources to readiness and sustainability is paying off. Flying time for tactical aircrews has increased by fifty percent since 1978, and the 1984 mission capable rates for the A-10,

F-4, F-5, F-15, F-16, F-106, F-111, and C-5 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.

In the future, our ability to field a viable, affordable fighting force may hinge on our efforts to improve the reliability and maintainability (R&M) of equipment and weapon systems. The potential long-term payoff on the investment in reliability and maintainability is the increased effectiveness of combat sorties at reduced cost. The technology to make significant improvements in this area is available. This Association strongly supports Air Force efforts, such as R&M 2000, that are designed to ensure that these advances are realized.

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

Sufficient quantities of more modern munitions and spares must be procured to provide the field commander with the most kills per dollar spent. Munitions shortfalls will require more time to correct than spares shortfalls due to the limited production base available and the time that is required to phase in newly developed munitions.

Readiness and sustainability shortfalls cannot be corrected overnight. Special attention must continue to be devoted to these requirements to eliminate the existing backlog.



## 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 prepositioning 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. Even though airlift capacity has increased during 1985, 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 can arise. 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 to deploy quickly and provide initial support for combat forces anywhere in the world. Growing Soviet offensive capabilities have reduced warning and mobilization time, placing a premium on our ability to apply US military power rapidly.

*Airlift Master Plan:* The Air Force Airlift Master Plan was developed to address proposed solutions to airlift problems, using the FY '83 capability as a baseline. Seeking to attain the goal of a minimum of 66,000,000 ton-miles per day, the full potential of existing resources—seventy-seven C-5As, 234

C-141s, and sixty KC-10s—should be realized as quickly as possible. The full potential of our existing aircraft must not be limited by a lack of spare parts. Continued growth in the airlift fleet will mean a concurrent increase in the spares requirement. Establishing and maintaining adequate levels of spares involves long lead times; therefore, funding must not be delayed.

The acquisition of fifty C-5Bs and sixty KC-10s will help correct today's insufficient capacity and meet central near-term requirements. The fifty C-5Bs requested by the Administration will add 7,500,000 ton-miles per day and provide a sixty percent increase in outsize cargo capability. The KC-10, a combined cargo and tanker aircraft, provides both a new dimension in long-range aerial refueling capability and the capability of transporting large amounts of bulk and oversize cargo on pallets. 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 to achieve the minimum intertheater airlift capability. Further, they do not alleviate serious shortfalls in intratheater airlift capability.

There is a continuing need for intratheater mobility and resupply. The C-130 is the backbone of the current force—the only currently operational 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 thirty years of hard service as experienced in Southeast Asia. Replacement of the outer wing, installation of a self-contained navigation system, and enhanced stationkeeping equipment will improve

and extend its mission capability, and the installation of missile radar homing and warning systems will aid in protecting it against hostile fire in combat. Preservation of the C-130 is mandatory, as it is USAF's only aircraft currently capable of performing all the tactical aspects of intratheater airlift. These modifications must go forward, but a replacement for the capability lost as older C-130s and C-141s retire will be needed in the 1990s.

*C-17:* Initiation of full-scale development (FSD) of the C-17 in FY '85 prepared the way for procuring the airlift system designed as the core of the Airlift Master Plan. The C-17 is the key to the Air Force's long-term program to reduce airlift shortfalls, especially in the area of outsize Army equipment. It gives four vitally needed capabilities.

- It completes and maintains the increase in intertheater airlift capability recommended by the Congressionally Mandated Mobility Study.

- It provides the theater commander with outsize intratheater capability.

- It offsets the capability lost as older aircraft begin leaving the inventory in the 1990s.

- It significantly improves our ability to support the Army field commander by delivering equipment and supplies directly to his operating area, thus bypassing overburdened main operating bases and saving critical transshipment time.

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 Aircraft:* The European Distribution System Aircraft (EDSA), the C-23A, became fully operational in FY '85. The EDSA provides rapid delivery of critical fighter aircraft spare parts in Europe. When combined with its logistics C<sup>3</sup> and

forward stockage, the C-23A will be an inexpensive means to enhance readiness and increase critical fighter sortie availability in NATO.

*CRAF:* The Civil Reserve Air Fleet (CRAF) provides more than thirty-five percent of the intertheater airlift—passengers and cargo combined—available under crisis conditions. Further expansion of the CRAF wide-body fleet is planned. Even with implementation of the full FY '85 program, airlift shortfalls will still exist and require major future efforts.

*Airlift C<sup>2</sup>:* To compensate for limited airlift resources, it is imperative that MAC's command and control (C<sup>2</sup>) capability be brought up to date and expanded. Quickly deployable very-high-frequency (VHF) satellite terminals, improved data sets, and a local area network information processing system are required to provide superior fleet operations management to partially offset 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 anywhere in the world. 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 expand and modernize the fixed-wing special operations aircraft fleet—especially the MC-130H Combat Talon II aircraft and the AC-130H 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. This replacement program is necessary to ensure that required low-level, night, operational capability exists.

*Aerial Refueling:* USAF analyses show that additional aerial refueling capability is needed to optimize bomber penetration routes in support of the Single Integrated Operational Plan (SIOP). In addition, the requirement for tanker support is increasing as B-52Gs and Hs begin to carry ALCMs. Compounding this is the growing requirement to refuel airlift and tactical aircraft for operations in NATO or Southwest Asia. Present aerial refueling requirements for SIOP and other contingencies exceed current capabilities by a substantial amount. During major contingency operations, strategic capabilities and other missions would be seriously degraded because of tanker limitations.

The Air Force program to reengine the KC-135 fleet with CFM56 engines is imperative. The Air National Guard has virtually completed the interim reengining of the KC-135 aircraft (while the Air Force Reserve is in the process of reengining) with JT3D/TF33 engines until the CFM56 becomes available to the Air Reserve Forces. Eventually, the entire inventory of 642 KC-135s must be reengined. The reengining program 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.



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 deployments of aircraft and cargo, and the KC-135 to the SIOP, mid-range deployment, or employment scenarios. A proper force mix of KC-10 and KC-135 aircraft is needed to enhance both long- and mid-range offload capacity and to provide increased basing flexibility.

#### **Tactical Airpower**

The Air Force faces the constant challenge of striking a proper balance between funding essential growth and modernization of its tactical fighter forces

and supporting programs designed to improve the near-term readiness and sustainability of those forces—all within the context of a constrained budget.

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 high; our limited number of combat aircraft must not be exposed unnecessarily. Standoff weapons with all-weather capability must be developed and produced within prudent fiscal bounds. Continued improvements in the density, quantity, and complexity of the Warsaw Pact and 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 that the US will ever match the

*The F-15 and the F-16 (in rear) form the backbone of USAF's tactical airpower fleet. US tactical forces must be continually modernized and expanded to cope with the growing Soviet threat during day and night and under all weather conditions.*



numbers of Soviet forces 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-generation" aircraft, including the MiG-23 Flogger, MiG-25 Foxbat, Su-24 Fencer, and later-model Sukhoi Fitter aircraft; they are now producing their fourth generation of tactical aircraft—Frogfoot, Fulcrum, Flanker, and Foxhound—even before completion of the third-generation buy. The result is that the average age of their tactical fighter force is one-half that of the US force.

*Tactical Fighter Roadmap:* Based on an assessment of the current force, a balanced procurement strategy was designed for the total force and is outlined in the Tactical Fighter Roadmap. This strategy addresses the Air Force's tactical fighter requirements from three perspectives:

- Procuring the required number of fighters to flesh out, modernize, and sustain a forty fighter wing force—twenty-seven active and thirteen reserve—plus an air defense force.

- Buying the needed mix of fighters to accomplish specialized and multirole missions.

- Developing the quality improvements to enable fighters to accomplish demanding combat missions.

The current fighter force consists of approximately thirty-six wing-equivalents of seventy-two combat aircraft each. Due to fiscal constraints, the goal to increase to forty wings (while maintaining an average aircraft age of about ten

years) will not be reached until the early 1990s rather than in the late 1980s, as previously expected. Procurement is the key to the roadmap, and in order to grow, modernize, and sustain a forty-wing goal, the Air Force must reach a procurement level of 260–280 aircraft per year.

To meet the Soviet challenge in the near term requires the Air Force to continue evolutionary improvements to existing fighters and 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 USAF has an excellent close air support system, the A-10, there is a need today to enhance surface-attack lethality, survivability, and around-the-clock all-weather capability. Emphasis on a survivable, capable tactical C<sup>3</sup> network is essential to offset significant Soviet improvements in C<sup>3</sup> countermeasures. Further, the US tactical C<sup>3</sup> network must be interoperable with that of US allies to provide better detection, location, and classification of enemy forces. The E-3 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. Development and deployment of the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system must be completed to permit penetration of enemy air defense at low altitude and to find and destroy enemy targets at night and in weather. Likewise, the global positioning and microwave landing systems must be provided to all USAF aircraft for a survivable, all-weather navigation, attack, and landing capability.

The centerpiece of the Tactical Fighter Roadmap is the introduction of 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 in-theater all-weather defensive counterair capability. The planned 392-aircraft buy will equip four combat wings and allow theater commanders flexibility never available before in application of tactical airpower.

By the mid-1990s, the Soviets will have built sufficient numbers of MiG-29 Fulcrums and Su-27 Flankers along with the likely introduction of a new generation of fighters to surpass our ability to counter them with F-15s and F-16s. These threats cannot be met merely by modification or improvement of the F-15 or F-16. Thus, to meet the imperatives of the 1990s and beyond, the Air Force must now begin work on a new fighter. The advanced tactical fighter will require sustained supersonic cruise and maneuver, reduced radar and infrared signatures, improved reliability and maintainability, and technically integrated avionics. The advanced tactical fighter program, coupled with associated efforts in engine technology, needs to be carried forward expeditiously so as to reach a planned initial operational capability (IOC) in the mid-1990s.

*Modern Munitions:* Sufficient stocks of modern, effective munitions are essential to our warfighting capability. Efforts must continue to improve the accuracy, lethality, and standoff capabilities of the munitions inventory.

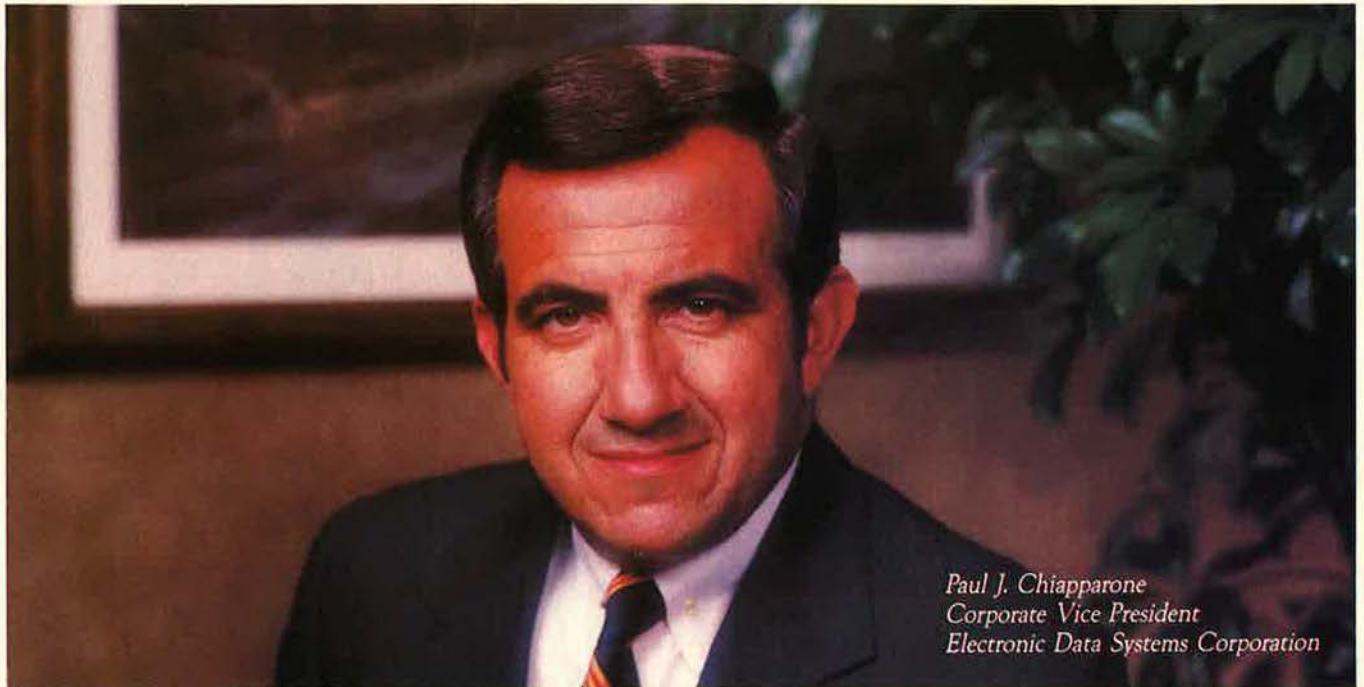
Particular emphasis must be placed on building Air Force stocks of air-to-air missiles by developing and

procuring AMRAAM, which is capable of coping with Soviet force improvements. AMRAAM will give fighters the capability to engage multiple targets and will increase aircraft survivability because of its high speed, range, and launch-and-maneuver capability. These traits are required to offset Soviet numerical superiority and to defeat the increased standoff capabilities of third-generation Soviet fighters. In the near term, additional AIM-7M and AIM-9M air-to-air missiles are required to meet stockpile requirements. The Air Force must also continue to buy more munitions, such as the GBU-15, the combined effects munition (CEM), and the Gator antiarmor mine, as well as to improve the effectiveness of such guided air-to-ground weapons as the IIR Maverick. Currently, US forces do not have adequate munitions to attack enemy airfields efficiently. Acquisition by the Air Force of Durandal, a French-built, rocket-assisted, runway-cratering munition, should be continued while development of a new generation of weapons and submunitions continues.

Intensive R&D efforts are required to field the next generation of munitions: sensor-fuzed weapons (SFW), hypervelocity missiles (HVM), and the Direct Airfield Attack Combined Munition (DAACM). The Air Force must begin procuring a powered GBU-15 (AGM-130), an improved 2,000-pound bomb, and an alternate warhead Maverick on schedule to achieve an enhanced capability against semihardened targets. Continued funding will be required to ensure that adequate stocks of these and similar weapons are available. Only by providing the required conventional capability—the right munitions in sufficient quantities on the right aircraft—can this country lower the threat of nuclear conflict.



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Corporate Vice President  
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Chemical weapon modernization is of vital importance. The US currently has only a very limited capability to respond in kind to a chemical attack. No chemical weapons have been produced in this country since 1969, and the reliability of the aging munitions in the current stockpile is increasingly doubtful. This Association strongly supports the production of a new generation of binary chemical weapons with a standoff and deep-strike capability. These new weapons would use two inert chemicals that mix and become lethal only when the weapon is fired. The increased safety, reliability, and effectiveness of these weapons would better deter the Soviets from initiating any chemical use and, combined with improved defensive preparations, would substantially mitigate the current US vulnerability and raise the nuclear threshold.

Realizing the importance of training to readiness, AFA fully supports the continuation and broadening of the current family of realistic 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. AFA advocates additional specific realistic 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.

*Tactical Surveillance and Engagement System:* Advances in Soviet tactics and the sheer size of the threat demand that the Air Force reduce the time lag between the identification and the attack of targets. The Joint Surveillance and Target Attack Radar System (JSTARS), when deployed on the C-18 aircraft, will fill both Army and Air Force requirements for detection, tracking, and engagement

as well as worldwide flexibility. It also provides the theater commander with an overall picture of the ground situation that will significantly enhance the command and control of his forces. The surveillance capability of JSTARS enables ground and air commanders to bring the required forces to bear at the right place and time. By identifying and tracking real-time tactical moving targets, it will allow timely destruction of moving ground forces at standoff ranges, before they can reach the ground battle.

*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 reliable EC options for aircraft self-protection and the ability to selectively jam, exploit, deceive, or destroy elements of the enemy's air defense and command and control systems. A major requirement is the 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 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, countermeasures to enemy EC systems are needed to ensure that aircraft avionics and ground- and space-based weapon systems remain effective. Development of airborne self-protection jammers, updated existing radar warning receivers, procurement of low-smoke engines, and continued in-

stallation 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 secure radios and jam-resistant secure data communications systems, such as the enhanced joint tactical information distribution system (EJS/JTIDS), must be developed and continually improved to provide required protection for voice and data communications 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 can jam early warning, acquisition, and ground-controlled intercept radars, while Compass Call systems counter selected tactical communications. The planned update to the EF-111A will permit it to counter new Soviet threats and is essential.

The Soviet Union relies heavily on electronic equipment for both its land and air forces. 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. To aid the Air Force in gaining air superiority in combat areas and to delay and disrupt the momentum of a Soviet attack require real-time intelligence, effective defense suppression, close air support of engaged ground forces, and the ability to electronically confuse Soviet forces and their command and control structure. 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 Operations

The Department of Defense is becoming increasingly dependent on space-based assets to conduct effective 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 the capabilities of our land, sea, and air forces.

The timely creation of a unified Space Command (SPACECMD) provides for the consolidation of operational space activities into a major command and provides for a strong working relationship between space-related research, development, and acquisition agencies and the operational users.

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, detailed, timely meteorological data.

• Space defense operations—detecting, tracking, and identifying all objects in space, providing timely warning to the NCA of hostile actions against the United States and 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.

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 national 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 in order 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. 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 commitments to the STS, 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.

Continued development of a high-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 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 missions, such as communica-

tion, surveillance, on-orbit service and repair of satellites, and research and development, that could be performed from a space station.

The Air Force should fully exploit the potential of space-based systems to meet the wide-area surveillance requirement. Such active space-based systems would be extremely effective for intelligence gathering, forward posturing, and also force management.

### **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 \$185 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 has declined by some forty percent since 1966. Over this same period, the Soviets graduated three to four 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 development of charged particle beams and high-energy lasers and applications of chemical warfare, antisatellite weapons, 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 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 vigorously 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 OSD-managed) program is imperative to provide the technology for coming generations of integrated circuits. VHSIC technology will permit implementation of advanced avionics system architectures in future production F-15/F-16 aircraft and the future advanced technology fighter that integrate sub-



systems 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 significantly upgrade air- and spacecraft avionics. Technology advancements in infrared imaging sensors that increase the range and resolution over current sensors and provide significant improvement in the day/night/adverse weather reconnaissance and strike capability are essential R&D objectives.

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

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

ability 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 and less dependence on ground control. Aggressive development and demonstration of technologies needed for the next generation of space missions are critical.

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

One of the key objectives in all military research and development efforts, in the view of this Association, must be to maximize the return on investment. 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 cy-

cles of moves and counter-moves. Simultaneously, a strong technology development program must be in place to provide the essential demonstrations that give the confidence to transition new technology quickly to an operational status. The US not only must be able to understand and correctly forecast Soviet weapon developments but 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 overall lead and restore superiority in areas where the Soviets have overtaken us. 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 by increasing the percentage of Air Force total obligation authority for science and technology to two percent over the next Five-Year Defense Plan.

More than two decades ago, President Kennedy told us that the nuclear age forces us to choose between being a great generation of Americans or being the last. That generation chose the path of greatness. The world today is even more perilous, but the choice we face is the same. We believe that this generation of Americans, given the facts, will display the same will, national consensus, and determination necessary to protect our freedoms and maintain the peace. ■



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# Quality People— Quality Force

A policy paper titled "Defense Manpower Issues," adopted by delegates to AFA's annual National Convention on September 17, 1985.

**T**he Air Force can accomplish its mission because we have well-trained, experienced, highly motivated people to operate and maintain our weapon systems. Our ability to get the mission done and to maintain an effective deterrent force depends on recruiting and retaining high quality men and women in sufficient numbers to provide an experienced and combat-ready force. Retaining our experienced people takes a combination of personal commitment from them and a strong commitment to them on our part."

Those few words of Air Force Chief of Staff Gen. Charles A. Gabriel sum up well the caliber of people in today's Air Force. And people are all-important. While the "big-ticket" weapon systems and sophisticated hardware tend to grab a lot of publicity and attention, they would be of little value without the quality people who ensure their effective use.

The Air Force has great cause to be proud of its more than one million men and women. This includes the active military, Guard, Reserve, and civilian employees. There is an old saying that "you get what you pay for." In the Air Force today, the truth is that in the "people" arena, this country is getting much more than it's paying for in terms of selfless devotion to the defense of the nation and to the principles, ideals, and way of life the Air Force represents.

Air Force men and women continue to sacrifice much in order to serve. They knowingly surrender many of the personal freedoms that most Americans take for granted. They are highly disciplined in a society that places a high value on individual freedom. They are prepared to live anywhere, fight anywhere, and maintain high morale and combat efficiency under frequently adverse and uncomfortable

conditions. They work long hours, experience frequent family separations, and are directed to move an average of seven to eight times in the course of an average career.

And, through it all, they face considerable personal risk. They pay a very high, personal cost to serve. They are truly extraordinary people who deserve extraordinary support in return.

## **Air Force People— Who Are They?**

A good question! Let's look briefly at three representative examples.

Our representative NCO is a staff sergeant with six years in the Air Force. He enlisted with a high school diploma and has since earned two years of college credit by attending classes during his off-duty hours. He is a Maintenance Supervisor, and the Air Force has invested roughly \$13,000 in his technical training. He typically supervises six subordinates who, collectively, are responsible for maintaining millions of dollars of equipment. He has aggressively pursued his professional military education, having attended the NCO Preparatory Course and the NCO Leadership School. He has consistently received outstanding ratings on his performance reports. He is married, with two children, one of whom is of school age. His wife works outside the home to help make ends meet. He has been directed to move three times thus far and can expect to move four or five more times in a full career. He works long hours under difficult conditions. He has been separated from his family for a full year while on a remote overseas tour and endures further separation each year as a result of temporary duty requirements.

A representative officer is a pilot—a captain with seven years of commissioned service—in whom the Air Force has invested up-



wards of \$1 million in training. He entered the Air Force at age twenty-two with a bachelor's degree and has acquired a master's degree on his own time. He is a graduate of Squadron Officer's School and is enrolled in the Air Command and Staff College by correspondence. Like our NCO, this officer has a family, and it is likely his spouse must seek outside employment to maintain an adequate standard of living. He has also made three moves and can expect at least four or five more should he choose to stay in. He, too, works long hours and has spent a full year separated from his family while on an unaccompanied tour and is frequently separated for additional lengths of time due to extensive unit flying deployments.

Our representative civilian manager is a thirty-year-old GS-11 with eight years of federal experience. Having entered federal service with a bachelor's degree, this important member of the Air Force team has been trained on specific Air Force systems and procedures. A salary of \$27,000 makes it difficult to maintain a family without a working spouse. Like his or her military counterpart, moves are a reality—several during the course of a thirty-year career are commonplace. Our typical civilian manager is involved in programs of worldwide scope and budgets of millions of dollars.

These Air Force people—enlisted, officers, and civilians—are different in many ways. They perform different jobs and have different responsibilities. They have varying education levels. They are motivated to serve their country by different drives—and perhaps their expectations are very different.

But they also have much in common. All are affected to varying degrees by the impact of frequent moves, which disrupt their families, make it difficult to build

equity in a home, make them susceptible to rapidly changing interest rates, and force them to borrow or draw from savings to pay for the expenses involved. The impact is further compounded because of the moves' effects on their spouse's employment opportunity. When spouses are fortunate enough to find a job in their chosen field, they frequently lose seniority and find it difficult to progress. It's another "hidden cost" of government-directed moves.

These three Air Force people are also alike in their commitment to the local community in which they live. Like so many Air Force families around the world, they volunteer their off-duty time to a wide variety of worthy causes. They're active in their church. They're the leaders in Scouting programs. They help run the Special Olympics. They contribute their fair share to the Combined Federal Campaign and to the Air Force Assistance

Fund. They're consistently among the first to be there whenever the community has an urgent need.

They're alike in their concern for the future of their country and for the future of the Air Force. They are fully aware of the economic dilemma the country faces—the growing deficit and the increasing competition for scarce resources. They want the country to be militarily strong—but only as strong as it needs to be. They don't want a penny more. Like other taxpayers, they want a "lean" Department of Defense that makes the most productive use of every tax dollar provided. They're as disturbed as anyone at the discovery of overpriced hammers and toilet seats, and often, they are the very ones who have identified these wastes. They appreciate the faith and confidence their fellow citizens have entrusted to them—and they're committed to living up to that trust with every fiber of their being.



**Capable, willing, determined—in spite of such hardships as frequent moves, unaccompanied tours, long hours, and inadequate pay, people in every part of the Air Force are getting the job done.**



They're giving it everything they've got, and their daily sacrifices should not go unrecognized. The institution and the nation must support them in return.

### **Retirement**

The single most important institutional benefit and career incentive the Air Force offers is the military retirement system. That is borne out consistently by every available measure of people's attitudes and perceptions. In a survey conducted in 1984, fifty-five percent of the respondents indicated that a significant change to the retirement system would be the one thing most likely to cause them to leave. That was a higher percentage than for all other potential resignation reasons combined. It's the most urgent topic of concern among Air Force people and their families. They view the threat of further change as a breach of faith, as a lessening of institutional support, and as an indication that their sacrifice and contributions are not appropriately recognized by policymakers.

The principal purpose of the retirement system is readiness. It provides a mobilization base. Retired pay is reduced compensation for a reduced level of service. The system is a way to ensure the needed blend of youth and experience. It is a vital institutional support. No private retirement system in the United States retains the right to recall a retiree back to service.

The Air Force Association strongly opposes any further change to the system. Changes imposed since 1980 have already reduced the value of lifetime earnings for future retirees by fifteen percent to twenty percent. No further change should be made before the potential impact on combat force readiness of changes already made is better understood. Further reductions would clearly have a disastrous impact on the Air

Force's ability to maintain a quality force.

### **Pay**

The most basic element of individual and family support is pay. Adequate levels of pay have been achieved through annual pay raises, and these have been a major factor in the success of rebuilding the manpower force. However, according to the Professional Administrative, Technical, and Clerical Workers Survey (PATC), continued pay caps and delayed raises have placed military personnel approximately eleven percent and civilian personnel nineteen percent behind in comparison with the private sector. A continuation of these gaps will seriously jeopardize the Air Force's success in attracting and keeping high quality people. AFA urges a prompt return to pay comparability and that steps be taken to ensure comparability is maintained.

### **Aviation Career Incentive Pay**

Another key factor influencing the retention of rated personnel is Aviation Career Incentive Pay (ACIP). Preserving and enhancing ACIP in the future is vital. If it helps keep just 200 pilots per year, it more than pays for itself through savings in accession and training costs.

The ACIP system is vitally important in attracting and retaining aviators and ensuring each has the proper balance of cockpit and noncockpit experience. The system is visible, provides compensation stability, is cost-effective, and has been proven with experience. But inflation has decreased the purchasing power and incentive value of the current ACIP rates. This incentive value must be restored if ACIP is to continue as an effective aviator management system.

### **Allowances**

AFA supports a fair and equitable system of allow-

ances to cover various costs that should rightfully be borne by the government in conjunction with military or civil service.

The variable housing allowance (VHA), originally implemented in 1980, is an example of a program that is working well and meeting the need it was intended to meet. It was created to help members afford an acceptable standard of housing in the continental United States and to eliminate disparities in standards of living among various geographical locations. The VHA program, as modified in FY '85, is well conceived and should be allowed to mature without further turbulence.

AFA opposes the Internal Revenue Service's (IRS) ruling 83-3 that attempts to reduce the tax deductions military personnel are allowed to take for housing expenses by an amount proportional to nontaxable income. Such a ruling would have a devastating impact on military families. More than 300,000 military homeowners would incur an additional tax liability of approximately \$800-\$4,000 annually—the equivalent of a two to four percent pay cut. The Treasury proposal ignores the fact that the "tax-exempt" nature of housing allowances is an integral part of military compensation and has been accounted for in establishing military pay levels since 1965. Further taxation of military allowances would be contrary to congressional intent and legal precedent.

Two more allowances of specific concern to AFA include the Basic Allowance for Subsistence (BAS) and the Civilian Uniform Allowance. AFA supports providing BAS for all career personnel. We believe it to be particularly demeaning for single NCOs in the grades of staff sergeant and above to be required to use a government dining facility for three meals per day when the married junior enlisted personnel

they supervise are permitted to eat wherever they choose.

The second example of inequity is the current Civilian Uniform Allowance. Civilian employees who must wear uniforms, such as firefighters and police officers, receive an annual uniform allowance of \$125. This amount has not changed since 1969 and is inadequate. The result is a significant out-of-pocket cost burden borne by the employee for something that is rightfully a cost that should be borne by the government. AFA recommends the statutory limit be raised to accommodate better the realities of the current cost of uniforms.

### **Permanent Change of Station Reimbursement**

The time is long overdue for the government to pay the full reasonable cost for permanent change of station moves. Current authority permits the reimbursement of only \$1 of every \$4 spent by military personnel in making government-directed moves. Exclusive of home-ownership costs, the median unreimbursed expense ranges from \$1,400 to \$2,700 per move. As a result, nearly sixty percent of those who responded to a 1984 survey indicated they needed to borrow money or draw on personal savings to meet PCS expenses. The fact that the average career member is directed to move seven to eight times in the course of a career multiplies the financial impact of this continuing inequity. The time has come for the government to recognize the need to pay for moves it directs. It's purely and simply a legitimate cost of doing business. Military personnel and their families sacrifice enough without having to pay the bulk of the cost of moves they're ordered to make. AFA urges prompt enactment of appropriate legislation to rectify this inequity.

For civilian personnel,



we support an end to the inequity in reimbursement for relocation expenses between moves made to CONUS locations and those made to overseas locations. Under current authorizations, those transferring to overseas locations are not receiving the same real estate benefits that those moving to Stateside locations receive. This is an unnecessary irritant that should be reversed.

### **Health Care**

Few things have a more direct, individual impact on the quality of people's lives and dedication to duty than their own and their families' continued health and physical and mental well-being. The quality and availability of adequate health care ranks high among the concerns of Air Force people. It is an important factor in daily performance and in career decisions. AFA strongly supports those measures that will help in this regard. The most important is the continued availability of military hospitals. Also critical are a long overdue dependent dental care insurance program, a cap on catastrophic CHAMPUS expenses, and expansion of CHAMPUS coverage to organ transplants.

Military personnel and their families are well aware that the range of benefits available to dependents through the Uniformed Services Health Benefits Program is substantially less than that available to family members through other major employers. For example, routine dental care, catastrophic coverage, eyeglasses, and orthodontic care are not provided. Yet, they've shared in the escalating costs of civilian health care (about fifty percent in the last four years alone). As a result, the proposals to make a 100 percent increase in the CHAMPUS annual deductible and to impose a co-payment fee and deductible on care in military

medical facilities will have a particularly disruptive financial impact. Such measures will be perceived as an erosion of what has long been considered a key institutional support, with a predictable negative impact on morale and retention.

### **Family Support**

AFA fully agrees that "career decisions are a family matter." The degree to which family members are satisfied with the quality of their individual lives and the degree to which their personal and collective needs are met have a tremendous influence on



the productivity of the individual service member and on his or her decision to stay with the Air Force. If the family as a social unit is not properly served, if their basic needs are not effectively met, the most probable result will be the loss to the Air Force of a skilled professional.

We recognize the changed environment in which family needs must be met. Today, more than half of all Air Force married members have a spouse working outside the home—and more than half of those are doing so to make financial ends meet. In addition, there are nearly

24,000 couples in which both partners are military personnel. These sociological changes have great implications for the kind of institutional supports required.

The traditional institutional supports must be retained. The value of discount shopping at base commissaries and exchanges is essential. The broad spectrum of morale, welfare, and recreation (MWR) programs is important. Today's Air Force family more than ever needs convenient child-care support. But much more is also needed to keep pace with changing times.

***The key challenge is keeping the right number and quality of trained, experienced people beyond their initial service obligations in order to manage and lead an effective career force. Healthy retention levels also mean lower costs in many areas.***



In this regard, AFA fully supports the continued funding of Family Support Centers, with a target date of FY '91 for establishing one center at every major Air Force installation. The Family Support Center acts as a focal point for a full range of Air Force and civilian resources, services, and programs that can support and assist Air Force members and their families with their special needs.

### **Manpower**

The quality of working conditions must also be reasonable if the Air Force is to continue to attract and keep the needed quality of people. The key factor in this regard is having a sufficient number of qualified people to get the job done. In recent years, the Air Force has had only partial success in getting the manpower authorizations needed to support approved growth in its force structure. The realities of a growing national budget deficit and the resulting fierce competition for scarce fiscal resources mean we can expect a continued gap in needed manpower resources through the early 1990s.

Extraordinary measures have been and must continue to be taken in an effort to effectively fill in that "gap" as much as is humanly possible. The Air Force should continue to maintain the highest reserve contribution to the total force, within the limits of force and cost effectiveness. It should continue to enhance productivity through contract cost comparisons, productivity-enhancing capital investments, functional reviews, improved reliability and maintainability in systems development, and other innovative methods.

Congress can help by better recognizing and authorizing the minimum level of required additional manpower authorizations to accompany approved increases in force structure. It can

also remove specific barriers it has imposed to effective manpower management. Specifically, AFA supports the elimination of the European troop strength ceiling and of civilian end strength controls.

Ultimately, the cost of adding new missions and forces without commensurate manpower must be paid. It will be paid in the future, as it is being paid now, by Air Force people—people who are working long hours and being forced to spend more time away from their families as they are pressured to fill in the manpower gap. If this continues unabated, that payment will result in lower morale and retention, inefficient management, higher costs, and a less ready force.

### **Recruiting and Retention**

Recruiting requirements are being met with near-record quality. The Air Force leads the way by producing the most accessions per recruiter with the lowest average cost. If the Air Force is to continue its remarkable success in this regard, it is essential that we keep striving for the right mix of incentives to continue to attract the kinds of people we need.

The key to the people challenge is keeping the right number and quality of trained, experienced people beyond their initial service obligations in order to manage and lead an effective career force. Healthy retention levels mean a significant savings in accession, recruiting, commissioning, and training costs. And healthy retention levels should be attainable if the proper measure of congressional and institutional support continues.

There is currently reason for cautious concern. In most categories, retention rates peaked in FY '83, moderated in FY '84, and continued a downward trend in FY '85. We are particularly concerned that pilot retention has shown a

marked decline. The cumulative continuation rate, the Air Force measure of retention for pilots with six to eleven years of service, has fallen from seventy-eight percent in FY '83 to below sixty percent today. And with airlines continuing to hire, this downward trend is expected to continue into FY '86. We well recall the disastrous situation the Air Force faced in the late 1970s, when repeated pay caps and other factors drove qualified people out of the Air Force to an extent where readiness was threatened. We can't afford to face a similar situation again—a possibility if we lose sight of the importance of many factors affecting the propensity of Air Force people to stay in service.

### **Other Retention Factors**

A variety of other factors bears on the Air Force's ability to get and keep the kind of people it needs. These include the lure of high-technology training, the certainty of equal opportunity and treatment, and decent living and working conditions. Air Force people and their families expect a fair measure of support in return for their extraordinary service. They deserve a decent quality of life.

Readiness, as always, is the bottom line. And people are the key to readiness. AFA believes nothing should have a higher priority than Air Force people. The following are specific people initiatives AFA supports or opposes.

### **Retirement and Estate Programs**

#### **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.

- Increasing the Survivors Group Life Insurance (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 Federal Employee Group Life Insurance (FEGLI) benefits during periods of active-duty military service.

#### **AFA Opposes:**

- Any proposal permanently modifying the Cost of Living Adjustment (COLA) mechanism or any other proposal that would further erode the real purchasing power of retiree



pay, including caps and freezes.

- Any offsetting of military retired pay by Social Security.
- 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."

### **Health Care**

#### **AFA Supports:**

- Health care cost containment initiatives that preserve the quality of the medical benefit.
- Enacting legislation providing a dental care insurance program for all nonactive-duty beneficiaries.
- Cost sharing of eye exams by CHAMPUS for retirees and their dependents.
- Continuing CHAMPUS coverage after age sixty-five as a second payer to Medicare, rather than termination at age sixty-five.
- Enacting legislation providing a catastrophic cap of \$1,000 per year for CHAMPUS liability of an active-duty family and \$3,000 per year for a retired family.
- Expanding organ transplant coverage under CHAMPUS to include the heart and other organs.
- 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.
- Closing enrollment (facilities designation) that restricts beneficiaries from seeking care at military facilities of their choice.
- Increasing CHAMPUS copayments and deductions.
- Imposition of annual deductible charges in military treatment facilities.

### **Pay**

#### **AFA Supports:**

- Using a phased approach, beginning in 1987, 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.
- Permanently exempting military personnel from a possible tax ruling similar to IRS 83-3 or any other action that would limit military members' tax deductions by requiring them to offset a proportional amount of mortgage interest and tax deductions by the amount they receive in BAQ, 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 and then, as our ultimate goal, expanding the criteria to all careerists (E-4 over 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.
- Maintaining the VHA program as enacted in FY '85.

#### **AFA Opposes:**

- Enactment of legislation that would preclude so-called "overpayments" of VHA.
- Further taxing of federal insurance benefits and contributions to civilian annuities.

### **Flying Incentive Pay**

#### **AFA Supports:**

- Increasing the ACIP rates, targeted to the flying-intensive year groups, to reestablish ACIP's incentive value and offset the effects of inflation.
- Reestablishing non-rated officer crew member flight pay rates at \$125 to



*No matter how advanced the technology gets, there will always have to be people to keep the Air Force running—on the ground and in the air.*



\$250 per month and raising enlisted crew member rates to \$110 to \$200 per month.

#### **AFA Opposes:**

- A "fly-for-pay" system or payment of ACIP only to operational flyers.

#### **Enlistment/Reenlistment Bonus Authority**

##### **AFA Supports:**

- Legislation giving the services permanent authority to pay Enlistment Bonuses and Selective Reenlistment Bonuses (SRB).

- Congressional approval and funding to implement that portion of the SRB law that allows the services to include up to twenty-four months of an unserved service-directed extension of enlistment when calculating all SRB entitlements.

- Legislation allowing the services to pay SRBs in lump sum at the time of reenlistment.

#### **Travel Allowances**

##### **AFA Supports:**

- Increasing PCS reimbursements for military members and eliminating the "negative compensation" associated with PCS moves.

- Increasing the dislocation allowance for military members.

- Increasing the PCS travel allowance for military dependents.

- Increasing maximum weight allowance on shipment of household goods for military members.

- Providing funding for military members to receive a Temporary Lodging Allowance for PCS moves within the continental United States.

- Providing one funded round trip per year for dependents of members assigned to Alaska and Hawaii who attend secondary schools or undergraduate college in the continental United States.

- Providing adequate travel reimbursement to junior enlisted members being reassigned in the continental United States.

- Eliminating the re-

strictive language that creates differences between officer and enlisted per diem payments and returning 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 to home of record 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.

#### **The Family**

##### **AFA Supports:**

- Expanding support functions and developing new programs responsive to changing needs of the Air Force family of the 1980s.

- Establishing Family Action Information Boards to increase awareness of base family needs, resolve problems, and improve the quality of life for Air Force families.

- Establishing fully funded, installation-level Family Support Centers throughout the Air Force.

- Expanding relocation programs to address the needs of the entire family and providing help in obtaining temporary lodging before departure and at the new station, in locating new housing, and in settling at the new location.

- Improving the quality of household goods shipment.

- Improving the quality and quantity of existing military family housing units.

- Appropriating funds for the construction and the

operation of child-care facilities.

- Providing employment and education programs to assist family members in locating and preparing for employment.

#### **New GI Bill**

##### **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.

- Changes to PL 98-525 in the interest of making the new GI Bill more attractive as a recruiting tool and more equitable to service members. These changes include providing new enlistees up to four months to decide to opt out of the program; providing Vietnam-era veterans who have a break in service the opportunity to convert their benefits, provided they are able to serve on active duty through January 3, 1988; allowing new accessions to contribute \$60 per month over a twenty-month period as opposed to \$100 for twelve months; providing all members who opt for the new GI Bill the opportunity to receive a one-time refund of their deductible funds at any time during their eligibility for the program; in the event of the participant's death, permitting the contributed funds to be passed on to the deceased's estate; and permitting members of the selective reserve to pursue studies beyond the baccalaureate level, as do members of the active force.

#### **Commissaries**

##### **AFA Supports:**

- Continuing the current commissary system.

##### **AFA Opposes:**

- Contracting out the management and control of commissary operations.

#### **Manpower/End Strength**

##### **AFA Supports:**

- Continued emphasis on improved effectiveness and enhanced productivity of manpower resources.

- Full funding of required active-duty and reserve manpower strength levels to support force structure and readiness programs.

- Management of civilian employment levels within fiscal constraints, not civilian end strength ceiling controls.

- Management of force levels within overall end strengths and without theater-specific ceiling limits.

#### **Morale, Welfare, and Recreation**

##### **AFA Supports:**

- Constructing new people support facilities, such as child-care centers, libraries, recreation centers, gymnasiums, arts and crafts centers, and youth centers.

#### **Air Force Engineers and Scientists**

##### **AFA Supports:**

- Continuing to fund for payment of an engineering and scientific continuation bonus and the AFIT Scientific and Engineering Continuing Education Program.

#### **Recruiting**

##### **AFA Supports:**

- Retaining for each service Secretary the prerogative to manage each service's recruiting policies and procedures, within statutory limitations.

- Providing adequate recruiting resources based on each individual service's mission.

##### **AFA Opposes:**

- Arbitrary constraints on one service's recruiting efforts for the alleged benefits of another service.

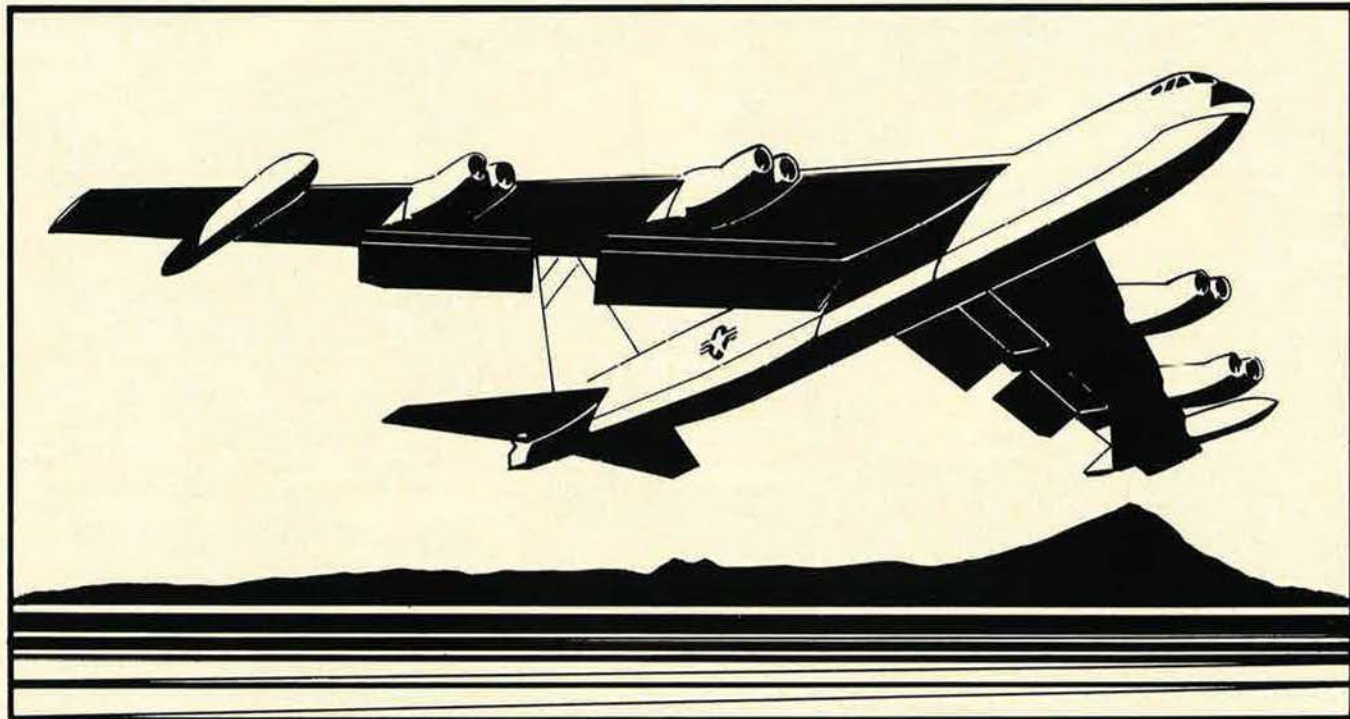
#### **Air Force Junior ROTC (AFJROTC)**

##### **AFA Supports:**

- Increasing the number of funded AFJROTC units to the authorized level of 335 units.



# FROM THE FIRST .....



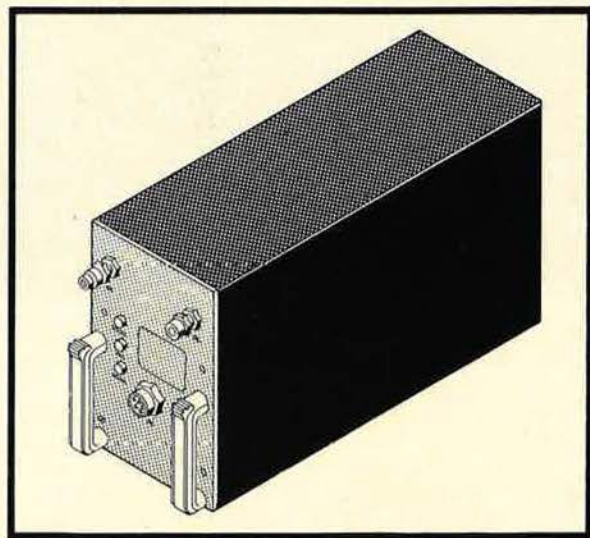
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## **Commissioned Officer Accessions**

### **AFA Supports:**

- Increasing the ROTC subsistence allowance for senior and scholarship cadets.
- Taking action to assure accreditation for AFROTC courses toward degree requirements at those colleges and universities that do not grant such credit or that grant limited credit.
- Continuing funding at the 395 entry level for the Airman Education and Commissioning Program through the Five-Year Defense Program (FYDP).
- Offering opportunities for highly qualified enlisted members to become commissioned officers.

## **Training**

### **AFA Supports:**

- Increased emphasis on the "Project Warrior" program.
- Retaining the "Project Technology 2000" program as a low-cost program to motivate 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.
- Enhancing manpower, personnel, and training involvement in the system acquisition process.

## **Air Force Reserve and Air National Guard**

### **AFA Supports:**

- 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 allowing payment of an actuarially reduced retirement annuity for reservists with twenty creditable years of service who are under age sixty.
- Raising the ceiling of sixty creditable inactive duty retirement points for Air Force Reservists and Air Guardsmen.
- Legislation permitting totally disabled Reservists who have otherwise qualified for Reserve retirement to receive immediate retirement pay.
- 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).

- Congressional initiatives to amend Title 5, USC, "to provide for the mandatory separation and immediate retirement eligibility of a military technician of the Air Force Reserve" and Title 10, USC, "to provide that the Secretary of the Air Force may authorize certain Reserve officers who are employed as military technicians to be retained in an active status until age sixty."
- Providing commissary shopping privileges to reservists on the basis of one shopping day for each day of active duty, to be used at the option of the reservists or their authorized family member.
- Military medical benefits for survivors of Reservists who die while on active-duty training or inactive-duty training of thirty days or less.
- Efforts of Congress to make Guard and Reserve

*The roles of women in the Air Force have greatly expanded over the last few years. Continued growth in such areas as pilot training and law enforcement is in the offing.*



equipment shortages visible and to procure specific items of equipment needed to meet projected wartime requirements.

- Providing adequate recruiting and retention resources and incentive programs to ensure attainment of Reserve Forces manpower objectives.

- Removing an inequity in the Reserve Component Survivor Benefit Plan so that survivors of those reservists who die during the ninety-day period following notification that the reservist has completed twenty years of creditable service but before having made a survivor benefit plan election would be eligible for coverage.

- Continuing to recognize the Air Technicians and Air Reserve 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 Guard/Reserve Component Chief.

- Congressional initiatives to bring about a national awareness of the critical role played by the Guard and Reserve in the Nation's Total Force.

### **Civil Air Patrol**

#### **AFA Supports:**

- Providing continued federal funding of Air Force-authorized missions, to include actual emergency services activities as well as training.

- The cadet and aerospace education programs.

- Providing continued federal funding for aircraft, vehicles, equipment, and uniforms for CAP.

- Legislation authorizing the Secretary of the Air Force to allow CAP to acquire excess items of equipment and supplies from all federal departments and agencies.

### **Veterans**

#### **AFA Supports:**

- Continuing medical treatment for veterans with

nonservice-connected disabilities and construction and resources needed to treat the nonservice-connected disabled veteran.

#### **AFA Opposes:**

- Reducing, in any way, benefits associated with veterans' 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.

### **POWs/MIAs**

#### **AFA Supports:**

We continue to support the President's initiatives concerning our unaccounted-for prisoners of war and missing in action (POW/MIA) and continuation of direct Presidential interest to focus on a complete accounting for all POW/MIAs from Vietnam, Korea, or any other hostile actions, past or future, in which US military or civilian personnel are detained against their will.

### **Former POWs**

Former POWs are a small population of approximately 86,000 and represent only three-tenths of one percent of the total living war veterans. Their population has a unique profile characterized by the after-effects of their experience and an identified higher morbidity and mortality rate, differing by locations and length of captivity and the nature of the treatment received from their captors.

Congress has passed several pieces of legislation particularly affecting this group. Other legislation is pending to assist with a satisfactory transition to civilian life (HR 864), and AFA supports its passage in principle, but would recommend certain refinements when it is finally addressed by Congress. These refinements would imply that a presumptive service-connected case

could only be made for the former POWs who were confined in a certain location known as one where conditions of captivity were manifestly harsh and characterized by such things as physical violence, torture, executions, forced hard labor, prolonged isolation, malnutrition, starvation, etc., and that the symptoms/aftereffects of the diseases listed are evident in the ex-POW patient by medical records or current examination.

If these two conditions are met, then the applicant *should not* be required to provide previous military records, and claims could not be disallowed for that reason.

#### **AFA Supports:**

- Recognition of the dedicated efforts of the Advisory Committee on Prisoners of War to the Veterans Administration that has developed a significant report now being studied by Congress.

- The Advisory Committee's position on PL 864, expanding presumptions of service-connected disorders.

### **Unique Conditions of 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.

### **Espionage**

The Air Force Association urges Congress to enact and the President to sign into law legislation to deal promptly and stringently with those convicted of injurious acts and espionage against the United States, to include authorization for the death penalty when such convictions concern directly the major

weapon systems, defense plans, or defense communications and cryptological systems of the United States.

### **The Imperative for 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 as a people. The seriousness of our lack of excellence in education 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. This should include (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, for the college bound, (6) two





## TI's HARM missile keeps Air Force pilots out of harm's way

When you scramble off that runway in your F-4G Wild Weasel it's nice to know that those HARM missiles under your wing can truly make you the hunter rather than the hunted.

With HARM's long range, high speed, broad frequency coverage, and onboard software adaptability against existing and future radar threats, the tactical potential of the missile is limited only by the imagination.

The range of the missile and

the sensitivity of the seeker, coupled with the programming and control of the missile by the highly effective APR-38 Receiver Set, make HARM an excellent hunter killer asset to keep you out of harm's way.

TI, as Weapon System Integrator for this joint U.S. Navy/U.S. Air Force program, is in full-scale production and is delivering missiles to F-4G Wild Weasel squadrons where HARM has proven extraordinarily reliable

in the completion of defense suppression missions.

Texas Instruments is proud of its long association with the U.S. Air Force and proud to be able to add this highly reliable defense suppression weapon to the Air Force Inventory.

**TEXAS**  
**INSTRUMENTS**







**MILAN.**  
Anti-Tank missile system  
for use by the infantry.



**ROLAND.**  
Guided missile system  
mounted on a shelter for  
use against low-flying  
aircraft.



**MW-1.**  
Multipurpose weapon  
system to be used on the  
Tornado.



**CGIVS.**  
Computer-generated  
image visual system for  
the Tornado training  
simulator.

## Our High-Tech-Contribution to Defense.

The target: Utmost economy in defense.  
The procedure: Cooperation as a NATO partner.  
The principle: Applied system responsibility.  
The result: High-Tech Weapon Systems.

MBB and its Partner Companies.  
This stands for successful cooperation in the fields of anti-tank and air defense, ground attacks and anti-ship operations as well as electronic systems and components.

MILAN and HOT: Anti-Tank missile systems of medium and long ranges, respectively.\*  
ROLAND: Surface-to-air missile system for use against low-flying aircraft.\*  
MW-1: Conventional multi-purpose weapon for anti-tank defense and against enemy airfields.  
KORMORAN: Air-to-ship guided missile.  
CGIVS: Computer-generated image visual system.

Messerschmitt-Bölkow-Blohm GmbH  
North America Corporate Office  
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1655 N. Fort Myer Drive  
Arlington, VA 22209  
Phone (703) 525-9800



Partner in  
international programs

\* In cooperation with Aérospatiale France, marketed by EUROMISSILE.



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.

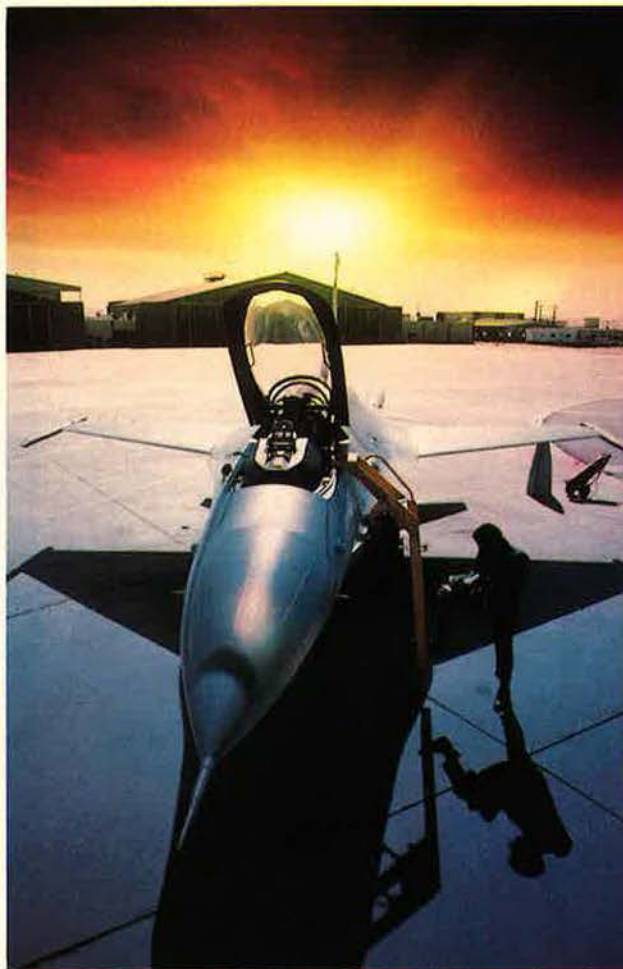
- Significantly more time be devoted to learning the new basics. This will require more effective use of the school day, a longer school day, or a lengthened school year.

- Appropriate actions be taken to improve the preparation of teachers and to making 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.

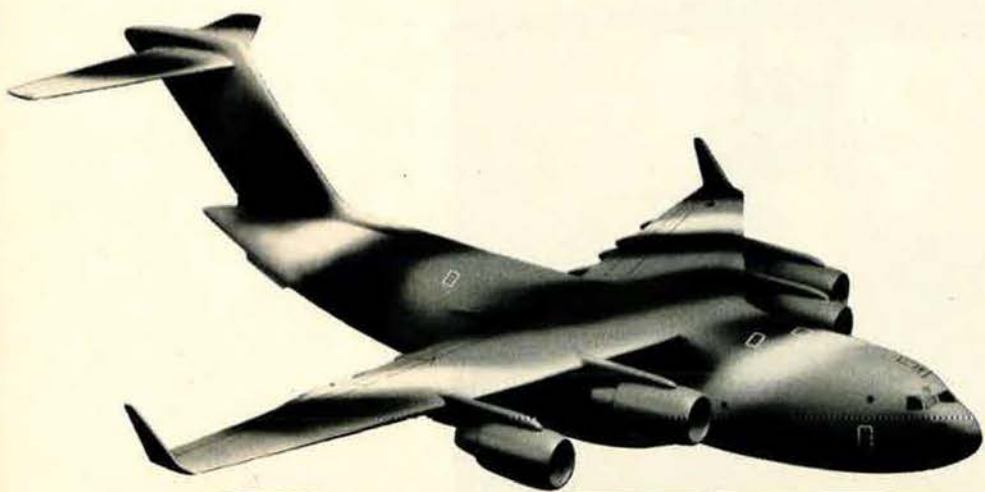
A nation's ability to influence other nations and survive in freedom depends on the integration of its economic, political, social, and military power in a purposeful design. In democracies, this design and the roles and capabilities of its major elements are determined by the populace. In the United 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, the Air Force Association advocates a deliberate program of education in military history and military science in American schools and colleges. ■

***Maintaining aggressive and realistic training in such exercises as Red Flag and strengthening individual training programs to keep pace with technology and new missions are important concerns for the Air Force.***  
***(Photo by Erik Simonsen)***





# C17

"C" as in  
*close*





## **NEW AIRLIFTER DESIGNED TO FLY DIRECT TO THE FRONT.**

The C-17, now in development, is designed to fly military cargo routinely from the U.S. directly into combat zone airstrips as short as 3,000 feet.

With this short-field capability, plus exceptional ground maneuverability, all Army and Marine Corps battle gear—the biggest tanks, artillery pieces, even helicopters—will move in a rapid, sustained flow right to the fight.

The C-17—it's the fastest way to deliver the goods.

# **MCDONNELL DOUGLAS**





# **THE F-16 FIGHTING FALCON. UNSURPASSED PERFORMANCE.**

A specially configured F-16C for air defense and selected air-to-ground missions has been offered to the U.S. Air Force for a flyaway cost of \$9.7 million. Cost and performance of this superb fighter are guaranteed.



**GENERAL DYNAMICS**



## Real-world systems highlight AFA's Aerospace Development Briefings and Displays.

*Reflections of the Aerospace Briefings and Displays at the AFA Convention. More than 100 corporations and their divisions set up exhibits.*

# Defense on Display

BY JAMES P. COYNE  
SENIOR EDITOR



**T**HE aerospace business is dynamic, diverse, wide-ranging, and full of vitality. Nowhere was this more evident than at this year's popular AFA annual Aerospace Development Briefings and Displays.

In Washington, under one roof, and concentrated in 1.3 acres of floor space and three days in September, the international aerospace community displayed its products and briefed its accomplishments and proposals for the future. Almost 8,000 people toured the three huge exhibit halls. Formal briefings, limited to a total audience of 4,600 by space considerations, were fully subscribed.

Visitors were reminded of recent solid accomplishments—delivery of the first operational B-1B to the Air Force, first flight of the new C-5B airlifter, successful launch of the country's first antisatellite (ASAT) system, and the string of successful tests of the Advanced Medium-Range Air-to-Air Missile (AMRAAM). They were also told of upcoming advancements in both space and the atmosphere, the former in-

cluding laser guns and better navigation satellites; the latter, new aircraft or new versions of existing aircraft, such as the proposed reconnaissance version of the F-16, a supersonic version of the A-7 called the Strikefighter, and a more powerful version of the F-20 Tigershark, which has yet to go into production.

Real hardware was a part of the displays, too. One exhibit included a Ground-Launched Cruise Missile (GLCM) from the US base at RAF Greenham Common in England. It had been successfully flight-tested at Dugway, Utah, and was en route back to its unit. Another included a Northrop NV-151 unmanned aircraft. Other displays included actual hardware as small as antipersonnel munitions the size of softballs up to gun pods and dispensers six to twelve feet long. Full-size AIM-7 Sparrow, AIM-9 Sidewinder, and AMRAAM missiles were on display, as well as an ASAT warhead.

Displays covered the full range of mission areas, including strategic, tactical, and air defense. Many of them featured the importance of

electronics in command control and communications, intelligence, targeting, and reconnaissance.

Rockwell International's North American Aircraft Operations presented a multimedia B-1B Program Readiness Report. Company representatives emphasized that the first B-1B flight, in October 1984, was five months ahead of schedule. The first operational B-1B was delivered on schedule to the 96th Bomb Wing, Dyess AFB, Tex., on June 29, 1985. That was exactly thirty years after the first B-52 strategic bomber had been delivered. Just before the AFA displays and briefings began, Rockwell received USAF contracts totaling \$8 billion for production of the final eighty-two of the 100 B-1B strategic bombers the Air Force plans to acquire.

The company emphasized that the program is still ahead of schedule and below cost. Initial Operational Capability (IOC) for the B-1B is scheduled for August 1986, and the 100th aircraft will be delivered by June 1988. The company will be producing four aircraft per month.



## New Transports

The Lockheed-Georgia Co. updated attendees on the status of the new strategic airlifter, the C-5B Galaxy, which made its first flight September 10. The B is an improved and updated version of the C-5A. Among improvements are a new, strengthened wing (which is also being retrofitted on A models), better, lighter, and longer lasting wheel

pany said, a single KC-10 escorted eight A-7s to Great Britain, refueling them in flight and carrying along their support personnel and equipment. The aircraft did the job of six other tanker and cargo aircraft and saved \$300,000. On a South Pole flight, a company spokesman said, one KC-10 replaced three KC-135s and increased the accompanying payload by eighty percent, saving



*Even the Convention Hall's 1.3 acres of display space couldn't accommodate a real C-5B, but this scale model of MAC's newest heavy airlifter did dominate the Lockheed exhibit.*

brakes, updated General Electric TF39-1C engines, state-of-the-art avionics, and tougher overall construction with aluminum alloys. The first C-5B will be delivered to an operational Air Force unit before the end of December, after a fifty-five-hour flight-evaluation program being carried out by Lockheed.

McDonnell Douglas emphasized the unique capabilities of the KC-10 Extender, which is utilized by the Air Force both as a tanker and as a cargo carrier. A military version of the DC-10, the Extender is entering the Air Force in quantity. The KC-10 is the first tanker that can refuel both receptacle-equipped or probe-equipped aircraft on the same flight. Other tankers have to land to reconfigure from one capability to the other. This means the KC-10 can refuel any front-line Air Force, Navy, or Marine Corps aircraft, on the same flight if necessary.

In addition, the Extender can carry passengers and cargo and still be employed as a tanker. On its first operational deployment, the com-

\$250,000. The KC-10's range is limited only by crew rest considerations because the aircraft itself is refuelable in flight. The Air Force is scheduled to have thirty-nine KC-10s by the end of this year and a full complement of sixty by the end of 1987.

Another large aircraft developed by McDonnell Douglas is the C-17 transport, which has been in full-scale development since last February. In a video presentation, the company showed how the aircraft could be used in deploying a mechanized division in NATO. With existing aircraft, a division would be deployed to a theater of operations by C-141 and C-5. Once in theater, troops and equipment would transfer from the larger transports to smaller C-130s for deployment to rough airfields near the battle area. But oversized equipment would be transported in-theater slowly, by rail, road, or waterway.

By utilizing the C-17, however, a mechanized unit could travel all the way into the forward area with its equipment. This would be possible

because the C-17 can carry almost all of the kinds of outsize cargo airlifted by the C-5 and still utilize short (3,000 feet), relatively undeveloped airstrips. The C-17 has a wingspan of 165 feet, compared with the C-5's 222.8 feet, but its cargo compartment is the same height (13.5 feet) and only one foot narrower (eighteen feet vs. nineteen feet) than the C-5's. (The C-5 cargo space is much longer, though—144.7 feet vs. eighty-eight feet, meaning it can carry a significantly larger payload than the C-17.) The C-17 can utilize smaller strips because each engine will have a thrust reverser that directs the exhaust up and forward from both the fan and the core engine exhaust system. This provides rapid deceleration on the ground and helps stop the aircraft in less than 3,000 feet. The engines can also be reversed in the air, allowing very steep descents into battlefield strips in close proximity to the enemy.

The C-17 can back up a two percent grade with maximum payload aboard without blowing dirt and debris into the air because of the upward exhaust blast deflection. Other aircraft may be backed, too, but on unprepared strips, dirt and debris thrown into the air by the exhaust blast obscure the flight crew's vision and cause foreign object damage (FOD) to the engines. After the aircraft has been unloaded, its four Pratt & Whitney PW2037 engines, with 37,000 pounds of thrust each, will enable the C-17 to get off the ground in well under 3,000 feet with a moderate payload and enough fuel to fly 500 miles. The PW2037 is now in service with several airlines around the world.

The new transport will be able to handle any air transport mission, including personnel and heavy cargo airdrop, low-altitude parachute extraction system (LAPES), and container delivery system (CDS), and it can carry palletized cargo or rolling stock. It can be configured for aeromedical evacuation and has an in-flight refueling capability. It will have a payload capacity of 172,200 pounds. Given the anticipated funding from Congress, the C-17's first flight is expected in 1989, with an IOC of 1992. The Air Force hopes to acquire 210 of them to bring total



airlift capacity up to the required 66,000,000 ton-miles per day.

For a different kind of aircraft, Bell Helicopter Textron updated attendees on development of the Air Force version of the V/STOL joint development aircraft, the V-22. This aircraft is a larger evolution of the XV-15 Tiltrotor, which in turn evolved from the XV-3 "Convertiplane" of the 1950s. The two existing aircraft have prop-rotors that tilt up for vertical takeoff and landings and tilt forward for cruising. The XV-15 has attained more than 300 miles per hour in level flight and 345 mph in a shallow dive. According to Bell, it travels twice as far in half the time and on the same amount of fuel as a helicopter of similar weight.

The Air Force version of the V-22 would be used for special operations, replacing the HH-53 helicopter now used for Special Operations Forces (SOF) support. It will be self-deployable with in-flight refueling anywhere in the world and will be able to carry twelve troops within a 700-mile operating radius. It will be used to insert and extract SOF people in enemy territory at night and in adverse weather. According to a Bell Textron spokesman, the first V-22 flight is scheduled for 1988, with delivery of the first Marine Corps aircraft in 1991. The first USAF version would come on board at the beginning of 1993. However, USAF procurement may be affected by the agreement recently signed between the Chiefs of Staff of the Army and the Air Force, which stated that the Army can assume the rotary-wing lift SOF support mission. (The V-22 is a fixed-wing aircraft, but it does have rotors.) Present USAF plans are to acquire eighty V-22s.

### Improved Fighters

Paramount among fighter displays was a McDonnell Douglas presentation on the versatile F-15 Eagle. Arguably the world's best air-superiority fighter, the Eagle continues to assume new roles, company spokesmen pointed out. The F-15 was selected to be the first Multi-Stage Improvement Program (MSIP) aircraft, and the first MSIP Eagle was delivered last June. It is equipped with an improved central computer, armament control system, tactical electronic warfare sys-

tem, and radar. Further improvements will include equipping it to carry the advanced medium-range air-to-air missile and the anti-satellite system and use the joint tactical information distribution system (JTIDS). These changes will be included on all future F-15s delivered to USAF and will be retrofitted on some already in USAF service.

Latest version of the Eagle is the F-15E dual-role fighter. It will be a long-range interdiction aircraft capable of delivering large ordnance loads accurately in adverse weather and at night. It will retain its exceptional air-superiority capabilities. The first F-15E is scheduled to fly in December 1986. The Air Force plans to acquire 392 of them.

McDonnell Douglas has delivered F-15s to the US Air Force, Israel, Japan, and Saudi Arabia. Japan builds F-15s under license at Mitsubishi Heavy Industries and recently signed an agreement to produce fifty-five more aircraft for a total of 155 Japanese-built F-15s.

In a different exhibit hall, General Dynamics representatives offered a multimedia presentation and display on the versatile F-16 Fighting Falcon. Most interesting was a full-size cockpit of the proposed reconnaissance version of the F-16. A recce F-16 demonstrator will start flying at Edwards AFB, Calif., in January, a company spokesman said. In addition to changing the rear cockpit in an F-16B to a reconnaissance configuration, the recce F-16 would utilize a new reconnaissance and sensor pod with, among other systems, forward-looking infrared (FLIR) radar, electro-optics, and a vertical infrared line scanner. General Dynamics estimates the Air Force would be able to use about 300 of the recce F-16, with an IOC in January 1994. The aircraft could be converted back to an attack fighter, a company representative said, by downloading the recce pod and making some software changes in aircraft computerized systems.

Also on display was a full-size cockpit of the F-16C/D featuring new cathode ray tube (CRT) displays and push buttons. Company representatives discussed at length, in one-on-one conversations with attendees, the new specially config-

ured F-16C that GD is offering as a lower-cost fighter alternative to Northrop's new F-20 Tigershark.

Far across the exhibit area, Northrop showed an F-20 film and briefing that emphasized the performance of the new fighter, especially when equipped in the future with the new General Electric F404 engine with 18,000 pounds of thrust. The company emphasized areas in which the Tigershark is expected to outperform the F-16C. (It should be noted that there are a number of differences in comparison estimates by both companies.) In discussions with attendees, Northrop representatives said they would welcome the congressionally proposed flight competition between the two aircraft, especially if done on a large scale over an extended period of time so that relative maintenance and other support costs could be accurately verified for both aircraft.

The Vought Aero Products Division of LTV Aerospace and Defense, meanwhile, proposes its own new fighter, specially missionized for close air support and battlefield air interdiction (CAS/BAI) through the year 2010 and beyond. Essentially, it would be a modernized, stretched A-7 with a new high-thrust, afterburning turbofan engine, added maneuvering devices, and an updated, semiautomated cockpit. The Vought briefer emphasized the aircraft would have integrated antijam C<sup>3</sup>I and precision navigation equipment, including a ring laser gyro, and be fully capable of night and under-the-weather operation. The aircraft could operate out of a 2,500-foot strip, he said. Flyaway cost for the new fighter variant was estimated at \$4.9 million each, with the first aircraft being delivered to an operational squadron in thirty months.

Grumman's display emphasized a different kind of aircraft, the X-29 advanced technology demonstrator. The X-29 has been flying at Edwards since last December, providing new data on its unique forward-swept wing. NASA is in charge of the testing, with Air Force participation. There are two X-29s in existence, and NASA is using one to investigate the high-speed, low-angle-of-attack side of the aircraft's performance envelope. Grumman is proposing to the Air Force that the



second aircraft be used to explore the other (low-speed, high-angle-of-attack) side of the envelope. An estimated \$6.4 million would be required to install required equipment and instrumentation, a company spokesman said.

Another full-size cockpit was the mockup of the Fairchild Republic T-46 multipurpose trainer. The T-46 ran into development problems in mid-1985, and at the time of its appearance in Washington, its future was uncertain. The trainer would be USAF's first new primary trainer in thirty years. With a pressurized cockpit and twin Garrett F109 turbofan engines, it would be able to operate at altitudes above the weather that sometimes restricts primary training today and have one-third longer endurance than the current primary trainer. The T-46A's operating and maintenance costs would be so low (\$348 per flight hour for the T-46 vs. \$745 for the current trainer) that it is expected to pay back acquisition costs in fourteen years.

Fairchild is also proposing an AT-46 for weapons training, an A-46 for an attack aircraft to be sold through the Foreign Military Sales program, and a forward air controller version. The aircraft is now undergoing testing at Edwards. The Air Force, it is expected, will buy 650 T-46As, with first delivery next year and the program extending through 1992.

British Aerospace displayed materials depicting some of the company's leading efforts, including the Experimental Aircraft Program, which parallels BAe's efforts to help meet the new European Fighter Aircraft (EFA) requirement. With France now out of the EFA program, BAe spokesmen said the program would probably move forward because remaining countries—Great Britain, Germany, Spain, and Italy—are relatively close on what the aircraft should be required to do. Company briefers also described development of the Hawk ground attack/trainer. The US Navy has bought a version for training that McDonnell Douglas will build under license.

#### ASAT and Other Missiles

Undoubtedly, the most interesting missile in the hall was the anti-

satellite system model displayed by LTV, because the successful and much-publicized ASAT test had taken place September 13. The missile is just under eighteen feet long and about twenty inches in diameter. The ASAT miniature vehicle, which is what strikes the targeted satellite, and the missile's upper stage are built by the Vought Missiles and Advanced Programs Division of LTV Aerospace and Defense Co. The upper stage uses an Altair III rocket, which for years has been the fourth-stage propulsion unit of the Scout space-launch vehicle. The lower stage is a modified version of the Short-Range Attack Missile (SRAM), which Boeing Aerospace Co. produces for the Air Force.

In the test, ASAT was launched from an F-15, using tracking information from a ground control station. After the first-stage booster exhausted its fuel and fell away, an inertial guidance system in the Altair guided the ASAT to the proper location in space for interception of the satellite. The cylindrical ASAT, about a foot in height and diameter, used eight infrared telescopes, a laser gyroscope, a computer, and a set of sixty-four thruster rockets to adjust its trajectory. The telescopes are manufactured by the Electro-Optical and Data Systems Group of Hughes Aircraft Co. under contract to Vought. Using its sensors, the ASAT simply repositioned itself to remain in the target's orbital path.

During the test, the ASAT collided with a target satellite, and they destroyed each other at more than 25,000 miles per hour. The accomplishment, a Vought spokesman said, was like "hitting one of several corks floating in the middle of the ocean with a rock."

Among other air-launched missiles were the latest versions of the AIM-7 Sparrow, the AIM-9 Sidewinder, and the Advanced Medium-Range Air-to-Air Missile, all displayed by Raytheon. All three are billed as all-aspect missiles, effective in a front-quarter attack against an airborne target. The Sparrow is radar-guided, while the Sidewinder is an infrared seeker. Both are credited with look-down/shoot-down capability, and they can distinguish between targets and deception devices deployed by targets.

The AMRAAM, slightly smaller than a Sparrow, is also deadlier. It is initially locked on to the target by launch aircraft radar, but is launched in an extended inertial navigation guidance mode. It transitions to active radar homing for the terminal target attack phase. AMRAAM has full digital processing and tracking in range, range rate, and angle. It has demonstrated a look-down/shoot-down tail-aspect attack capability in a high-clutter, low-level environment. The missile has had three guided test launches, all successful. The second launch was from an F-15 flying at Mach 0.9



A group of young Air Force officers are briefed on Avco System Div.'s CBU-97/B Sensor Fuzed Weapon. The SFW, used for destroying tanks, consists of ten BLU-108/B submunitions that are dispensed from the SUU-64/B Tactical Munition Dispenser.



at 16,000 feet above ground level (AGL). The target, a QF-100 drone, was at Mach 0.65 at 1,000 feet AGL. The missile scored a clean "hit" by passing through the lethal zone of the drone. The missile was launched at ninety percent of its maximum launch range for a tail attack. In the third one, the missile was launched from an F-16 flying at Mach 1.2 at 25,000 feet. The missile scored a direct hit in a head-on attack on a drone that was flying at Mach 0.95 at 20,000 feet.

AMRAAM has come under fire in Congress this year, and at one point in the budgeting process, the House cut program funding completely. Money was restored in a joint House/Senate committee meeting. Air Force planning is for development to end in mid-1988 as production starts. IOC would be in mid-1989. Hughes and Raytheon, the missile's suppliers, have been tasked for cost-reduction proposals. Secretary of Defense Caspar Weinberger has proposed a \$7 billion ceiling on the production run of 24,000 missiles, with a maximum cost per missile of \$288,000.

British Aerospace also displayed missiles, including the Advanced Short-Range Air-to-Air Missile (ASRAAM), jointly developed with West Germany, and the Air-Launched Anti-Radar Missile (ALARM). ASRAAM is being pushed as the follow-on to the Sidewinder, and BAe hopes the ASRAAM will be manufactured under license in the US, just as Hughes and Raytheon might expect to see AMRAAM manufactured under license in Europe.

For defense of airfields and other high-value targets, BAe briefed the Rapier air defense missile. USAF has already bought Rapier for protection of airfields in the United Kingdom. Rapier units there will be manned by British crews.

Among other air-to-ground missiles, Texas Instruments provided information on the AGM-88A High-speed Anti-Radiation Missile (HARM). HARM is carried on the USAF's F-4G Wild Weasel, the Navy's A-7E, and the Marine Corps's F/A-18. The Royal Air Force considered HARM a few years ago, but chose ALARM instead for the radar-busting mission.

Both Hughes, the primary sup-

plier, and Raytheon, the second supplier, were dispensing information on the AGM-65D infrared-guided Maverick (IR Maverick). Just before the AFA displays and briefings began this year, the Air Force's Aeronautical Systems Division announced that Raytheon's first successful IR Maverick launch took place at Eglin AFB, Fla. The missile was launched from an F-16B against an M47 tank. It took place in the final stages of a thirty-month qualification program. Upon successful completion of the program, the Air Force plans to purchase 800 IR Mavericks between May 1987 and November 1988. The first competitive buy (Hughes vs. Raytheon) decision will be made in FY '87, with deliveries starting in FY '89. The Air Force plans a total buy of 60,664 IR Mavericks.

The Maverick is the multiservice standoff, rocket-propelled air-to-surface missile for use against hard-point targets like fortifications, bunkers, tanks, parked aircraft, radar, missile sites, and ships. The AGM-65A is a television-guided weapon, as is the updated AGM-65B. The new Marine Corps AGM-65E uses a laser-seeking system that also requires a laser designator. It will be used for close air support of troops in combat. All versions of Maverick provide a high single-pass kill probability because of their accuracy and lethal, high-penetration warhead with selectable fuzing. More than 1,550 Mavericks have been launched, with a direct hit score of eighty-five percent. In 100 actual combat launches, eighty-seven Mavericks scored direct hits on targets.

McDonnell Douglas was extolling the proven performance of the Harpoon antiship missile. Harpoon has been carried on B-52s for some time now. Strategic Air Command was given sea surveillance and antishipping operational missions some years ago and will use the Harpoon to carry out its antishipping mission.

Designated the AGM-84A-1, Harpoon is an over-the-horizon, all-weather missile with a high degree of mission success guaranteed by its low-level cruise trajectory, active radar guidance, counter-countermeasures capability, and shaped warhead design. It weighs more

than 1,100 pounds, including a 488-pound high-explosive warhead. A B-52 can carry eight Harpoons on pylons. When one is launched, it is propelled initially by a rocket motor booster, which separates when the missile has descended to 1,300 feet above the sea, where a turbojet sustainer engine starts. The missile continues to descend until commanded to pull out of the dive by a radar altimeter. It then levels out at cruise altitude and flies at high subsonic speed along the intended flight path to the target. Terminal guidance is by on-board radar.

The Air Force's AN/AVQ-26 *Pave Tack*, a guided bomb delivery system developed and manufactured by Ford Aerospace & Communications Corp., was briefed to attendees. It is a follow-on to *Pave Knife*, an electro-optical system that successfully used laser-guided bombs in the Vietnam War against such targets as bridges. The basic weapon is a laser-guided 1,000- or 2,000-pound bomb, lofted from an attacking aircraft equipped with the acquisition system.

Enclosed in a pod with a forward-looking infrared detector (FLIR), the system integrates the aircraft's navigation, target acquisition, and fire control systems to acquire the target, designate it for the weapon, and then keep the target in view while the aircrew releases the weapon and takes whatever evasive action is required to escape from the target area. The bomb, equipped with an IR seeker, homes on the target. The aircraft's pod, with a rotating sensor head, can even take damage assessment IR pictures while the launch aircraft is heading away from the target. Pilots like it, briefers said, because of the high probability of getting the target on the first pass. The system is operational with the USAF fighter wing at RAF Lakenheath in England and at Seymour Johnson AFB, N. C.

A follow-on to *Pave Tack* is Ford's *Nite Owl* targeting pod. Utilizing the same basic technology and techniques, *Nite Owl* is smaller, more versatile, and more accurate. It has been tested on the USAF F-15 and is carried on the Navy's F/A-18.

### Small Munitions

Several manufacturers, domestic and foreign, briefed a family of



small, scatterable munitions used for launch-and-leave missions for air interdiction, defense suppression, close air support, and passive air defense. Typical of these is the Sensor Fuzed Weapon (SFW) built by the Avco Systems Division of Textron, Inc. SFWs are small weapons that contain even smaller Skeet smart warheads. An aircraft deploys the weapon by parachute over a target area. At a specified altitude, Skeet smart warheads with infrared sensors are deployed and search the area below for targets. Upon locating them, the warheads fire explosively forged penetrator (EFP) projectiles into the targets. In a September test, four Skeets were dropped over a target array of fourteen old M48 tanks. Each warhead detected and hit a separate tank in the successful test. Avco expects the SFW to go into full-scale development this year.

Another weapon is the Combined Effects Warhead (CEW), developed

by Aerojet Ordnance Co. Deliverable as low as 200 feet at speeds up to 700 knots, 202 CEWs are released over the target area by a spinning dispenser. Targets can be a mix of armor, vehicles, and personnel. The CEWs, about a foot long and three inches in diameter, are slowed by a parachute-like "ballute," which stabilizes them. They can be set to go off at a preset altitude, by proximity fuzing (near a target), or on impact. The CEWs have mixed warheads, ranging from antiarmor shaped charges to incendiary "doughnuts." It is a launch-and-leave weapon. The weapon has a guaranteed shelf life of ten years and will soon be in production for the Air Force.

Rockwell International's AGM-130 standoff weapon is a powered version of the GBU-15 guided weapon system. It enables the attacking aircraft to release the weapon out of range of target defenses. It can guide itself to the target or be di-

rected by the aircrew. The weapon can contain a single bomb or carry a mix of runway cratering submunitions and area denial mines.

Another area denial munition is the HB876 canister manufactured by the Ferranti Weapons Equipment Co. in Great Britain. After a runway has been cratered, an aircraft like the Tornado parachutes hundreds of scatterable munitions, each about the size of a soft drink can. Upon landing, a dozen strip-metal "feet" spring out to right each munition. Fuzing is random, some set to go off if the munition is disturbed, others over a period of time. The munition disables vehicles and people trying to repair the runway.

The Defense Systems Division of General Electric briefed the GPU-5/A 30-mm lightweight gun pod, which imparts to any aircraft that can carry it the punch of the A-10 antitank aircraft. The pod, which contains a Gatling gun, is self-contained, with its own pneumatic drive

## Aerospace Industry in Review

### Companies Represented at the 1985 Aerospace Development Briefings and Displays

#### **Aerojet General Corp.**

Recent Accomplishments in High Mass Fraction Solid, Liquid, and Air-Breathing Propulsion and Control Systems

#### **Avco Systems Div.**

Modernizing Strategic and Tactical Weapon Systems—A Progress Report

#### **Boeing Co., The**

Teamwork and Technology in Air Force Programs

#### **British Aerospace**

British Aerospace Technology: Today and Tomorrow

#### **Brunswick Corp.**

Low-Drag LAD for LOCPD, AGM-130B, and SR SOM Applications

#### **Canadair Ltd.**

Canadair CL-227 and Challenger Twin-Turbofan Aircraft

#### **Control Data Corp.**

Reconnaissance Management Systems and Advanced Disk Systems

#### **Eaton Corp.**

Airborne Warning and Control Systems—Electronic Warfare Systems

#### **E-Systems Inc.**

Signals in Space

#### **Ferranti plc**

Advanced Avionic Equipment and Air-Delivered Weaponry

#### **Ford Aerospace & Communications Corp.**

Defense, Space, and Communications Systems

#### **Garrett Corp., The**

An Overview of High Technology Equipment for the Air Force

#### **Gates Learjet Corp.**

Learjet: Turning Concepts into Reality

#### **General Dynamics Corp.**

F-16 Mission Versatility

#### **General Electric Co.**

**Aerospace Business Group**

Air Defense Radars

**Aircraft Engine Business Group**

New Aircraft Engine Technologies

#### **General Motors Corp.**

VLSI/VHSIC Computers and Advanced Engine Technologies from General Motors

#### **Gould Inc.**

Innovation and Quality in Electronic Defense Systems for USAF

#### **Grumman Corp.**

X-29 Advanced Technology Demonstrator

#### **GTE Government Systems Corp.**

SSD Worldwide C<sup>3</sup>

#### **Gulfstream Aerospace Corp.**

Gulfstream Military Aircraft

#### **IBM Corp.**

IBM's Involvement in Tactical and Strategic Avionics and Space Systems

#### **Israel Aircraft Industries Ltd.**

Maintenance and Overhaul of J79 and F100 Engines

#### **ITT Gilfillan**

Tactical Air Traffic Control Systems

#### **Lear Siegler, Inc.**

Flight Management, Weapons Management, Data Collection and Control

#### **Litton Industries, Itek Optical Systems**

Real-Time and Near Real-Time Imaging

Reconnaissance

#### **Lockheed Corp.**

C-5B Rollout—Key Milestone for MAC's Largest Airlifter

#### **Loral Electronic Systems**

Loral: Defense Electronics

#### **LTV Aerospace and Defense Co.**

A-7 Strikelfighter

#### **Martin Marietta**

The Advantages of Advanced Systems

#### **MBB Messerschmitt-Bölkow-Blohm GmbH**

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

#### **McDonnell Douglas Corp.**

**Douglas Aircraft Co.**

C-17—The Airlifter That Makes the Difference

**Douglas Aircraft Co.**

KC-10 Extender—Promises Delivered

**McDonnell Aircraft Co.**

F-15 Eagle Fighter

**McDonnell Douglas Astronautics Co.**

The Meaning of Success

#### **Northrop Corp.**

The F-20 Tigershark

#### **PACCAR Inc., PCF Defense Ind.**

HML Tractor and B-1B Weapons

#### **Raytheon Co.**

Air Force and Raytheon—Partners for Peace

#### **Rockwell International**

**Autonetics Strategic Systems Div.**

Covert Penetration

**Collins Government Avionics Div.**

Producing the Proven GPS

**North American Aircraft Operations**

B-1B Aircraft Program

**North American Space Operations**

Rockwell Space Program Technologies and Program Review

#### **Singer Co., The**

**Kearfott Div.**

Joint Tactical Information Distribution Systems (JTIDS)

**Link Flight Simulation Div.**

Link's Total Training Systems

#### **Sperry Corp.**

High-Performance Avionics Processors

#### **Sundstrand Corp.**

Sundstrand Aerospace and the US Air Force

#### **Teledyne CAE**

Turbine Engine Power: Today, Tomorrow

#### **Texas Instruments Inc.**

Operation TIEG Strike

#### **Thomson-CSF, Inc.**

Thomson Avionics Activities

#### **TRW Electronics & Defense Sector**

Technology Thrusts

#### **United Technologies Corp.**

**Pratt & Whitney/Gov't Products Div.**

Update on Engine Programs for the US Air Force

#### **Sikorsky Aircraft**

USAF's Next-Generation Combat Search and Rescue Helicopter, the Night Hawk

#### **Western Gear Corp.**

The Big Differences in Weapons Delivery

Technology

#### **Westinghouse Electric Corp.**

Westinghouse Defense—Yesterday, Today, and Tomorrow

#### **Williams International**

Small Gas-Turbine Engines



system to turn and fire the four-barrel gun. Firing rate is 2,400 shots per minute. The pod, already in production for the Air Force, can be installed on the A-4, A-7, F-4, F-5, F-15, F-16, F-18, F-20, OV-10, and A-10.

### Targeting Systems

For the first time, Lockheed described specifically how its Precision Location Strike System (PLSS) will operate. Triads of TR-1 high-altitude reconnaissance aircraft, successors to the U-2, will follow separate racetrack orbits outside the combat area, detecting enemy radar emissions. By triangulation, a site is automatically located precisely and identified by radar type. A ground station is notified automatically. Through the ground station, an aircraft carrying a programmable weapon like HARM is dispatched to attack the target before it can be moved or more heavily defended. PLSS is expected to be a

valuable adjunct to USAF forces supporting the Army's new Air-Land Battle doctrine in combat.

A different strike system is Martin Marietta's Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. This system, currently being tested on the F-16, will revolutionize the combat effectiveness of tactical fighter aircraft, especially at night or in adverse weather, according to company spokesmen. A LANTIRN-equipped aircraft will carry a navigation pod and a targeting pod linked to a wide-angle field of view head-up display (HUD) in the cockpit. The aircraft will have a terrain-following capability and will depend on FLIR. Pilot work load, it is believed, will be manageable through the presentation of integrated flight symbology, radar cautions and warnings, and targeting information on the HUD. Principal weapons employed will be laser-guided bombs or missiles like Maverick. Martin

Marietta is selling this system as a force multiplier, and with good reason. Night combat effectiveness is bound to go way up with this system, according to pilots visiting the display area.

The Strategic Defense Initiative (SDI) was not emphasized at this year's AFA briefings and displays as heavily as it was last year, but a plethora of related strategic systems were shown. These included command control and communications, intelligence, B-1 support systems, airborne warning and control, Peacekeeper reentry vehicles, a proposed Midgetman Hard Mobile Launcher Transporter, the ASAT, military satellite communications systems, electronic warfare in space, and the Navstar Global Positioning System.

A visitor to the AFA show had three days to see it all. See it he could, but absorbing all the information available would take much longer. ■

The following companies displayed, but did not hold briefings.

#### Aerospaziale Inc.

AS 30 Laser

#### American Cyanamid Co.

Safety Flares

#### Bell Helicopter Textron

V/STOL Concept—The Tiltrotor XV-15

#### Canadian Marconi Co.

AN/APN-221 Doppler Navigation System

#### Deere & Co.

Stratified Charge Omnivorous Rotary Engine (SCORE™)

#### EDO Corp., Government Systems Div.

Command Control System Applications

#### Electronic Data Systems Corp.

Systems Integration Highlights for Large-Scale Electronics Projects—High-Technology Aspects of the GM/EDS Alliance—A DEERS Capability Demonstration

#### Emerson Electric Co.

Emerson's Latest Aircraft Radar Systems

#### Fairchild Control Systems Co.

Fuel Tank Certifier for Aircraft External Stores

#### Fairchild Republic Co.

Full-Scale Mockup of the AT-46A Multipurpose Trainer Fuselage

#### Fairchild Weston Systems, Inc.

Mini Electronic Countermeasures Jamming Equipment, Electro-Optical Camera Systems, ECCM Training Systems

#### GA Technologies, Inc.

Materials for Advanced Silo Hardening, RAM, Neutral Particle Beams, and Other Advanced Technology

#### GEC Avionics Ltd.

F-16C/D, F-16 LANTIRN, & F-5 HUDs, Cats Eyes, TICM II FLIR, SCADC, MSMS, DCMU, SAFCS Updates

#### Goodyear Aerospace

Goodyear Aerospace—A Major Supplier to the US Air Force

#### Hazeltine Corp.

C<sup>3</sup>I Systems and Products, ECCM for Communications, Tactical Communications, Command and Control Display Systems, and Electronic Identification (IFF)

#### Honeywell Aerospace & Defense Div.

Broad Product Capabilities to Service the US Air Force

#### Hughes Aircraft Co.

Guided Missile and Advanced Avionics Equipment Intermetrics, Inc.

Intermetrics's Aerospace Software Business Areas

#### Jane's Publishing, Inc.

Jane's Yearbooks and Reviews

#### Kaiser Electronics

Latest in Aircraft Electronics for the Tactical Aircraft Cockpit

#### King Radio

Latest in Tactical HF Communications Systems, Hand-Held VHF Radios, and Navigation Systems

#### Litton Industries, Applied Technology Div.

Threat Warning Systems; Signal Processing; Test, Training, and Simulation Systems; Electro-Optical/Acoustic-Optical Technology

#### Litton Industries, Data Systems/Guidance & Control Systems

Command Control and Communications for Offensive and Defensive Air Operations—State-of-the-Art Navigation Systems

#### M.A.N. Truck & Bus Corp.

Wheeled Vehicle Products

#### Magnavox Government & Industrial Electronics Co.

Electronic Products and Systems for Defense

#### Marotta Scientific Controls, Inc.

High-Pressure Hydraulic/Pneumatic Components and Systems From the Conceptual Stage Through Production

#### Morton Thiokol, Inc.

Space Shuttle Solid Rocket Booster, Minuteman, Peacekeeper, SRAM, and the B-1B Rotary Launcher

#### Motorola Government Electronic Group

Demand Assigned Multiple Access (DAMA)

#### Northrop Corp.

##### Defense Systems Div.

Electronic and Infrared (IR) Countermeasures Systems for Aircraft Protection

##### Electronics Div.

MX Missile, Advanced Inertial Reference Sphere (AIRS)

##### Electro-Mechanical Div.

Major Supplier of Passive Sensor and Tracking Systems

##### Precision Products Div.

Precision Inertial Instruments and Associated Subsystems

##### Ventura Div.

NV-151 Unmanned Aircraft

#### Olympus Corp., Industrial Fiberoptics Dept.

Fiberscopes, Borescopes, and Accessories

#### Perkin-Elmer, Optical Group

Electro-Optical Systems and Precision Optics

#### RCA Corp., Aerospace and Defense

Microelectronics, C<sup>3</sup>, and Artificial Intelligence

#### Recon/Optical, Inc., CAI Div.

Next-Generation Tactical Reconnaissance Systems

#### Rediffusion Simulation, Evans & Sutherland

Computer-Generated Imagery

#### Rockwell International

##### Collins Defense Communications

Miniature Receive Terminal, a VLF System for US Strategic Bomber Forces

##### Missile Systems Div.

GBU-15 Cost-Reduction Story

##### Rolls-Royce

Military Aircraft Engines

##### Roim MIL-SPEC Computers

Full Line of MIL-SPEC Computer Products

##### Science Applications International Corp.

SAIC's Capabilities as the "Unique System Integrator"

#### Smiths Industries Aerospace & Defence Systems, Inc.

Aircraft Flight Deck CRT Displays

#### Standard Manufacturing Co., Inc.

Trailing Arm Drive (TAD) Vehicles

#### Syscon Corp.

Information and Products Related to System Integration Capabilities in the Wargaming and Simulation Arena

#### Systron Donner, Safety Systems Div.

Reliable Engine Fire and Overheat Detectors Available for Any Aircraft

#### Turbomach, Div. of Sundstrand Corp.

T-62T-40-1 APU for Night Hawk Helicopter

#### United Airlines Aircrew Training, Inc.

Dedication to Excellence in Aircrew Training and Support of the Air Force Mission

#### United Technologies Corp.

##### Hamilton Standard

Advanced Systems for Flightline Electrical and Air Start Power Plus Conditioned Air

##### Norden Systems

Advanced Multimode Radar for Fighter Aircraft

##### Vega Precision Laboratories, Inc.

Radar Command and Control Systems and Reconnaissance Tracking and Control Systems for RPVs and Target Drones

#### Vitro Corp.

Major Systems Engineering and Technical Services for the Military



# AWARDS AT THE 1985 AIR FORCE ASSOCIATION NATIONAL CONVENTION

## AFA NATIONAL AEROSPACE AWARDS

**The H. H. Arnold Award** (AFA's highest annual award)—To **Gen. Bernard W. Rogers, USA**, Supreme Allied Commander, Europe, SHAPE, Belgium, for his brilliant and effective leadership of the military forces of the United States and our NATO allies in maintaining the peace and freedom of Western Europe and for his prescient strategic initiatives in NATO planning that will enable US and allied airpower to exploit its full potential in the deterrent posture of Allied Command Europe.

**The David C. Schilling Award** ("The most outstanding contribution in the field of Flight")—To Astronaut **Capt. Bruce McCandless II, USN**, Lyndon B. Johnson Space Center, Houston, Tex., for his personal courage and pioneering spirit in undertaking and mastering untethered individual spaceflight from the United States Space Shuttle *Challenger*, thus becoming history's first "human satellite."

**The Theodore von Kármán Award** ("The most outstanding contribution in the field of Science and Engineering")—To **Maj. Henry L. Pugh, Jr., USAF**, Air Command and Staff College, Maxwell AFB, Ala., for his exceptional performance and superb professional achievements in planning, implementing, and managing vital Air Force basic research programs of national renown that involve the advanced scientific complexities of spaceborne multi-megawatt power generators, energy storing, and particle beam and plasma projectile generation.



AFA President Marty Harris presents the von Kármán Award to Maj. Henry L. Pugh, Jr., USAF, for his work with spaceborne energy storage and generation research projects.

**The Gill Robb Wilson Award** ("The most outstanding contribution in the field of Arts and Letters")—To **Ted Koppel**, ABC News, Washington, D. C., for his sustained objectivity and exceptional performance as moderator and commentator for the American Broadcasting Company's nationally televised "Nightline" program—a program that has warranted the interest, confidence, and respect of the American viewing public and that has brought national recognition and well-deserved accolades to its founding moderator.

**The Hoyt S. Vandenberg Award** ("The most outstanding contribution in the field of Aerospace Education")—To the **Chief Master Sergeants of the Air Force**, for their unique and pervasive role, extending over two decades, in furthering the full range of aerospace education objectives within the entire United States Air

Force and throughout the civil communities of the nation. The eight unique leaders who have occupied this singular position have been selfless in their devotion to the education and inspiration of millions of young Air Force men and women and tireless in their efforts to explain their educational needs and to champion their preparation for excellence.

**The Thomas P. Gerrity Award** ("The most outstanding contribution in the field of Logistics")—To **Col. Clifford W. Bingham, USAF**, Wing Deputy Commander for Maintenance, 48th Tactical Fighter Wing, RAF Lakenheath, UK, for his superior technical expertise and unique managerial skills as Deputy Commander for Maintenance of the 48th Tactical Fighter Wing—the Air Force's largest F-111 maintenance complex. Colonel Bingham's total insight and dynamic qualities in all aspects of maintenance management enabled his unit to establish the best worldwide sortie rates, maintain outstanding reliability, and sustain outstanding unit maintenance effectiveness while deployed to three separate operational locations, plus home base.

**The Veterans Administration Employee of the Year Award**—To **Edith B. Fowler**, Supervisory Veterans Benefits Counselor, VA Regional Office, Jackson, Miss. Through compassion, dedication, and constant readiness to "go the extra mile" as a Supervisory VA Regional Veterans Benefits Counselor, her efforts have wrought a positive change in the lives of hundreds of veterans, dependents, and beneficiaries.

**The Juanita Redmond Award for Nursing**—To **Capt. Cynthia L. Murray, USAF**, Quality Assurance Coordinator, USAF Regional Hospital, MacDill AFB, Fla., for her sustained professional excellence in all aspects of her nursing duties, leading to her selection as Quality Assurance Coordinator at the USAF Regional Hospital, MacDill AFB, Fla. She redesigned and upgraded all aspects of the Quality Assurance program and effected many improvements in the overall hospital Infection Control program.

**The General Edwin W. Rawlings Award for Energy Conservation**—To **Clarence W. Fisher**, Logistics Management Specialist, 6515th Test Support Squadron, Edwards AFB, Calif., and **SSgt. Steven W. Beattie, USAF**, Civil Engineering Control Systems Technician, 410th Combat Support Group, K. I. Sawyer AFB, Mich., for their outstanding achievements in energy conservation within the United States Air Force.

## AFA CITATIONS OF HONOR

**Capt. Frank E. Anderson, USAF**, Assistant Weapons Officer, 312th Tactical Fighter Training Squadron, Luke AFB, Ariz., for his effective and innovative management as an expert in electronic warfare operations. His platform instructor program for F-16 pilots' electronic combat requirements is the model for all of TAC. He was responsible for flight check and postflight procedures to eliminate misfires in the F-16 chaff dispenser systems. Through his tireless efforts, successful solutions to complex technical problems have resulted in dramatically improved electronic warfare capabilities for the tactical air forces.

**William T. Cross**, Launch Control Advisor, Peacekeeper Flight Test Program, Vandenberg AFB, Calif., for his superior performance as a lead engineer and Launch Control Advisor for the Peacekeeper ICBM flight test program. His exceptional launch experience gained over twenty-three years and his unusual determination, dedication, and unique knowledge have contributed immeasurably to the outstanding test success of this vital national program.

**MSgt. Judith A. Doran, USAF**, Leadership and Management Development Center, Maxwell AFB, Ala., for her professional and lasting contribution to the Air Force base-level NCO Preparatory Course program. Her development of an entirely new and more comprehensive instructor course has turned out better-pre-



pared NCO instructors in professional military education who, in turn, have improved their training of thousands of junior enlisted leaders Air Force-wide. She is a teacher of teachers, with an enviable record of achievement.

**Col. James A. Fain, USAF**, Strike Systems Program Director, ASD/RWN, Wright-Patterson AFB, Ohio, for his brilliant managerial accomplishment as Director of the LANTIRN System Program Office, including innovative production contract procedures, comprehensive management of system development, and exceptional systems evaluations that have resulted in initiation of production of a critically needed navigation pod to enhance the warfighting capability of USAF's tactical air forces.

**MSgt. John P. Fedarko, USAF**, 305th Air Refueling Wing, Grissom AFB, Ind., for his exceptional record of performance as the Noncommissioned Officer in Charge of the Fuel System Repair



**AFA Board Chairman David Blankenship presents the Schilling Award to Astronaut Capt. Bruce McCandless II, USN, for his work with the Manned Maneuvering Unit (MMU).**

Shop, 305th Air Refueling Wing. He effectively reduced KC-135 aircraft downtime to near zero by diligent resolution of fuel and water injection system problems and an innovative Fuel Cell Preventive Maintenance Program. He is the driving force behind preventive maintenance to eliminate recurring fuel leakage. His program now has Air Force-wide application.

**Lt. Col. John S. Graham, USAF**, 16th Surveillance Squadron, Shemya AFB, Alaska, for his outstanding dedication and brilliant foresight in identifying the urgent need for an integrated, comprehensive national space intelligence system and in developing the statement of need, to include a Space Operational Intelligence Center for intelligence fusion. His forceful and dynamic advocacy has assured that a Space Operational Intelligence System will soon provide for integrating the unique intelligence required for effective space defense.

**Dr. Richard P. Hallion, Jr.**, Historian, Air Force Flight Test Center, Edwards AFB, Calif., for his exceptional talents and tireless activities as author, orator, moderator, and historian in explaining the profession of arms, the heritage of USAF, and how its equipment was designed, built, tested, and deployed. He was technical advisor to the television series "Call to Glory," consultant to NASA and the National Geographic Society, and contributor to the Project Warrior program; countless thousands have benefited from his exceptional talents and his selfless sharing of his expertise.

**Shiro Ito**, Chief of Circuit Management, 1956th Information Systems Group, Yokota AB, Japan, for his unique and critical contributions to United States and allied communications systems in the Northwest Pacific theater. Mr. Ito's bilingual capability and extensive technical knowledge of all US and allied long-haul communications systems in this theater have made him invaluable as an interpreter of both language and culture. His outstanding dedication to duty and his exceptional talents have provided vital links in the US-Japan mutual defense plan.

**Capt. Craig Z. Lowery, USAF**, Hq. Space Command, Peterson AFB, Colo., for his sustained technical excellence and skill in managing complex operational support for a diversity of space projects

susceptible to interference by orbiting satellites, space debris, and unintentional laser illumination. He has designed operational software and algorithms for satellite safety and survivability and is responsible for the tracking and impact prediction procedures used by space operations crews.

**Donald J. Murphy**, Directorate of Metrology, Aerospace Guidance and Metrology Center, Newark AFS, Ohio, for his keen insight into complex and technical measurements and outstanding work with standards at the Aerospace Guidance and Metrology Center. His modernization of precision modulation standards has resulted in improved accuracy and reliability in instrument landing systems. This achievement alone will have significant impact on the safety of military and commercial aviation, and his exceptional work will have widespread application to many other areas involving amplitude modulation.

**MSgt. William Pone, USAF**, 60th Organizational Maintenance Squadron, 60th Military Airlift Wing, Travis AFB, Calif., for his superb performance as Line Chief of the 60th Organizational Maintenance Squadron and his excellent contribution to the C-5A and C-5B technical order rewrite program. His unique experience and sustained excellence in maintaining the C-5 aircraft prompted his selection for this task. Sergeant Pone's dedicated leadership and technical proficiency have established him as a true expert with the C-5, and his work with the technical order rewrite is certain to save hundreds of work-hours by maintenance technicians, with no compromise to safety or reliability.

**TSgt. Clarence W. Ranow, USAF**, 6595th Shuttle Activation Task Force, Vandenberg AFB, Calif., for his sustained excellence, personal bravery, and superb engineering and managerial performance as Test Operations Leader at the West Coast Space Shuttle Launch Site. NASA requested Sergeant Ranow by name to act as Launch Pad Operations Leader on Space Shuttle Missions 6 and 8. His personal courage during a fire at the launch complex saved the lives of four of his coworkers. Sergeant Ranow's unique engineering and managerial expertise is directly responsible for the solution of several difficult technical problems at the Space Shuttle Launch Complex at Vandenberg AFB that saved hundreds of thousands of dollars.

**William J. Reynolds**, Waldorf, Md., for his unique contribution to our aerospace heritage by coupling his combat fighter pilot experiences and his unique artistic talents to produce a varied gallery of military aviation art. His exceptional portrayals of aircraft and events have given a significant visual dimension to the rich aeronautical history of our nation.

**SrA. Beverly R. Sargent, USAF**, 13th Air Force Special Communications Terminal, 1961st Information Systems Group, Clark AB, Philippines, for her superb professional skill and unique achievements as a telecommunications operations specialist that have resulted in unprecedented, error-free communications records. Her technical knowledge and innovative leadership have resulted in improved publications procedures, improved facility effectiveness, and dramatically reduced operational error rates.

**Maj. Ronald W. Shoulars, USAF**, 3247th Flight Test Squadron Operations Officer, Armament Division, AFSC, Eglin AFB, Fla., for his superb airmanship and sustained managerial excellence as Chief of Test Operations Branch during the munitions and avionics systems testing of F-16s and F-4s. The highly successful testing of a wide variety of armament and munitions for both F-4s and F-16s contributed significantly to the development and certification of weapons that will enhance the combat capability of all the tactical air forces.

**The A-7 Fighter Workcenter Team**, Oklahoma City Air Logistics Center, Tinker AFB, Okla., for their outstanding performance in rejuvenating the combat effectiveness of the entire USAF fleet of 349 A-7s despite a devastating main depot fire that forced relocation of the entire workcenter to alternate makeshift facilities. The Workcenter Team's innovative operating system has contributed greatly to their outstanding success in meeting delivery dates with an unprecedented defect rate of less than one-half percent per aircraft. (Accepted by James Dupy, Aircraft Production Branch Deputy Chief.)

**419th Tactical Fighter Wing**, Hill AFB, Utah, for excelling in all aspects of the major conversion from the last F-105 unit to the first F-16 wing in the Air Force Reserve. In addition to its accident-free record and operational success in this unique conversion, the Wing's creative publicity program for the F-16 arrival



and F-105 farewell reached a national audience of millions and sparked widespread recognition and public support for the personnel and mission of the United States Air Force Reserve. (Accepted by Col. John J. Closner III, Commander.)

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#### AFA MANAGEMENT AWARDS FOR LOGISTICS

**AFA Executive Management Award**—To **Maurice LeBlanc**, Deputy Chief, Propulsion Division, Oklahoma Air Logistics Center, Tinker AFB, Okla., for his outstanding contributions to management while assigned to Air Force Logistics Command.

**AFA Middle Management Award**—To **L. H. Riggs, Jr.**, Deputy Manager for Logistics, Aircraft and Trainer Aircraft Engines, Wright-Patterson AFB, Ohio, for his outstanding contributions to management while assigned to Air Force Logistics Command.

**AFA Junior Management Award**—To **Capt. Gerald T. Frey**, Chief, NATO AWACS, Geilenkirchen AB, Germany, for his outstanding contributions to management while assigned to Air Force Logistics Command.

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#### AFA MANAGEMENT AWARDS FOR SYSTEMS

**AFA Distinguished Award for Management**—To **Lt. Gen. William E. Thurman, USAF**, Vice Commander, Hq. AFSC, Andrews AFB, Md., for his outstanding contributions to management while assigned to Air Force Systems Command.

**AFA Meritorious Award for Program Management**—To **Col. Stephen M. McElroy, USAF**, Assistant Deputy Chief of Staff, Hq. AFSC, Andrews AFB, Md., for his outstanding contributions to management while assigned to Air Force Systems Command.

**AFA Meritorious Award for Support Management**—To **Col. Jack B. Coleman, USAF**, Vice Commander, Western Space and Missile Center, Vandenberg AFB, Calif., for his outstanding contributions to management while assigned to Air Force Systems Command.

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#### AIR NATIONAL GUARD AND AIR FORCE RESERVE AWARDS

**The Earl T. Ricks Award**—To **Maj. James F. Barnette, USAF**, 112th Tactical Fighter Group, Greater Pittsburgh IAP, Pa., for his outstanding airmanship and demonstration of the highest degree of flying skill and courage while flying an A-7D over the Ohio Valley area. He elected to stay with his disabled aircraft until it cleared a populated area, even though this necessitated a nighttime ejection. This heroic action undoubtedly saved many lives.

**The Air National Guard Outstanding Unit Award for 1985**—To the **145th Tactical Airlift Group**, Charlotte/Douglas Municipal Airport, Charlotte, N. C. (Accepted by Col. William T. Bundy, Jr., Commander.)

**The Air Force Reserve Outstanding Unit Award for 1985**—To the **452d Air Refueling Wing**, March AFB, Calif. (Accepted by Brig. Gen. William B. McDaniel, Commander.)

**The President's Award for the Air Force Reserve**—To a crew of the **302d Tactical Airlift Wing**, Peterson AFB, Colo. (Accepted by Maj. John H. Taylor, Jr., Aircraft Commander.)

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#### SPECIAL CITATIONS AND OTHER AWARDS

**Keith Ferris**, Morris Plains, N. J., for a lifetime of exceptional artistic achievement, culminating in his preeminent position as our nation's aviation artist *extraordinaire*. AFA salutes his achievements and his talents as artist, sculptor, inventor, and historian. His generous support of the Air Force Association and the programs of the Air Force and the Society of Illustrators has made lasting contributions to the history of military aviation.

**The Stuart R. Reichart Award for Lawyers**—To **Col. William P. Rudland, USAF**, Director of Contract Appeals, Hq. Air Force Contract Law Center, Wright-Patterson AFB, Ohio, for outstand-

ing achievements in the field of law within the United States Air Force.

**The Paul W. Myers Award for Physicians**—To **Maj. Edwin J. Whitney, USAF**, Surgeon General's Consultant for CARE Program, Brooks AFB, Tex., for his exceptional expertise in the field of internal medicine and especially for his development of a comprehensive preventive cardiovascular program. This program, originally developed for Laughlin AFB, is being disseminated Air Force-wide, and Major Whitney is personally instituting his preventive cardiology programs throughout the Air Force.

**The General Curtis E. LeMay Strategic Aircrew Award**—To **Crew S-55**, 529th Bombardment Squadron, 380th Bomb Wing, Plattsburgh AFB, N. Y., as the best overall aircrew in Strategic Air Command. (Accepted by Lt. Col. Paul E. Murr, Aircraft Commander.)

**The General Thomas S. Power Strategic Combat Missile Crew Award**—To **Crew S-200**, 308th Strategic Missile Wing, Little Rock AFB, Ark., as the best overall combat missile crew in Strategic Air Command. (Accepted by Capt. Robert E. Servant, Missile Crew Commander.)

**The Lieutenant General William H. Tunner Aircrew Award**—To a crew of the **8th Military Airlift Squadron**, 62d Military Airlift Wing, McChord AFB, Wash., as the best overall aircrew in Military Airlift Command. (Accepted by Capt. Patrick Moran, Aircraft Commander.)

**The Lieutenant General Claire Lee Chennault Award**—To **Maj. William F. Hodgkins, USAF**, USAF-CF Officer Exchange Program, Ogdensburg, N. Y., as the outstanding aerial warfare tactician.

**The Chief Master Sergeant Dick Red Award**—To **CMSgt. Burl E. Summers**, 134th Air Refueling Group, Tennessee ANG, McGhee Tyson Airport, Knoxville, Tenn., as the outstanding Air National Guard aerospace maintenance technician.

**The General Jerome F. O'Malley Award**—To **Crew E-05**, 1st Strategic Reconnaissance Squadron, 9th Strategic Reconnaissance Wing, 14th Air Division, Beale AFB, Calif., as the best reconnaissance crew in the United States Air Force. (Accepted by Maj. Robert F. Behler, Aircraft Commander.)

**Outstanding USAF Personnel Manager of the Year Award**—To **Capt. Lisa A. Goldner, USAF**, Chief of Personnel Utilization, CBPO, Kadena AB, Japan, for her outstanding knowledge and demonstration of professional skills in creating and applying unique and effective management solutions to personnel programs while assigned as Chief of Personnel Utilization, CBPO, Kadena AB, Japan.

**The Verne Orr Award**—To the **485th Tactical Missile Wing**, Florennes AB, Belgium, for the best utilization of human resources in USAF. (Accepted by Col. David C. Reed, Commander.)

**The Outstanding ROTC Cadet of the Year Award**—To **Thomas J. Elton**, AFROTC Detachment 410, The College of St. Thomas, St. Paul, Minn.

**The Outstanding CAP Cadet of the Year Award**—To **Erik C. Nielsen**, Gadsden, Ala.



**The first General Jerome F. O'Malley Award for the best reconnaissance crew in USAF was presented to Crew E-05 of the 1st SRS, 9th SRW, Beale AFB, Calif. Maj. Robert Behler accepted the Award from AFA Board Chairman David Blankenship.**



An Amraam missile bored through radar clutter to intercept a drone aircraft target in the second guided launch of the full-scale development program. The test firing was the third consecutive launch of the advanced medium-range air-to-air missile, under development by Hughes Aircraft Company for the U.S. Air Force and Navy. An F-15 launched the missile in a "look-down, shoot-down" tail-aspect attack while flying at Mach 0.9 approximately 16,000 feet above the desert floor at White Sands Missile Range. The QF-100 target flew at Mach 0.7 only 1,000 feet above the ground. The Amraam flew the first part of its flight under control of its on-board inertial reference unit, using target coordinates provided in prelaunch by the F-15's Hughes APG-63 radar. The missile then switched to its own active radar for guidance and tracked the drone through the heavy ground clutter to intercept.

For the first time, information from NATO's air defense network and AWACS aircraft can be correlated into a single air picture so commanders on the ground can more accurately assess situations and direct fighter interceptors against intruders. The Airborne Early Warning/Ground Environment Integration Segment (AEGIS) relays radar data from AWACS aircraft to more than 40 ground stations throughout Europe. Computers integrate the data with ground-based radar data and feed the information to consoles in NATO Air Defense Ground Environment (NADGE) centers. The key component in AEGIS is a jam-proof communications link known as the Joint Tactical Information Distribution System (JTIDS), which provides voice and digital communications between the aircraft and ground centers. The JTIDS Class 1 terminals, provided by Hughes, spread message transmissions in time and frequency to enhance capacity and jam resistance well beyond conventional systems.

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

Malaysia is guarding its skies against intruders with a new automated air defense system. The Malaysian Air Defense Ground Environment (MADGE) detects and identifies all aircraft approaching Malaysian airspace. It uses advanced data processing equipment, large-screen displays, new communications systems, and a modern three-dimensional long-range radar. Should aircraft be identified as threats, commanders can order fighter interceptors to take defensive actions. The Hughes system forwards target data from radars located throughout the nation to command centers, where computers process and display information.

A device that evaluates military lasers instantaneously is giving industrial and government laboratories new capabilities for measuring the performance of lasers. The computerized system, called an automatic laser test set (ALTS), monitors and stores information such as beam energy, divergence, misalignment, pulse shape, pulse spacing, and pulse stability during a laser's warm-up period. It detects variations that cannot be determined by conventional techniques, which use electro-optical/mechanical apertures and take an average of multiple pulse measurements. By evaluating variations from pulse to pulse, engineers can improve future laser system requirements and specifications. Hughes supplies ALTS to the U.S. Army.

For more information write to: P.O. Box 45068, Dept. 75-3, Los Angeles, CA 90045-0068



# Deliverance at Kham Duc

With skill and courage and aided by a series of miracles, Joe Jackson pulled off one of the most daring rescues of the Vietnam War.

BY JOHN L. FRISBEE  
CONTRIBUTING EDITOR

**A**LUMBERING, unarmed Fairchild C-123 transport is not exactly the aircraft a pilot would choose for a rescue attempt on an enemy-held airstrip—especially a pilot like Lt. Col. Joe Jackson, who had twenty years in fighters and U-2 reconnaissance planes. As a matter of fact, it's hard to think of any bird that would have made such a venture attractive, but that's exactly what Joe Jackson, in the left seat of C-123 No. 542, was about to undertake.

On May 12, 1968, Jackson and his crew—Maj. Jesse Campbell, TSgt. Edward Trejo, and SSgt. Manson Grubbs—had been on a normal trash-hauling run combined with an annual proficiency check when they were recalled to their base at Da-nang. A Special Forces camp at Kham Duc, about forty-five miles to the southwest, had been under siege for three days. C-123s and C-130s were frantically evacuating some 1,000 troops from the surrounded camp. Joe Jackson was dispatched to help.

As he orbited at 9,000 feet in a holding pattern, the scene below was one of increasing devastation as the Viet Cong moved closer to the camp's 4,000-foot airstrip. Through the marginal and rapidly deteriorating weather, Jackson could see fires, exploding ammunition dumps, and wrecked aircraft lying just off the runway. The strip itself was littered with debris and blocked at midpoint by a burning helicopter. There were enemy gun positions a few hundred feet beyond the chopper.

The thought of flying into that grisly scene in a slow-moving C-123 that even an entry-level gunner should be able to hit was not one to gladden the heart. Then the future brightened, though only briefly. Word came that the last Special Forces survivors had been evacuated. Time to head for home—until it was discovered moments later that a three-man combat control team had been overlooked. They were somewhere near the runway, but could not be contacted by radio.

The airborne command post asked a C-123 ahead of Jackson to attempt a pickup. Supported by friendly fighters, the C-123 pilot went in under fire, failed to locate the control team, and firewalled his throttles. Just as he lifted off, the men were spotted in a ditch near the burning helicopter, but it was too late to stop. The C-123, low on fuel, returned to its base.

"Would No. 542 make a last try to rescue the team?" Without hesitation, fighter pilot Jackson peeled off from 9,000 feet in a most unconventional approach for a transport—a steep dive with full flaps to reduce

exposure to enemy fire. Somehow, though he exceeded flaps-down speed by a wide margin, the flaps held. A minor miracle.

Jackson leveled off just above the treetops, touched down at the end of the strip, and stood on the brakes. He couldn't reverse props, since that would automatically cut off the two small auxiliary jet engines hung on the wings. He would need them for takeoff, if skill and good fortune got them that far.

No. 542 skidded to a stop just short of the burning helicopter. Jackson swung his aircraft around, preparing for an emergency takeoff, as the three controllers dashed across the runway and were hauled aboard. As he looked down the 2,200 feet of debris-littered strip, he had an unpleasant surprise. Coming toward 542 was a 122-mm rocket, fired at zero elevation. It skidded off the runway, came to rest ten yards from the plane, and failed to explode. A major miracle.

Ten seconds after Jackson's plane began to roll, a barrage of mortar shells hit where he had stopped to pick up the team. Ahead, the runway was crisscrossed by tracers fired from both sides. No one aboard No. 542 expected to make it, but of the thousands of rounds fired at the C-123, not one found its mark. A supreme miracle.

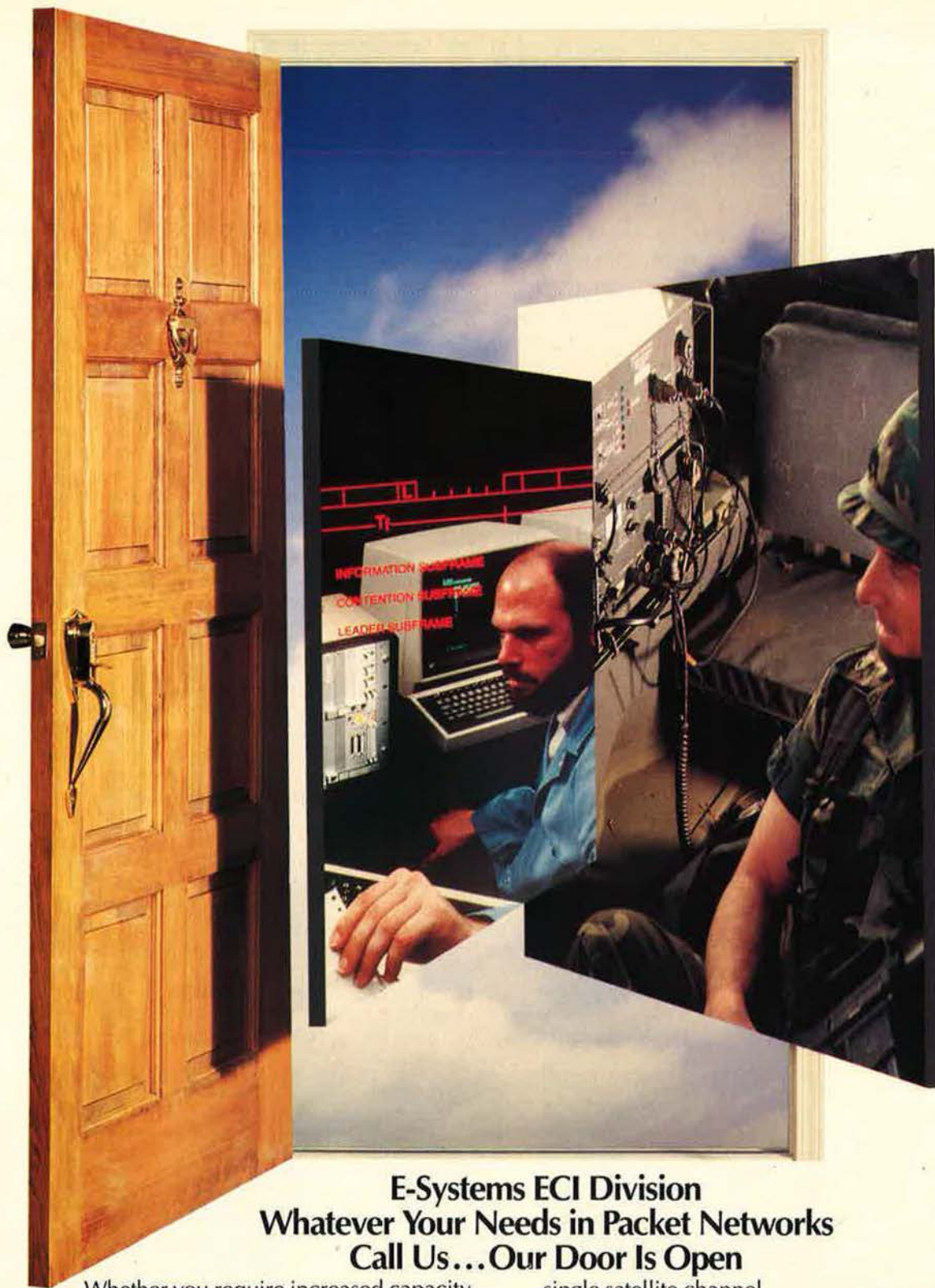
At 1730 hours that day, two hours after he had entered his holding pattern near the camp, Joe Jackson, his crew, and the three rescued men landed safely at Da-nang.

On January 16, 1969, in one of his last acts before leaving the White House, President Lyndon Johnson presented the Medal of Honor to the pilot of No. 542. Along with his own skill and valor, Joe Jackson must have had a second Copilot when he volunteered for that desperate attempt to save three abandoned men, but he had no way of knowing that when he dropped his flaps and started a screaming, vibrating dive toward seemingly certain disaster. ■



*Lt. Col. Joe Jackson became the fifth Air Force man to win the Medal of Honor in Vietnam when he used a C-123 to rescue a combat control team at Kham Duc.*





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# THE BULLETIN BOARD

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

## Laughing All the Way To the Brig

In World War II it was said that "loose lips sink ships," referring to the need for those who knew of troopship movements to keep the information to themselves, lest the enemy set up torpedo welcomes.

Today, DoD has reminded all military travelers that wisecracking passengers can find themselves in serious trouble for making comments in airports regarding terrorist activity.

Transportation officials cite the recent case of two soldiers turned over to airport security officials for "questionable comments" they made while passing through security checkpoints at Charleston International Airport. Army officials later took follow-up action.

Officials note that in view of current worldwide terrorist activities, even comments made in jest concerning hijacking or bombing will not be tolerated. Air Force legal officials say that people who make such comments could be court-martialed and prosecuted in a US District Court. Federal laws prohibit conveying false information about destroying, hijacking, or carrying weapons into an aircraft or interfering in any way with aircraft operations.

An Air Force Judge Advocate General officer says the laws were specifically written to put a stop to such comments as "Ho, ho, you didn't find a bomb" or "Next stop—Cuba!" Even comments that no one could be expected to believe could result in a substantial fine or confinement for up to four months. Comments considered "malicious" could earn a dishonorable discharge and up to five years in prison.

If the so-called joke is made during flight and someone believes it, the "jokester"—whether military or civilian employee—may face a fine of up to \$100,000 and twenty years in prison.

If tempted, keep in mind that silence is golden. You could be laughing all the way to the stockade.

## Passing of an Era

CMSgt. Gordon R. Newman, Senior Enlisted Advisor of the 910th Tactical Airlift Group (AFRES), Youngstown Municipal Airport, Ohio, recently retired and, as he stepped down, took with him the title of the Air Force enlisted person with the most years of service.

The Chief retired with forty-two and a half years of service—most of it in the Air Force Reserve. Air Force offi-

cial at the Air Force Military Personnel Center in San Antonio, Tex., confirmed that he held seniority over all enlisted people on active duty or in the Reserve or Guard.

Still in high school when he enlisted in the Army Air Forces in 1943, the football and basketball star went off to basic training at a real "hardship post"—Miami Beach, Fla. "My first contact with the Army was at a tourist hotel," he recalls. During those wartime years, the Miami Beach hotels were pressed into service to handle the flood of trainees.

He later served as a gunner on a B-17. Looking back, the Chief believes that the biggest change he has witnessed as the Air Force went from the "brown-shoe" days to today has been the total acceptance of the reserve forces as an integral part of the overall defense posture.

As a Reservist, he also found time to put in a thirty-four-year career with Conrail, and he has retired concurrently from that post. This will give him time to devote to his family. Of the six children he and his wife, Norma, have brought into the world, three are in the service—two in the Air Force and the other in the Army.

Meanwhile, the officer ranks has lost, by retirement, the person who



Maj. Frank Purdy Lahm II (left) of the 44th Strategic Missile Wing, Ellsworth AFB, S. D., and Lt. Col. Norman Wolfe, Los Angeles AFS, Calif., admire the new bronze bust of Brig. Gen. Frank P. Lahm at the dedication of the Mansfield-Lahm Airport terminal in Mansfield, Ohio. Major Lahm is the grandson and Colonel Wolfe is the nephew of General Lahm, who, in 1909, became one of the first military aviators.



During a visit to the Air Force Space Technology Center at Kirtland AFB, N. M., US Sen. John H. Glenn, Jr. (D-Ohio), reviewed and autographed Jason A. Sherlock's research paper on the February 1962 Mercury mission in which then-Marine Colonel Glenn became the first American to orbit the earth. Jason is the son of Lt. Col. Harry Sherlock, a division chief at the Center. (USAF photo by SrA. David W. Noell)



holds the distinction of being the oldest new second lieutenant to graduate from the Air Force Academy.

Col. Arthur K. Shumate, who wound up his career as commander of the Air Force Contract Management Division at the Boeing Co. in Seattle, Wash., was in the first graduating class of the Academy in 1959. At that time, he was one month shy of being twenty-six years old.

A native of St. Cloud, Fla., the Colonel had been attending the University of Florida at Gainesville when the Academy first opened its doors—actually at Lowry AFB, Colo.—in 1955. He subsequently earned pilot's wings and flew O-1s as a forward air controller in Vietnam, racking up more than 1,000 hours and 675 combat sorties.

The Air Force has not yet determined who on active duty now succeeds to the incumbency of either of these distinctions.

### VA Hospitals Graded by GAO

In Fiscal Year 1984, the VA spent more than \$8 billion on health care, and this amount could rise sharply in the next two decades as millions more veterans become eligible for free health care. Nearly two of every three males over age sixty-five in the year 2000 will be eligible veterans.

Accordingly, the General Accounting Office (GAO) recently looked at fifteen VA hospitals with an eye to reducing costs, primarily by cutting back on the length of stay. It found, it says, that such stays could be reduced considerably. VA both agrees and disagrees.

For example, the GAO notes that the following practices could cut time in the hospital:

- Give certain diagnostic tests, such as blood tests and chest X rays, before admission rather than afterward.
- Avoid admissions just before weekends.
- Plan ahead for patient discharges in order to avoid unnecessary processing time.

Further, the GAO says, the VA should set more specific goals for its hospital managers, provide centralized help for problems that might surface at more than one site, and assist local hospital directors in evaluating the efficiency of professional employees and staff. For example, it notes that the American Hospital Association has developed specific guidelines for surgery scheduling and turnaround times for test results. The GAO recommends that the VA either adopt these or develop its own, based on specific experience.

Some "worst-case" examples cited



*While taking part in annual Air Force Reserve training at Edwards AFB, Calif., MSgt. Harold Taylor (right) of Buena Park, Calif., and TSgt. Stephen Ramos of Enumclaw, Wash., learned they were related. They both serve as Air Force Reserve Security Police personnel. (USAF photo by TSgt. Don Wetterman)*

by the GAO include that of a sixty-seven-year-old man who was living with his spouse within commuting distance but who was kept in the hospital for five days after an uncomplicated eye operation. The GAO said that one day would have been a normal postoperative stay in this case. Another was a sixty-year-old woman, again living within commuting distance with her spouse, who was kept in the hospital for seven days for diagnostic tests—she was in no acute stress—although these tests could have been administered on an outpatient basis.

The VA has agreed with many of the GAO recommendations—in fact, it notes that several having to do with reducing time in the hospital have already been implemented—but it takes exception to suggestions that increased central control be instituted, believing that local review of procedures better reflects the community standards.

GAO reports are not binding on agencies, but since they are submitted to Congress, they obviously have some impact on future funds voted by Congress. The VA estimates that if it were to serve all veterans who request care over the next twenty years, it would need a budget increase of perhaps \$20 billion in construction funds alone. Congress will certainly consider ways that this might be cut, and reducing hospital stays might offer a possible way to do that.

### Commissary Sales Help Enlisted Widow's Home

Pointing up that Air Force people take care of their own, Air Force commissaries at more than 137 locations around the world recently raised more than \$181,000 through special promotional sales to help the Bob Hope Village.

The Village, located near Eglin AFB, Fla., is the newest addition to the Air Force Enlisted Widow's Home Foundation. Major brokers and manufacturers supplying goods to the commissaries contributed up to \$2.40 to the Village for every case of their product ordered. In addition, commissary customers saved money on special price reductions tied to the program.

"I'm very pleased with the response of our partners in the grocery industry," said Maj. Gen. M. Gary Alkire, AFCOMS Commander. "They've proved to be dedicated and committed to the Air Force family." Participating companies will have their names displayed in the Village's Honors Room on special plaques designating them as "Super Bob Hopes."

### Benefits Sometimes Don't Travel Well

Nearly half a million US veterans currently reside overseas. In addition, more and more Americans are traveling overseas on vacation, and this obviously includes a fair proportion of veterans.

The VA is concerned that VA beneficiaries know how this travel affects their benefits. The overall caution here is to check with your local VA office—in the telephone book under US Government—to see how your specific benefits may be affected.

For example, veterans with service-connected disabilities should obtain a statement of these disabilities from the VA office that maintains their medical records. The statement will enable the veteran to obtain emergency treatment or hospitalization—paid for by the VA—when proper application and the statement are presented to the US Embassy or Consular Office overseas.

In another category, certain VA educational benefits are available overseas to eligible veterans, their spouses, and their children. Also, VA will mail compensation and pension checks to most overseas locations when requested. On the other hand, the VA Home Loan Guaranty program is not available to buy property overseas.

To help American citizen-veterans sort out these problems, the VA is conducting in-service training pro-



grams for State Department employees serving in foreign lands. Many representatives of American consulates abroad have taken the training in the past year. There is only one VA Regional Office in a foreign country—that's the one in Manila.

### Short Bursts

The **Civil Air Patrol** is about to take on a new role—passing on word to the US Customs Service if they spot **suspected drug-smuggling craft at sea**. The Air Force auxiliary will also assist in pinpointing hidden airfields used for drug drops, especially in the southeastern part of the US. The CAP members are not allowed to give chase or to make arrests.

The largest long-term **assessment of drugs used by epileptics** has just been completed by the VA. It compared the efficacy and toxicity of four drugs over a two-year period. Evaluations were made of carbamazepine, phenobarbital, phenytoin, and primidone. While rankings of the four were developed, one interesting fallout of the study is a clear demonstration that a more effective drug overall is needed. A newer one, valproate, will be looked at in a follow-on review.

The **Air Force** today is **overwhelmingly a married force**. More than two-thirds of its people are married, and this figure probably approaches eighty percent when careerists only are considered.

As a general policy, all **government agencies are tightening the screws on debtors**. For example, CHAMPUS recently started charging interest on uncollected payments that were originally made in error to service family members, retirees, or health-care providers. VA now reviews all outstanding GI Bill delinquencies before approving home-loan applications.

**Retired Guard members** are now eligible for **Space-A travel** even if

# THE BULLETIN BOARD

they haven't reached age sixty. The key is that they have an official letter saying they have met all requirements for retiring upon reaching that age.

USAF has a **new Chief Nurse**—and she has a promotion to one-star to go along with the new duty. **Brig. Gen. Carmelita Schimmenti** is the designee. She was formerly command nurse at SAC.

The **Thunderbirds** are looking for **NCO volunteers** in nearly **twenty-five career fields**. In addition to the usual maintenance slots, they're also looking for administrative and public affairs types. Photographers and a first sergeant will also be needed shortly. Assignments are for two years—headquarters is at Nellis AFB, Nev. See CBPOs for details.

VA reminds **GI home loan holders** that **"release of liability" does not restore entitlement**. To use your GI home loan again, you must have completely disposed of your property and eliminated the VA as a guarantor.

**Ronald Warner**, Principal of DoD's MacArthur Elementary Dependents School at Clark AB, Philippines, is among fifty-four US elementary and middle school administrators—and the only DoD recipient—chosen for the **National Distinguished Principals Award**. The US Department of Education makes the selections.

Informed Capitol Hill sources say that some level of **mandatory Survivor's Benefit Plan (SBP)** will be laid on during this congressional session. One scenario would require **new retirees** to cover their current spouse for the minimum—\$300—and then re-

quire a firm decision as to coverage or no coverage and desired level at the end of two years. No change is seen in the requirement for retirees who elect no coverage to have the affected spouse concur in writing.

### Senior Staff Changes

**PROMOTIONS:** To be **Major General:** Stuart E. **Barstad**.

To be **Brigadier General:** John P. **McDonough**.

**RETIREMENT:** M/G John A. **Collins**.

**CHANGES: B/G (M/G nominee) Stuart E. Barstad**, from Dep. Chief of Chaplains, Hq. USAF, Bolling AFB, D. C., to Chief of Chaplains, Hq. USAF, Bolling AFB, D. C., replacing retiring M/G John A. Collins . . . **Brig. Gen. James S. Cassity, Jr.**, from DCS for Communications, Electronics & Computer Resources, & Cmdr., Space Info. Systems Div., Hq. NORAD/SPACECMD, Cheyenne Mountain Complex, Colo., to DCS for Systems Integration, Log. & Support, Hq. NORAD/SPACECMD, Cheyenne Mountain Complex, Colo. . . **Col. (B/G selectee) Maralin K. Coffinger**, from Dep. Dir., Personnel Prgms., DCS/M&P, Hq. USAF, Washington, D. C., to Command Dir., NORAD Combat Ops. (J-31), Hq. NORAD/SPACECMD, Cheyenne Mountain Complex, Colo., replacing B/G Christian F. Dreyer, Jr.

**Col. (B/G selectee) James W. Hopp**, from Ass't DCS for Plans & Prgms., Hq. AFLC, Wright-Patterson AFB, Ohio, to Vice Cmdr., Sacramento ALC, AFLC, McClellan AFB, Calif., replacing B/G Trevor A. Hammond . . . **Col. (B/G nominee) John P. McDonough**, from Command Chaplain, Hq. TAC, Langley AFB, Va., to Dep. Chief of Chaplains, Hq. USAF, Bolling AFB, D. C., replacing B/G (M/G nominee) Stuart E. Barstad . . . **Brig. Gen. Raymond V. McMillan**, from Chief, Systems Integration Office, Hq. NORAD/SPACECMD, Cheyenne Mountain Complex, Colo., to Chief, Systems Integration Office, & Ass't DCS for Systems Integration, Log. & Support, Hq. NORAD/SPACECMD, Cheyenne Mountain Complex, Colo.

**SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Richard P. E. Cook**, to SEA, Hq. AFDW, Bolling AFB, D. C. . . **CMSgt. Charles K. Ray**, to SEA, Hq. MAC, Scott AFB, Ill., replacing retiring CMSgt. Carl A. Roberts . . . **CMSgt. Michael C. Shirley**, to SEA, Hq. AFMEA, Randolph AFB, Tex., replacing retired CMSgt. James W. Garrison. ■

*TSgt. Donald Douglas, 51st Equipment Maintenance Squadron, Osan AB, Korea, quenches the thirst of a youngster at the nearby Ephphatha Orphanage for deaf children. Airmen at Osan volunteer their time to assist fifteen orphanages in the Republic of Korea. (USAF photo by Sgt. Sheryl Brown)*





### 1985 National Convention Commemorates WW II Victory

In marking the thirty-eighth anniversary of the Air Force and AFA's thirty-ninth birthday, the 1985 Air Force Association National Convention also saluted "World War II: Victory in the Air."

Throughout the many Convention activities, the significance of the fortieth anniversary of the end of World War II and the role that airpower played in the Allied victory were highlighted at every opportunity. World War II veterans were specifically recognized during the Convention's moving opening ceremonies. The theme throughout this year's Convention was consistent and sobering: In order to prepare for the future, you must build on the lessons of the past.

- **Membership:** The Convention started off on a positive note Sunday evening with the Annual Membership Awards and Delegate Reception in the Cotillion Room of the Sheraton Washington Hotel. National President Martin H. "Marty" Harris lauded the Association and the Membership Committee, citing the fact that AFA membership had grown to a total of 240,000, up nearly 20,000 from the previous year. As in past years, the highly successful on-base membership drive played a key role in bringing in new AFAers. Equally impressive in the membership area was the twenty-five percent increase in Life Memberships, which rose to a total of more than 22,000.

Membership awards were presented to two regions, seven state organizations, and fifty-two chapters (see p. 144). The awards honored the successful efforts of hundreds of volunteers throughout the country. The overflow crowd especially applauded the efforts of one individual—Maj. James "Snake" Clark of Texas AFA's Alamo Chapter. As chapter membership chairman, Major Clark was responsible for recruiting 1,804 new members during the year.

- **Opening Ceremonies:** In a replay of last year, the Convention's Monday

THE WHITE HOUSE  
WASHINGTON

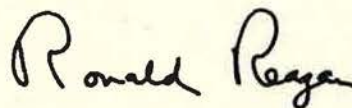
September 4, 1985

As Commander in Chief of the Armed Forces and as a lifetime charter member, it is a pleasure for me to welcome the members and guests of the Air Force Association to Washington on the occasion of your 39th national convention.

Your celebration of the 40th anniversary of the American and Allied victory in World War II recognizes the critical importance of airpower in bringing to a successful end the most destructive war the earth has ever known. It acknowledges that today, in a world shrunken in size by the development of supersonic aircraft and intercontinental ballistic missiles, a strong Air Force with trained personnel and the most up-to-date equipment is vital as a deterrent to our enemies. While eternal vigilance is not an easy task, it is our only choice if we are to keep America strong and protect world peace and freedom.

The Air Force Association and its 240,000 members have worked hard to educate the public on the need for military preparedness as well as the importance of maintaining our technological edge in the aerospace field. I am proud to be numbered among your ranks and encourage you to continue your commendable efforts on behalf of the nation.

Nancy joins me in extending our congratulations on the Association's success. May God bless all of you.



morning Opening Ceremonies and Awards presentations filled Sheraton Hall to capacity. Rev. Richard Carr, the retired Air Force Chief of Chaplains and AFA's National Chaplain, gave a moving invocation and paid memorial tribute to fifty aerospace and AFA leaders who had passed away during the past year (see box on p. 146). Con-

vention delegates and guests then heard Brig. Gen. Charles E. "Chuck" Yeager, USAF (Ret.), deliver a rousing keynote address. General Yeager recalled his exploits and achievements as an ace, a special peacetime Medal of Honor recipient, a test pilot, and the first man to break the sound barrier and concluded with a hearty and



# Registration Form



AFA's Gathering of Eagles 1986  
Las Vegas, Nevada, April 27, 1986–May 1, 1986

**Package #1:**

(All activities including Honors Banquet—limited to first 3,500 registrants)

AFA Member/Patron  
AFA Spouse/Dependent

Non-Member

Postmark Date  
Prior to  
Nov. 1, 1985

- \$195
- \$195
- \$195
- \$195
- \$225
- \$225

Postmark Date  
Nov. 1, 1985 to  
February 28, 1986

- \$205
- \$205
- \$205
- \$205
- \$235
- \$235

Postmark Date  
On and After  
March 1, 1986  
(and on site)

- \$250
- \$250
- \$250
- \$250
- \$250
- \$250

**Package #2:**

(All activities except Honors Banquet, Wed., April 30)

AFA Member/Patron  
AFA Spouse/Dependent

Non-Member

- \$145
- \$145
- \$145
- \$145
- \$175
- \$175

- \$155
- \$155
- \$155
- \$155
- \$185
- \$185

- \$200
- \$200
- \$200
- \$200
- \$200
- \$200

**REGISTRATION FORMS MUST BE ACCOMPANIED BY U.S. DOLLAR CHECK OR MONEY ORDER PAYABLE TO "AFA," OR CREDIT CARD AUTHORIZATION**

What Name/Title on your Registration Badge(s):

Your Name: \_\_\_\_\_  
\_\_\_\_\_

Other Registrants: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Your Address: \_\_\_\_\_  
Street Address  
City State Zip

Phone Number: ( ) \_\_\_\_\_  
Country

Send this form and your payment to:

**"Gathering of Eagles"  
Air Force Association  
1501 Lee Highway  
Arlington, VA 22209-1198**

I enclose \$ \_\_\_\_\_ U.S. Dollars  
(in check or money order only) for  
\_\_\_\_\_ Registration Packages

or:

Charge \$ \_\_\_\_\_ U.S. Dollars to  
my credit card, as indicated:

- AM EX
- VISA
- MasterCard

Account number: \_\_\_\_\_

Expiration date: \_\_\_\_\_

Cardholder's signature: \_\_\_\_\_  
\_\_\_\_\_

AFA's "Gathering" airlines—United and Eastern—are offering discount fares to Las Vegas.

When making airline reservations, be sure to identify yourself with the special AFA account numbers as follows:

**United Airlines**  
**Eastern Air Lines**

**ACCOUNT NUMBER**  
# 609-G  
# EZ4P13

**TOLL FREE LINE**  
**(800) 521-4041**  
**(800) 468-7022**  
**or in Florida: (800) 282-0244**



# Air Force Association's Gathering of Eagles—1986

Las Vegas, Nevada, April 27, 1986–May 1, 1986



## APPLICATION FOR HOTEL RESERVATIONS

HOTELS	Single	Double	1-Bedroom Suite	2-Bedroom Suite
MGM Grand	\$77	\$77	\$178-up	\$260-up
Caesar's Palace	70	70	200	300
Flamingo Hilton	60	60	150-up	240-up
Dunes	58	58	180	250
Imperial Palace	60	60	150	210
Maxim	38	38	---	---
Continental	45	45	---	---
Alexis Park (All Suites)	70/90	70/90	---	---
Tropicana	42	42	125	250
Hacienda	55	55	100	165
Marina	42	42	100	150
Sands	55	55	125-up	225-up
Desert Inn	75	75	150-up	225-up
Frontier	54	54	185	225
Riviera	55	55	150	200
Sahara	55	55	90-up	180-up
Landmark	52	52	95-125	---
Las Vegas Hilton	64	64	---	---
Mardi Gras (All Suites)	33	33	---	---

### Application for Hotel Reservations

(Please print or type)

Please list three choices of hotels: \_\_\_\_\_

1st \_\_\_\_\_

2nd \_\_\_\_\_

3rd \_\_\_\_\_

Room will be occupied by: \_\_\_\_\_

Name \_\_\_\_\_

Affiliation \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Type of Accommodation

\_\_\_\_\_ Single Rate \_\_\_\_\_

\_\_\_\_\_ Double Rate \_\_\_\_\_

\_\_\_\_\_ 1 B/R Suite Rate \_\_\_\_\_

\_\_\_\_\_ 2 B/R Suite Rate \_\_\_\_\_

Date of Arrival: \_\_\_\_\_

\_\_\_\_\_ Hour \_\_\_\_\_ AM-PM

Date of Departure: \_\_\_\_\_

\_\_\_\_\_ Hour \_\_\_\_\_ AM-PM

#### Note:

1. The AFA Housing Bureau will handle all reservations. Do not contact hotels. If changes need to be made after receiving confirmation, contact hotel directly.
2. A deposit of one night's lodging must be sent directly to the hotel once you receive confirmation.
3. Room assignments will be made on a first-come, first-served basis.
4. If a block of rooms is required, attach a list of individuals needing rooms to this form with arrival and departure dates and times.

Fill out this form completely and mail to:

**"AFA Housing Bureau"**  
Las Vegas Convention & Visitors Authority  
3150 Paradise Road  
Las Vegas, Nevada 89109-9096



deeply felt endorsement of AFA and what it stands for. The audience capped his remarks with a cheering, standing ovation.

AFA National President Marty Harris, with assistance from Chairman of the Board David L. Blankenship and

# INTERCOM

and Guam unanimously adopted AFA's 1985-86 Statement of Policy (see "The Essential Priorities," p. 6) and two position papers: Force Modernization and R&D (see "Deterrence Across the Spectrum," p. 92) and Defense Manpower Issues (see "Quality

## 1985 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, 1985. AFA salutes them as pacesetters in the important work to enlarge and strengthen the Association.

### REGIONS

South Central  
Southwest

### STATES

Arizona  
Arkansas  
Delaware  
Kansas  
Michigan  
Mississippi  
Texas

### CHAPTERS

Abilene (Texas)  
Air Capital (Kansas)  
Airport Number One (Pennsylvania)  
Alamo (Texas)  
Altoona (Pennsylvania)  
Athens (Georgia)  
Beaver Valley (Pennsylvania)  
Blytheville (Arkansas)  
Central Maryland (Maryland)

### VICE PRESIDENTS

C. Cliff Ball  
T. A. Glasgow

### PRESIDENTS

Meryll Frost  
Aaron E. Dickerson  
Joseph H. Allen, Jr.  
Cletus J. Pottebaum  
Robert J. Schaeztl  
R. E. Smith  
Bryan L. Murphy, Jr.

### PRESIDENTS

Larry W. Lawrence  
Russ Barrett  
Edmund J. Gagliardi  
E. F. Faust  
David L. Jannetta  
Robert P. Crow  
Fred H. Daugherty  
B. A. Walters  
William L. Ryon, Jr.

### CHAPTERS

Colin P. Kelly (New York)  
David D. Terry, Jr. (Arkansas)  
Delaware Galaxy (Delaware)  
Diamond State (Delaware)  
Flatirons (Colorado)  
Florida Highlands (Florida)  
Fort Worth (Texas)  
Frank Luke (Arizona)  
Fran Parker (New Mexico)  
Front Range (Colorado)  
Garden State (New Jersey)  
Gold Card (Utah)  
Golden Triangle (Mississippi)  
Grand Strand (South Carolina)  
Grissom Memorial (Indiana)  
High Desert (California)  
Homestead (Florida)  
Huron (Michigan)  
Illini (Illinois)  
Jerry Waterman (Florida)  
Joe Walker (Pennsylvania)  
John C. Stennis (Mississippi)  
Kitty Hawk (North Carolina)

### PRESIDENTS

John A. Beyerle  
Robert L. Byrd  
James A. Flood, Sr.  
Ronald G. Mehan  
John W. Thaxton, Jr.  
Roy P. Whittion  
M. N. Heib  
Norman O. Gallion  
Frank S. Gentile  
James F. Clark  
Beverly Kuhrt  
Lee Mohler  
H. Y. Quarles  
William B. Gemmill  
Don McKellar  
Harry Childress  
J. Rudolph Gossman, Jr.  
James A. Abney  
Don Kruse  
John G. Rose  
Ron Chromulak  
Russell D. Thompson  
Gordon W. Cruickshanks

### CHAPTERS

Lake Superior Northland (Illinois)  
Laurel Highlands (Pennsylvania)  
Llano Estacado (New Mexico)  
Lloyd Schloen-Empire (New York)  
Madison (Wisconsin)  
New Jersey Wing CAP (New Jersey)  
Panama City (Florida)  
Phoenix Sky Harbor (Arizona)  
Plattsburgh (New York)  
Rocky Mountain (Utah)  
Savannah (Georgia)  
Sedona (Arizona)  
Steel Valley (Ohio)  
Swamp Fox (South Carolina)  
Tacoma (Washington)  
Tucson (Arizona)  
Union Morris (New Jersey)  
Ute (Utah)  
Wichita Falls (Texas)  
Wings (New Jersey)

### PRESIDENTS

Donald N. Nystrom  
Donald H. Fyock  
Oliver J. Cook, Jr.  
Anthony Christiano  
James L. Dawson  
Abelardo Rico, Jr.  
Joseph T. Manning  
Les Bartlett  
James F. Judkins, Jr.  
Carol A. Matteson  
Edward J. Farrell  
Thomas B. O'Connell  
Paul D. Monroe  
Charles W. Myers  
Eugene J. Nuss  
Robert A. Munn  
Thomas M. Gilbert  
Peggy Mohler  
Robert D. Haley  
Paul E. Sutt

senior Air Force officials, presented sixty-one awards to individuals and units of the Air Force Association and the Air Force (see boxes). A special award went to world-renowned aviation artist Keith Ferris for his outstanding contributions to aviation history and his strong support of AFA.

The highest Association unit activity award, the Donald W. Steele, Sr., Memorial Award, went to the Cape Canaveral Chapter of Florida. With this recognition, the chapter was designated the "1985 Unit of the Year."

For only the third time in AFA history, two individuals were selected as the "AFA Man of the Year." For 1985, this distinctive recognition for outstanding individual accomplishment and contribution went to George H. Chabbott of Delaware and Hugh L. Enyart of Illinois. Past AFA Man of the Year honorees as well as this year's Exceptional Service Award and Medal of Merit winners were also recognized.

• *Man of the Year Meeting:* For the second consecutive year, a breakfast meeting of past AFA Men of the Year took place Wednesday morning of Convention week. This meeting is an annual Convention event and recognizes the invaluable AFA experience vested in this dedicated group.

Those attending the breakfast were Carl J. Long (1959), Marjorie O. Hunt (1968), Victor R. Kregel (1976), Ed-

ward A. Stearn (1977), David C. Noerr (1980), Thomas W. Anthony (1982), Richard H. Becker (1983), Earl D. Clark, Jr. (1984), and George H. Chabbott and Hugh L. Enyart (1985).

• *Business Sessions:* Equaling last year's record attendance, 414 registered delegates representing forty-three states, the District of Columbia,

*People—Quality Force,*" p. 108). These papers serve as the foundation for AFA's programs and action for the coming year.

A highlight of the first Business Session was an address by the Hon. Robert C. McFarlane, the President's National Security Advisor (see p. 86 for coverage of Mr. McFarlane).

In support of previously approved



*Brig. Gen. Chuck Yeager, USAF (Ret.), kicked off the Convention with a collection of stories from his active-duty flying days. In his speech, he defended the Air Force's publicity blackout after he broke the sound barrier in 1947. At left, Marty Harris.*



## Floor Resolutions

The following resolutions were submitted by delegates on the floor at the second business session of the AFA National Convention on September 17. The resolutions were presented to the Convention as a whole and approved by the Convention delegates that morning. The approved resolutions were later passed out in printed form to the delegates prior to the Salute to Congress.

### Joint Force Development Process

*Whereas* a Joint Force Development Process was initiated on May 22, 1984, through a historic Memorandum of Agreement initiated by the Air Force and Army Chiefs of Staff, and

*Whereas* the Joint Force Development Process has currently resulted in thirty-four initiatives that have greatly increased combat effectiveness through elimination of duplicative programs, filling voids in service capabilities, and increased direct support to the warfighting CINCs,

*Be it resolved* that the Air Force Association wholeheartedly supports continued cooperation between the services as demonstrated in the ongoing and growing Joint Force Development Process, initiated by the historic May 22, 1984, Memorandum of Agreement between the Air Force and Army Chiefs of Staff. We applaud the progress to date and encourage continued cooperation through this important process.

### Antisatellite Targeting System

*Be it resolved* that the Antisatellite Targeting System (ASAT), as approved by the President and successfully tested by the Air Force, is vitally needed to deny the Soviets a sanctuary in space, deter use of their deployed ASAT, and counter space-based threats to our terrestrial forces.

Development, flight testing, and deployment of this country's first nonnuclear space defense weapon, the F-15 miniature vehicle ASAT system, must continue.

actions of the Board of Directors, delegates adopted changes to the Convention's Rules and Procedures, clarifying voting procedures and vote totals. Additionally, two special resolutions (see accompanying box) were passed that endorse the Army and Air Force Joint Force Development Process and the Antisatellite Targeting System (ASAT).

• *Election of Officers:* Two incumbent National Officers, President Marty Harris and Treasurer George H. Chabbott, were unanimously re-elected to office, while two other long-time AFA leaders, Edward A. Stearn and A. A. "Bud" West, were unanimously elected to the positions of Chairman of the Board and Secretary, respectively.



For only the third time in AFA history, two individuals were selected as the AFA "Man of the Year." Hugh L. Enyart, left, National Vice President, and George H. Chabbott, right, National Treasurer, received their awards from AFA President Marty Harris.

## Spouse Activity Program

With deep gratitude, AFA acknowledges the support of the following companies that participated in the Spouse Activity Program.

Avco Systems Div.  
The Boeing Co.  
Emerson Electric Co.  
Endo Corp.  
Honeywell Inc.  
Hughes Aircraft Co.  
ITT Gilfillan  
Lockheed Corp.  
Martin Marietta Aerospace  
McDonnell Douglas Corp.  
Morton Thiokol, Inc.  
Northrop Corp.  
Raytheon Co.  
RCA Aerospace/Defense  
Rockwell International  
Singer Kearfott Div.  
Texas Instruments  
TRW  
United Technologies

## Arthur C. Storz, Sr., Membership Awards

AFA's most prestigious membership awards are named after Arthur C. Storz, Sr., a former permanent AFA National Director and principal founder of Omaha's Ak-Sar-Ben Chapter. The Storz Membership Awards, made possible through a generous endowment to the Association by his son, Art Storz, Jr., are awarded each year for membership excellence based on criteria approved by AFA's Board of Directors for the year ending June 30, 1985.

### Storz Individual Award

Amos L. Chalif

### Storz Chapter Award

Blytheville Chapter  
Blytheville, Ark.  
President: B. A. Walters

### Storz State Award

Mississippi AFA  
President: R. E. Smith

### Storz Regional Award

South Central Region  
Vice President: C. Cliff Ball



Martin H. Harris of Winter Park, Fla., is an aerospace industry executive. He received his Bachelor of Aeronautical Engineering degree from New York University in 1953. Mr. Harris later earned his Master of Science degree in Systems Management from

# INTERCOM

## 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: Lt. Gen. Joseph H. **Atkinson**, USAF (Ret.); John S. **Badger**, Jr.; Lt. Col. Wilfred D. **Barrett**, USAF (Ret.); Brig. Gen. Stanley H. **Bear**, USAF (Ret.); Shevlin **Bigger**; Col. Stanley E. **Bogren**, USAF (Ret.); Col. John M. **Chapman**, USAF (Ret.); Lt. Paul **Cocks**, USAF; Lloyd **Crossman**; Col. Laurence S. **Dyer**, USAF (Ret.); TSgt. Robert A. **Eberflus**, USAF; Dr. Krafft A. **Ehricke**; Brig. Gen. David B. **Englund**, USAF; CMSgt. Francis **Fini**, USAF (Ret.); Col. James G. **Galagher**, USAF (Ret.); Col. Charles O. **Garrels**, USAF; Maj. Gen. Perry B. **Griffith**, USAF (Ret.); Col. Russell D. **Hale**, USAF (Ret.); Capt. Harry L. **Haugh**, USAF; Maj. Gen. Archie A. **Hoffman**, USAF (Ret.); Maj. Gen. Reuben C. **Hood**, Jr., USAF (Ret.); Brig. Gen. Sam L. **Huey**, USAF (Ret.); Leigh **Hunt**; Col. Bland B. **Hyatt**, USAF (Ret.); Maj. Gen. Alfred H. **Johnson**, USAF (Ret.); Irene B. **Keith**; Maj. Gen. Harold K. **Kelley**, USAF (Ret.); Michael **Lunardini**; Maj. Gen. William E. **Masterson**, USAF (Ret.); Col. John O. **McElvey**, USAF (Ret.); Maj. Gen. John **McNabb**, USAF (Ret.); Col. E. Scott **Minnich**, USAF (Ret.); Maj. Gen. Morris R. **Nelson**, USAF (Ret.); Lt. Col. Lester F. **Newton**, USAF; Col. Joseph G. **Nott**, USAF (Ret.); Col. Richard N. **O'Hagan**, USAF (Ret.); Gen. Timothy F. **O'Keefe**, USAF (Ret.); Maj. Gen. O. Donald **Olson**, USAF (Ret.); Diane M. **O'Malley**; Gen. Jerome F. **O'Malley**, Lyle O. **Remde**; William H. **Rice**, Jr.; Maj. Gen. Albert W. **Schinz**, USAF (Ret.); Brig. Gen. Garryl C. **Sipple**, USAF; Wilburt J. **Sutton**; Maj. Gen. William T. **Thurman**, USAF (Ret.); Brig. Gen. Morgan S. **Tyler**, Jr., USAF (Ret.); James T. **Walden**; Maj. Gen. Robert L. **Walsh**, USAF (Ret.); Barbara **Zuckert**.

the University of Southern California. Having previously served on active duty with the Air Force, he is now retired from the Air Force Reserve.

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 served as National Vice President of the American Defense Preparedness Association.

Mr. Harris was Chairman of the first AFA/SAC Strategic Requirements Symposium in 1971 and was AFA's National Secretary and Chairman of AFA's Resolution Committee for four years. He has also served AFA as State President, Chapter President, National Vice President (Southeast Region), and Organizational Advisory Council member. Currently, he serves as National President, a permanent member of the Board of Directors, Chairman of the Executive Committee, and a trustee of the Aerospace Education Foundation. He received AFA's Man of the Year Award in 1972 and is a Life Member of AFA.

Edward A. Stearn of Redlands, Calif., was elected to the office of Chairman of the Board. An aerospace in-

*AFA's strength is derived from its field organizations on the regional, state, and chapter levels. The South Central Region, here represented by C. Cliff Ball, right, was one of two regions to meet its membership goals.*



*The Dlytheville, Ark., Chapter was one of fifty-two local organizations to reach its membership goal for 1985. Here Chapter President B. A. Walters, right, accepts the award from AFA President Marty Harris.*



## Air Force Association's 1985 Activity Awards

### INDIVIDUAL RECIPIENTS

#### AFA Men of the Year

George H. Chabbott  
Hugh L. Enyart

#### Presidential Citations

Charles H. Church, Jr., Missouri  
Gen. Charles L. Donnelly, Europe  
E. F. "Sandy" Faust, Texas  
David Graham, California  
Mary V. Holub, Texas  
John P. E. "Jack" Kruse, New Jersey  
James M. McCoy, Nebraska  
Robert G. McCullough, Texas  
Jack K. Westbrook, Tennessee  
John F. White, Massachusetts

#### Exceptional Service Awards

Norman J. Abramson, Florida  
Donald T. Beck, Florida  
Kaye H. Biggar, Texas  
Don Casteel, Texas  
Jack G. Certain, Utah  
Henry Coffin III, Pennsylvania  
Phillips J. Copeland, California  
O. R. Crawford, Texas  
Meryll Frost, Arizona  
Thomas M. Gilbert, New Jersey  
Robert L. Griffin, California  
H. Lake Hamrick, Florida  
M. N. Dan Heth, Texas  
David L. Jannetta, Pennsylvania  
James M. Keck, Nebraska  
Frederick H. Klopfer, Illinois  
Louis C. Kriebel, Florida  
James P. LeBlanc, Louisiana  
Leonard Lesjak, Illinois  
Glenn M. Lusk, Utah  
Charles V. Manker, Europe  
Bryan L. Murphy, Jr., Texas  
Earle North Parker, Texas  
George A. Peterson, Nevada  
John Edward Przybys, Arizona  
William L. Ryon, Jr., Maryland  
Dana Spears, California  
James R. Temple, Illinois  
Spann Watson, Maryland  
Dorothy Welker, New York  
Glen W. Wensch, Illinois  
Roy P. Whitton, Florida  
Marcus C. Williams, Utah  
William G. Zavatson, Texas

#### Medals of Merit

David A. Allen, Pennsylvania  
Worth T. Allen, South Carolina  
Jack Anderson, Delaware  
R. Donald Anderson, Virginia  
Armen A. Avakian, California  
Warren L. Banes, Washington, D. C.  
Bobby E. Bates, Georgia  
Peter P. Beardsley, California  
Col. Dean T. Biggarstaff, Florida  
Henry W. Boardman, Mississippi  
Jack Booher, Florida  
Cecil G. Brendle, Alabama  
Gary L. Brinner, Illinois  
CMSgt. Charles W. Brown,  
Washington, D. C.  
Fred Brown, Puerto Rico  
Clarence J. Buchanan, Illinois  
Col. Robert A. Buethe, Jr.,  
Washington, D. C.  
Eugene P. Burke, Delaware  
Dr. Dan Callahan, Georgia  
Daniel F. Callahan III, Tennessee  
Edith E. Calliham, South Carolina

James D. Catington, South Carolina  
Robert Cauch, Michigan  
Marion Chadwick, Florida  
V. R. Christiansen, Virginia  
S. Ronald Chromulak, Pennsylvania  
James G. Clark, Texas  
Jeremiah J. Collins, Pennsylvania  
Lee Cordell, Illinois  
Theodore C. Cors, Virginia  
Wanda Coward, Texas  
Arden B. Curfman, Texas  
Francis Jo Curtis, Michigan  
Harry E. Davis, Illinois  
Capt. Dave Dingley, North Carolina  
Judith A. Donato, California  
Maxine Donnelly, New York  
W. Daniel Douthitt III, Pennsylvania  
Toby J. DuCellier, Maryland  
Donna Kay Rosendahl Elmore, Illinois  
Ron Enriquez, Utah  
Robert E. Fancher, South Carolina  
Edward J. Farrell, Georgia  
William Feder, Colorado  
Capt. Harrison Freer, Ohio  
Norman O. Gallion, Arizona  
Mary Ann Gavin, Massachusetts  
CMSAF Robert D. Gaylor, Texas  
William B. Gemmill, South Carolina  
Anthea L. Germano, Pennsylvania  
LeRoy A. Gibson, Utah  
T. R. Gillenwaters, California  
John Gray, Mississippi  
Gregory L. Griffin, Delaware  
Lewis W. Hall, Tennessee  
Col. William Halpin, Nebraska  
Maj. Steve Hampton, Alabama  
Max L. Hanson, Utah  
Charles E. Hedrick, Florida  
Florence Henninger, Arizona  
Sophia B. Hesbon, Nevada  
John P. Hill, Texas  
Vic Hollandsworth, Nevada  
Harold E. Humfeld, Texas  
Stan Janesik, Nevada  
Robert B. Jaxheimer, South Carolina  
Carl O. Johnson IV, Illinois  
Seely Johnston, Illinois  
Hermann J. Jung, Texas  
Robert W. Kalinowski, Missouri  
Wilbur H. Keck, Georgia  
Paul V. Kelly, Jr., New Jersey  
William F. Kimzey, Tennessee  
Dorothy Korpi, Michigan  
Robert H. Krumpe, California  
Kenneth Kuenn, Wisconsin  
Gordon Lake, New Jersey  
Lawrence D. Lambert, Tennessee  
C. W. Lawrence, Texas  
Donna Layton, Utah  
Kathleen Lesjak, Illinois  
Dorothy A. Lewis, Connecticut  
Rilee Lindquist, California  
Carlton A. Loos, Texas  
Charlotte Loos, Texas  
Len Luka, Illinois  
Arthur R. MacFadden, Tennessee  
G. Warren Manley, Illinois  
Charles W. Marotske, Wisconsin  
Robert W. Marsh, Jr., Georgia  
Albert J. Martha, Florida  
Cesar Martinez, Nevada  
Carol Matteson, Utah  
Paul Maul, Nebraska  
Anthony I. Mazzolini, Ohio  
Edward J. McCormick, Nevada  
Bob McLellan, Nevada  
Capt. Charles Merlo, Washington, D. C.  
Bernard J. Minardi, Illinois

Lawrence B. Molnar, California  
Ron Montgomery, New Jersey  
Col. Charles B. Moore, Alabama  
Capt. Ernest S. Moore,  
Washington, D. C.  
Joseph D. Moore, Illinois  
Larry Moore, Florida  
Clarke A. Nelson, California  
Charles D. Obershaw, California  
Fred W. Onions, Delaware  
Capt. Donna Pastor, Washington, D. C.  
Hugh D. Perry, Tennessee  
Raymond W. Peterman, Missouri  
Corinna L. Petrella, Illinois  
Darrell L. Pratt, Tennessee  
R. R. Price, Virginia  
Leo T. Profilet, California  
William T. Reynolds, Maryland  
Kenneth Richardt, Illinois  
Ernie Rogers, Illinois  
John G. Rose, Florida  
John H. Ruble, Tennessee  
R. H. Russell, Virginia  
Robert J. Ruzicka, Missouri  
Ernest Sawyer, Georgia  
Robert J. Schaetzl, Michigan  
Kurt Schmidt, Illinois  
CMSgt. Richard Schneider,  
Washington, D. C.  
Jean P. Schobert, Illinois  
Michael L. Seiver, Delaware  
R. E. Smith, Mississippi  
Juan Sotomayer, Nevada  
Capt. Keri Spears, California  
Dana E. Spencer, Maryland  
Doris M. Stone, Massachusetts  
William Stone, Michigan  
Howard C. Strand, Michigan  
Maj. Jerry Straw, Colorado  
Lt. Col. Paul Taylor, Florida  
George J. Thom, South Carolina  
David N. Thompson, Pennsylvania  
SSgt. Barry L. Thornbury, Michigan  
Lt. Michael Underwood, Illinois  
William VanEaton, South Carolina  
L. B. Webber, Texas  
Lee P. Webber, Guam  
Cecil H. Wentzell, Nebraska  
Emery Wetzel, Nevada  
Edward I. Wexler, Georgia  
William L. Wilhelm, Indiana  
Lt. Col. R. Will Williams, Massachusetts  
CMSgt. Richard Williamson, Texas  
TSgt. Kenneth Wilson,  
Washington, D. C.  
Samuel B. Wiper, Nevada  
Leland K. Wolfe, Georgia  
Joseph A. Zaranka, Connecticut  
John Zipp, Colorado

#### Special Citations

Gordon W. Cruickshanks,  
North Carolina  
James D. Elmer, California  
Charles E. McGee, Missouri  
J. Gilbert Nettleton, Jr., California  
Earl M. Rogers, Jr., Minnesota  
Francis D. Spalding, Ohio  
George R. Weinbrenner, Texas  
Defense Language Institute, Texas  
Garden State Chapter, New Jersey  
Nation's Capital Chapter,  
Washington, D. C.  
San Bernardino Area Chamber of  
Commerce, California  
125th Fighter Interceptor Group, ANG,  
Florida





# 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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dustry executive, he is an alumnus of the University of Pennsylvania and served in the US Army during World War II.

Mr. Stearn's numerous civic activities include service as the President of Scholarships for Children of American Military Personnel and as Chairman of the Advisory Committee of the AFA Bob Hope Charity Golf Tournament. He is also active in the Air Force Museum Foundation, Inc., is a trustee of the Air Force Museum of the West, and is involved with local units of the

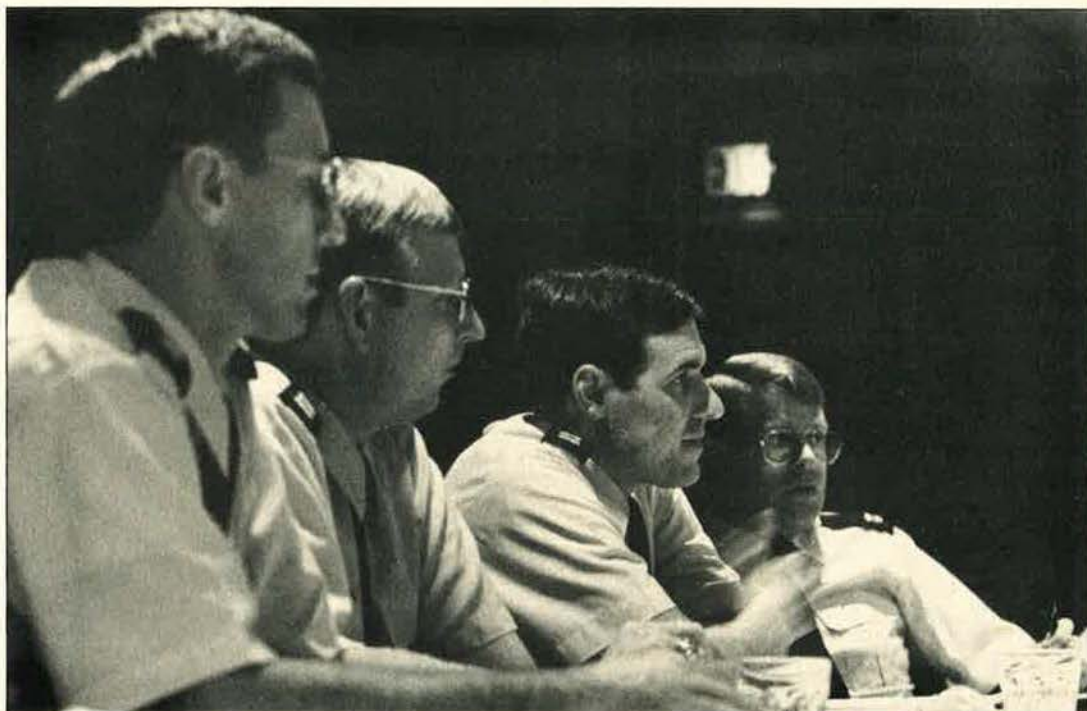
## INTERCOM

Association of the United States Army, the Navy League, and the Air Force Sergeants Association. His volunteer work includes service with the Arrowhead United Way, the YMCA,

and the American Institute of Aeronautics and Astronautics. He is a member of both the Los Angeles Area and San Bernardino Area Chambers of Commerce.

Mr. Stearn is a permanent member of AFA's Board of Directors and is currently a member of the Executive Committee. He has also served AFA as National Vice President (Far West Region), State President, and Chapter President. In addition, he is a trustee of the Aerospace Education Foundation. He received AFA's Man of the

*The Junior Officer Advisory Council and the Enlisted Council advise AFA on Air Force personnel issues. The JOAC was one of ten groups holding meetings in conjunction with the AFA Convention.*



### Air Force Association's 1985 Activity Awards

#### UNIT RECIPIENTS

##### Donald W. Steele, Sr., Memorial Award AFA Unit of the Year

Cape Canaveral Chapter, Florida

##### Outstanding State Organization

California State Organization

##### Outstanding Chapters

Fort Worth Chapter, Texas (more than 900 members)  
Fresno Chapter, California (401-900 members)  
Charles A. Lindbergh Chapter, Connecticut (151-400 members)  
Florida Highlands Chapter, Florida (20-150 members)

##### Exceptional Service Awards

Pennsylvania State Organization (Aerospace Education)  
Colorado Springs-Lance Sijan Chapter, Colorado (Best Single Program)  
Carl Vinson Memorial Chapter, Georgia (Communications)  
Ak-Sar-Ben Chapter, Nebraska (Community Relations)  
Scott Memorial Chapter, Illinois (Overall Programming)

Year Award in 1977 and is a Life Member of AFA.

A. A. "Bud" West of Hayes, Va., was elected to the office of National Secretary. A retired aerospace executive, he received his Bachelor of Science degree from MIT in 1947 and did graduate study at MIT's Sloan School of Industrial Management. Having served on active duty as a combat pilot in World War II and as a research and development staff officer in the Korean War, he retired from the Air Force Reserve in 1974 with the rank of colonel.

Mr. West has been active in numerous civic and professional organizations, having served as President of the Virginia Peninsula Chamber of Commerce and National President of the 57th Bomb Wing Association. He holds membership in the Retired Officers Association, the American Helicopter Society, and the Daedalian Society.

In addition to his current service as permanent National Director of the Association, Mr. West is a member of



the Finance Committee and a trustee of the Aerospace Education Foundation. He has also held the elective offices of National Vice President (Central East Region), State President, and Chapter President and has served as a member of the Executive Committee,

## INTERCOM



**Air Force Vice Chief of Staff Gen. John L. Piotrowski, center, and a fellow officer talk with Martin Marietta representatives about the LANTIRN system at the Aerospace Development Briefings and Displays during the AFA Convention.**

Constitution Committee, and Scientific Advisory Committee. Mr. West is an AFA Life Member.

Elected to his fifth term as National Treasurer was George H. Chabbott of Dover, Del. He 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 in the Vietnam War. A graduate of Utah State University, he attended senior-level finance courses at the Columbia School of Bank Administration and Management and has been awarded the designation of Certified Commercial Investment Member (CCIM) by the National Real Estate Marketing Institute.

In addition to his current service as National Treasurer, Mr. Chabbott is Chairman of the Finance Committee and a member of the Executive Committee. He also has held the elective offices of National Director, National Vice President (Central East Region), and State President. Mr. Chabbott received AFA's Man of the Year Award this year and is a Life Member of AFA.

• **National Vice Presidents:** Twelve National Vice Presidents were elected by delegates to represent their regions. Seven were reelected to office

this year. They are C. Cliff Ball, South Central Region; Charles H. Church, Jr., Midwest Region; Hugh L. Enyart, Great Lakes Region; John P. E. Kruse, Northeast Region; Arley McQueen, Jr., New England Region; William L. Ryon, Jr., Central East Region; and Phil Saxton, Northwest Region.

Five National Vice Presidents are serving in this capacity for the first time. They are William "Hoot" Gibson, Rocky Mountain Region; H. Lake Hamrick, Southeast Region; Thomas W. Henderson, Far West Region; Paul G. Markgraf, North Central Region; and Bryan L. Murphy, Jr., Southwest Region.

• **Directors:** Five new individuals joined the Board of Directors. They are Robert L. Carr, Pittsburgh, Pa.; Karen M. Kyritz, Golden, Colo.; Jan M. Laitos, Rapid City, S. D.; William V. McBride, San Antonio, Tex.; and Mary Ann Seibel, St. Louis, Mo.

Thirteen Board Members were returned for an additional term. They are Richard H. Becker, Oak Brook, Ill.; R. L. Devoucoux, Portsmouth, N. H.; Jon R. Donnelly, Richmond, Va.; Thomas J. Hanlon, Buffalo, N. Y.; H. B. Henderson, Seaford, Va.; Lee C. Lingelbach, Warner Robins, Ga.; Frank M. Lugo, Mobile, Ala.; James M. McCoy, Bellevue, Neb.; Edward J. Monaghan, Anchorage, Alaska; William C. Rapp, Buffalo, N. Y.; Walter Scott, Dixon, Calif.; Howard C. Strand, Marshall, Mich.; and Herbert M. West, Tallahassee, Fla.

In addition, six Under-40 Directors will join the Board for the coming year. Serving for the second consecutive year is Robert G. McCullough, San Antonio, Tex. The five new Under-40 Directors are Gary L. Brinner, Springfield-Decatur, Ill.; Maureen E. Gavin, Fitchburg, Mass.; Anthea L. Germano, Altoona, Pa.; Thomas J. McKee, New York, N. Y.; and Edward I.



**AFA's prestigious Donald W. Steele, Sr., Memorial Award for the "AFA Unit of the Year" went to the Cape Canaveral, Fla., Chapter. Chapter President Robert Reynolds, right, accepted the award from AFA President Marty Harris.**



Announcing:

# Above and Beyond— The Military Uses of Space

An Air Force Association  
National Symposium

November 14–15, 1985  
Vandenberg AFB, Calif.

An in-depth look at the broad spectrum of national security needs in space, from space vehicle and launch requirements to all aspects of the Strategic Defense Initiative.

Invited participants include Adm. William J. Crowe, Jr., Chairman, Joint Chiefs of Staff; the Hon. Edward C. Aldridge, Jr., Under Secretary of the Air Force; Gen. John L. Piotrowski, USAF Vice Chief of Staff; Gen. Robert T. Herres, Commander in Chief, United States Space Command; Gen. Lawrence A. Skantze, Commander, Air Force Systems Command; Gen. Larry D. Welch, Commander in Chief, Strategic Air Command; Lt. Gen. Forrest S. McCartney, Commander, Space Division, AFSC; and others to be announced. The program will feature special welcoming remarks by Maj. Gen. Jack L. Watkins, Commander, 1st Strategic Air Division, SAC; and Maj. Gen. Donald W. Henderson, Commander, Space and Missile Test Organization, AFSC. Special bus tours of Space Launch Complex Six (SLC-6) will be offered, and AFSC briefers will accompany each bus. The Symposium ticket price includes bus transportation to and from the Santa Maria, Calif., hotel.

And coming in January 1986—a broad-based review of tactical air warfare capabilities. A major National AFA Symposium in Orlando, Fla.

January 30–31, 1986



## REGISTRATION FORM

A 1985 Air Force Association  
National Symposium

### "Above and Beyond— The Military Uses of Space"

Vandenberg AFB, Calif.  
November 14–15, 1985

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Enclose \$40 for the additional ticket.



Wexler, who is from Savannah, Ga.

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 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,

## INTERCOM

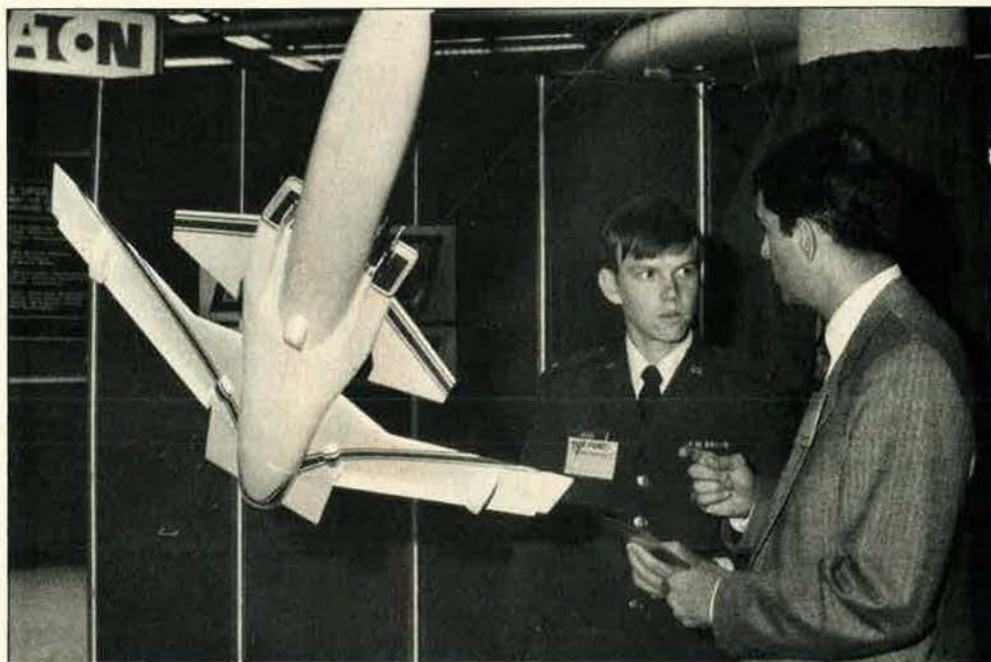
National Vice Presidents, and National Directors appears in "This Is AFA" on page 148.

• *Acknowledgments:* C. Cliff Ball, South Central Region Vice President, served as Convention Sergeant at Arms. Constitution Committee Chair-

man and National Director Edward J. Monaghan served as Parliamentarian. Credentials Committee members were Northeast Region Vice President John P. E. Kruse, Chairman; Cletus J. Pottebaum, Kansas State President; and John F. White, Massachusetts State President. The Inspectors of Election were permanent National Director James P. Grazioso, West New York, N. J., Chairman; William R. Berkeley, Redlands, Calif., permanent National Director; and Sam E. Keith, Jr., Fort Worth, Tex., permanent National Director.

With heartfelt gratitude, AFA salutes the tremendous volunteer con-

*A young lieutenant gets a brief introduction to the Grumman X-29 advanced technology demonstrator during the Aerospace Development Briefings and Displays. Both the Air Force and DARPA are now testing the X-29 at Edwards AFB, Calif.*



*The Air Attaché from the Federal Republic of Germany, Friedrich P. Busch, discusses Messerschmitt-Bölkow-Blohm's munitions dispenser with company officials during the Briefings and Displays.*



tributions by the following individuals: Norm Aubuchon, Jane Belanger, Cecil Brendle, Mark Connolly, Sean Habina, Chuck and Mary Lucas, Paul McLaughlin, Ann Monti, Dana and Kerry Spears, Wannii 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 and whose dedication and consistent, diligent efforts contributed to the success of the 1985 Convention. Your willingness to expend personal 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 1986 National Convention will be held at the Sheraton Washington Hotel in Washington, D. C., September 14-17. See you there!

—By Craig Lindberg

### Foundation Marks Year of Growth

The Aerospace Education Foundation culminated an important year of growth at the Foundation Luncheon held Monday of Convention week. More than 600 Foundation supporters attended the annual event, during which the Foundation's Chairman of the Board, Sen. Barry Goldwater, and Foundation President George D.

## Aerospace Education Foundation Fellowships

(Presented at September 16 Luncheon)

### Corporate Jimmy Doolittle Fellows

AT&T Technology Systems

Avco Corporation

The MITRE Corporation

### Individual Jimmy Doolittle Fellows

Gen. George Brown, USAF  
(in memoriam)

Bill Borchert Larson

Charles B. "Tex" Thornton  
(in memoriam)

Donald Beall, President of Rockwell International

Fort Worth Chapter

A. A. "Bud" West

Wilburt J. Sutton, Jr. (in memoriam)

Irene B. Keith (in memoriam)

Nicholas D. Lash (in memoriam)

Gen. Jerome F. O'Malley, USAF  
(in memoriam)

### Corporate Ira Eaker Fellows

McDonnell Douglas Foundation

LTV Aerospace and Defense Company

Hughes Aircraft Company

### Individual Ira Eaker Fellows

Mrs. George "Skip" Brown

Gen. George Brown, USAF  
(in memoriam)

Bill Borchert Larson

Brig. Gen. Vernon Chong, USAF

Lt. Gen. Kenneth L. Tallman, USAF  
(Ret.)

Col. George Weinbrenner, USAF (Ret.)

Col. Vance Marchbanks, Jr., M. D.,  
USAF (Ret.)

Col. Frederick D. Gregory, USAF,  
Astronaut

Mrs. Diane M. O'Malley (in memoriam)

Lt. Col. Mike Nisos, USAF (Ret.)

Hon. Stuart Symington

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## Aeronautics

### Shaping new ideas



*In January, AIR FORCE Magazine will present a special issue on **Aeronautics** that looks at developments in engines, airframes, and avionics and at the ways they will shape the future of the US Air Force. Senior Editor James W. Canan will report the viewpoints of key officials at USAF's Aeronautical Systems Division, and an ASD Systems Checklist will sort out the many projects under way, complete with program status and contractor listings. This valuable issue will be retained and referred to many times during the year. Among the other exciting features in the January issue will be John W. R. Taylor's Annual Aerospace Survey. Mr. Taylor, Editor in Chief of Jane's All the World's Aircraft, is a contributing editor to AIR FORCE Magazine and an internationally acclaimed analyst of aeronautical developments. This is an excellent issue for your advertising. Shelf life is long, and interest will be high.*

*Closing for reservations is November 22, copy is due December 4.*

**AIR FORCE**  
MAGAZINE



# INTERCOM

Hardy recognized the achievements of the past year and the contributors who made them possible.

A highlight of the Luncheon was the introduction of the Foundation's newest edition in the Aerospace Heritage Series, *Valor*.

"*Valor* compiles the individual stories of the men and women who built America's proud aerospace heritage," Mr. Hardy said. "I know you will enjoy reading the book and be moved by the stories."

A significant part of the Luncheon was spent honoring the people and corporations who made the work of the Foundation possible through their support of the General Jimmy Doolittle and General Ira Eaker Fellowship programs.

"The work of the Foundation is made possible by our Jimmy Doolittle Fellowship program," Mr. Hardy said. "The Ira Eaker Fellowship program, on the other hand, provides the resources that help perpetuate the rich aerospace history of our nation."

Mr. Hardy told the audience that there are now 439 individual and twenty-eight corporate Doolittle Fellows and ninety-eight individual and ten corporate Eaker Fellows. During the Luncheon, Senator Goldwater presented another twenty-seven new Fellowships. Corporate Doolittle Fellows invested at the Luncheon included AT&T Technology Systems, Avco Corp., and the MITRE Corp., while Hughes Aircraft Co., LTV Aerospace and Defense Co., and McDonnell Douglas Foundation signed on as corporate Eaker Fellows.

Generous support of the Foundation's Fellowship programs has enabled AEF to pursue two new initiatives—the Aerospace Education Center's Roundtables and the Partners in Education program.

"The purpose of the Roundtables is to increase public understanding of the importance of aerospace technology to our national defense and to our economic stability," Mr. Hardy told the audience. "Some of the topics we have explored include 'Educating for Leadership in Space,' 'Terrorism,' and 'The Integrity of the US Defense Industry,'" he added.

According to Mr. Hardy, the Foundation's new Partners in Education program will directly address the mission of the Foundation. "Through the

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Singer's presentation during the Briefings and Displays was once again one of the most popular. Attendees were given a look at the company's electronics division and then later allowed to "fly" an F-16 simulator.

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# INTERCOM

Partners in Education program, the Foundation will open a line of communication and cooperation between corporate America and our educational system," Mr. Hardy explained. "The program will help our educational system provide the nation with qualified scientists and engineers to fill the needs of our increasingly technological society."

As the Foundation expands with new programs, it continues its annual sponsorship of the Air Force Junior ROTC contest, which over the years has proved to be a most successful means of encouraging future aerospace and military leaders. During the Luncheon program, the JROTC unit from Heritage High School in Maryville, Tenn., received the winner's plaque and a check for \$2,000.

"The purpose of the contest is to supplement and reinforce the Air Force JROTC aerospace and leadership education courses," Foundation Vice President Dr. Eleanor Wynne told Luncheon guests. "This is the thirteenth continuous year that the Foundation has sponsored an Air Force JROTC contest," Dr. Wynne pointed out, "and we are very proud of this program."

This year's contest theme was "The History of Aerospace in Our Area." Sixty-eight JROTC units entered the

contest, and five finalists were selected. Each finalist is awarded \$500, and the overall winner is given an additional \$1,500. There are twenty Honorable Mentions.

The cadets from Tennessee won this year's contest with a sound-slide presentation titled "The History of Aerospace in East Tennessee." Heritage High School will use the \$2,000 first prize to establish a scholarship fund, according to the unit's Aerospace Science Instructor, Lt. Col. Glenn Marks, USAF (Ret.).

"I am glad to have the opportunity to congratulate the cadets from Tennessee," said Senator Goldwater, "on their fine work in this year's JROTC contest.

"The JROTC contest gives cadets the opportunity to dream new ideas, to show initiative, to work hard, and to make their own decisions," Senator Goldwater commented. "These are the qualities America demands of its leaders—not just in the military, but in industry, in science and engineering, and in our government.

"The Aerospace Education Foundation is dedicated to America's future—by encouraging youth to pursue careers in technology and science and by inspiring them with America's rich aerospace heritage," Senator Goldwater reminded the Luncheon audience.

Newly reelected AFA President Martin H. Harris also attended the Luncheon and took the opportunity to make several special AFA award presentations. Mr. Harris presented the AFA Outstanding Civil Air Patrol Cadet of the Year Award to Cadet Erik

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Brig. Gen. Vernon Chong accepts an Ira Eaker Fellowship from the Chairman of the Board of the Aerospace Education Foundation, Sen. Barry Goldwater (R-Ariz.), at the AEF Luncheon. General Chong's fellowship was sponsored by Gen. and Mrs. Ira Eaker.





**Northrop's Ventura Div. displayed a one-quarter-scale model of the BQM-74C unmanned drone and a model of the drone's Reconnaissance Payload Compartment as well. The Briefings and Displays are a perennial favorite at the AFA Convention.**

Nielsen of Gadsden, Ala., and the AFA Outstanding ROTC Cadet of the Year Award to Cadet Thomas Elton of St. Paul, Minn.

Mr. Harris also presented three Citations of Honor at the Luncheon. The honorees included MSgt. Judith Doran, Maxwell AFB, Ala., for her "professional and lasting contribution to the Air Force base-level NCO Preparatory Course program"; Dr. Richard Hallion, Jr., Edwards AFB, Calif., for "his talents and tireless activities in explaining the profession of arms and the heritage of the United States Air Force"; and renowned aviation artist William Reynolds of Waldorf, Md., for his "exceptional portrayals of aircraft and events that have given significant visual dimension to the rich aeronautical history of our nation."

A number of special guests attended the Luncheon, including two of America's most famous test pilots, Scott Crossfield and Brig. Gen. Chuck Yeager, USAF (Ret.). Also attending the event were the Air Force Assistant Secretary for Manpower, Reserve Affairs and Installations, the Hon. Tidal McCoy; Tennessee Congressman John J. Duncan; and several of the Tuskegee Airmen, including their immediate past President, Col. Charles McGee, USAF (Ret.).

Another important Foundation activity took place on Tuesday of Convention week as the Foundation's Board of Trustees met to discuss plans for the coming year and to elect officers. Four incumbent officers were reelected. They include Sen. Barry Goldwater, Chairman of the Board; George D. Hardy, President; Dr. Eleanor Wynne, Vice President; and Jack B. Gross, Treasurer. Newly

elected as Secretary was John R. Alison, an AFA National Director, who replaces Alton G. Hudson. President Hardy presented a special leather-bound copy of *Crusade for Airpower* to Mr. Hudson for his year of dedicated service to the Foundation.

—By Mark Moore



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## HOW AFA CHAMPLUS® WORKS FOR YOU!

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- 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. (There are some exceptions for older age children. See "Exceptions and Limitations".)

### 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.
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- 3) Up to 30 days care per insured per year and up to 60 days lifetime in a

CHAMPUS-approved Residential Treatment Center.

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- 5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

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### 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 Age 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 Age 65 so there will be no lapse in coverage. However, no Medicare supplement benefits can be issued to residents of the state of Georgia.

#### 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 \$7.10 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS® pays the \$7.10 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 \$7.10 per day, whichever is greater.	CHAMPLUS® pays the greater of \$7.10 per day or \$25 of the reasonable hospital charges not covered by CHAMPUS
Inpatient military hospital care	The only charge normally made is a \$7.10 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS® pays the \$7.10 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.



# Against Costs CHAMPUS Doesn't Cover

## 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.



## EXCEPTIONS & LIMITATIONS

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 24 consecutive months, pre-existing conditions will be covered regardless of prior treatment. Children over age 21 (age 23 if in college) will continue to be eligible if they have been declared incapacitated and if they were insured under CHAMPLUS® on the date so declared. Coverage for these older age children will be provided at slightly higher rates upon notification to AFA.

## 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, orthopedic 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	\$21.88	\$27.35	\$14.85
50-54	\$32.70	\$40.88	\$14.85
55-59	\$39.78	\$49.73	\$14.85
60-64	\$45.80	\$57.25	\$14.85

#### Inpatient and Outpatient Benefits

	Member	Spouse	Each Child
Under 50	\$30.82	\$36.98	\$37.13
50-54	\$42.35	\$50.82	\$37.13
55-59	\$56.01	\$67.21	\$37.13
60-64	\$64.48	\$77.38	\$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 \$18 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 \_\_\_\_\_ Form 6173GH App.

Application must be accompanied by a check or money order. Send remittance to:  
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Bob Stevens'

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READY TO JETTISON... 10, 9, 8, ...





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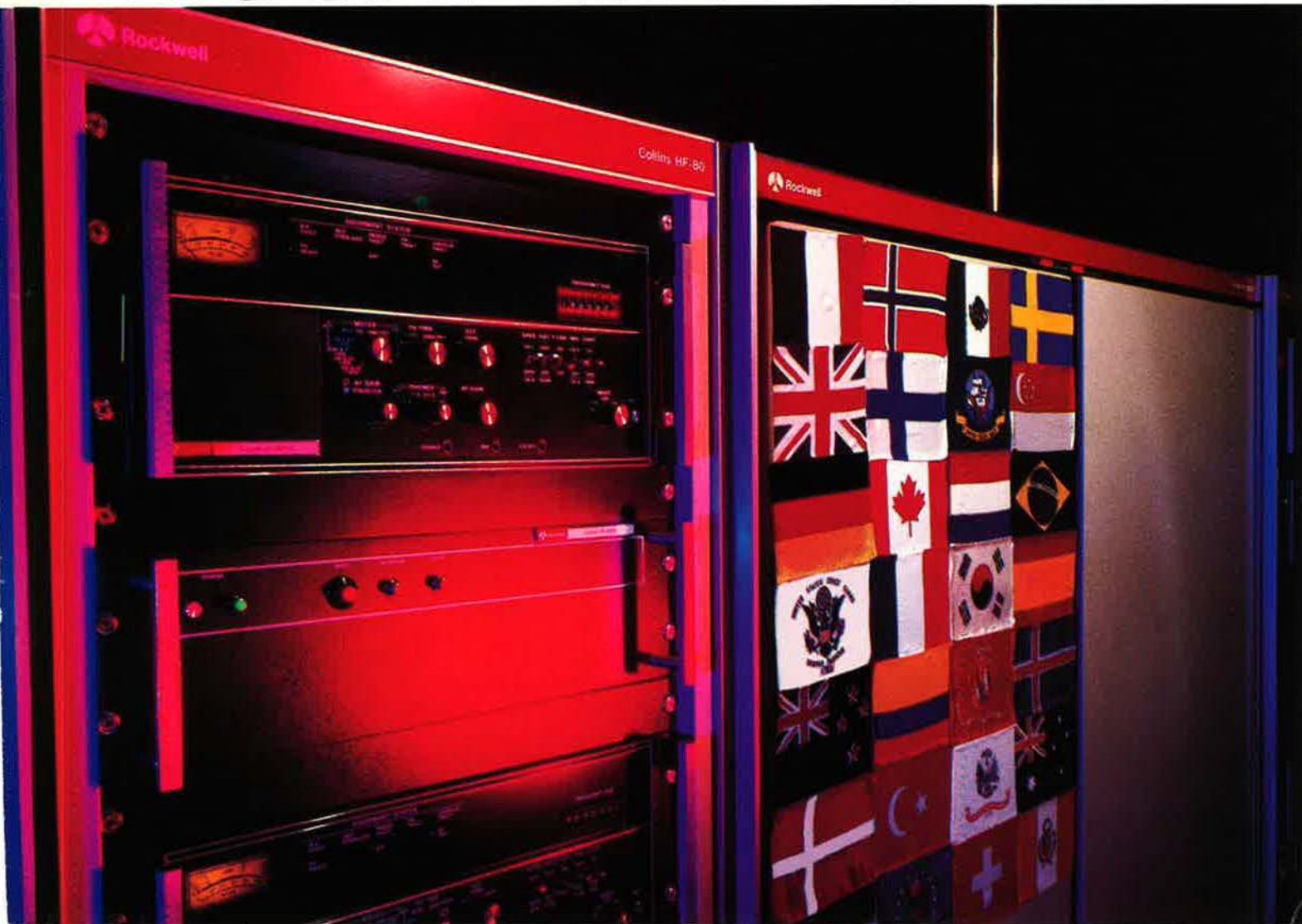


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