APRIL 1983/$1

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

FROM ANDERSEN TO ZWEIBRUCKEN
USAF WORLDWIDE

Special Travel Section:
OVER HERE & OVER THERE

The GE technology edge: durable fighter turbofans with turbojet characteristics.

GE engines — now in production or flight test — are truly setting new standards for fighter turbofans.

• **OPERABILITY:** Pilots report that F404 and F110 turbofans behave like General Electric's famed J79 fighter turbojet. As one pilot said, "I can really fly the aircraft up to its capabilities." And unlike competitive engines, both the F404 and F110 can operate throughout the entire flight envelope with no throttle restrictions.

• **DURABILITY AND RELIABILITY:** Because of preeminent hot section technology, including machined ring combustors and single-stage turbines, GE engines offer two to three times the hot section life of any other engine in service. An F110 test engine recently completed 5000 TAC cycles . . . the equivalent of 2500 F-16 mission hours!

• **OPERATING COSTS:** Simplicity — plus the durability that comes from advanced technology — provide low maintenance costs. General Electric engines have a preeminent record: The J79 removal rate in the F-4 is three per 1,000 flight hours. The TF34 in the A-10 is under two per 1,000. And the F404 and F110 are on track for two per 1,000 — three times better than competitive turbofans.

• **ENGINES OF CHOICE:** With performance like this it's no wonder General Electric engines are becoming a preferred source of power.

The 16,000 lb. thrust class F404 is in service with the U.S. Navy/Marine F/A-18 and Canadian CF-18 and will power the Australian and Spanish F/A-18s. The F-20 Tigershark and Swedish Gripen aircraft are fitted with 17,000 and 18,000 lb. thrust class versions of the F404.

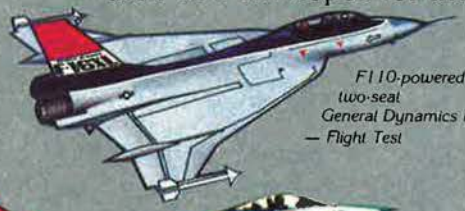
The F110, a derivative of the F101 developed for the U.S. Air Force B-1, is in the 27-29,000 lb. thrust class. Funded to provide competitive production in the large fighter engine class, this engine has participated in outstandingly successful flight test programs in both the USAF F-16 and USN F-14. It is now flying in a General Dynamics F-16XL aircraft, a two-seater.

When you add it all up, it all comes down to a single word: performance.

F404-powered Northrop F-20 Tigershark — Flight Test

F404-powered McDonnell Douglas F/A-18 — Production

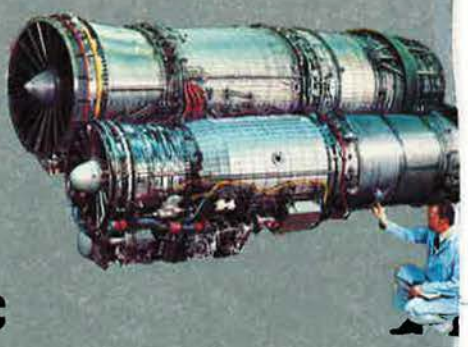
F110-powered Grumman F-14 — Flight Test



F110-powered two-seat General Dynamics F-16XL — Flight Test

F110-powered General Dynamics F-16 — Flight Test

Great Engines From General Electric's Advanced Technology



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APRIL 1983
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About the cover: Four F-15 Eagles swoop down near Bavaria's Castle Neuschwanstein—just one of many scenic backdrops for the worldwide Air Force. (USAF photo by MSgt. Rick Diaz)

Special Section: The Air Force Worldwide

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Behind each spec expert operations

Lockheed knows how.

Great as the NASA Space Shuttle's achievements have been thus far, it is now poised for even more impressive strides. Soon it will take us into the era of regular, frequent space operations. Success in that era requires operations management of the highest order for between-flight processing.

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lized fleet: management.

for the F-104 training program at Luke Air Force Base. Those successes are based on a broad, deep team of highly efficient, professional managers.

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Titusville, Florida

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AN EDITORIAL

Modest but Meaningful

LAST month we noted that Secretary of Defense Caspar Weinberger was wide of the mark in justifying and explaining the Administration's proposed 1984 freeze on military pay. We suggested that he and other civilian leaders consult the uniformed service Chiefs, and also seek inexpensive ways to offset the bad effects of the freeze.

Here are a few things that could be done by the Administration along those lines. They cost either nothing or very modest sums. But these measures would be meaningful in showing military people that their leaders support them.

First, a couple of "don'ts." Don't continue giving lip service to personnel topics as has been characteristic of Administration testimony before Congress thus far. Both the Members of Congress and the troops see through that, and feel deceived. Second, don't try to claim that pay comparability has been reached when it has not. This shatters credibility, casting doubt on every personnel statement.

Now for positive matters. Support family programs that the Air Force and other services have begun. Child-care centers, for instance, require construction funds to bring them up to minimal standards for health, fire, and safety. But that is money well spent, really contributing to readiness, because so many young parents need to use the centers when they are on the job.

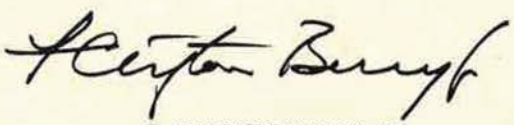
Eliminate inequities for persons stationed overseas. Example: support the bill offered by Rep. G. William Whitehurst (R-Va.). As rules now stand, dependents of overseas military families who are attending school in the United States have lowest priority (essentially none) for space-available flights to join their families. Yet dependents of civil service and foreign service sponsors overseas are granted higher priorities under existing rules. Mr. Whitehurst wants to ensure that military dependents have the same status as their civil and foreign service counterparts. Estimated cost: less than a million dollars annually.

Develop ways to reduce the injustices surrounding PCS travel. Example: the Air Force has established that the average middle-grade airman is out of pocket between $1,200 and $1,500 on a PCS move. That's a cruel financial punishment that should not have to be borne by our young people.

Quit eroding the retirement system. Acknowledge that it is a unique system that is a major incentive to loyal service. The attacks on it, and the feeling of broken contracts, are major concerns of our military people.

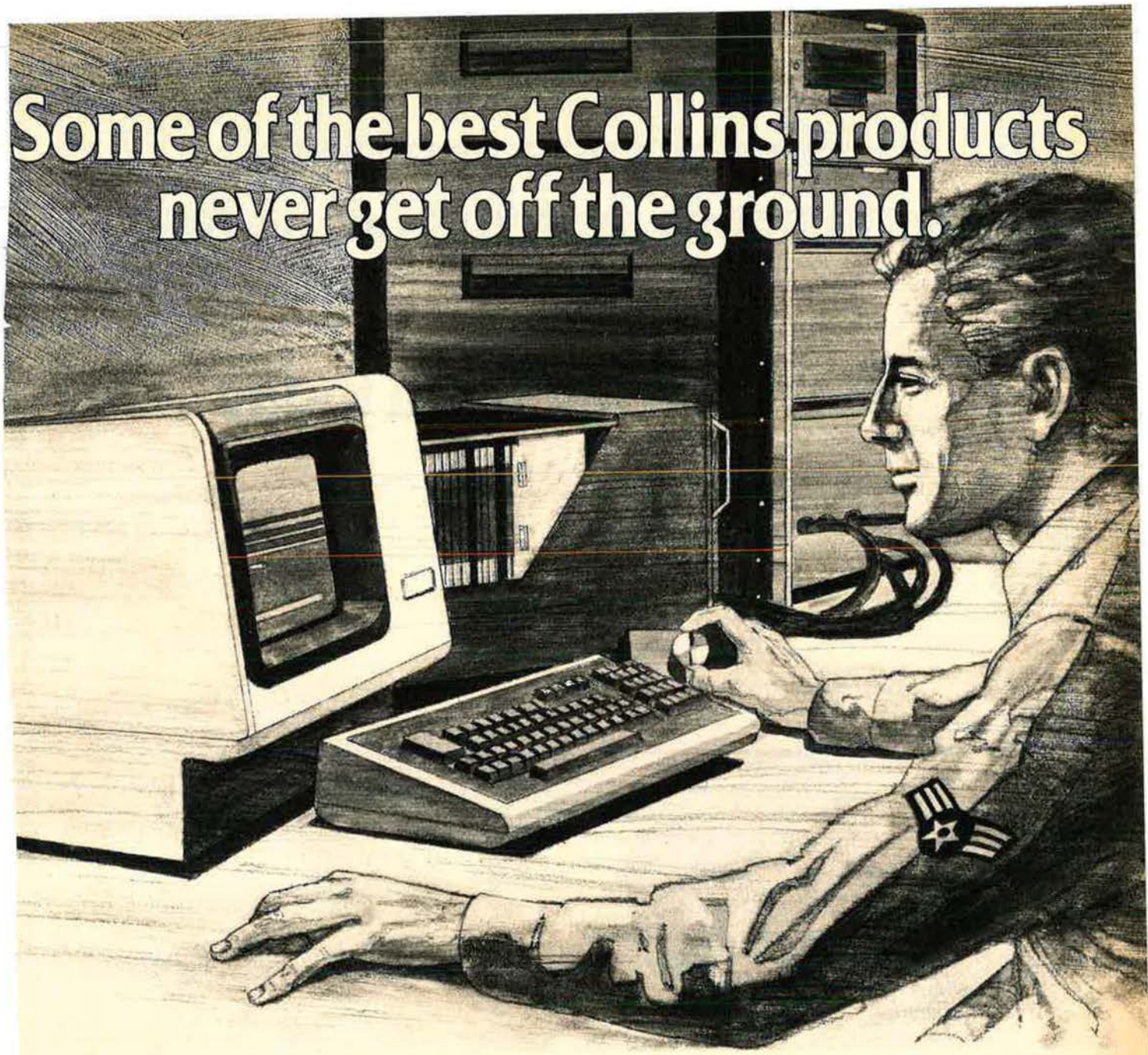
Basically, both uniformed and civilian leaders can ameliorate the impact of the pay freeze if they are honestly interested in, and actively support, the men and women serving in the armed forces. It must be an honest interest, not lip service.

Right now, the Administration is perceived as obsessed with weapons and uncaring about the people who use them to defend the nation. That must change, and it can, without spending billions of scarce dollars.



F. CLIFTON BERRY, JR.
EDITOR IN CHIEF

Some of the best Collins products never get off the ground.



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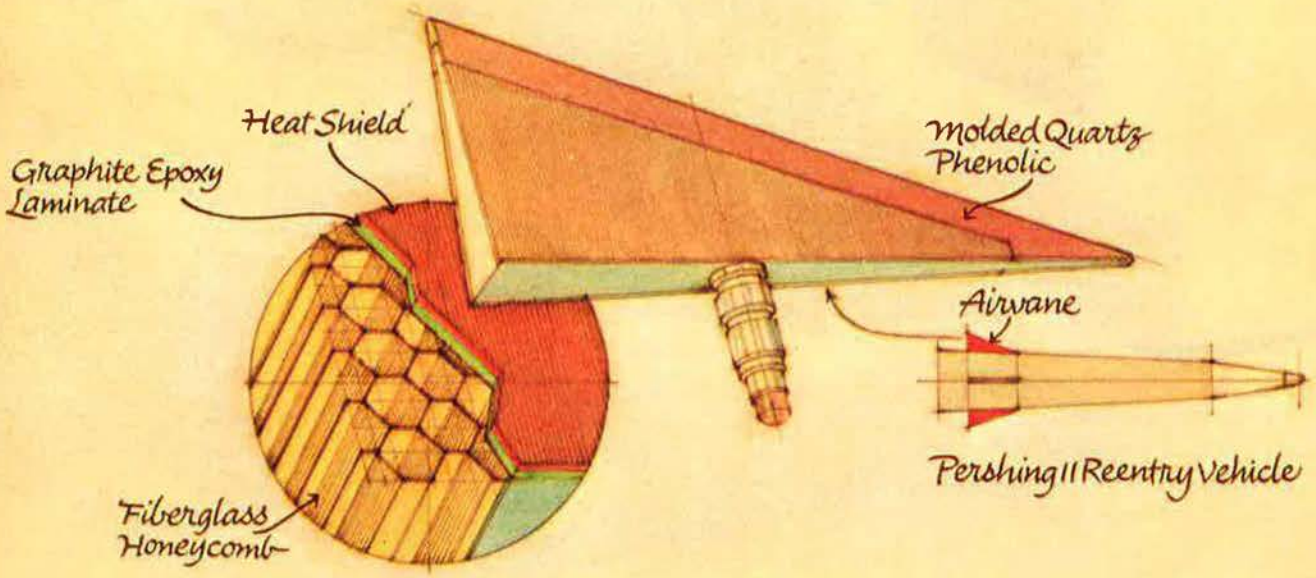
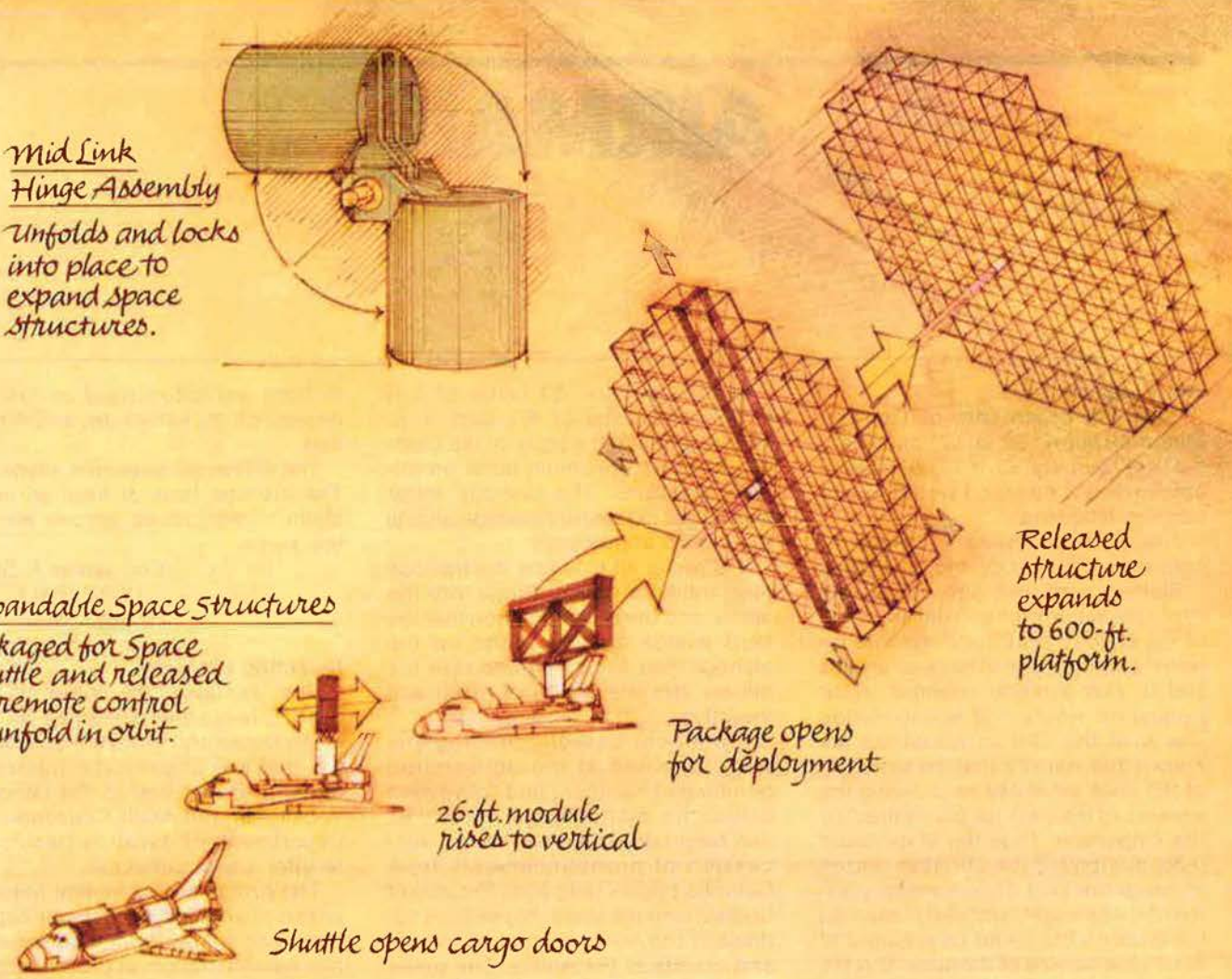


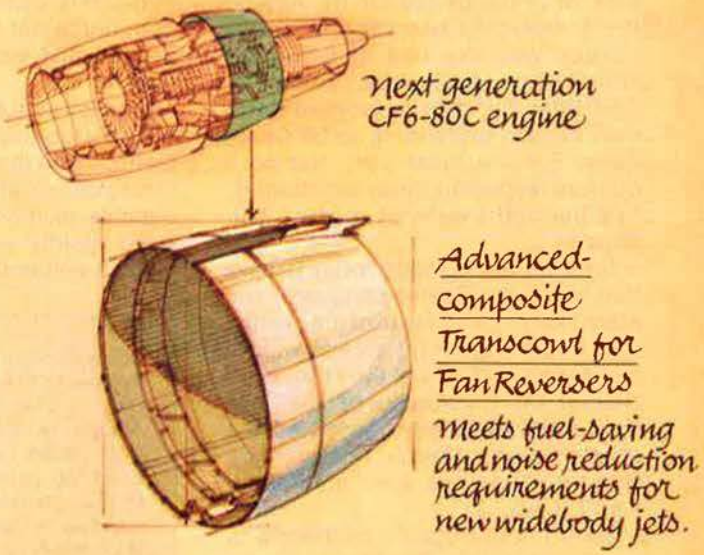
Composite Pershing II Airvane
25% weight saving increases performance of reentry vehicle.

Reducing weight while increasing serviceability and strength are prime requisites in future defense and aerospace systems.

Looking toward this need, Martin Marietta is combining new production technologies with innovative design and testing techniques for graphite/epoxy composites.

For example, unique arrangements of many different composite fabrics and honeycomb materials are involved in the precision manufacture of fan reversers for the next generation of commercial transports and their military counterparts.





Composites also play an important role in the Navy Vertical Launch System (VLS) and the Air Force mobile MX missile. And we're conducting independent research and development programs on the use of composites in large orbiting space structures.

In more than 30 years of developing successful systems, we have backed the vision of our people with the facilities to transform concepts into realities. Composites are but one case in point.

MARTIN MARIETTA

Martin Marietta Aerospace
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AIRMAIL

The Freeze

With the comments of General Milton *(January '83, p. 67)* and Colonel Duff *(January '83, p. 11)* all reasonable men will concur. I would like to add the following:

The bishops need a refresher course in (1) theology and (2) history.

Sixteen centuries ago, Augustine explicitly acknowledged the authority of the state to arrest and execute internal enemies, and to raise up armies and to slay external enemies. What Augustine would *not* acknowledge was what the Church would *not* acknowledge, namely, that the authority of the state extended to ordering the worship of the state (as personified by the emperors). Thus the state could (and did) require the Christian citizen to serve the civil and/or military authority; this might (and did) mean that the citizen's life could be required of him in the service of the state. But the state had *no* authority to tell the citizen what God to worship. . . .

Augustine's tenure as Bishop of Hippo was contemporary with the sack of Rome by the Goths. Among the historical observations he recorded was the use of Christian churches as sanctuaries, not only by Christians but also by cowardly Roman pagans pretending to be Christians. For the most part, the conquerors respected these sanctuaries. And the Goths were, of course, "barbarians."

Now, do the bishops today believe that when the Soviet conqueror (or, more likely, one or more of his clients) sacks Washington his troops will respect the sanctuary of the churches? Neither the Bolsheviks of 1917 nor their heirs have ever respected the sanctuary of a church, nor will they. But the Russians are "civilized," aren't they?

Send the bishops on sabbatical to the Soviet Union. There they will certainly get an up-to-date refresher course in both theology and history. But will they be allowed to come back and tell us about it?

Col. John M. Verdi,
USMCR (Ret.)
Santa Ana, Calif.

In the January '83 issue of AIR FORCE Magazine *(p. 67)*, Gen. T. R. Milton spoke to the issue of the Catholic bishops' upcoming letter on nuclear weapons. The bishops' letter should get extensive coverage and its full import appreciated.

It is not at all true that the bishops have trailed a radical fringe into the arena, and the silly intimation that the KGB wields a secret hand on the bishops' pen serves only to take the debate into the region of insult and invective.

Prominent Catholic theologians were horrified at the obliteration bombing of Hamburg and Tokyo even before the destruction of Hiroshima and Nagasaki. There has been a succession of pronouncements from Catholic bodies (and from Protestant bodies) over the years. Popes have addressed the issue in front of the UN and on site at Hiroshima. The priest who blessed the *Enola Gay* has done public penance in sorrow for his blindness.

Out of Vatican Council II in the mid-1960s came a Catholic Church committed not only to social justice, but to active work in seeking its realization. . . .

I think it should be emphasized that a direct confrontation between the bishops and the government over nuclear policy is at hand. It appears inescapable to me that this conflict will build rapidly and will become radicalized and embittered quickly if the bishops are categorized as fools or dupes, or as somehow anti-American.

The stakes are awesome, planetary. The bishops have at least as much claim to wisdom as anyone else on the scene.

Col. James F. Berry,
USAF (Ret.)
Raleigh, N. C.

Submissions to "Airmail" should be sent to the attention of the "Airmail" editor, 1750 Pennsylvania Ave., N. W., Suite 400, Washington, D. C. 20006. Letters should not exceed 500 words, and preferably be typed. We reserve the right to condense letters as necessary. Names will be withheld on request, but unsigned letters are not acceptable. Because of the volume of letters received, it is not possible to print all submissions. Please allow lead time of *at least* two months for time-sensitive announcements.

Scientific Illiteracy

The January '83 issue of AIR FORCE Magazine contained an article by Secretary of the Air Force Verne Orr that was of particular interest to me and to our staff in the Office of Vocational and Adult Education, US Department of Education. I would like to offer a few comments.

The problem of scientific illiteracy is also of great concern to our department and is now being addressed by this Administration, at the highest levels. However, it is a problem of which the field of vocational and technical education has always been aware, since our programs' main purpose is to prepare students for jobs as they currently exist and as they will exist in the future.

Secretary Orr, taking the long view, states that the military services will experience considerable difficulty in recruiting and retaining persons with a variety of skills during the coming decade. I believe that he and others who may read this letter will find the vocational-technical education community to be both a means for training and a source for recruitment. . . . [This community is] organized and equipped to offer advanced skills programs that are pertinent to our defense establishment.

I am aware that the Air Force itself has an excellent training component, of which it is rightfully proud. Vocational-technical education in no way views itself as a substitute for such military training resources—instead, as a supplementary resource, as needed and requested by the service concerned.

Last fall, the Department of Defense and the Department of Education jointly offered a two-day seminar on

vocational education and defense preparedness. This seminar implemented an exchange of ideas between Secretaries Weinberger and Bell, which is leading to other forms of interagency collaboration. All of the military services, plus the defense industrial base, were represented. They heard (and actively contributed to) a series of project presentations that highlighted ways in which the military, the private sector, and the vocational-technical education community were collaborating to relieve shortages. . . .

The proceedings of this seminar . . . will be available to both civilians and the military in the very near future. . . . Inquiries may be directed to Dr. Howard Hjelm, Office of Vocational and Adult Education, Department of Education, ROB-3, Rm. 5044, 7th and D Sts., S. W., Washington, D. C. 20202.

In conclusion, I can assure you that vocational-technical education will do all in its power to assist in answering the defense establishment's needs for skilled personnel. Our system is anxious to establish effective collaboration at all levels.

Robert M. Worthington
Ass't Secretary for
Vocational and Adult
Education
Dep't of Education
Washington, D. C.

Brown's Folly?

There are obvious weaknesses in the statements by former Secretary of Defense Harold Brown *(February '83 issue, p. 17)* concerning the possible vulnerability of our SSBN fleet to Soviet missile attack in the 1990s. The comments were that a barrage attack by 400 one-megaton warheads could destroy an SSBN with a position location uncertainty (PLU) of 100 miles, and that "the Soviets need only acquire 10,000 warheads with a one-megaton yield" to destroy all twenty-five of our SSBNs normally on station.

Any nuclear weapon basing system can be overloaded if one assumes that the enemy has an unlimited number of deliverable warheads. Making such an assumption, however, does not contribute to rational debate concerning our deterrent capability. Dr. Brown's statement postulates a massive Soviet missile buildup isolated from our response to such a buildup. This rivals the concern by nuclear freeze advocates with our nuclear weapons in isolation from Russia's [weapons].

Dr. Brown also ignores the low cost-effectiveness of such a Russian threat to our SSBNs, which entails the use of 10,000 warheads to destroy 4,000 warheads. . . .

Finally, there are long-term environmental consequences of such a profligate use of nuclear weapons . . . that would probably be unacceptable to the Russian leadership. [A study] by the National Academy of Sciences considered the effects of nuclear weapons and came to some surprising conclusions. The most notable was that the creation of vast amounts of oxides of nitrogen would drastically reduce the amount of ozone in the upper atmosphere, which would greatly inhibit agriculture. Global temperatures would drop by approximately one degree centigrade, which would terminate large-scale wheat growing in Canada and most, if not all, of the Soviet Union.

The barrage attack upon our SSBNs described by Dr. Brown involves exactly the same megatonnage as that of all the weapons in the war assumed in the above study.

The decrease in atmospheric ozone from a war involving 20,000 megatons of nuclear detonations would be catastrophic. The temperature decrease would so reduce the growing season in the Soviet Union as to imperil the production of most food crops there. The latter alone might destroy the Soviet Union as an organized state.

The brute force approach to strategic warfare problems has limitations, which are well illustrated in Dr. Brown's scenario. Even his other comment that twenty-five one-megaton weapons could attack an SSBN with a PLU of twenty-five miles with a high probability of success is open to criticism. If the Russians can eventually track our SSBNs with only a twenty-five-mile uncertainty, then the SSBNs will be vulnerable to a lot more than just strategic missiles.

Thomas M. Holsinger
Turlock, Calif.

Gift From the Gods?

With all due respect to [TAC Commander] Gen. W. L. Creech, I would suggest that he have a conversation with his Marine Corps counterpart as to the capabilities of the AV-8B *(January '83 issue, p. 83)*.

Operating with a 1,000-foot or less takeoff roll and no landing roll, the AV-8B will carry any payload up to 9,500 pounds an equal or greater distance than can the F-16 or A-10, on roughly the same amount of fuel. On a stormy night, the AV-8B will be the only one of the three to deliver its ordnance accurately, and the only one to recover on a bombed-out runway without extensive electronic assistance and some kind of arresting gear.

I fail to see how the AV-8B would be at any more of a "severe disadvantage against [modern] Soviet fighters" than would be an F-16 in an attack role or—heaven help us—an A-10. It is true that the F-16 and A-10 are credited with a larger ultimate short-range payload than the AV-8B, but remember, the AV-8B will always be operated with a 300-meter or less runway. If you're willing to use a longer takeoff roll, the AV-8B could carry just as much as an F-16 or A-10 and still use less space.

Put another way, the range/payload of the F-16 or A-10 is a mere fraction of the AV-8B's when operating from the places an AV-8B can operate from.

When all of General Creech's TAC personnel are busy shoveling dirt into the holes in their bombed-out runways and taxiways, maybe some will look up at the AV-8Bs flying by and wonder if the Marines or RAF will loan them a couple.

C'mon USAF, V/STOL is not a tool of the devil. It might just be a gift from the gods.

Art Hanley
Carmichael, Calif.

Blacks in US Aviation

I applaud your articles on "Blacks in US Aviation" in the January and February '83 issues. They were an enjoyable, entertaining, and relevant collection of US history that is seldom mentioned.

America's claim to greatness has resulted from a concerted effort on the part of all of its citizens—regardless of race, creed, etc. Furthermore, our maintenance of our position in the free world is directly contingent on the continuance of all Americans "working together getting things done."

Again, I applaud your articles, and pray God's richest blessings on such future endeavors.

1st Lt. Melvin Waters, USAF
Indian Mountain AFS, Ark.

The Black Sheep

Re: Lt. Lance Charnes's letter, "The Black Sheep?" in the February '83 issue *(p. 9)*.

Although I am now a Reservist and married, I experienced similar feelings and frustrations as a single officer while on active duty. Singles activities were few, and mainly oriented toward younger enlisted members.

Fortunately, there are now an increasing number of singles groups in the civilian community that provide a wide range of social and support activities. Many are church-sponsored but usually don't force-feed religion with their singles programs. They

provide an excellent opportunity to broaden one's circle of friends and to get to know the community "outside the gate."

I feel that chaplains and base MWR managers are missing a great opportunity by not assisting and encouraging military personnel to discover and to participate in community singles programs. Small, isolated bases are at a disadvantage, but even these could arrange periodic visits to areas with active programs.

A more visible effort to assist the single military member could enhance community relations and improve the health, morale, and quality of life for that "other thirty-five percent" of the Air Force family.

Name withheld by request

Still Mighty Eighth

The other day the engineer/gunner of my World War II bomber crew, Clifford A. Bodin, sent me a copy of your article, "The Still Mighty Eighth," which was in the December '82 issue. He asked that I make special note of the first paragraph, last word: *Virgo*.

I couldn't help but think that you might enjoy getting a letter from the man who was aircraft commander of *Virgo* so many years ago.

The 834th Squadron of the 486th Bomb Group was known as the Zodiac Squadron. Twelve of our planes (of course, the squadron had more than just twelve B-24s) had the twelve signs of the zodiac, and I had the honor of being the pilot of *Virgo* from the time she left the States until our Group changed to B-17s. I add quickly that I also had the honor of being the pilot of the best damned crew in the Eighth Air Force!

My crew had lost all contact with each other when we left England in 1944 until 1979, when I found my waist gunner. With the most wonderful luck we have now found all but two men—the nose gunner, James H. Baker, and the crew chief, Marvin H. Wickline. Does anyone have any information on the whereabouts of these two?

To the Mighty Eighth!

Maj. J. Charles Macgill, USAF (Ret.)
801 Revere St.
Aurora, Colo. 80011

The Wright Flyer

Re: Your "Aerospace World" item *(February '83, p. 25)* on the replica of the Wright brothers' 1911 "B" Flyer.

I would like to comment that it is very fortunate for aviation that Orville and Wilbur did not take seven years and require 500 men and women and

AIRMAIL

200 companies to build the original. I believe they built it in about four months.

I have heard of cost overruns and padded payrolls, but this is something else. The government must have had something to do with it.

Kidding aside, the people who accomplished this feat are to be commended. I hope that some of the other vanished aviation milestones can be reproduced.

Robert W. Fuehr
Alhambra, Calif.

Oops! (Part I)

The January '83 issue of AIR FORCE Magazine contained an article entitled "Our Thousand Aces in the Hole" *(p. 64)*. There was one area that was misrepresented. The training for Minuteman and Titan missile combat crew officers and NCOs is accomplished at Vandenberg AFB, Calif., not Chanute AFB, Ill. This training is done by the 4315th Combat Crew Training Squadron. I would like to provide you with the following information on our squadron.

The members of the 4315th train all missile crew members manning Strategic Air Command's Minuteman and Titan II launch complexes. The squadron also conducts instructor and missile staff courses, including the Ballistic Missile Staff Course for key civilian agencies and Department of Defense personnel.

Every SAC missile combat crew member is an alumnus of the 4315th "Missile Operations University" Initial Qualification Training (IQT) program. The Minuteman IQT produces mission-ready crew members on graduation. Under this program, students are ready to assume their alert duties with only a short orientation course at their operational missile wings. Titan II IQT graduates, while not trained to the mission-ready level, are prepared to enter upgrade training on arrival at their missile wings.

The 4315th people train approximately 800 crew members each year. But training is not limited to the crews. They also train instructors for the missile career field. . . .

To accomplish its mission, the 4315th CCTS has more than 200 officers and NCOs assigned. Each is a carefully selected specialist with extensive field experience in either missile operations or maintenance. All instructors have either standardization and evaluation or instructor experience.

This one-of-a-kind squadron has taught the basics of missile procedures and operations to more than 16,000 SAC missileers since 1963.

Capt. John R. Henninger III, USAF
Vandenberg AFB, Calif.

Oops! (Part II)

While perusing the February '83 issue of AIR FORCE Magazine, I noted on page 18 in the "In Focus . . . " section that you have removed Sen. Steve Symms from his home in Idaho and transferred him to the state of Wyoming.

After the electorate in Idaho put him in the Senate, I don't believe they would take kindly to your removal of the Senator to our sister state.

Judge George W. Hargraves
Pocatello, Idaho

Town of New Roads

A New Roads women's organization, the Mothers' Culture Club, has been searching for the past year for a particular B-25. In 1943, this organization sold $300,000 in war bonds and stamps to buy a B-25. This plane was named *Town of New Roads*. We would like very much to locate this plane and bring it home. Our entire community has become very enthused about this project, as every family feels it shared in the purchase of the plane.

At the outset of our search, we wanted not only to find the plane but also wanted the history of its crew and missions. This is still our ultimate goal. But, at this point, we would accept any similar plane for display in our community. . . .

Thus far, our efforts have been fruitless, except for one response. A Florida resident . . . recalled seeing our plane in 1947. As a member of the Eighth Air Force stationed in Osaka, Japan, he was part of a crew that put our plane in mothballs there. We are unable to trace the plane any further. . . .

Any assistance readers might give us would be greatly appreciated. The aircraft and/or its history would mean so very much to us as a monument to the patriotism and gallant efforts of our citizens in the 1940s.

Bettie B. Capps
President, Mothers' Culture Club
P. O. Drawer 580
New Roads, La. 70760

801st/492d Bomb Group

To aid me in a forthcoming book on

the Carpetbagger Group designated the 801st Bomb Group (Provisional), and later (August 1944) redesignated as the 492d Bomb Group, flying out of Harrington, England, Station 179—I am seeking all members who were in the 856th, 857th, 858th, and 859th Squadrons. I am also seeking members of 36th and 406th Squadrons of the 801st Bomb Group. . . .

I am also seeking information on the whereabouts of the former Group COs of the 492d Bomb Group: Col. Clifford J. Heflin, Lt. Col. Robert W. Fish, Col. Hudson D. Upham, and Lt. Col. Jack M. Dickerson.

The Group flew black B-24 Liberators, plus an assortment of other aircraft. Around 3,000 sorties were flown with 4,511 tons of equipment dropped, along with a total of 556 agents dropped into Occupied Europe.

I would appreciate any information and records pertaining to the group during August 1943 to October 1945. Please contact me at the address below.

Sebastian H. Corriere
4939 N. 89th St.
Milwaukee, Wis. 53225

AFROTC Det. 157

AFROTC Detachment 157 at Embry-Riddle Aeronautical University will be hosting a special Tenth Anniversary Dining-Out and Pass and Review Ceremony this April 9.

We are currently trying to contact all alumni; however, we are running into problems in finding current addresses. Would all former members please contact the address below?

Attn: Alumni Project Officer
AFROTC Det. 157
Embry-Riddle Aeronautical University
Daytona Beach, Fla. 32014

Where Are You?

I was a member of the US Army Air Forces from 1942 to 1945. My career ended after I was wounded over Austria in February 1945. I was a member of the 464th Bomb Group, 777th Bomb Squadron, Fifteenth Air Force, and served as a flight engineer on a B-24. There were ten members in our crew.

Last August, at a 464th reunion, five of us met by accident. This was the first time that we had seen each other since 1945. We are now trying to locate the rest of the crew. We know that two of them are deceased, and we are trying to find the other three.

They are: Joseph B. Summers, Daniel E. Murphy, and John P. O'Toole.

I would greatly appreciate any infor-

mation readers may have about these men. Please contact me at the address below.

George Geraci
14300 S. Knox Ave.
Midlothian, Ill. 60445

We are looking for Lt. Col. Richard Verdier, who served as Chief of the Supply Division at the 3d Strategic Air Base, Eighth Air Force, at Watton, England, in 1943–45.

More than 650 former members of the installation are planning a seventh reunion, to take place this July in Chicago. We would like this officer to attend. Please contact the address below if you have any information as to his whereabouts.

Lt. Col. Matthew W. Doyle, USAF (Ret.)
416 Wycliff Ct.
Melbourne, Fla. 32935
Phone: (305) 242-1124

I am a former B-17 pilot with the 384th Bomb Group. On September 16, 1943, our plane was shot down over occupied France, and seven of our crew survived.

After all of this time we are now getting together for a crew reunion in late spring or early summer. None of us can locate our former copilot, Herman Wollenweber. He lived in Chillicothe, Ohio.

Any readers having any information about his whereabouts can contact me at the address below.

Johnny A. Butler
Box 3010
Arcadia, La. 71001
Phone: (318) 263-8793

I would like to contact one of my husband's service friends to let him know that my husband has passed away. I understand that this person is only recently retired from the Air Force, and might still be doing some type of work for the service.

His name is Mallory W. Mitchell. His last address, as of a year or two ago, was in San Diego, Calif.

I'd be ever so grateful for any help that readers might be able to provide.

Elia Bolton
5412 Newburg Rd.
Rockford, Ill. 61108

I would like to locate anyone who knows the present address of Warrant Officer Clifford W. Barman. He is believed to have retired in the Panama City, Fla., area. Any help would be appreciated.

Please contact the address below.

George W. Owens
2461 W. Ball Rd., #19
Anaheim, Calif. 92804

AIRMAIL

Collectors' Corner

My son and I collect USAF patches and, as such, are most willing to accept all donations.

However, in the spirit of collecting, we are willing to trade one of our Air/Ground Operations School patches for each wing, group, squadron, or weapon systems patch sent. We have a limited number to trade, so the exchange is on a first-come, first-serve basis. We will return those patches that we cannot exchange for AGOS patches if requested by sender.

Please send any patches to the address below.

Fred R. Franzoni
47 Hume Dr.
Hurlburt Field, Fla. 32544

I am a collector of US Air Force unit patches.

I need the following patches for my collection: Northeast Air Command (NEAC), Military Air Transport Service (MATS), USAF Security Service (USAFSS), and any patch of the 6607th Air Base Wing or the 6607th Field Maintenance Squadron.

Anyone who would like to donate or sell these patches, please contact me at the address below.

Rex Coots
4941 Glenn St.
Rapid City, S. D. 57701

I am a former member of the 58th Bomb Wing, which ultimately became a part of the Twentieth Air Force. . . .

I would like very much to locate some Twentieth Air Force shoulder patches for sentimental reasons. I am also looking for patches from the 468th "Billy Mitchell" Group.

Please contact the address below.

LeRoy Armstrong, Jr.
P. O. Box 821
San Jacinto, Calif. 92383

I have been trying, without success, to acquire an issue type of gunner aeronautical badge awarded in the early 1940s.

It is my intention to give one to an Australian friend who took his training and received the rating as a gunner here in the US, but who recently lost his valued badge. He dearly prized this emblem of his training, qualification, and war service, and would be most pleased to have it duplicated.

Anyone having such an item or willing to help in this matter should contact the address below.

Lt. Col. Horace S. Levy, USAF (Ret.)
7725 Oak Meadow Ct.
Cupertino, Calif. 95014

I am an active-duty novice collector of military squadron and command patches of the Air Force and other military services.

Any individuals or organizations interested in swapping, collecting, or selling patches are invited to contact the address below.

Sgt. Sherry E. Calvert, USAF
PSC Box 7303
Pope AFB, N. C. 28308

I am putting together a patch collection of the units throughout the Air Force, and patches of the various aviation units of the Army, Navy and Marine Corps. I would be willing to buy, trade, or accept donations of patches. I'll gladly pay postage for any patches donated.

Please contact me at the address below.

MSgt. Lance K. Nielsen, USAF
3421-B Buttonwood St.
Dover, Del. 19901

I served in the Air Force from 1958 to 1962 at Schilling AFB, Kan., with the 4310th OMS and the 310th Bomb Wing.

My responsibilities were as an engine mechanic and crew chief on KC-97s. I am very much interested in obtaining a model KC-97.

Can any readers help me?

John M. Davis
200 E. 30th St., #333
San Bernardino, Calif. 92404

I am interested in collecting jet-era helmets, visors, goggles, oxygen masks, and flight-suit equipment.

If you have such items to donate or sell, please write me. I am willing to pay shipping on donations.

Wayne Schotten
1005 Market St., #207
San Francisco, Calif. 94103

I am a pilot with the Portuguese Air Force. I would like to collect photos, pictures, and patches of American fighter squadrons and Air Force bases.

Anything readers are willing to send on military aviation will be greatly appreciated. Please contact the address below.

António Miguel L. S. Morgado
Apartado 145
2402 Leiria Codex
Portugal

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Write: Advanced Systems Sales Manager, Garrett Pneumatic Systems Division, P.O. Box 5217, Phoenix, AZ 85010.

GARRETT

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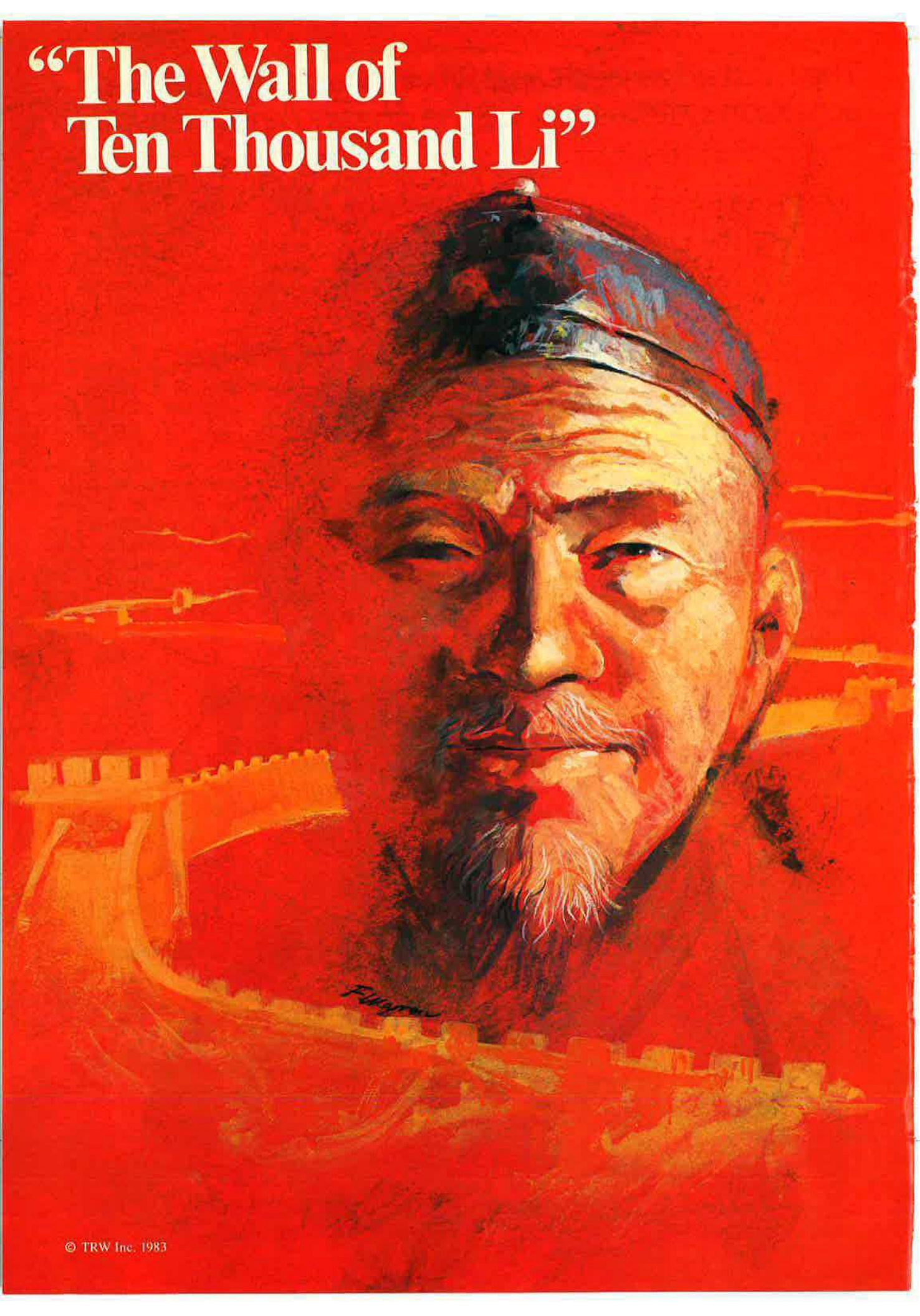
"The Wall of Ten Thousand Li"



Third Century BC — China. A country beset by Barbarians from the North. Continual raids divert its resources and sap its strength.

To counter the threat, Emperor Huang ordered the largest military defensive system ever constructed: "The Long Wall of Ten Thousand Li," a 1,500 mile long bulwark, wide enough for horses to gallop five abreast along the crest. Three hundred thousand Chinese labored a decade to create it.

Today's defense systems are enormously more complex. To develop them, teams of engineering and scientific specialists have to be coordinated. High-speed information processing systems link them to each other and to huge data banks. And the key to those systems is software.

As one of the largest software developers in the country, TRW harnesses information and diverse technologies to solve the ever-changing problems of national defense.

Largest Real-Time Program

A case in point: The Army's Ballistic Missile Defense Technology Program. In 1979, TRW delivered to McDonnell Douglas, the prime contractor, both support and operating software : 1.3 million machine instructions to meet more than 10,000 detailed requirements. In a test over the Pacific Missile Range, the software analyzed torrents of radar returns, discriminated between warheads and booster fragments, and accurately targeted threats, all in real time.

The success of this landmark program confirmed the basic TRW approach to software development, which has been adopted by key government agencies.

Space Systems Software

A pioneer in space technology, TRW has developed software for a wide range of military, scientific, and commercial space systems. The launch of SPACECOM's Tracking and Data Relay Satellites opens a new era in spaceborne data links. Through this TRW-built three-satellite system, with its single ground station, will flow all of the data which has been handled by NASA's worldwide network of ground stations. Receiving and transmitting simultaneously, the White Sands Ground Station's 11 internetted computers and over 300 racks of electronic gear are a modern software wonder. 800,000 machine instructions make this real-time system work, no mean trick at 300 megabits per second. This experience provides our technological base for future, worldwide communications systems, which will have to be even more powerful and flexible.

Electronic Information Systems

The sheer quantity of information needed to make intelligent decisions overloads physical storage and retrieval systems. Even computerized data banks are often hampered by interface and language problems. TRW is making large investments in new techniques to develop, maintain, and manipulate very large data bases containing literally billions of bytes of data so that significant information can be made readily accessible to thousands of online users. Sophisticated software is needed to support whole new architectures so that local area networks can be used efficiently to solve problems for government and institutional users. One major application will be the modernization of FAA's vast network for the National Airspace System.

Increasing Productivity

Our goal is to double the productivity of our software developers by 1985 and double it again by 1990. TRW is expanding its research in automated support tools and automated office capabilities to enhance our ability to concentrate on the creative aspects of software development rather than on routine tasks. As systems builders, we know the value of rapid, computer-aided interaction between engineers, scientists, mathematicians, and software developers.

Today's task is not to build a wall of ten thousand Li, but to harness the best minds and the finest machines so they may gallop easily, five abreast.

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IN FOCUS...

The Mass Media Discover EMP

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Despite the known effects of EMP, survivable C³I is within the state of the art.

Washington, D. C., Mar. 1

A spate of recent media reports tended to create the impression that certain side effects of nuclear detonations—lumped together under the umbrella term of electromagnetic pulse (EMP)—had just been discovered, would wreak total and unpreventable chaos on military command and control, and disable crucial electronic components of such weapon systems as planes and missiles. The bottom line of some of the reports was the claim that it makes no sense to build modern nuclear weapons, especially of the counterforce variety, because this new phenomenology would paralyze their command and control as well as guidance and navigation systems.

While EMP in its various forms is indeed one of the most insidious products of a nuclear burst, it is hardly a new discovery. Moreover, weapons designers have not thrown up their hands in despair, even though shielding and hardening of critical military systems in space, in the air, and on the ground are costly and difficult. In the atmosphere the effects of EMP—the creation of intense electromagnetic fields—resemble lightning, but affect vastly larger areas and cover a broad segment of the frequency spectrum from extremely low frequencies to several hundred megahertz, concentrated in the main in the radio frequency region. EMP, like radio signals, propagates at the speed of light.

The electromagnetic pulse unleashed by an intense high-altitude burst can disable electric and electronic systems up to 3,000 miles away. If no precautions are taken, EMP, for instance, could lock out the launch control or missile guidance subsystems of an ICBM in its silo—thereby halting the countdown—or disturb the weapon's digital computer by introducing false signals or eradicating information in its memory banks.

Since even massive, conventional explosions can produce electromagnetic disturbances, the generation of an electromagnetic pulse from a nuclear burst came as no surprise to nuclear scientists even early on. Nuclear testing in the atmosphere some thirty years ago caused equipment malfunctions that subsequent analyses identified as having been caused by EMP. In the following decade, scientists and systems designers developed a better understanding of the nature and scope of EMP. They also concluded correctly that EMP could be used in the long-range detection of nuclear detonations, giving rise to the development of various detection and monitoring systems.

Work on hardening critical components and systems against EMP and such associated phenomena as Transient Radiation Effects on Electronics (TREE) has been in progress since the 1950s, but did not get high priority until the US detonated a nuclear device with a yield of 1.4 megatons about 250 miles above Johnston Island in 1962. A number of satellites in low earth orbit at the time of the burst suffered severe electronic damage resulting in malfunction and early failure, according to a report issued by the US Arms Control and Disarmament Agency (ACDA). Another unexpected effect of this and other high-altitude bursts was the blackout of high-frequency radio communications. Disruptions of the ionosphere—which reflects radio signals back to the earth—by nuclear bursts wiped out communications for hours at distances of up to 600 miles from the burst point.

The products of a nuclear detonation in dense atmosphere include—in addition to massive shock waves and thermal radiation caused by X rays—invisible and lethal rays generally referred to as the initial nuclear radiation as well as persistent radioactivity called residual nuclear radiation. About five percent of the energy released by standard nuclear weapons is in the form of prompt radiation, while residual radiation accounts for roughly ten percent of the energy output. Prompt radiation consists mainly of gamma rays, X rays, and neutrons, and lasts for only fractions of a second. The gamma rays and neutrons of nuclear explosions of all kinds—from ground burst to high-altitude detonations—cause EMP. In a practical sense, however, it is the EMP generated by high-altitude bursts that causes the greatest concern.

In oversimplified form, EMP is triggered in the atmosphere when gamma rays are emitted from a nuclear detonation and collide with electrons in the atoms and molecules in the air. In the course of these collisions the gamma rays transfer some of their energy to the electrons, causing them to recoil and scatter in a phenomenon known as the Compton effect. When the Compton electrons move away from the explosion, they leave behind the much slower moving positive ions. The relative displacement of negative and positive charges produces intense electromagnetic fields. This transient radiation is collected by the skin of such systems as aircraft and missiles and converted into strong electric currents and high voltages. Major disturbances of the earth's magnetic fields ensue at the same time.

What happens is similar to when radio waves are picked up by antennas, except, of course, that EMP produces currents and voltage surges of great destructiveness.

EMP of a different type affects spacecraft. Known as the "system-generated EMP," or SGEMP, this type of radiation involves X rays and gamma rays that interfere with the operation of or cause damage to electronic components of unshielded satellites and ballistic missiles in space. Large, high-altitude bursts can propagate radiation energy of this type far out into space and possibly even affect

satellites in geosynchronous orbit (22,300 miles above the earth). Energy from electromagnetic radiation can be transferred or "coupled," usually via the cable harness, to electronic components and cause disturbance or even burnout. Yet another form of EMP, the "dispersed EMP," can affect spacecraft but is generally less severe than SGEMP. A spacecraft hardened against SGEMP, therefore, is not likely to be affected by dispersed EMP.

A variety of means is being tested and used to protect military systems from disruption or damage by EMP. While exact details of nuclear hardening are protected by security classification, these measures involve shielding to prevent EMP penetration, reliable grounding to divert power spikes, surge arrestors similar to those that prevent lightning damage, various filters, and special cable arrangements.

One of the ironies attending EMP and other electromagnetic radiation is that old-fashioned vacuum tubes are far less vulnerable than microelectronics. Unfortunately, the substitution of vacuum tubes for miniaturized components is not possible in most modern military systems.

In general, progress in the simulation and understanding of EMP on the one hand and an advanced means for hardening vulnerable systems on the other is such that most experts believe that survivable C³I systems (command control communications and intelligence) are within present technological capabilities.

IN FOCUS...

Budget Not Inflationary

The Congressional Budget Office, in a report entitled "Defense Spending and the Economy," has concluded that the Administration's proposed defense budgets for the next five years—FY '84 to FY '88—are not likely to "rekindle inflation or stunt employment growth over the next few years." The report, however, appends the caveat that "this conclusion rests on an assessment of the near-term economic outlook, which is influenced by all aspects of federal budgetary and monetary policy."

Pointing out that even if defense spending rises as fast as the Administration proposes—and thereby reaches 7.7 percent of GNP in 1987—the defense share of GNP will remain substantially below levels achieved routinely in the 1950s and 1960s. In 1969, and in fact throughout the years 1950–69 on an average, defense outlays were 8.6 percent of GNP. The CBO report finds that the Administration plan for 1982–87—assuming the unlikely circumstance of no congressional cuts or changes—represents a sixty percent real growth in outlays, compared with forty-three percent during the Vietnam buildup (1966–68) and 200 percent from a low base during the Korean War (1951–53).

The Congressional Budget Office also predicts that the defense spending levels proposed by the Administration will not "adversely affect" overall employment. Rather, the CBO study finds that the number of jobs created by added defense spending is the same as for other spending.

So far as aerospace industry is concerned, CBO rates the outlook "highly uncertain." Weak commercial demand should keep capacity utilization low for the next one to two years. Improving commercial demand coupled with continued increases in military procurement could well lift capacity utilization in 1985 to near its 1979 peak.

Most analysts believe, however, that if the 1983–85 commercial upturn is gradual, as is now anticipated, aerospace industry capacity will be adequate over that period. One indication of this is that aerospace employment in late 1982 was about twenty-five percent below its 1968 peak. Assuming a gradual upturn in commercial orders, it will take more than three years for employment to reach that earlier level. In addition, Department of Defense forecasts indicate that military airframe and jet-engine manufacturing facilities have ample capacity to handle likely demand during the next few years. The Navy, for example, reports that the prime contractor for each of its major aircraft has a maximum production capacity of at least twice current shipments.

The outlook toward the end of 1985 and beyond is more problematical, according to the CBO analysis. Military production is likely to rise. A surge in commercial aircraft demand, starting in the mid-1980s, is also possible. Many commerical carriers have plans to modernize their fleets with the new generation of quieter, fuel-efficient transport aircraft that are designed for effective operation over a series of short to medium hauls, as required in today's market. The airlines have deferred these plans following the decline in commercial traffic that has precipitated a severe squeeze on earnings.

Improved economic conditions over the next three years could well unleash those pent-up demands. If this occurs, the aircraft industry would be severely tested in the latter 1980s. Forecasts assuming a continued increase in military production and a strong rebound in commercial orders show not only a strong recovery between 1982 and 1985, but also sustained double-digit increases in production into the latter 1980s, according to the Congressional Budget Office.

Arms-Control Maneuvers

Assistant Secretary of Defense for International Security Policy Richard N. Perle warned the House Committee on Foreign Affairs that Soviet Leader Yuri Andropov's recent call to reduce US and Soviet ballistic missile launchers and heavy bombers by twenty-five percent was not accompanied by information on "what reductions, if any, the Soviets are willing to make in such more significant categories of offensive arms as ballistic missile warheads and throw-weight."

With respect to current negotiations on intermediate-range nuclear forces (INF), Secretary Perle charged that "Andropov's highly publicized proposal amounts to no more than a bid to maintain the Soviet monopoly of INF missiles in Europe, and to retain an SS-20 force even larger than the one they had at the time the President announced his 'zero option' proposal."

It is in the area of intermediate-range nuclear forces, he told the committee, "that the Soviets have been most anxious to stop our modernization program. In fact, the Soviets have made their START proposals conditional on the nondeployment of our INF missiles in Western Europe. Thus, in both negotiations, they are trying to block our INF program without having to eliminate their own INF missiles. At the same time, they have proposed a series of one-sided constraints in START, which are designed to hamper US strategic modernization programs while allowing their own to proceed."

Terming the Pershing II and ground-launched cruise missile programs "the very coin of our negotiating effort," he said that "it was not until the Soviets became convinced that their propaganda efforts were not succeeding in stopping deployment preparations that they agreed to come to the negotiating table at all." Lashing out at Congress's deletion of funds for production of Pershing II, he charged that "this unilateral curtailment of the program has far-reach-

SCIENCE/SCOPE

An Advanced Medium-Range Air-to-Air Missile has intercepted a drone target, showing its ability to find low-flying targets amid high clutter caused by the missile's radar returns reflecting from the ground. The prototype AMRAAM was fired from an F-15 fighter from an altitude of 16,000 feet and a range of about 13 miles. The remotely controlled target flew toward the F-15 only 400 feet above the ground and used electronic countermeasures in an effort to jam the missile's seeker. Hughes Aircraft Company, AMRAAM's designer, is producing the missile under a full-scale development contract for the U.S. Air Force and Navy.

The infrared-guided Maverick missile has proven its effectiveness against many kinds of targets, scoring 20 direct hits in 26 launches in evaluation tests. The IR Maverick adds precision night attack capabilities to the U.S. Air Force arsenal of air-to-surface weapons. In addition to night and day capability, its seeker sees through battlefield haze and smoke. The 20 direct hits were scored against moving tanks, a hangarette, radar vans, idling tanks, a simulated large building, a patrol boat, and a simulated fuel dump. Eleven hits came at night. Weather conditions and terrain varied from humid subtropics to desert to cold snowy plains. The misses involved minor hardware or software problems that have been corrected. Hughes has begun low-rate pilot production of 200 missiles.

Under budget and ahead of schedule for the third straight time, Hughes has delivered an order of laser designators for installation on two Northrop fighters, the F-5B Freedom Fighter and the F-5F Tiger 2. The units are part of the Laser Designator Test Set, which uses a laser beam to pinpoint a target and direct laser-guided weapons to it. Deliveries now total 81 designators.

Technologies of laser holography and diffraction optics have led to an experimental visor for protecting military pilots from potentially blinding laser beams. The visor reflects light at wavelengths used for lasers without significantly reducing visibility. It would replace devices employing dyes, which produce distracting discolorations, absorb light, and cut visibility. Designed by Hughes for the U.S. Navy, the visor could be adapted for ground troops.

Aircraft approaching from beyond 250 miles away can be detected by a new long-range surveillance radar. The Hughes Air Defense Radar (HADR) picks out targets from far away even amid radar clutter. It also maintains a low false alarm rate, meaning it can relay very accurate information to automated command and control systems. HADR can be used for civilian air traffic control and military air defense. Its electronically steered pencil beams let operators determine the altitude of a target without using separate height-finding equipment. HADR systems are being installed in West Germany and Norway.

Japan will field the airborne TOW antitank missile system on new AH-1S Cobra helicopters. The system has a special stabilized sight that lets a gunner aim TOW (Tube-launched, Optically tracked, Wire-guided) missiles with precision despite helicopter vibration or movement. Hughes will build 14 systems and related equipment. Nippon Electric Co. is licensed for co-production of 40 more.

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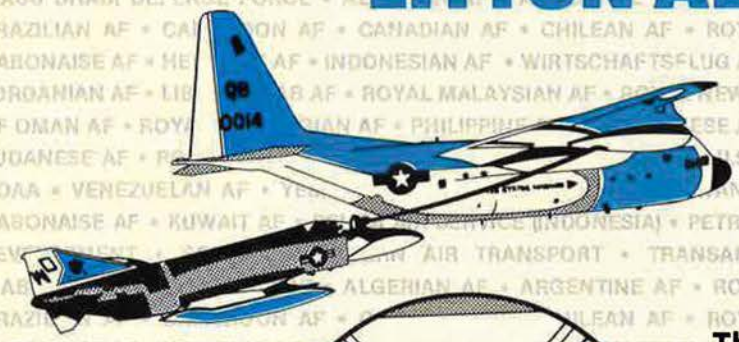

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ing implications for the negotiations: Our allies must question our resolve in pursuing the INF negotiations; the Soviets gain further evidence that they will never be faced with a decision to yield the SS-20."

Recent successful tests of Pershing II, he said, "validate the fact that the problems encountered earlier were minor problems associated with developing any new weapon system. These tests and the continued success of the GLCM test program demonstrate that we can fulfill our commitment to the Alliance by deploying, on schedule, safe and reliable systems, but full funding for both programs is essential."

Rejecting speculation about alleged disinterest in arms control by the Administration, he said that "the real question is whether we can achieve arms-control agreements which increase our national security by bringing about equal, verifiable, and reduced levels of strategic offensive arms, or whether we are willing to settle for cosmetic agreements which do not enhance strategic stability and which permit the Soviets to maintain or even increase the strategic arms advantage they now enjoy."

He warned the Committee that a nuclear freeze now would be "irresponsible. It would perpetuate the current imbalance in nuclear forces, undercut the long-term deterrent value of our nuclear forces, and doom to failure our efforts to achieve deep and meaningful reductions in the START and INF negotiations. It would signal to the Soviet leaders that we are unwilling to modernize our forces to meet the challenge posed by their massive buildup of nuclear forces since the SALT negotiations first began in 1969. By failing to take the steps necessary to protect the security and reliability of our deterrent forces, it would encourage the Soviet leaders to continue to invest in a nuclear superiority which could pay substantial political dividends."

And, perhaps most importantly, he added that "by reneging on the NATO 'dual-track' decision to deploy Pershing II and GLCM in Western Europe unless we could negotiate an agreement that would substantially reduce the Soviet nuclear threat to our allies, we would be undermining the military basis of the NATO Alliance and our own credibility as an ally.

"We must remember that, despite the political controversy surrounding these systems, the democratic governments of our allies support their deployment. If we were to adopt a policy which canceled those deployments while it did not affect the Soviet systems whose existence made the deployments necessary, we would be betraying our allies. If we attempted to justify our action on the grounds that the democratic governments of our allies did not represent the will of their peoples, then the betrayal would be far deeper and far worse."

IN FOCUS...

INF Modernization Imperative

A recent study of nuclear forces in Europe by the private United States Strategic Institute concluded that there is a clear "overkill" potential associated with Soviet nuclear forces in being and under development. Possessing about 10,000 medium- to high-yield warheads—ranging from fifty kilotons to one megaton in yield—Soviet forces "could cover about eighty-five percent of NATO Europe (excluding France, Spain, Portugal, Denmark, and Norway) with blast overpressure in the moderate-to-severe level (six to ten pounds per square inch)." The Institute's analysis could not find plausible reasons for the Soviets to build up such excessive capabilities and suggested that this arsenal "certainly is not required for military targets in NATO alone."

The analysis—which was coauthored by Dr. Donald R. Cotter, a former Assistant for Atomic Matters to three Secretaries of Defense and a driving force behind NATO's nuclear modernization program—argues cogently for a "survivable, long-range NATO nuclear hold-at-risk" force to counter the present Soviet superiority in both nuclear and conventional forces. Such a NATO capability would force the Soviets to rethink their attack strategy in Europe and to restructure their forces accordingly. It is this prospect, the study suggests, "rather than the professed fear of NATO missiles aimed at Soviet territory, that has generated the Soviet reaction to NATO's modernization decision."

A NATO nuclear force that can prevent the Warsaw Pact from massing its forces—and hence can provide credible and durable deterrence, according to the analysis—should include:

- A substantial number of surface-to-surface missiles with yields of several tens to hundreds of kilotons and with ranges up to 2,500 km for targeting against Pact ground forces.
- Several hundred high-quality gravity bombs (incorporating advanced security and safety features) to provide for a small force of quick-reaction alert (QRA) aircraft and for special targeting contingencies.
- Several hundred *survivable* nuclear air defense missiles to "hold at risk" the echeloned air armies (waves of succeeding aircraft) and thus to deny a massed air attack capability to the Soviets.
- Several hundred long-range W-79 eight-inch nuclear artillery shells. Ideally—but not necessarily—these shells should have the enhanced radiation reduced blast (ER/RB or "neutron bomb") capability that is so important to presenting a credible threat against first- and second echelon regiments and divisions in any breakthrough attempt.

Washington Observation

★ The Washington, D. C.-based Northeast-Midwest Institute that serves congressional and state interests in those areas recently accused the Defense Department of "regional biases in defense spending," claiming that "sixty-five percent of all defense installations, eighty percent of all defense personnel, and sixty percent of all prime contractors are located in the South and West." In analyzing trends in defense spending on a state-by-state basis over a thirty-year period, the Institute's study, entitled "The Pentagon Tilt," states that the Northeast-Midwest region's share in military prime contract dollars decreased from 71.8 percent in 1951 to 38.7 percent in 1981.

The current defense budget favors the South and West with "more than twice as many dollars" as the Northeast and Midwest. Claiming to have drawn impartially on Defense Department figures, the Institute reports that "while the estimated average per capita defense outlay (excluding procurement) for the entire US in 1983 will be $539, the Northeast-Midwest Region will receive only about half this amount—$279 per capita. In contrast, the South and West will receive $754 per capita."

The analysis by the regional group stressed that defense "expenditures have an important economic impact, as each dollar of defense spending produces a 'multiplier' effect on the surrounding area. The Northeast-Midwest . . . share has decreased over the past thirty years by an alarming proportion. The situation is exacerbated further by the absence of any effective program or policy at the federal level to assist those people and communities most adversely affected by the closing of a military base or loss of a major defense contract." ■

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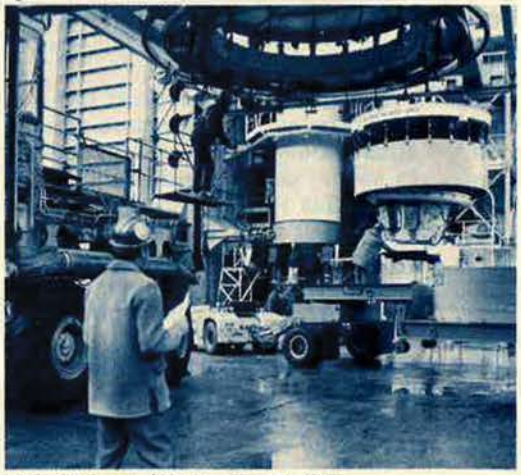

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CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Feb. 18

FY '84 Defense Spending

Administration plans to spend $274 billion for defense in FY '84 are taking a beating in both Houses of Congress. The projected ten percent real growth for DoD appears to be unacceptable to many in light of anticipated deficits near $200 billion in FY '83 and FY '84. Even some of the Pentagon's best friends in Congress, self-proclaimed superhawks, warned the Secretary of Defense that cuts must be made beyond the $11.3 billion savings found by the Administration before the budget was sent to Congress. Many want the Pentagon to recommend programs to be cut and to plan for slower, steadier defense growth; they reject Defense Secretary Weinberger's standard response that the increased severity of the Soviet threat dictates large defense expenditures.

The chairmen of the House and Senate Budget Committees, Rep. James Jones (D-Okla.) and Sen. Pete Domenici (R-N. M.), respectively, suggest that a five percent real growth rate for FY '84 may be more in line with the economic times and, hence, more palatable to Congress. A five percent growth could save $8 billion in FY '84 and some $125 billion through FY '88, according to certain estimates. Meanwhile, the chairman of the House Appropriations defense subcommittee, Rep. Joseph Addabbo (D-N. Y.), wants a whopping $30 billion cut in Pentagon spending authority. He thinks the procurement accounts are top-heavy with expensive strategic systems and would like to cut MX, B-1B, and Pershing II.

Secretary Weinberger let Congress know that attempts to achieve quick reductions in the deficit by making large procurement outlay cuts in FY '84 may not be possible. Outright cancellation of such programs as MX, B-1B, the carriers, the Air- and Ground-Launched Cruise Missiles, the Trident, F/A-18, F-16, F-15, F-14, C-5B, and the M-1 tank would yield only $8 billion in FY '84 outlay savings and some $15 billion in FY '85.

Congress, deviating from its past practice of looking only for short-term solutions, may sharpen its budget ax for the long-term by focusing on the DoD budget authority request for FY '84 and the outyears, which represents funds to be spent two to three years hence. This would impact significantly on procurement and R&D programs and could have devastating effects. While still too early to predict, a $10 to $20 billion reduction for FY '84 may be in the offing.

Tower Chides Defense Cutters

Sen. John Tower (R-Tex.), Chairman of the Senate Armed Services Committee, may be one of the few in Congress not calling on the Administration to recommend additional defense cuts. He recently chided his colleagues for being caught up in an "irrational frenzy . . . making defense decisions based on what they perceive to be the popular whim of the moment." He warned such action may result only in prolonging the risks associated with the imbalances in today's forces.

The Senator questioned the motives of some, citing senators' arguing against defense hikes while seeking to secure defense projects for their own states. He challenged senators to prove their true commitment to cutting defense by submitting to him a list of lower-priority defense programs or facilities in their home states where reductions could be made. Senator Tower does not expect much response since Congress fights home base and other installation closings as well as cancellation of programs important to state economies.

No ALCMs in FY '84

The Administration did not include funds for the purchase of any Air-Launched Cruise Missiles (ALCMs) in the FY '84 USAF budget in anticipation of buying in the near future an improved, second-generation ALCM—the Advanced Cruise Missile. Greatly improved Soviet air defense was reportedly the basis for opting in favor of the newer version.

However, Air Force Secretary Verne Orr reportedly told a congressional panel that the projected cost of the newer missile could cause a reversal of the decision to halt production of the current ALCM. Air Force officials are concerned because some early cost estimates for the Advanced Cruise Missile are higher than anticipated, which, according to a panel member, "makes the weapon more difficult to justify in the near term." The Air Force planned selection of a contractor for the program in March.

Last year's budget forecast plans to buy 440 ALCMs in FY '84. The proposed phaseout of the program would reduce the number of current-generation ALCMs to 1,499, and would allow $4.1 billion to be transferred to the newer version.

The projected high cost of the updated cruise missile could save the current ALCM program in Congress. Rep. Norm Dicks (D-Wash.), representing the state that is home to the ALCM manufacturer, said, "The real issue is whether small improvements in the ALCM can be made to improve the penetrating capability of the missile at a much lower cost than proceeding with an entirely new program." In light of budgetary pressures, the Congressman may get his colleagues to concur.

CBO on Defense Spending

The Congressional Budget Office (CBO) informed Congress that "clearly, the US economy can support the defense buildup proposed by the Administration." CBO analyses showed that the proposed defense budget could be sustained with little risk of rekindling inflation or adversely affecting overall employment. Rather, CBO believes $10 billion spread across all types of defense spending would create 250,000 additional jobs.

Other good news from the CBO showed DoD progress on holding down growth in unit weapons costs. According to the study, forty percent of systems analyzed have unit prices below those projected last year.

CBO urged a multiyear plan to reduce projected deficits, but warned that substantial budget cuts in the near-term could jeopardize the anticipated economic recovery. ■

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AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

Washington, D. C., March 3

★ The Air Force has announced a long-term plan for strategic modernization. It has also detailed a number of air defense upgrades and realignments.

The objective, according to Air Force officials, is to "maintain maximum basing flexibility while adding new systems."

Under the proposals:

- Dyess AFB, Tex., would become the first B-1B base. It would receive twenty-six of the new aircraft in late 1985 while losing thirteen B-52Hs. Dyess has also been designated as the site of a B-1B combat crew training squadron.
- Andersen AFB, Guam, would replace fourteen B-52Ds with a like number of B-52Gs later this year. The Short-Range Attack Missile—SRAM—would be added in 1986.
- At Carswell AFB, Tex., seventeen B-52Ds are to be retired this year. The base is to receive seven B-52Hs and eight KC-135 tankers, with an additional thirteen B-52Hs arriving in late 1985.
- At Robins AFB, Ga., the 38th Bombardment Squadron is to be deactivated this year, with thirteen B-52Gs to be relocated. Replacing them will be a like number of KC-135s.
- The seven B-52Hs at Castle AFB, Calif., are to be replaced by B-52Gs.
- The 916th Air Refueling Squadron at Travis AFB, Calif., is to be deactivated later this year and its nineteen KC-135s relocated.
- The B-52Gs at Barksdale AFB, La., are to be relocated later this year and the base is to be equipped with air-launched cruise missiles in 1986.

In the air defense arena, USAF plans to retire all of its remaining F-106s in the next few years. Under this proposal:

- The F-106s would be replaced by F-15s at Tyndall AFB, Fla., K. I. Sawyer AFB, Mich., and Minot AFB, N. D. At Tyndall, the 2d Fighter Interceptor Squadron would be reequipped with eighteen F-15s this year, with a tactical fighter training squadron to be activated with eighteen F-15s in 1984. K. I. Sawyer's 37th Fighter Interceptor Squadron is slated for eighteen F-15s late next year and a like number for Minot's 5th FIS in 1985.
- ANG F-106s are to be replaced by eighteen F-4Ds at Fresno Air Terminal, Calif., and fifteen at Jacksonville IAP, Fla.
- This summer, AFRES A-10s at Barksdale AFB, La., are to be increased from one squadron of twenty-four aircraft to two squadrons of eighteen, with one of the units designated to train fighter crews. The move is to add eighty full-time Air Reserve Technicians and 162 part-time Reservists.
- The ANG training unit at McConnell AFB, Kan., is to be beefed up next year to forty-four F-4Ds.
- Also next year, ANG F-4Cs at Kingsley Field, Ore., will be increased to eighteen. Some 264 full-time active-duty and Guard positions are to replace 139 part-time slots.
- This summer, the A-10 training unit at Davis-Monthan AFB, Ariz., is to be reduced from eighty-six aircraft to seventy-four. Some 159 active-duty and seventy-four civilian slots are expected to be eliminated in the move, officials said.

Gen. James P. Mullins, Commander of Air Force Logistics Command, visits Dowty Fuel Systems at Cheltenham, England, to inspect USAF work being done there. In this case, it is the afterburner control system for the F100 engines that power USAFE's F-15 and F-16 aircraft. Under a contract with AFLC, Dowty Fuel Systems has overhauled more than sixty systems so far, with zero rejections. DFS is also working on fuel control systems for the TF30 engines that power USAFE F-111 aircraft. The work also includes design, construction, and operation of test rigs for USAFE engine controls, a field in which DFS is well established. (Photo by Michael Hall)

★ The Air Force plans to provide self-aid and buddy-care medical instruction during basic military training.

For the time being, however, new programs are coming on line to fill the gap.

"The self-aid and buddy-care program recognizes that there will not be enough medics in the conflict area at the outbreak of any future confrontation," noted Col. (Dr.) Dewey V. Sturges, program monitor in the Office of the PACAF Command Surgeon. "I'm using 'medic' in the generic sense to include all health-care professionals—officers and airmen. In the early stages of any future conflict, the wounded will have to care for themselves and each other until they can reach a medical facility.

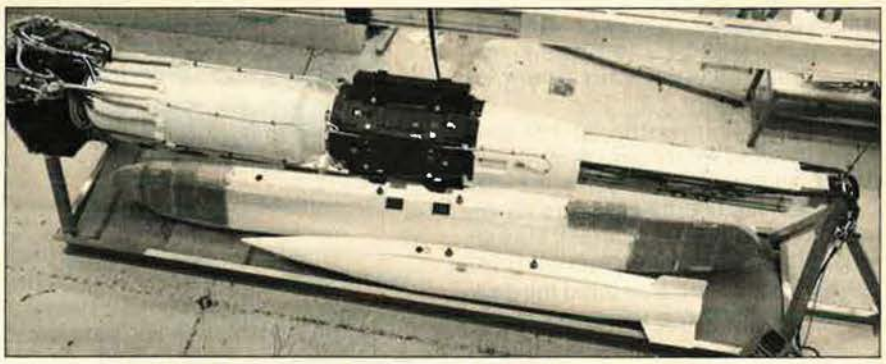
"We have certified self-aid and buddy-care instructors in all major units to provide initial and refresher training to all personnel in overseas assignments or in deployable mobility positions," Dr. Sturges said. "Empha-

sis is on self-care, with about five hours of hands-on experience with training aids. We want everyone to be able to treat himself or herself."

Dr. Sturges concluded, "In a recent review of ancillary training programs, self-aid and buddy-care was determined to be an essential one; one that could be a matter of life or death—your life or death."

★ Last year, the Air Force chalked up a new record for flying safety with only 2.33 major mishaps per 100,000 hours logged in the air. This topped the previous mark of 2.37 per 100,000 flying hours set in 1973.

In all, some 3,300,000 hours were flown during 1982. In the year the Air Force lost seventy-eight aircraft to accidents, but the 1982 safety rate also



A full-scale functional mockup of Grumman Aerospace Corp.'s entry in the competition for a Common Strategic Rotary Launcher for SAC aircraft. It is unique in having a fixed composite material center beam and in that no pyrotechnics are used in the ejection of missiles from the aircraft's bomb bay. Instead, the device relies on a single proprietary hydraulic system designed for the purpose. The launcher is capable of carrying a full complement of five base-line weapons and prospective growth weapons in the bomb bays of the B-52H, B-1B, and forthcoming Advanced Technology Bomber (ATB). The five weapons include several types of gravity bombs, SRAM, and ALCM-B.

IAAFA Marks Fortieth Year of Service

The Inter-American Air Force Academy, Albrook AS, Panama, celebrates forty years of dedicated service to Latin America this year. Serving the nations of Central and South America, IAAFA has graduated more than 20,000 students from virtually every one of these nations.

In Air Force training, IAAFA is unique. It is the only Air Force school that teaches exclusively in Spanish to accomplish its mission "to provide technical training in aircraft maintenance and related fields and professional development courses for personnel of the Latin American armed forces."

Training methods in IAAFA are equivalent to other Air Force training centers with the added feature that the instructor staff is bilingual and that all materials, including manuals and teaching aids, have been translated into Spanish.

Courses range from basic airman skills to more complex subjects, such as electronics and tactical air operations for officers. Also, IAAFA serves as an ambassador of goodwill where bonds of camaraderie are forged with our Latin American counterparts.

Strategically located, IAAFA is a major unit of TAC's Southern Air Division. Its location at Albrook AS makes IAAFA easily accessible to all of Latin America. The climate, averaging eighty-four degrees annually, is ideal for year-round training.

IAAFA officially opened its doors on March 15, 1943, to one officer and ten enlisted members of the Peruvian Air Force.

Initial training was developed as an outgrowth of courtesy visits to the Canal Zone by military representatives of Latin American countries as early as 1939.

Instruction began as on-the-job training at the Panama Air Depot, and the school was formally designated as the Air Force School of Military Training Center of the Panama Canal Department.

The first course was six weeks long and then extended to three months at the request of the Peruvian government. As requests for training by different countries increased, so did the curriculum. On-the-job training was deleted and technical training begun. The course evolved to include radio operations and maintenance, teletype maintenance, bombsight maintenance, and power-thrust maintenance.

The school was discontinued following World War II, but reopened at the persistent request from the Latin American armed forces, dependent on it for special types of training. In 1947, the Air Force became a separate unit of the US armed forces and assumed complete responsibility for the school.

Throughout the years the school has continued to expand, but not without its share of growing pains. The economics and political environment in Latin America, plus the needs of each of the nations' armed forces, influenced the stability of annual class enrollment. Further, solutions to such local problems as language barriers, student educational levels, and the growing demand for technically qualified bilingual personnel played an important role in the school's expansion.

The language problem was partially solved when a translation department was set up in the school to translate manuals and lesson plans. The program was so effective that in 1948 the school was given responsibility for Caribbean Air Command's translation library. Many of the technical terms used in the Latin American air forces were coined by IAAFA.

A guest instructor program begun in 1962 still continues. It has included instructors from at least eighteen countries, and the direct involvement of guest instructors has produced a more inter-American atmosphere. In 1966, as a result of this program, the school was redesignated the Inter-American Air Forces Academy.

Presently assigned to the IAAFA staff are fourteen officers, ninety-one enlisted persons, five guest instructors, six translators, and twelve secretaries and clerk-typists, all bilingual and highly qualified in their specialty.

Today's IAAFA instructor must be internationally in tune and able to create the type of learning environment so necessary for the inter-American atmosphere of the classes.

Modernization and improved technology have added immensely to the school's curriculum. More than twenty courses are now offered, some basic in nature and others more advanced for noncommissioned officers and officers. On October 18, 1982, a Pilot Instrument Procedures Course and a Pilot Instructor Course were added to the curriculum. This was a landmark, since it was the first time either course has been taught outside the United States and in Spanish.

Training is not restricted to the classroom. Mobile training teams and technical assistant teams are periodically sent to the field to teach specialized or tailored courses, depending on the needs of the countries. In 1982, teams were sent to Ecuador, El Salvador, Haiti, Honduras, Jamaica, and Mexico.

This year IAAFA will set another landmark. The school will conduct the first Professional Military Education course exclusively for Latin American officers. Approximately four months in duration, the course was developed much along the lines of USAF's Squadron Officers School and the more advanced Air Command and Staff College.

A growing unrest in much of Latin America has put special interest on US Security Assistance Programs. IAAFA plays a large part in assisting Central and South American countries by training their airmen in security and defense procedures.

showed a steady improvement from the recent high of 3.16 Class A mishaps per 100,000 flying hours recorded in 1978.

Much of the continued improvement in flying safety can be attributed to the all-time record low of 4.8 mishaps per 100,000 flying hours for the higher-risk fighter and attack aircraft, noted Gen. Charles A. Gabriel, USAF Chief of Staff, who also cited the dedication of Air Force safety personnel

Under the Pave Tiger program, Boeing is developing a small, expendable minidrone as a supplement to USAF's tactical force. See adjacent item.

for the improved results. It goes without saying that maintenance people throughout the service played a major part.

Ejections from aircraft also demonstrated a marked improvement in 1982. The safety rate stood at 88.9 percent, ten percent better than the previous year.

Officials also noted that the ground mishap fatality rate also improved by four percent over 1981.

★ The Air Force has initiated the development of an unpiloted minidrone as an expendable weapon against ground targets.

Dubbed Pave Tiger, the weapon is being developed by Boeing Military Airplane Co., Wichita, Kan., under a $14 million contract awarded by AFSC's Aeronautical Systems Division, Wright-Patterson AFB, Ohio.

The system and payload are being designed for use in nonnuclear, theater-type warfare. The contract runs through September 1983, with flight demonstrations beginning this spring. In all, Boeing is to produce fourteen vehicles, twelve for testing and two spares.

AEROSPACE WORLD

Designed to attack high-priority targets, Pave Tiger could carry such payloads as electronic countermeasures packages, warheads, or sensors. It would fly a preprogrammed mission, with microprocessors guiding it along a flight path to final destination.

"In certain high-risk missions the effectiveness of the tactical fighter force can be enhanced by use of unmanned weapon systems," according to Lt. Col. Jack Colligan of ASD's Deputy for Tactical Systems. "The Air Force recognizes the advantages of using expendable aircraft in this supplementary role. Until recently," added the program director, "the costs of fielding a significant number of such unmanned aircraft have been prohibitive. The key to this system is low cost."

The sweptwing Pave Tiger features an in-line, two-cylinder engine, with propeller in the rear. In canard configuration, the seven-foot-long aircraft has vertical stabilizers on the wings, whose span is eight and a half feet.

Pave Tiger is constructed of such injection-molded composite materials as fiberglass, resin, and polyurethane.

While manufacture and assembly is done in Wichita, the BMAC operation at Huntsville, Ala., is responsible for the airplane's avionics and payload integration.

Being unloaded in Japan for transshipment are the first OA-37B Dragonflys slated for the 19th Tactical Air Support Squadron at Osan AB in South Korea. The OA-37s are scheduled to replace the OV-10A Broncos currently assigned to the unit. First two of the Dragonflys are to be used as maintenance trainers at the Korean base. (USAF photo)

Following flight testing, the Air Force is expected to award a production contract.

Pave Tiger is a Quick Reaction Capability program, "which essentially means the Air Force has a near-term need for an operational system," said Colonel Colligan.

Boeing is able to meet the Air Force's requirement because of the company's independent research efforts, begun in mid-1979, to develop

This Royal Navy Hovercraft BH7 Mk2 has successfully completed a series of mine countermeasures trials. According to officials, the Westland-built craft proved highly controllable, attained high transit speeds, demonstrated its ability to cross shallows and sandbanks, and operated from unprepared sites. With low underwater magnetic, acoustic, and pressure signatures, the craft is unlikely to explode mines although tests showed it virtually immune to underwater explosions. Another advantage: half the operational cost of conventional antimine vessels.

such an aircraft, BMAC officials said.

The Air Force program was preceded by a test aircraft produced under Boeing-funded research and development during the past three years.

★ Aérospatiale, the French manufacturer of the Epsilon trainer aircraft, will unveil an armed version of the plane at the upcoming Paris Air Show. *(For a pilot report, see February '83 issue, p. 62.)* Company officials told AIR FORCE Magazine that aircraft 01 went into a modification program in January. It has been fitted with four wing pods capable of carrying up to 660 pounds (300 kg) of external stores with one pilot aboard, and up to 440 pounds (200 kg) with a crew of two.

The aircraft began flight tests at Istres in February. It is to be exercised in weapons practice at Cazeaux during April and early May, with test results available in time for presentation to prospective customers at the air show at Le Bourget Airport beginning on May 25.

The armed Epsilon is an additional variant to the basic aircraft that Aérospatiale is exploring in order to broaden the export market for the craft. Several countries, including the Republic of Korea, have expressed interest in a turboprop version of the Epsilon. For this version, Aérospatiale has chosen an Allison 250 turboshaft engine rated at 420 shaft horsepower. It is derated to 350 shp for this application. According to Gen. Pierre Delachenal, Military Advisor to Aérospatiale, conversion to turboprop requires no airframe modifications. It will give Epsilon the same performance at 20,000 feet it now has at 10,000 feet with the regular Avco Lycoming flat-six internal combustion engine.

Aérospatiale has received expressions of interest from Canada, the UK, and West Germany regarding coproduction of the standard Epsilon for use as a basic trainer. It is in production for the French Air Force for that purpose, with the first squadron to be fully operational in July 1984. Other countries in Africa and Latin America have evaluated it for possible purchase.

For the turboprop and armed versions of the Epsilon, Aérospatiale contemplates the customer country sharing in the development costs.

★ The FAA has adopted new airworthiness standards for the certification of newly designed helicopters.

Foremost among these is that any multiengine helicopter that carries ten or more passengers must be capable of continued safe flight if one engine fails during climb, cruise, or descent. Other changes deal with certification for Instrument Flight Rules operations and for flight in icy conditions.

The new standards are the first of a series that are expected to be adopted in the next two years as a result of the agency's Rotorcraft Regulatory Review Program. The new standards became effective in March.

The new standard on continued

British Aerospace Corp. Looks Ahead

"We haven't up to now exploited our unique broad-based systems capability," Adm. Sir Raymond Lygo, Royal Navy (Ret.), told AIR FORCE Magazine. But, according to the new Managing Director of British Aerospace Corp. (BAe), the company will do just that in the future. Admiral Lygo assumed his post as BAe's chief executive at the beginning of January. He was formerly Chief Executive of BAe's Dynamics Group, following a long and distinguished career as an aviator in the Royal Navy, including command of the aircraft carrier HMS *Ark Royal*.

In an interview with AIR FORCE Magazine, Admiral Lygo looked ahead to the challenges facing the company during his watch at the top. In noting the systems capabilities of BAe, he cites the wide range of its products and projects. The Aircraft Group manufactures and performs research on both civil and military aircraft of all types, while the Dynamics Group concentrates on missiles of all kinds. Admiral Lygo notes that the Space & Communications Division of the Dynamics Group is Europe's largest and fastest-growing space company.

In competing for business in the years ahead, Sir Raymond expects not only to exploit the company's systems-management capabilities, but also for the many BAe divisions to compete against outside suppliers for company business. In his view, this will not only result in more efficient execution of BAe business; it will also help the company's divisions win more business outside the company, strengthening it across the board domestically and internationally.

Reflecting on his thirty-six years of service in the Royal Navy and at BAe, Admiral Lygo says "You have to have a conscience." That applies to any military business, he is convinced, because your product means life or death for the men who use it. He says the major criteria on a military product are time (delivering it when needed), cost (within or below the budget), to specifications (meeting the customer's needs), and, finally, "the conscience"; that is, making certain the product is the best you can produce for that need and that it will work in combat.

He noted that wars don't happen as the planners wish them to: "War is a muddle; he who muddles least, wins." Turning to the recent Falklands campaign, he said, "We did things one shouldn't do," but had to, nonetheless. Examples: steaming ships within range of land-based fighter-ground attack aircraft, operating a fleet without an airborne early warning system, launching attack aircraft in marginal weather against heavily defended airfields.

All of those actions were necessary in the situation. The results, aside from prevailing over the Argentine invaders, included finding out how weapons worked in practice, and showing Her Majesty's Government the holes in its systems that need plugging up. He cites with pride the many instances of BAe's work force turning to with innovative and immediate solutions to the needs of the task force that won in the Falklands.

Looking at weapons, Admiral Lygo deplores the loose use of the word "systems" in reference to a specific weapon. He advocates instead the true systems approach. He uses air defense in depth as an example. The antiaircraft guns at an airfield are not a system, he says. Rather, they are but one *element* in a system. Here is his idea of an air defense system for air bases:

- Defense in depth, with long-range early warning. Recognize that the enemy will try to knock that out early, so provide for alternate means of detection in that event.
- Provide point defense weapons against aircraft, guided missiles, and conventional ballistic missiles.
- Area defense weapons.
- Fighter interceptor aircraft for flexibility and range, with part of them airborne and under control of the air force commander. As for characteristics, they need endurance as much as speed, and must be in the air when needed.
- A means of commanding and controlling the entire system under combat conditions, with the air force commander in charge.

Admiral Lygo advocates approaching national security challenges with the system approach as above, not with what he calls "the hole-boring syndrome," where each weapon's proponents push it unilaterally. In his top post, he has the opportunity to make headway in that direction, both for the UK and in the several countries in which BAe is involved in cooperative projects.

—F.C.B., Jr.

The F-16: Standard of excellence in fighter performance around the world.

The F-16 Falcon operates from air bases throughout the United States, Europe, the Middle East and the Far East.

Today, more than 900 F-16s have been delivered on or ahead of schedule and have been flown by more than 1,000 pilots of eight air forces. Deliveries are scheduled to two more Free World nations, Venezuela and Korea.

GENERAL DYNAMICS

safe flight relates the performance required of a helicopter to the number of passengers it carries, a policy consistent with the standards for fixed-wing aircraft.

The new rules for IFR operations are designed to provide an airborne platform stable enough for safe instrument flying in bad weather.

The new icing standards recognize the fact that helicopters do not fly as high as fixed-wing aircraft and require the manufacturer only to demonstrate that the helicopters are protected against icing at normal operating altitudes.

The new standards also relax the existing "height-velocity" requirements for helicopters carrying fewer than ten passengers. Existing regulations say, in effect, that a helicopter should maintain enough altitude and airspeed to allow it to autorotate safely to a landing. This, however, has limited a helicopter's flexibility, as in some rescue operations, and the new standard is intended to restore some of that flexibility, FAA spokesmen said.

AEROSPACE WORLD

★ A major educational facility with air-division-equivalent status has been added to the Air University complex at Maxwell AFB, Ala.

The Center for Aerospace Doctrine, Research and Education (CADRE), which opened its doors in January 1983, will better enable AU to accomplish a major area of its assigned mission: to assist in the development of Air Force doctrine, concepts, and strategy.

CADRE was formed by realigning elements of the Air War College, Air Command and Staff College, and Squadron Officer School. "This organizational alignment," said officials, "fills a void in the AU mission by expanding its capabilities to support the research needs of the Air Force and adding force to its efforts to stimulate fresh thinking in the areas of warfighting and force employment."

CADRE's mission is to conduct basic and applied aerospace power research; to assist in the development, analysis, and testing of concepts, doctrine, and strategy; to conduct computerized wargaming for the Air Force; and to provide specialized educational assistance and publication support for AU academic programs.

CADRE's three major divisions are the Airpower Research Institute, the AU Press, and the Air Force Wargaming Center. The Center's Commander is to be a two-star general who is also Commandant of the Air War College and Vice Commander of AU. Initially, the new facility is authorized seventy personnel slots with a growth to 113 in the near future, officials said.

★ McDonnell Douglas Corp. has been awarded a contract that could be worth up to $2.7 billion to build forty-four KC-10 Extender advanced tanker/cargo aircraft, AFSC officials announced.

This year's funding for the multiyear award totals $867 million, while monies for 1984 through 1987 must have congressional approval. The multiyear pact is in line with the Air Force initiative to save tax dollars by allowing prime and subcontractors to look forward to undisrupted production runs and thus be able to plan much more economically. For example, AFSC officials estimate that the multiyear KC-10 contract will save some $600 million.

The new contract calls for the delivery of four Extenders this year, eight next year, eleven in 1985, twelve in 1986, and nine in 1987.

USAF has already in its inventory twelve of the combined tanker and cargo aircraft, with another four to be delivered this year under an earlier contract.

In addition to the aircraft order, the award also contains $27 million for logistics support for FY '83.

★ General Aviation—personal and business flying—showed gains during 1982 despite a depressed market for aircraft sales, the Aircraft Owners and Pilots Association reported.

About twenty percent more private pilots were licensed last year than in 1981, even though the number of new student pilots decreased.

"Although fewer people are starting to learn to fly," noted AOPA President John L. Baker, "more of those are staying with it and getting their private licenses."

Flying is becoming safer, too. For

INDEX TO ADVERTISERS

Walter J. Boyne, acting director and former deputy director of the National Air and Space Museum, has been named director. Mr. Boyne, a retired Air Force colonel who has logged 5,000 hours flying time, has been a member of the Museum staff since 1974 and has held a variety of key posts. A prolific writer, Mr. Boyne is the author of five books and 200 articles on aviation, and has two additional books awaiting publication.

example, fatal accidents were down eleven percent from 1981. And when this reduction is assessed against the number of hours flown, Mr. Baker predicted, the data will show a further improvement in accident rates that continues a downward trend.

The AOPA official predicted long-term growth in the use of personal aircraft, since in the past twenty years the number of pilots has doubled and the active fleet of general aviation aircraft has tripled.

While a great deal of emphasis has been placed on business flying, this segment represents a slower growth pattern than the use of aircraft for personal flying. Twenty years ago, for example, business aircraft represented nearly half of the active fleet. Today that figure is less than one-third.

Executive flying represents only about seven percent of the fleet.

According to Mr. Baker, the highway speed limit, fuel efficiency, and better utilization of time are forces pushing people to their own air transportation.

Baker also credits the rapidly expanding ultralight aircraft program for aviation's growth.

"These light, inexpensive vehicles that grew out of the hang-glider movement are introducing thousands of people to flying," Baker added, "and none of this present activity is included in fleet size or operational data."

Baker noted that AOPA membership increased during 1982 while some of the other aviation-related businesses declined. AOPA now claims representation for more than 330,000 pilots; 260,000 members plus an additional 70,000 in the immediate families of members.

★ **NEWS NOTE**—AFRES has proposed the **activation of a 250-bed contingency hospital at Travis AFB, Calif.** Detachments of the Reserve hospital would also be established at Mather and March AFBs, both also in California; Davis-Monthan AFB, Ariz.; and Fairchild AFB, Wash. These would assume health care when active-duty members are temporarily deployed elsewhere. The Travis headquarters would be operated by 225 Reservists and three civilians. Detachments would have from eighty to 105 Reservists and one civilian. Activation is planned for mid-year and, while no new construction is contemplated, Reserve slots would increase by a total of 605. ■

FROM ANDERSEN TO ZWEIBRUCKEN
USAF WORLDWIDE

A STAFF REPORT

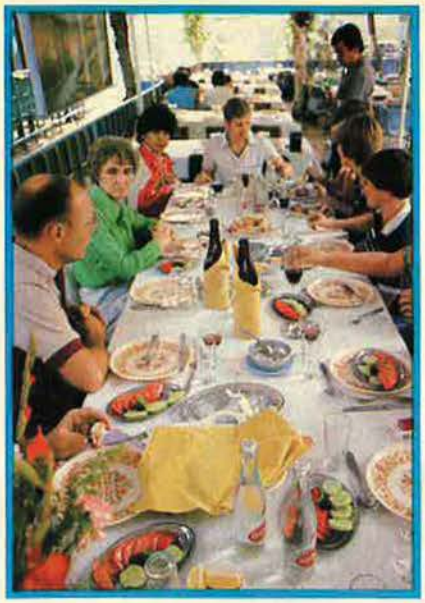
IF YOU joined the Air Force to see the world, chances are excellent that you won't be disappointed. At any given time, some twenty-three percent of the active-duty force is stationed overseas.

From Andersen AFB on Guam to Zweibrücken AB in Germany, the Air Force has sixty squadrons of aircraft abroad, operating from thirty major bases and 681 smaller installations.

Even so, the Air Force does not have enough people and machines in place overseas to meet the full requirements for airpower in the event of a major conflict. The overseas Air Force would have to be rapidly reinforced by units deploying from Stateside.

For those who are part of the in-place forces over there, the duty has its hardships, but there are rewards, too. Most Air Force people say they wouldn't swap their experiences overseas for anything. They see places the stay-at-homes only dream about. They get to know interesting cultures different from their own. And they take special satisfaction and pride in their mission in the first rank of the worldwide Air Force.

A-10 pilots receive a warm welcome upon arrival at Suwon AB, Korea, a Pacific Air Forces tactical fighter base. Blue-suit presence in Korea is the fourth largest in the overseas Air Force, exceeded only by USAF contingents in Germany, the United Kingdom, and Japan.



Air Force people assigned to the air station at Ankara in Turkey relax over a traditional Turkish lunch in a local café. (USAF photo by SSgt. Bill Thompson)

PEOPLE ABROAD

By latest count, there are 136,345 active-duty Air Force members in foreign lands. The largest concentrations are in Germany (35,000), the United Kingdom (22,300), Japan (14,100), South Korea (9,300), and the Philippines (8,400). At the other end of the scale, the Air Force presence on Diego Garcia in the Indian Ocean consists of one officer and nine airmen. Members completing a long tour of duty abroad after September 1, 1980, get the new Air Force Overseas Medal.

Family separations remain a fact of life for many. Close to 17,000 of USAF's overseas people are serving short tours. Forty-four duty locations are remote. When possible, the Air Force tries to give people their choice of next duty location when they return from unaccompanied tours of fifteen months or less.

Accompanied tour lengths normally vary from twenty-four to thirty-six months, but Air Force people may volunteer to extend beyond their prescribed tour lengths. In fact, 22,495 airmen were extended during FY '82.

Limitations on travel entitlements for junior airmen are still a problem. For E-4s and below with less than two years of service, gov-

ernment shipment of household goods is limited to 1,500 pounds. The Air Force is again requesting money this year to improve this situation, but the outlook is not promising. These junior airmen, however, have had funded transportation for dependents to overseas duty stations since 1978.

A cost-of-living allowance (COLA) in certain overseas areas now defrays the average excess costs (excluding housing) for such items as food, personal care, recreation, and clothing. In addition, the Rent Plus system reimburses members who live off base for the cost of their rent and utilities within a prescribed "by-grade" formula.

When it comes to assignments, "overseas" is a relative term. Two American states—Alaska and Hawaii—count as overseas duty, but only for those who aren't legal residents of those states.

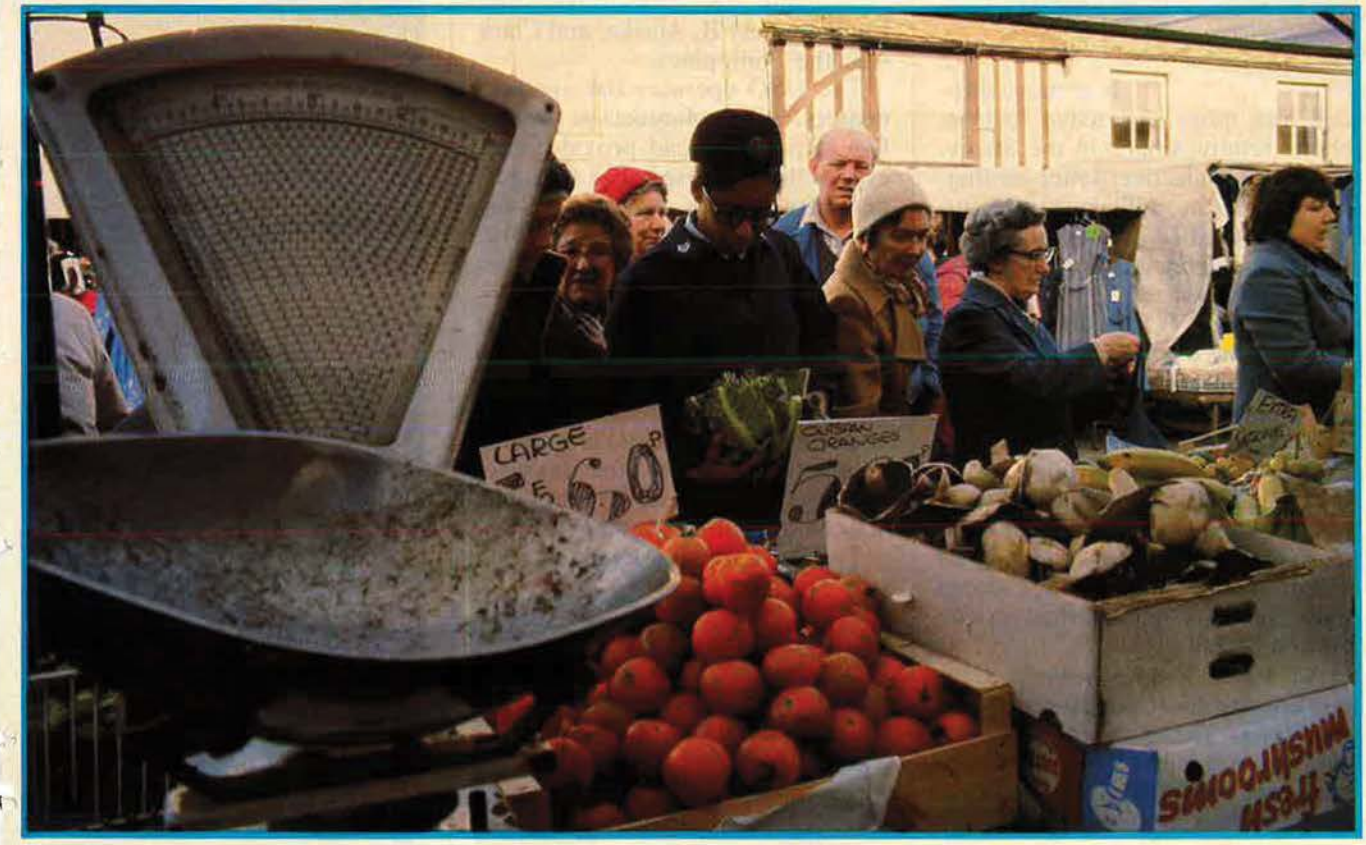
Choice overseas assignments for officers, based on expressed preferences: Germany, United Kingdom, Hawaii, Spain, and Korea. Top preferences for airmen: Germany, United Kingdom, Hawaii, Alaska, and Spain.

HOME AWAY FROM HOME

Your life-style changes when you're stationed abroad. For example, new opportunities abound for travel. One of the most popular military recreation areas in Europe is at Garmisch, Germany's leading Alpine resort. Nearby is Neuschwanstein (pictured on the front cover of this issue), the model for Walt Disney's fantasy castle. Within a fifty-mile radius is the Wies Kirche (church), noted for its Bavarian rococo architecture, and the cultural and touring center of Innsbruck, Austria.

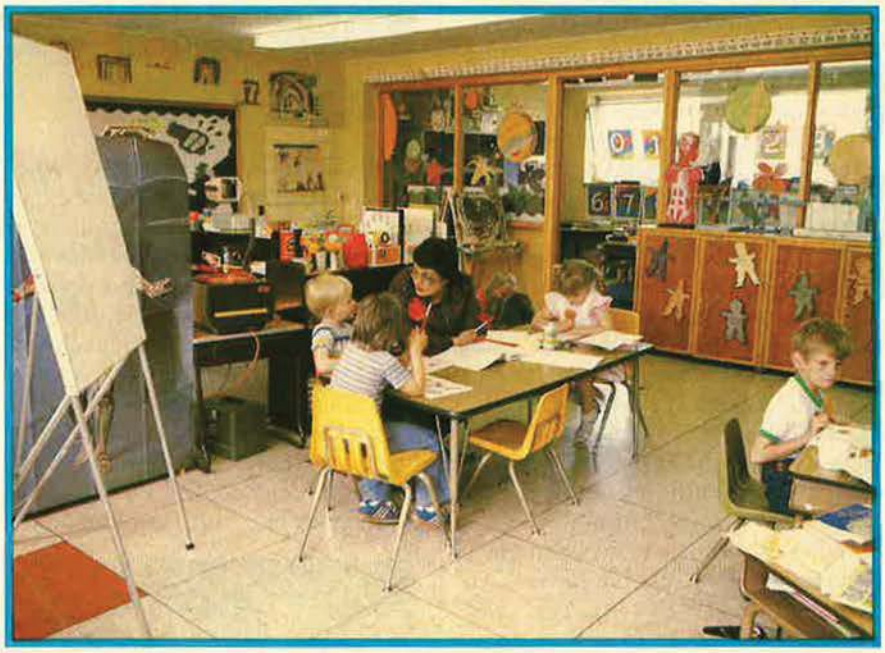
Shopping—and in many places, bargaining—for local merchandise can be fun. And overseas exchanges stock a wider selection and a greater price range of merchandise. Fur coats, television sets, stereo components, and cars can be purchased. These items aren't for sale in Stateside exchanges. Neither are diamonds larger than half a carat, but if you can afford them, you can find larger ones in BXs abroad. Overseas commissaries report that most items their customers want are generally available, with only occasional exceptions. At press time, commissaries in Europe had current shortages of such high-demand items as potato chips, paper products (toilet tissue and diapers), family-size and king-size detergents, bleach, biscuits, cream cheese, and horseradish. In PACAF, it's difficult to keep perishable items like fresh fruit and vegetables in good condition. Whenever possible, stocks of these items are supplemented by local purchase.

Television, taken for granted Stateside, becomes important. In



TOP: There are no commercials and the Super Bowl may be broadcast at midnight, but Armed Forces Radio and Television Service brings the sights and sounds of home to airmen around the globe. Here, the AFRTS signal is beamed from the Azores. (USAF photo by SrA. Guido Melo) ABOVE: An Air Force shopper picks vegetables at an open market in Mildenhall, Suffolk, England. (USAF photo by SSgt. Myron Geddings)

1982, approximately forty-five satellite TV events, including live sports and special news, were transmitted abroad. Work is still in progress to complete the worldwide Armed Forces Radio and Television Service (AFRTS) Satellite Network (SATNET). When completed, SATNET will provide live and taped radio and TV programs twenty-four hours a day.



ABOVE: American children study at the Hahn AB, Germany, elementary school. LEFT: The Dallas Cowboys cheerleaders are among USO's most popular overseas entertainment tour groups.

It is more difficult and more expensive to telephone relatives back in the States, so people rediscover letter writing. In FY '82, the military postal service delivered 72,295,000 pounds of mail to and from Air Force installations overseas.

Last year, 9,552 officers and 72,693 airmen were enrolled in off-duty educational courses overseas. The Department of Defense Dependents School System (DoDDS) runs from kindergarten through grade twelve, and has 271 schools in twenty countries. Over a seven-year period DoDDS students achieved higher average SAT and ACT scores than the national average in the United States.

Air Force Family Support Centers are now located at five overseas locations. These centers provide support to families while Air Force members are TDY. They also help spouses find jobs, resolve family money management problems, and teach family enrichment courses. Six new centers are scheduled to open during 1983, at Zweibrücken AB, Germany; RAF Upper Heyford and RAF Lakenheath, UK; Eielson AFB and Elmendorf AFB, Alaska; and Clark AB, the Philippines.

The USO operates 106 overseas centers. USO volunteers at twenty-five airports abroad provide nursery facilities, hospitality lounges, and refreshments. Among USO entertainers on tour overseas in 1982: Lou Rawls, the Dallas Cowboys Cheerleaders, the Los Angeles Rams Cheerleaders, and the cast of TV's *Happy Days*, including the Fonz—Henry Winkler. The Cowboys and Rams cheerleaders were so popular that the USO is planning another tour by them later this year. Johnny Lee and Tony Orlando may also be appearing overseas soon.

The Red Cross is at every location where American troops are, relaying messages between service members and their families and verifying emergency leave requests. The Red Cross handled more than 500,000 welfare and emergency leave messages for military people overseas last year.

At Iraklion AS, Crete, expectant parents attend a childbirth class. (USAF photo by SrA. Mark Crabtree)

JOINTNESS AND COMBINEDNESS

In the event of war, the US Air Force would be fighting alongside other US forces and allied forces. In fact, a significant trend of the 1980s is toward greater emphasis on joint (among US forces) and combined (among allies) cooperation and training.

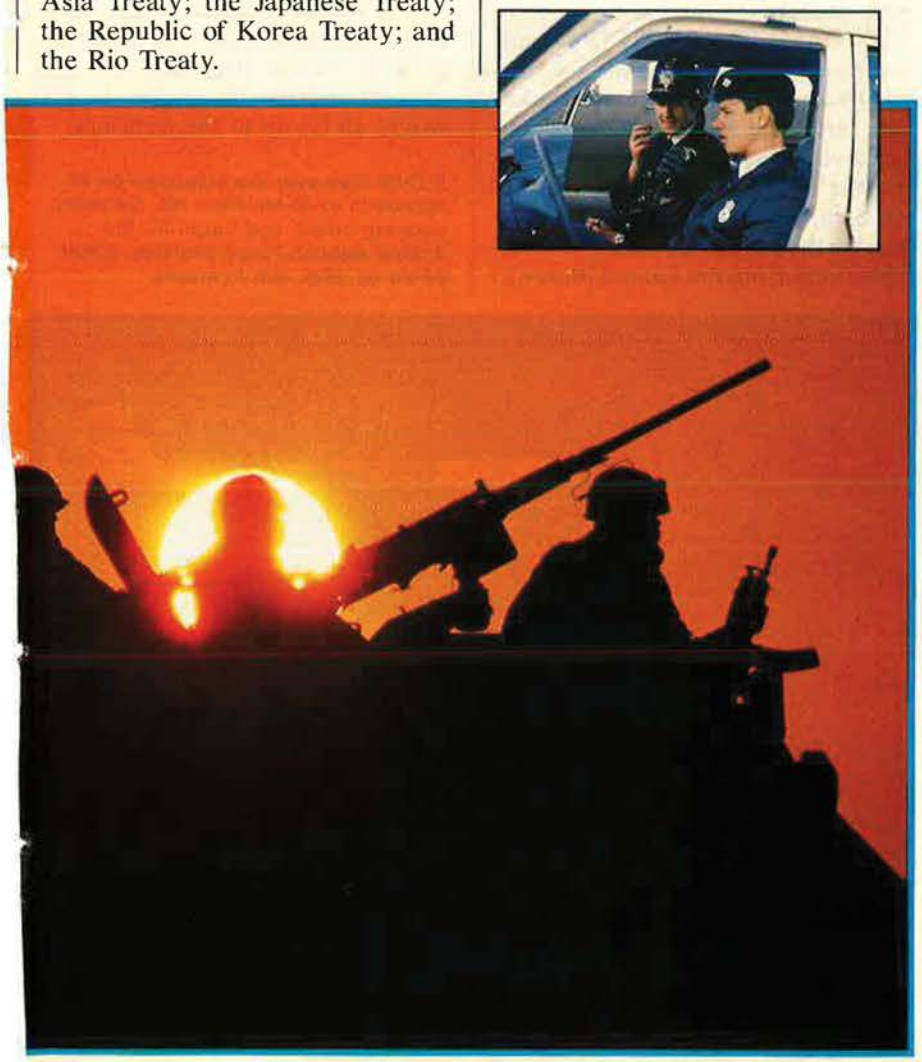
Articles elsewhere in this issue spotlight such developments as the Joint Attack of the Second Echelon (J-SAK) concept and USAF participation in the maritime mission, as well as programs in which US and allied airmen fly together, both in big exercises and as an everyday routine.

The US is a party to seven collective defense agreements: the North Atlantic Treaty; the ANZUS (Australia, New Zealand, US) Treaty; the Philippine Treaty; the Southeast Asia Treaty; the Japanese Treaty; the Republic of Korea Treaty; and the Rio Treaty.

Jointness and combinedness have not been without their tensions—for example, roles-and-missions questions about air base defense and interdiction, or in the case of allies, the portion of common defense costs being borne.

After much debate last year, Congress capped US troop strength in Europe at FY '82 levels, about 4,700 short of what the Administration had asked for. Reductions in overseas troop strength are advocated by some who feel America's allies are not carrying their fair share of the burden, and by others whose concern is budgetary—an overseas force being very expensive.

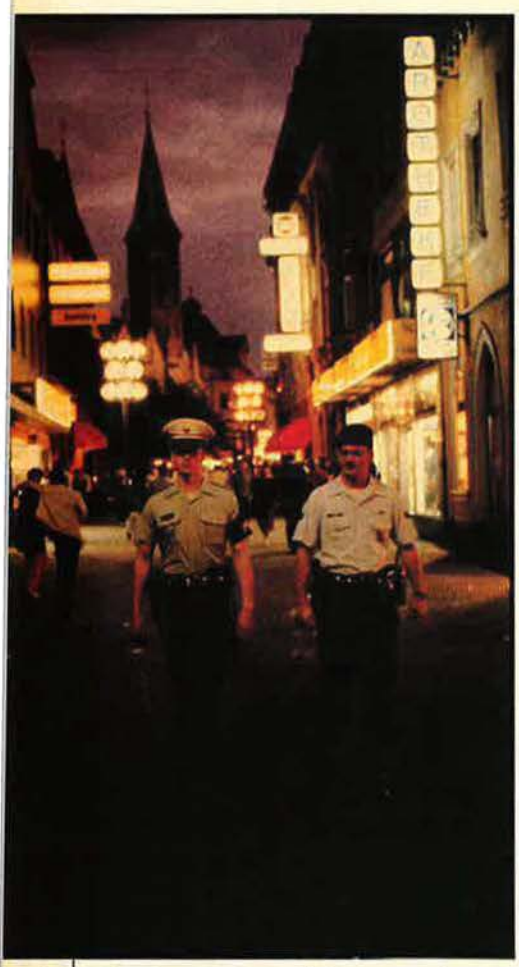
But as the Secretary of Defense pointed out in his annual report to Congress, "US forces are maintained in Europe directly in support of US political and military interests—not as an act of charity toward our allies." The same applies wherever American forces are serving worldwide.



YOU KNOW YOU'RE OVERSEAS WHEN . . .

- Your kids think all school buses are blue.
- You fill in another block on your short-timer calendar.
- You get intense cravings for things the commissary and exchange are out of. (There's peanut butter but no jelly for the sandwich you dream of, and a big jar of jelly breaks in your roommate's luggage when he's returning from Stateside leave.)
- Ultrahigh temperature milk or the powdered and reconstituted stuff (with coconut oil) doesn't taste so bad anymore.
- You hang your coat next to your gas mask on the duty section coat rack.

LEFT: Security policemen, deployed from Keesler AFB, Miss., in Exercise Team Spirit 82, patrol at Kunsan AB, Korea. (USAF photo by SSgt. Jim Pearson) INSET: A local constable gets a security police orientation at RAF Chicksands, UK. ABOVE: USAF and Korean maintenance personnel work on an F-4 at Taegu AB in Korea. (USAF photo by TSgt. Mike Dial)



The Army and the Air Force conduct a joint night patrol in downtown Kaiserslautern, Germany. (USAF photo by Ken Hackman)

- You decorate your living room based on the number of transformers you have.
- Your ration card is used up with a week left to go in the month.
- You wish AFRTS had real commercials.
- There is a female attendant in the men's room.
- Those relatives from North Dakota who have promised to visit you for years finally show up.
- The Super Bowl is broadcast in the middle of the night.
- The locals want to talk with you so they can practice their English.
- The MARS station patches you through for a call home, and you have to keep reminding your mother to say "over."
- You quit watching the Dow Jones and turn to the exchange rate.
- The Stars and Stripes (the flag, not the newspaper) never looked quite so grand.

(Send in your additions to this list.)

LONG LINES TO A GLOBAL FORCE

Not every airman overseas is assigned to an overseas command. The crews of Military Airlift Command, for example, come and go constantly from aerial ports abroad.

One of the consequences of having a global force is that it must be supplied, sustained, and, if necessary, reinforced. The Army also looks to the air for its lifeline, and an increasing percentage of what the Army needs is outsize cargo. In the first fifteen days of a European war—the time when airlift would be most critical—about twenty-seven percent of all the cargo to be hauled is outsize.

The airlift situation is improving, and will improve still more by the end of the decade. Last year, programs were completed to add aerial refueling capability to the C-141B and to increase the cargo space in the C-141A. The FY '84 DoD budget request includes funds for fifty C-5Bs and eight KC-10 cargo tanker aircraft. The Air Force hopes to achieve initial operating capability for the C-17 next-generation airlifter. Still, there are presently shortages in the airlift that would be available, both from the United States to overseas and within the overseas theaters. Prepositioning of materials relieves this to some extent, but is not the total answer. Crises tend to develop in places far from where the stocks are located. Furthermore, positioned stocks are vulnerable to attack or capture, and often require maintenance to keep them usable.

Among its programs to alleviate the current shortfall in facilities available to handle casualties, the Air Force wants funding for two air transportable hospitals and eighteen mobile surgical suites.

The United States is more distant from the principal theaters in Europe and the Pacific than is the Soviet Union. The east coast of the United States is about 3,500 nautical miles from the most likely European battlefields, for example, while Moscow is only some 1,300 miles away. Also, Soviet reinforcements could come by road and rail, while the Americans must deploy by either sea or air.

Eventually, sealift would carry better than ninety percent of the cargo in an extended conflict or crisis abroad, but in the early days it would all be up to the airlifters.

A C-5A flies over the autobahn on its approach to Rhein-Main AB, Germany, carrying troops and cargo for the annual Autumn Forge exercise. (USAF photo by SSgt. Jim Pearson)

OVERSEAS ALL THE WAY

Seventeenth Air Force observes its thirtieth birthday this month. It was activated April 25, 1953, at Rabat, French Morocco, and its colors have flown continuously on foreign soil ever since.

Today, it is the most forward-deployed of the three numbered air forces in USAFE. It has been headquartered at Sembach AB, Germany, since 1972. Major units are assigned to Zweibrücken, Bitburg, Hahn, Spangdahlem, Ramstein, Sembach, Lindsey, and Rhein-Main in Germany, and to Camp New Amsterdam in the Netherlands.

The command has air defense responsibilities throughout central Europe, and manages a large portion of USAFE's collocated operating base program. For these upfront squadrons, combat training is serious business. In 1982, Seventeenth Air Force crews logged 77,000 sorties and 97,000 flying hours to keep sharp their combat-mission readiness.

This key organization is spotlighted here as a representative of *all* the fine units of the overseas Air Force. ■

An F-4G Wild Weasel aircraft from Spangdahlem AB passes above Cochem Castle on the Moselle River in West Germany. Against such scenic backdrops, the forward-deployed units of the overseas Air Force prepare daily for the grim possibility of war.

US and allied airmen would have their hands full with the ever increasing might of the Warsaw Pact.

IF WAR came to Europe, events would unfold rapidly. NATO's ground defenses are situated near the inter-German border, and only about fifteen minutes of flying time separates the forward elements of the opposing air forces.

Warsaw Pact doctrine, dictated by the Soviet Union, emphasizes surprise and quick victory.

In the first crucial hours of conflict, echelons of armor-intensive ground forces would hammer NATO's forward defenses while wave after wave of tactical aircraft would seek control of the skies and destruction of NATO air defenses, air bases, and command and control centers.

Even after reinforcements began arriving from the United States, allied airpower would have its hands full. It would have to establish air superiority, keep enemy fighters off the backs of friendly forces, and also help defeat the ground assault. The opening battle over the continent, though, would be in the hands of airmen from US Air Forces in Europe (USAFE) and NATO partner nations.

Thanks in part to system modernization in recent years, these in-place forces are looking good. F-15Cs and Ds from Bitburg AB, Germany, and Camp New Amsterdam in the Netherlands would provide potent air defense in the NATO center. Conversion to F-16s at Hahn AB, Germany, was completed in 1982. A-10s are now at RAF Bentwaters and Woodbridge in the UK, but would deploy forward in wartime. The veteran F-4 is still effective. USAFE's electronic combat capability will be significantly enhanced around the end of this year when EF-111A tactical jamming air-

USAFE IN THE DANGEROUS DECADE

An AIR FORCE Magazine
Staff Report

craft are stationed at RAF Upper Heyford. The F-111Es and Fs based in Great Britain can operate around the clock in any weather. They are heavily committed to long interdiction and strike missions.

Allied airmen are flying some impressive equipment too, such as the multinational, multirole Tornado, which can be outfitted to dispense cluster munitions against mobile targets. Enhancing the effectiveness of tactical air forces in Europe is the E-3A Airborne Warning and Control System aircraft flying out of the NATO air base at Geilenkirchen in Germany, where the first multinational crews have been assembled. Four NATO E-3As are now on station, and the plan is to have eighteen operational by 1985.

USAFE squadrons are keenly aware of the responsibility that would fall to them in the forefront of a European conflict. They work steadily on their ability to generate sorties and keep runways open. They practice their wartime routines in bulky clothing and equipment that offers some protection from chemical attack. Combat training is more realistic than ever, and teamwork with allies and US ground forces receives constant emphasis.

USAFE F-15s and F-16s are better than anything the Soviets can put up against them, and are likely to remain better for the next several

An A-10 from RAF Bentwaters taxis out at Sembach AB, Germany, during an Autumn Forge exercise, Carbine Fortress, last September. (USAF photo by Ken Hackman)

F-16s arrive at their new duty station, Hahn AB, Germany, July 9, 1982. Among those on hand to greet them was Gen. Billy M. Minter, CINC USAFE. Four other NATO nations also fly the F-16. (USAF photo by A1C Dave Polinsky)

years. In the overall conventional force balance, though, the Pact—which has long had the advantage in sheer numbers—has been closing the quality gap. The mobility and firepower of Soviet ground forces have increased greatly. The time is long gone when Soviet tactical airpower consisted chiefly of limited-range day fighters. The current generation of aircraft has significant range and increased night and bad weather capability. The next generation will be even better.

NATO may soon face the unenviable prospect of an enemy who is technologically equal as well as numerically superior. On both sides of the Atlantic, defense planners are concluding that once war begins, they cannot allow these strengthened enemy forces to keep the option of bringing the war to the West.

US doctrine in this regard is reflected in a new operational concept called Joint Attack on the Second Echelon—or J-SAK—in which the Air Force and the Army would work together to disrupt, delay, and destroy the enemy's capability for continuous operations by altering the momentum of his attack.

A prime target under this concept would be enemy armor moving up but not yet in the fight. These reinforcements would be hit from both the air and the ground in a coordinated effort. If they can be broken up, the Soviet strategy of punching through with successive echelons will be defeated.

Operating against the enemy's rear, however, calls for major strides in target acquisition and for munitions tailored to the purpose. The Joint Surveillance and Target Attack Radar System (Joint STARS) is being developed by the Air Force and the Army for long-look target detection, tracking, and weapon guidance. Target-hunting drones are another possibility.

The Air Force is working on a number of weapons for use against armor, and is also looking toward the possibility of attacking enemy airfields—a job for which it currently has no effective munition. A first step toward that capability is purchase of the French Durandal runway-cratering munition. Several other weapons, among them cratering submunitions, are in progress.

Acquisition of glide bombs and standoff attack weapons will add to the ability of US tactical air to hit fixed point targets in the enemy's rear—including various facilities at Pact air bases—which would at minimum put a hitch in the rhythm of sortie production.

USAFE eagerly awaits the availability of the LANTIRN navigation and targeting pods. At present, long winter nights and foul weather in Europe severely restrict the hours when ground-attack missions can be flown. LANTIRN pods will make it possible to conduct such operations in darkness and under weather.

Air Base Survivability

USAFE must anticipate that its own bases will be hit—or at least targeted. Protection of air bases is an Army responsibility, but in recent years the Army has neglected point defense in favor of area defense. To the Army's displeasure, the Air Force is acquiring British Rapier missiles, to be manned by the RAF, for defense of its air bases in the United Kingdom. Unless the Army shows more interest in meeting its responsibilities, a similar ar-

rangement may be made for defense of USAFE bases in Germany, probably with the German-French Roland system.

Dispersal and collocated operating bases are at a premium in Europe (*see p. 54*), so USAFE is working hard on ways to put a cratered runway back in use quickly.

At Ramstein AB, Germany, local civil engineers and a Red Horse team from RAF Wethersfield demonstrated recently that concrete slabs instead of conventional aluminum matting can be used to patch runways. In early December, more than fifty NATO engineers and logisticians watched as the team repaired a simulated crater, measuring twelve by sixteen meters, on the Ramstein ramp in four hours. In another demonstration in January, a slab repair held up nicely when an F-4E rolled across it. The slabs cost less than $3 a square foot, compared to about $25 a square foot for the AM 2 aluminum matting that USAFE has been stocking to fix battle-damaged runways.

The technique is a modification of a method the West Germans and the Swiss have used for several years.

First, high-speed concrete saws cut a square or rectangle around the damaged area. The crater is filled with rocks and gravel, then capped with the slab. Machines do the heavy work. People do most of the lifting when matting repairs are made, and it is grueling labor, especially if they must wear chemical protection gear. Ten people can make a slab repair that would require twenty-seven people if matting were used. The matting has to be prestocked and stored, whereas the slabs are manufactured locally and can be used for assorted paving jobs around the base. Forklifts easily shuttle the slabs to where they are needed.

F-15Cs from Camp New Amsterdam in the Netherlands fly a training mission over northern Europe. In the opening battle of a European conflict, USAFE F-15s would provide potent air defense in the NATO center and would be crucial to allied control of the air.

At present, USAFE's aircraft are extremely vulnerable to attack while refueling from trucks or at hot pits. To reduce the exposure of both aircraft and trucks, in-shelter refueling methods have been devised. A prototype system is in operation at Spangdahlem AB, Germany.

It consists of a buried pipeline loop leading into aircraft shelters, with isolation valves to limit the damage if the pipeline is cut. Tests conducted last year at Tyndall AFB, Fla., demonstrated that buried pipelines can withstand all but direct hits. USAFE hopes to install the first full-scale system at Bitburg, and is urging that in-shelter refueling be adopted as a NATO standard.

An additional aspect of air base vulnerability is the high degree of terrorist activity in western Europe. Infiltrators managed to explode a bomb in USAFE headquarters at Ramstein in August 1981. Less than a month later, a vehicle carrying an Army general was rocketed in Heidelberg. US installations and citizens are preferred targets for the terrorists. With attacks against the military on the increase, USAFE security procedures have been stepped up.

Sortie Generation

An improvement in sortie rates is almost as good as having additional airplanes.

Some of the sortie figures USAFE is now posting can be laid to the command's modernized fighter fleet. Fighter aircraft averaged one combat mission every four days in World War II, one every three days in Korea, and nearly one a day in Vietnam. Surge tests with F-15s in Europe have demonstrated rates of better than four sorties a day.

Part of the credit, however, goes to the production-oriented maintenance concepts now in use and to

OV-10 forward air controllers from Sembach AB, Germany, work in teams to find targets and direct attack aircraft onto them.

Civil engineers in full chemical ensemble practice rapid runway repair during an exercise at Hahn AB, Germany. A new technique for getting battle-damaged runways back into action employs concrete slabs instead of aluminum matting, a cheaper approach that requires less human labor.

the determined efforts of USAFE maintenance crews.

The newest wrinkle in USAFE maintenance is called Aircraft Battle-Damage Repair (ABDR), a concept pioneered by the RAF and said to have been proven during last year's war in the Falklands. Self-supporting repair kits, mounted on trailers, would contain everything needed to fix a battle-damaged fighter to the extent that it could fly at least one more sortie. These mobile units could be wheeled from one semihardened shelter to another, airlifted, or even taken to emergency landing strips on the German autobahn. The trailers would have their own power generators.

Thus far, USAFE is the only Air Force command working toward such a capability to augment conventional maintenance operations. ABDR manuals are already out for the F-4 and F-5, and manuals for the A-10, F-111, and F-16 will be available by next year.

Allied Teamwork

The most spectacular example of Alliance cooperation is the annual Reforger exercise, during which US units deploy from Stateside to demonstrate their ability to reinforce western Europe. Air Force crews get to know their bed-down bases, fly in multinational operations, and gain experience with local weather and terrain.

Less noticed are the cooperative ventures going on year-round between USAFE and allied air forces.

Combined training doesn't get much better than the Tactical Leadership Program (TLP) conducted eight times a year by NATO's Allied Air Forces Central Europe at Jever AB in northern Germany. Each session runs for four weeks. *(See "You Fight Like You Train," December '80 issue, p. 44.)*

Each nation selects its top performers to go, and competition is keen. Aircrews get a concentrated week of seminars on the threat, allied capabilities, doctrine, tactical leadership, and interoperability. The other three weeks are mostly flying. Each crew gets fifteen sorties alongside airmen from other NATO nations. A-10s, Harriers, F-15s, F-4s, FGR-2s, Alpha Jets, Lightnings, Mirages, Jaguars, and F-104s work together in a variety of missions. The combat training is as realistic as possible, but does not extend to live firing. (In general, NATO air forces get in less actual shooting than do the Soviets and the Pact.)

Five nations—the United States, Belgium, Germany, the Netherlands, and the United Kingdom—send aircraft and crews to TLP regularly. Canada, France, Denmark, and Norway have taken part at times, and Turkey and Greece have sent observers. Future TLP courses will involve the NATO AWACS, and the first appearance of the Tornado is expected soon.

In 1982, every USAFE fighter wing participated. This year, forty-two USAFE aircraft, including the F-16 for the first time, will be going to Jever.

There is good progress in a different dimension of cooperation: cross-servicing of aircraft that have to divert from their home bases on the way back from a combat mission. This program, begun in 1978, provides for them to refuel and rearm—or get fresh film in the case of reconnaissance aircraft—and not lose a sortie. USAFE aircraft can be handled at selected allied bases, and USAFE bases offer the same service to allied airplanes diverting their way.

Stage A servicing is refueling only; Stage B includes rearming and film reloading as well. Currently, USAFE can service ten different allied aircraft at its main operating bases, and eight types of US aircraft can be accommodated at allied bases in six nations. Five types of US aircraft can be serviced at dissimilarly equipped USAFE bases.

Turkey, Italy, and Norway were originally cool to the whole idea, but have recently expressed interest, although they have reservations about Stage B cross-servicing.

When an airplane diverts for cross-servicing, the Allied Tactical Operations Center (ATOC) will feed its next target to the receiving base, where a decision is made in conjunction with the aircrew on which of the available munitions will be loaded.

ATOC Interoperability

The ATOCs themselves will be working together more smoothly now that the EIFEL 1 command control and information system is in operation at USAFE's ATOC at Sembach AB, Germany. It is a high-

Map study is part of the course for NATO pilots and forward air controllers at the Air Ground Operations School at Sembach AB, Germany.

speed automated system, replacing manual procedures for planning tactical air requirements and matching them up with available sorties.

It provides a computer-to-computer interface with EIFEL 1 systems already in the two German ATOCs, Kalkar and Messtetten. The British, Dutch, and Belgian ATOC at Maastricht in the Netherlands will be getting EIFEL, too, which will standardize the ATOCs in the Central region.

EIFEL (the German acronym is for Electronic Information Command and Control System for the Luftwaffe) was developed by the Germans. USAFE adopted it as the quickest and most economical way to automate its air tasking. An added feature of the system is that the host computer at Sembach will share combat information with terminals at other USAFE bases.

Manual ATOC operations are no longer flexible and efficient enough to handle the requirements for tactical airpower that would flood in during wartime, to assign sorties and weapons against those needs, and to monitor execution of the orders.

Not every seemingly sensible cooperative venture is readily adopted, though.

Some days the troops in Europe must wonder if the folks back home understand the problem. A year ago this month, West Germany agreed to a wartime plan under which it would pay to mobilize 93,000 Reservists to support US forces if the US would pay for the equipment. Of the total, 27,000 of those Reservists would assist USAFE in air base security, airfield damage repair, collocated operating base augmentation, and medical evacuation. By some estimates, the proposal would cost the US one two-hundreth as much as bringing people and equipment from the States—but as this article went to press, Congress still had not funded the program.

The Most Dangerous Decade

Despite some improvements and new systems, the conventional military situation in Europe has been going downhill for the West. That, in turn, lowers the nuclear threshold and increases the possibility that NATO would have to resort to nuclear weapons early in a conflict or be defeated. Concurrently, the Soviets are doing well in their propaganda war to block upgrading of NATO's nuclear deterrent while continuing to deploy SS-20 medium-range nuclear missiles at an alarming rate.

Adequate conventional forces cannot eliminate the need for a nuclear deterrent, but they can raise the nuclear threshold and make war of any kind less probable.

The technology—particularly in target acquisition and munitions—is emerging to add muscle to NATO squadrons. Since the Alliance is pledged not to fire the shot that would open a war, any conflict would begin at the time and place of the enemy's choosing. That defensive strategy places a heavy burden on the flexibility of airpower.

This is already Europe's most dangerous decade since the Alliance was formed—and it could get even more dangerous before it's over. ■

IMPROVED AIRPOWER IN A BIG OCEAN

New aircraft, tough training, and closer cooperation have increased PACAF's combat capability, but the Soviet presence in the Far East still grows relentlessly.

BY JOHN T. CORRELL, SENIOR EDITOR

RUSSIAN aircraft and ships now operate routinely out of the old US base at Cam Ranh Bay in Vietnam.

The Soviets have deployed a third of their new SS-20 medium-range nuclear missiles in the Far East. The largest of their four naval fleets is home-ported at Vladivostok on the Sea of Japan.

The Backfire bomber has begun flying from Asian bases, and can reach Midway, Guam, and the Philippines and return home without refueling.

The Soviets have been steadily strengthening their forces on several islands they occupy just north of Japan.

And with some 2,500 combat aircraft and at least forty-six Army divisions in Asia, the Russians are flexing their muscles at every opportunity in hopes of intimidating US allies in the region.

When Japanese Prime Minister Yasuhiro Nakasone spoke in January of building defenses against Backfire incursions and of seeking to protect nearby sea-lanes, the Soviets conjured up visions of Hiroshima and Nagasaki by warning Japan of "a national disaster more serious than the one that befell it thirty-seven years ago."

Soviet forces in Asia have improved in quality as well as in numbers.

"In the past three years, they have replaced more than 600 of their older fighters in the Far East with new first-line aircraft," says Lt. Gen. Arnold W. Braswell, Commander in Chief of Pacific Air Forces. "That's about three times the *total* number of fighters we have in PACAF."

New Attention to Asia

All this has created a resurgence of US concern about the Pacific, at least among policymakers. In peacetime, the American public tends to ignore military matters in Asia, even though the nation's two most recent wars were fought there and despite the importance of the area to US interests. Trade with the Pacific-Asia community exceeds total trade with western Europe, and accounts for twenty-eight percent of all US foreign commerce. Asia is an important source for sixteen strategic materials needed by this country. Moreover, two American states extend far out into the Pacific, and five of the seven collective defense treaties to which the US is party are with Pacific nations.

"During the years following the Vietnam War, we understandably gave a great deal of attention to Europe," says General Braswell. "Now the Administration has concluded that we need to place greater emphasis on the worldwide problem and, as a result, the Pacific is getting appropriate attention."

That attention, he says, is coming in the form of new aircraft, construction money for much-needed housing and facilities, and in relief from shortages in spare parts and expendables.

F-16 aircraft have replaced F-4s at Kunsan Air Base in Korea, and A-10 attack aircraft are in place at Suwon AB. Misawa AB, Japan, will get two squadrons of F-16s, the first to be in place by 1985. The F-15 Eagle and the E-3A AWACS are

Cooperation with Asian allies is important in covering the vast area of the Pacific. Here, two USAF F-15s in formation with Singaporean F-5s, A-4s, and Hunters, and Australian Mirages in Exercise Kangaroo 81.

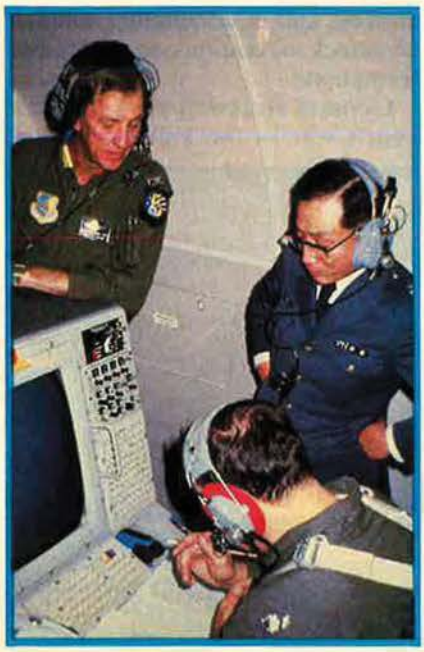
now operating out of Okinawa. The remaining F-4s in PACAF will gradually be replaced with more modern equipment.

Air defense in the Pacific has been significantly enhanced. AWACS can detect hostile aircraft at either high or low altitudes from hundreds of miles away. It can direct intercepts by the F-15, which can take on anything in the sky, and which will add to its already impressive range when it is equipped with conformal fuel tanks next year.

"The spare parts situation has been improving for the past year or so, and continues to improve," General Braswell says. "We, along with the rest of the Air Force, have some shortages of spare parts for our newest aircraft, and there are some shortages in certain types of modern munitions, mainly because they haven't been in production long enough for us to build up our stockpiles."

An Unfavorable Balance

Soon after the Vietnam War ended, PACAF forces were drawn down to roughly the same levels at which they stand today. The command has 230 fighters and reconnaissance aircraft, plus about 100 theater airlifters and support aircraft. Manning stands at 27,000 active-duty military members. In addition, some 19,000 USAF people from other commands are stationed in the Pacific. SAC has B-52s on Guam and furnishes tankers for aerial refueling in the theater. The E-3A AWACS is a TAC asset under PACAF control, and long-haul airlift in the Pacific is performed by MAC.



Japan Air Self-Defense Force observers get a firsthand look at the E-3A AWACS, now operating out of Okinawa and enhancing air defense in the Pacific.

Allied airmen in the Pacific train together regularly. Here, Japanese and American pilots hold a preflight discussion during a combined exercise. Given the unfavorable military balance in the Pacific, closer cooperation between allies has been increasing.

"I would anticipate that long-range airlift will turn out to be our greatest limiting factor in a crisis," General Braswell says, citing a concern shared by operational commanders almost everywhere in the Air Force. Recent actions to expand the airlifter fleet will help considerably by the end of this decade, he says.

Given the unfavorable military balance in the Pacific, PACAF is working in closer cooperation these days with the Navy, as well as with allied air forces. Six US carriers, with some 430 carrier-based aircraft, operate in the Pacific, covering the vast stretch between California and the Indian Ocean. In crucial Northeast Asia, the Republic of Korea has about 400 combat aircraft, and the Japan Air Self-Defense Force has 470.

In the event of hostilities, PACAF would call upon augmentation forces from the United States. The capability for rapid reinforcement is demonstrated each year in Exercise Team Spirit, in which PACAF units and Stateside squadrons deploy to Korea. "Team Spirit," General Braswell says, "is the free world's largest combined training exercise—and in many ways the most productive." Between big exercises, PACAF practices reinforcement on its own. "We periodically deploy a squadron or two, for example, from Okinawa to Korea, set them up at their deployment base, have them exercise at high sortie rates, and evaluate their performance," General Braswell says.

Korea, where a testy armistice has been in effect for thirty years, has long been regarded as the most likely setting for the next war in Asia. Together, the US and the Republic of Korea have about 500 combat aircraft in place. The North Koreans have around 700, but many of those are older MiG-17s and MiG-19s.

"We would expect a lot of armor in any initial attack in Korea," General Braswell says. "The new A-10 squadron at Suwon would help us stop that armor, and we're prepared to deploy additional A-10s to Korea.

USAF F-15s from Okinawa and F-104s from the Japan Air Self-Defense Force await the next round of Exercise Cope North. (USAF photo by SSgt. Steve McGill)

Moreover, our F-16s are equipped with Maverick missiles and are capable of assisting in that role."

At Osan, Korean and American officers work together daily on a combined planning and control staff. Integrated operations plans are in the hands of unit commanders from both nations, so they would be ready to work as a team from the first day of the war. "American and Korean aircrews fly together regularly in air exercises and operate from the same bases daily," General Braswell says. "Korean and American air units in South Korea, including Navy and Marine units, are prepared to fight as a single combat air force."

US airmen also train regularly with the Japan Air Self-Defense Force. Cope North, an air defense exercise, is conducted quarterly from Misawa AB, Japan.

The United States has long urged Japan to assume a greater role in its own defense, but building up the military remains a hot political issue in Japan. Prime Minister Nakasone has taken heavy criticism for his proposals to increase defense efforts.

"They're making significant progress," General Braswell says of the Japanese. "They are modernizing their naval and air forces in particular, and they are strengthening their ground forces as well. We, of course, would be glad to see their rate of buildup in those forces accelerate."

In the past, the Koreans and the Japanese have worked more closely with US forces than they have with each other. "There are some encouraging signs that defense officials in Japan and Korea see the importance of cooperation with each other, in air defense for example," General Braswell says. "I'm hopeful that some arrangements for closer cooperation will develop, but it's too soon to speculate on what forms that cooperation might take."

The Maritime Mission

PACAF's first mission is to defend against air attack on friendly installations and forces. Next, it would be required to gain air superiority over local battle areas, provide close air support for ground forces, and interdict an enemy's rear echelons and lines of communication. In the past year, PACAF has been giving serious attention to improving its capability for maritime operations—this coming prior to the agreement in Washington last fall for joint air training and greater cooperation worldwide between the Air Force and the Navy.

Over the past two decades, the Soviet Navy has been transformed from a basic coastal defense role and is now a blue-water force, ready to assume power-projection and sea-control missions. Today, it has about eighty major surface combatants and 130 submarines in the Pacific. It is now in a position to disrupt US use of sea-lanes. The Air Force has had a collateral mission to help protect the sea-lanes since 1947, but until recently had not been very active in that role.

"Operations at sea may be required of us if the Pacific Fleet is stretched thin, with carriers deployed as far away as the Indian Ocean," General Braswell says. "With the cooperation of the Pacific Fleet, we are regularly working with Navy forces, in fleet air defense exercises, and in conducting simulated attack operations against naval formations."

General Braswell says that last year's war in the Falklands illus-

During Exercise Team Spirit 82, American F-4 fighters practiced emergency landings on a Korean highway—a capability they might be forced to use in the event of a war.

trated a point already well known by military professionals. Aircraft armed with modern long-range missiles can be deadly against ships, and "modern naval forces must have effective long-range detection and air defense capability. The British did not have this in the Falklands. Our Navy has it in the form of their E-2C warning and control airplanes and their F-14A fighters with the long-range Phoenix missiles. Fortunately, from our viewpoint, the Soviet Navy is still deficient in this capability."

The Soviet Navy is also lacking in the Pacific bases, and its exit to the sea from Vladivostok is through straits adjacent to Japan. That is one reason the Soviets get so agitated when the Japanese talk about defending their home waters.

The US Air Force is considering the utility of equipping some bombers and fighters with the Harpoon antiship missile, or something similar, with which enemy vessels could be attacked from standoff range. More immediate is the requirement for USAF assistance in air defense of the fleet or sea-lanes.

"For example, F-15 aircraft deployed in small detachments to such places as the Aleutians can range out today as far as 1,000 miles to engage enemy aircraft threatening our ships," General Braswell says. "With air refueling—or with new external fuel tanks—they can go much farther than that."

A Theater of Distances

The United States does not have enough forces in the Pacific to cover every location that might need to be defended. Consequently, PACAF must be ready to deploy fighters for air defense of Guam, Diego Garcia, and other island bases. When the Soviets field their new long-range Blackjack bomber, even more US installations will be within reach of air attack, so the air defense task will increase.

The huge size of the theater affects airpower requirements in various ways.

"The distances in the Pacific are great, so we need longer range aircraft," General Braswell says. "For example, from available bases to many locations we might need to reach, the distances are greater than 500 nautical miles. Our current aircraft, operating from either Japanese or Korean bases, are in many cases not quite capable of reaching distant targets unless we use aerial refueling, which might or might not be available to the extent we would need."

The F-15 with conformal fuel tanks will have impressive range, of course, but, General Braswell says, "the F-15 is our principal air-to-air aircraft. We need it in that role, and we don't wish to divert it to air-to-surface missions if we can avoid doing so. What we need is longer range air-to-surface aircraft than we now have, with night delivery capability."

Excellent for those purposes, he says, would be the forthcoming E model derivative of either the F-15 or F-16. "We're also looking forward to the day when the B-1 will be available and some of those can be tasked to support us in the Pacific," he adds.

Preparing to Fight

"Today," General Braswell says, "our combat aircrews are better and more thoroughly trained for combat than they have ever been in the history of our peacetime Air Force."

A major reason is the Cope Thunder training program PACAF runs at the Crow Valley range near Clark AB in the Philippines. Modeled after the highly realistic Red Flag exercises held in Nevada, Cope Thunder seeks to have every PACAF aircrew fly between eight and ten mock combat missions a year.

The number is significant. Analyses show that most combat losses occur during an aircrew's first ten missions. Today, fewer than a third of the Air Force's primary fighter crews have seen actual combat. Cope Thunder is designed to give an aircrewman the closest thing possible to ten missions' worth of life-saving combat experience.

When Cope Thunder began in 1976, it was strictly an Air Force affair. Now, Navy and Marine flyers participate regularly, and periodically so do allied airmen from the Philippines, New Zealand, Australia, and Thailand.

The exercise is held seven times a year and lasts for two weeks each session. Crews go against every possible combat threat that can be duplicated or simulated, including electronic jammers and such "enemy" aircraft as those of the PACAF aggressor squadron, whose F-5E aircraft emulate MiGs in many respects.

PACAF ground crews are improving their combat skills, too.

"In the past few years, we have doubled or in some cases tripled the number of sorties per day that we expect our airplanes and our aircrews to fly in wartime," General Braswell says.

Contributing to this is a procedure called "integrated combat turn," in which all the actions necessary to turn a fighter around—such as rearming, refueling, and maintenance checks—are done at the same time rather than one after another. A fighter can be airborne again in about half an hour instead of the two- or three-hour intervals that elapse when sequential procedures are followed.

A Long Way From Home

About sixty-percent of PACAF's enlisted people are in grade E-4 or below. Fifty-four percent of PACAF officers are captains and lieutenants.

"Experience levels are lower than we would like," General Braswell acknowledges. "That's true with the aircrew force, but more especially with the maintenance force. I want to emphasize, though, that these are extremely capable, hard-working people, even though they're short on experience in some cases. I've been impressed with what they've been able to accomplish. If our retention continues at its present very satisfactory rate, our experience levels will improve."

PACAF retention rates are higher than Air Force averages across the board. Command reenlistment rates last year: first-term airmen, fifty-nine percent; second-term airmen, eighty-nine percent; and career airmen, ninety-eight percent. Retention rates for officers in the key group with between four and eleven years of service: pilots, ninety-one percent; navigators, ninety-two percent; and support officers, seventy-seven percent.

People seem to like PACAF—after they arrive and once they get settled in.

"Overseas duty is not as attrac-

tive as it was perhaps twenty years ago," General Braswell says. "Many of our facilities in the Far East are better than they were then, but other factors are involved. People are more reluctant to move anywhere, partly because of the housing market. If they own a house, they don't want to get rid of it, and they're worried about having to acquire a house if they move.

"If they move to any base in the Pacific, they will expect to live in government housing in most cases. Unfortunately, they'll have to wait for government housing and live on the economy for several months in some places."

One of the command's highest priorities, he says, is to fund additional family housing and bachelor quarters. He would especially like to see more family quarters in Korea.

"Korea is a modern nation," he says. "There's no reason why we shouldn't permit families to come there rather than continuing to depend principally on people serving remote tours. Korea today is not the country it was thirty years ago following the Korean War."

Surveys, he says, show that PACAF people enjoy the opportunity to travel and shop abroad, and they like meeting people from other cultures. They get satisfaction from performing an important mission. Overall, they find Far East duty interesting and exciting. However, there are disadvantages.

"It's a long way from home," General Braswell says. "They don't have a chance to visit relatives very often. It's difficult to get space-available travel, so it sometimes means traveling to the US at their own expense—and that can get very expensive."

Surveys have identified other concerns of members and their families within PACAF. Topping the list are limited employment opportunity for spouses, availability of adequate housing on the economy in Japan, and a restriction on shipping late-model cars to Japan because of problems in complying with Japanese emission and safety standards.

PACAF, which reports more people on unaccompanied tours than any other command, is especially concerned that the family separation allowance for most of them—$30 a month—has not changed since 1964.

A-10 attack aircraft are now in place at Suwon AB, Korea, and more could be deployed there if needed to meet an armored attack.

To help relieve some of these problems, PACAF has proposed several improvements in benefits, including more housing, government storage of vehicles for Japan-bound airmen, and one funded trip a year so that student dependents in the States can visit their parents in the Pacific. The command also believes that a $100-a-month foreign-duty pay should be established to help offset unique expenses and lost income to spouses.

Looking Ahead

US forces in the Pacific are thinly spread against a relentlessly growing Soviet presence. Russian advisors and technicians are active on the Southeast Asian subcontinent, and the Soviet occupying force of 100,000 troops in Afghanistan is only 380 miles from the entrance to the Persian Gulf. Cam Ranh Bay is a convenient stopover for ships en route to the Indian Ocean.

"It is no secret that they continue to seek additional basing arrangements in the region, and the growing number of independent small nations in the Southwest Pacific presents potential opportunities," General Braswell says.

Furthermore, the Soviets in the Pacific are now better organized than they used to be.

"Their Asian theater of operations—which encompasses all of the Soviet forces in the Far East—is now a unified command, and it is a more effective arrangement than they previously had in the region," General Braswell says.

A great part of the Soviet Far East force is pinned down opposite China, of course, but the remaining numbers are certainly adequate to exert Soviet influence in East Asia.

While US Air Force and Army presence has remained fairly constant over the past decade, US naval forces have declined. Overall, American force levels in the Pacific are at their lowest in more than twenty years.

The improvements to PACAF's combat capability are encouraging, as is the closer cooperation by the Air Force with the Navy and allied air forces. Renewed attention to the Far East by American policymakers is a good sign, too.

There is no question of matching the Soviets there man for man and machine for machine, but US forces of reasonable size, well equipped and well supplied, are essential if the United States is to avoid loss to its national interest in the Pacific—or else risk another war in Asia. ■

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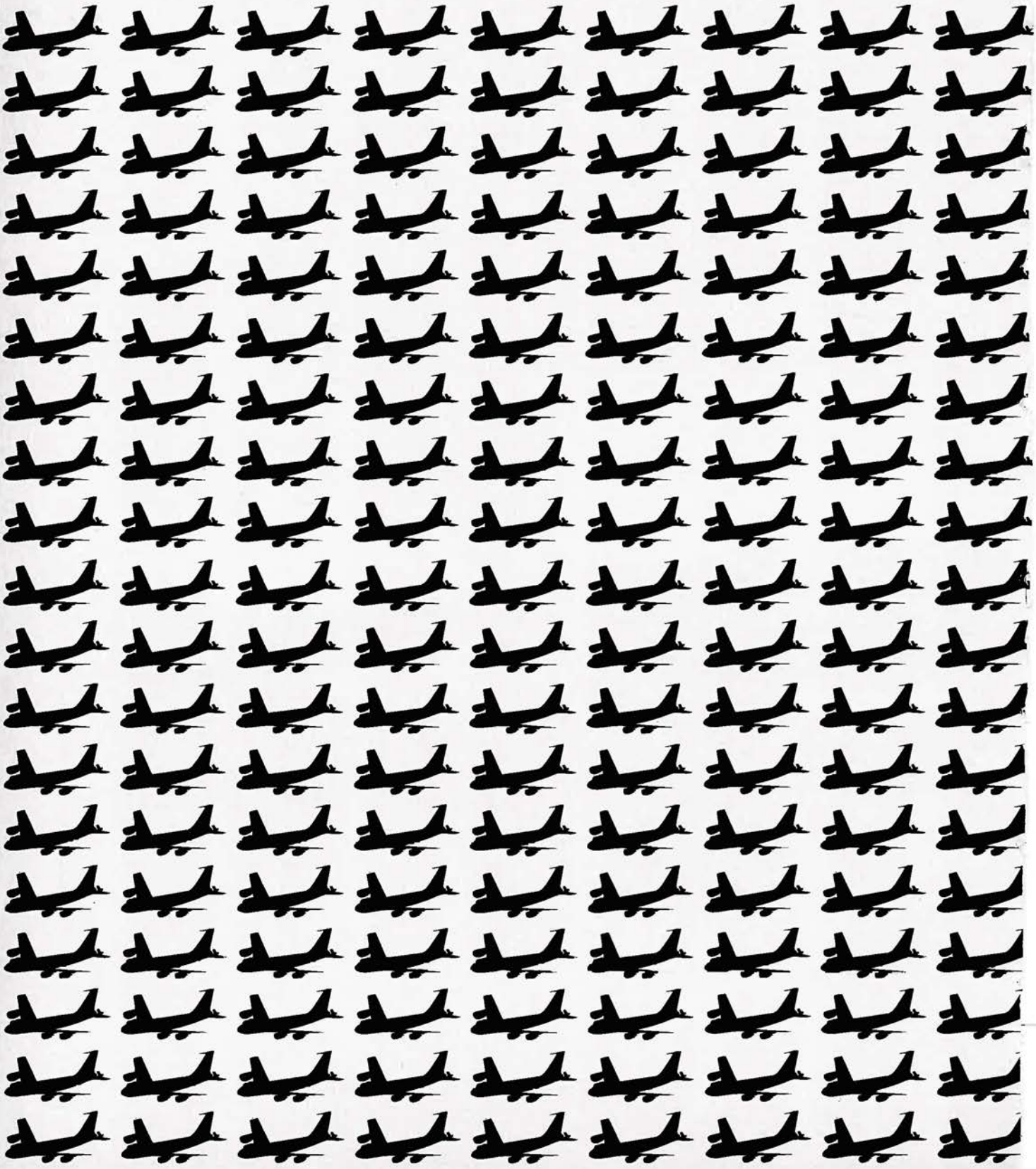

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FIVE PRIORITIES FOR FACILITIES WORLDWIDE

BY THE HON. TIDAL W. McCOY
ASSISTANT SECRETARY OF THE AIR FORCE (MANPOWER, RESERVE AFFAIRS AND INSTALLATIONS)

Among other problems, overseas housing is old—and there isn't enough of it. The need for collocated operating bases is acute.

SECRETARY of the Air Force Verne Orr and Chief of Staff Gen. Charles Gabriel emphasize one factor again and again: People are our number-one priority. To properly support our people—and our vital Air Force missions—we maintain worldwide some 2,996 installations, of which 134 (reduced almost fifty percent since 1960) are considered major. Twenty-eight major and 531 smaller installations serve as home bases for 140,000 Air Force members overseas (twenty-one percent of the active force). The replacement value of all Air Force facilities is $96 billion. Our assets include some 504,000,000 square feet of floor space, 247,000,000 square yards of airdrome pavement surface area, 11,000 miles of streets and roads, and 90,000,000 square yards of other pavement surfaces. Total Air Force land holdings are just under 11,000,000 acres. To complete the picture, installations and facilities costs were some $4.7 billion of the Air Force budget during the current fiscal year.

The management of all this real property and real estate is a large responsibility requiring about 32,000 military and 32,000 civilian employees. Five goals guide the management team. The first is to take full advantage of a systems approach to the design and construction of new facilities and preservation of existing structures and pavements. The second goal is to enhance readiness and sustainability

Maintenance crews in chemical gear with F-16 and shelter at Hahn AB, Germany. Between FY '68 and FY '82, 182 aircraft shelters were built.

by improving air base survivability/recovery and assuring worldwide contingency capability. The third goal is to improve quality of life by providing modern and upgraded facilities, better fire protection, and effective environmental quality for working and living conditions. The fourth goal is to improve facility energy management by providing fuel assurance (either uninterruptible or a backup supply) and an aggressive conservation program. The fifth goal is to support selected national programs.

A primary objective of my office is to ensure that facilities are designed, built, and maintained within a true systems approach. This must include the facility requirements of the system under consideration and the facility requirements, both on and off duty, of the people assigned to the system. The improved planning that results permits proper and efficient design and construction. This approach results in the most cost-effective construction and enables senior leadership to make decisions with a more complete view of total system requirements and costs.

COB Needs Are Acute

We generally think of readiness in terms of training proficiency, up-to-date hardware, plus adequate stockage of munitions, fuel, and spares. Facilities also play a vital role in the readiness equation. One crucial readiness program is not faring well.

More than 1,000 fighter, tanker, and transport aircraft will deploy directly from the United States to collocated operating bases (COBs) in Europe in the event of a contingency. A COB is an active allied military airfield that would also support deployed US Air Force aircraft. Almost sixty percent of the aircraft destined for COBs are from Air Reserve Force (Reserve and National Guard) units based in local communities all across the United States. Before these aircraft arrive, minimum essential facilities (MEF)—including munitions igloos, protected fuel storage, and dispersed aircraft parking pads—must be built to achieve even minimal protection and fighting capability. Once MEFs are completed, fuel, munitions, vehicles, and other support equipment can be prepositioned.

Stable outyear funding levels are needed for USAF to meet current established goals for modernization of the physical plant, construction of adequate base housing, and beddown of new weapon systems coming into the inventory.

In return for providing COB MEF, the US gets access to runways, hangars, dormitories, dining halls, and medical and some operations and maintenance facilities within the NATO area worth more than $2.5 billion. Our FY '84 request includes $44 million for COB MEF construction.

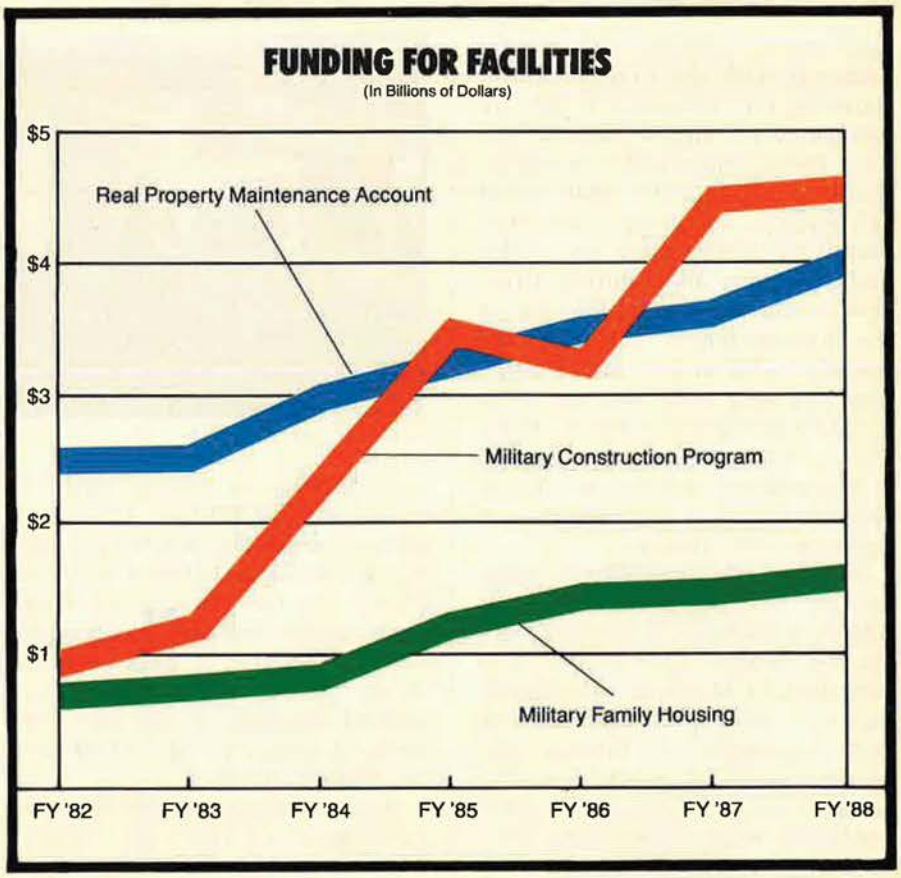
The need to fund COBs is acute. If all reinforcing aircraft went to our seven existing European main operating bases, severe saturation and force imbalances would result. This adverse combination will greatly impair air operations, aircraft servicing and support, and drastically increase the vulnerability of those aircraft while on the ground. The COB concept gives an extra measure of protection by providing both dispersal and enhanced ability to fight—at extremely low cost. Planning is now completed for more than seventy locations. Negotiations are concluded for forty-nine in seven NATO nations; others continue.

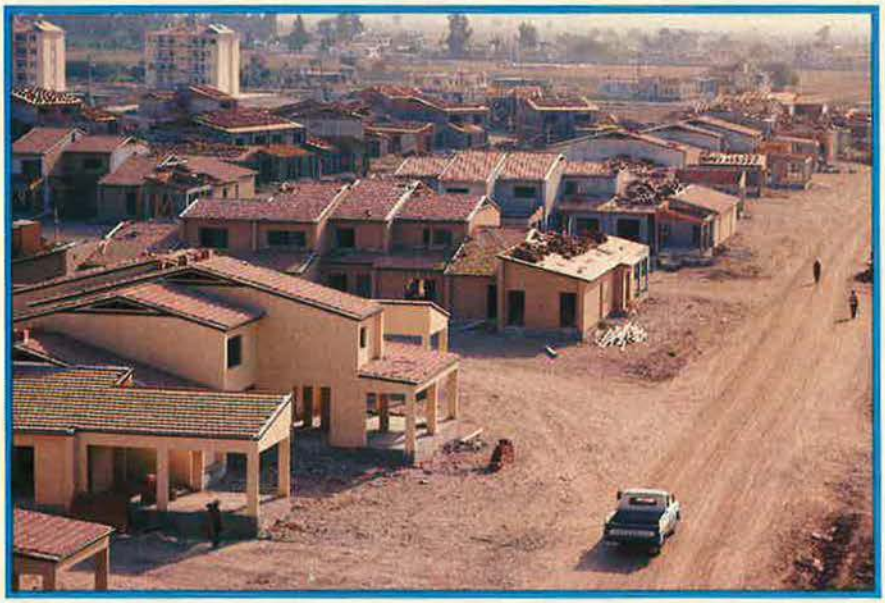
Regrettably, congressional funding for this program lags. Today, only a handful of COBs have the necessary minimum essential facilities. COB funding comes from two sources: NATO infrastructure funding and US military construction program (MCP) prefinancing—which is eventually recoupable. In fact, more than fifty percent of US prefinancing funds have been recouped. The remainder are either in process or awaiting SHAPE approval.

There is a perception that our NATO allies don't contribute their fair share, but, since 1977, NATO COB funding amounts to $137 million. Since 1978, the total Air Force appropriation is only $28.6 million. No COB funds were appropriated by Congress in the 1979, 1981, 1982, or 1983 budgets. We must continue to press for increased NATO infrastructure funding and convince Congress of the urgency of this program.

Shelters and Ground Facilities

The successful aircraft shelter program for our main operating





TOP and LEFT: New housing units at Incirlik AB, Turkey, are replacing substandard trailers that have served the families for twenty years. BELOW: Last September, Incirlik families began living in housing constructed under a build-lease agreement between USAF and a Turkish firm.

bases in both Europe and the Pacific contrasts with the COB program. Between FY '68 and FY '82, we completed 182 aircraft shelters and have twelve more under construction in the Pacific at a total cost of $63 million. In Europe, we completed 695; sixty-nine are under construction, and another fifty-seven—third generation—are on the drawing board. The total cost included $338 million of US prefinancing and $167 million from NATO infrastructure funds. However, no further shelter construction is programmed at this time. These shelters are a key to protecting our assets in both theaters.

Another readiness improvement includes base operation support facilities at six bases in five countries for the Ground-Launched Cruise Missile (GLCM). Operational facilities are being provided through NATO infrastructure funding. The congressional appropriations conferees reduced FY '83 GLCM funding to $75 million (down from $84.5 million). Additionally, congressional preference for unacccompanied personnel at GLCM sites has caused the deletion of funds for various community support projects (commissaries, family housing, child-support centers). It may, however, be possible to fund commissaries by other means. Overall, important questions remain due to the political sensitivity of GLCM basing location decisions.

Another important effort is the building of facilities for Central Command in Southwest Asia. Current projects totaling more than $156 million include airfield pavements, fuel and ammunition storage, operational and logistics facilities, and utility upgrades at Masirah, Seeb, and Thumrait in Oman, and at Ras Banas in Egypt. Aircraft maintenance and aviation storage facilities are being constructed on the island of Diego Garcia in the Indian Ocean.

Family Housing Concerns

Family housing is one of our chief concerns. With more than two-thirds of our Air Force people organized into family units, it is easy to see why. Our 141,000 family housing units average more than twenty-five years in age (as do all Air Force structures). Almost 6,500 of these units are considered substandard. It should come as no surprise that there is a direct correlation between the age of a structure and the amount of maintenance required. We have made considerable progress in raising funding levels to reduce backlogged repair needs. However, given budget realities, we will not achieve our ambitious goals of reducing the backlog to manageable levels until mid-FY '90.

Family housing at overseas locations is receiving increased attention. Secretary Orr is committed to improvements in this area. He is concerned that only forty-three percent of our people overseas can currently live in government quarters. He is also concerned about living conditions in general. Upon return from an overseas visit, he said, "It costs us today about $1 million to $1.5 million to train a fighter pilot. If we send that fighter pilot overseas without base housing and he lives in housing that I saw on the economy, which is utterly detestable, he is going to start to count the number of months left until he can get out of the Air Force. We are going to lose a $1.5 million investment for want of a $40,000 or $50,000 housing unit, and that's stupid."

I am pleased to report that during the next six years we plan to build an additional 9,165 new family-housing units at twenty-five locations, eighteen of which are overseas. The total bill for all this new family housing is $1.2 billion. We also plan to spend $418 million on improvements and $2.5 billion on

The commissary at Bitburg AB, Germany, features an attractive delicatessen. The FY '84 budget includes $35 million for upgrading such facilities as commissary stores, exchange retail outlets, open messes, and bowling alleys worldwide.

maintenance and operation of existing units over that same period.

Our ambitious unaccompanied personnel housing improvement program for both enlisted and officer members is worked through a three-tier program of major modifications and new construction ($250 million of work affecting almost 43,000 units since FY '78), minor modifications and aesthetic improvements, and replacement of furnishings. Major emphasis on program improvement began in FY '78 with a goal of improving the quality of life for our enlisted people. Improvements for officer housing began this year. Next year's program includes $242 million for thirty-six enlisted and eleven officer projects.

Quality of Life Projects

Facilities that enhance the off-duty quality of life of our people and contribute to the sense of community on our installations are vital aspects of morale and, subsequently, readiness. Gymnasiums, recreation centers, family support centers, and chapels, to name a few, are included, when funds permit, in the annual military construction program (MCP) for those installations with the greatest need. Other facilities, such as open messes, bowling alleys, commissary stores, and exchange retail outlets, are usually funded through nonappropriated sources with patronage-derived funds. We face serious backlogs of needs in these areas with insufficient nonappropriated funds to satisfy them in a timely manner. We must rely on some MCP funding until this backlog becomes manageable.

Establishing a sense of community at our overseas installations is, in general, more difficult to achieve than at our CONUS installations. For this reason, the primary thrust of our efforts is directed overseas. The FY '84 budget includes $35 million for such facilities at various locations worldwide.

Modernization of work facilities—upgrading the quality of the job—is also crucial to our efforts. Condition of work areas has a direct impact on improved morale, productivity, efficiency, and effectiveness. In turn, the condition of work facilities influences the retention of our highly trained and experienced people. Our Air Force leadership recognizes the significance of facilities modernization and supports modernization expenditures of more than $2 billion through Fiscal Year 1988. No military force, regardless of how sophisticated its equipment, will be any better than its people. Providing better places to live and work is extremely important to future Air Force well-being.

In the area of facility energy management, we must not only improve conservation but also address the reliability of energy sources during times of natural or man-made calamity. We are investigating various avenues by which the amount of energy required to operate our facilities can be reduced while maintaining comfortable environments.

The Air Force is well on the way toward achieving the goal by 1985 of reducing facility energy consumption twenty percent below that of 1975. We recently tested the ability of two of our operational bases to withstand the loss of power from off-base sources and still continue to perform their mission. Tests were conducted in conjunction with operational inspections at Minot AFB, N. D., and Spangdahlem AB, Germany. Analysis of the tests, while not complete, indicates that careful preplanning permits continuation of the mission for a finite period.

Support of National Programs

There are two major construction efforts that have worldwide and literally out-of-this-world impacts involving the exciting new Air Force mission in space: The Consolidated Space Operations Center (CSOC) in Colorado Springs and the Space Transportation System (STS) at Vandenberg AFB, Calif. CSOC will combine at a single facility both a DoD and Air Force satellite operations center and a Shuttle operations and planning complex. Construction is scheduled over FY '83

Tidal W. McCoy is Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations. A graduate of West Point, he served as a field artillery officer in command and staff assignments in the US, Europe, and Vietnam. He has held several high-level positions in the Defense Department, including service as Deputy Assistant to the Secretary of Defense and as Director of Policy Research in the Office of the Under Secretary of Defense for Policy. Prior to assuming his present position, Mr. McCoy was Assistant for National Security Affairs for Sen. Jake Garn.

and FY '84 at a cost of $145 million. CSOC must be ready by the summer of 1985 to permit sufficient time for equipment installation prior to IOC. Design of the facility is scheduled for completion this August.

The CSOC Technical Building design uses a modular concept so that the electrical, mechanical, structural, and other support systems have maximum flexibility to meet the needs of current and future mission control modules. The central power plant electrical and mechanical capacity of the complex includes a twenty-five percent growth factor to meet future needs. Horizontal construction work should begin in June. Vertical construction should start after congressional approval of the FY '84 budget in early 1984. When completed, CSOC will play a crucial role in the future security of our nation.

The Space Transportation System (STS) consists of three segments: a Space Shuttle, which will carry payloads to low-earth orbit and return to land on a runway; a commercial Spacelab, from which experiments are to be conducted in space; and launch/landing facilities, including associated ground support equipment, simulation, training, and mission control facilities needed to operate the system. The Air Force, as host agency at Vandenberg, must provide all general-purpose facilities to perform recovery, turnaround, and launch operations. We also provide unique DoD facilities and facility modifications at NASA installations needed for DoD missions.

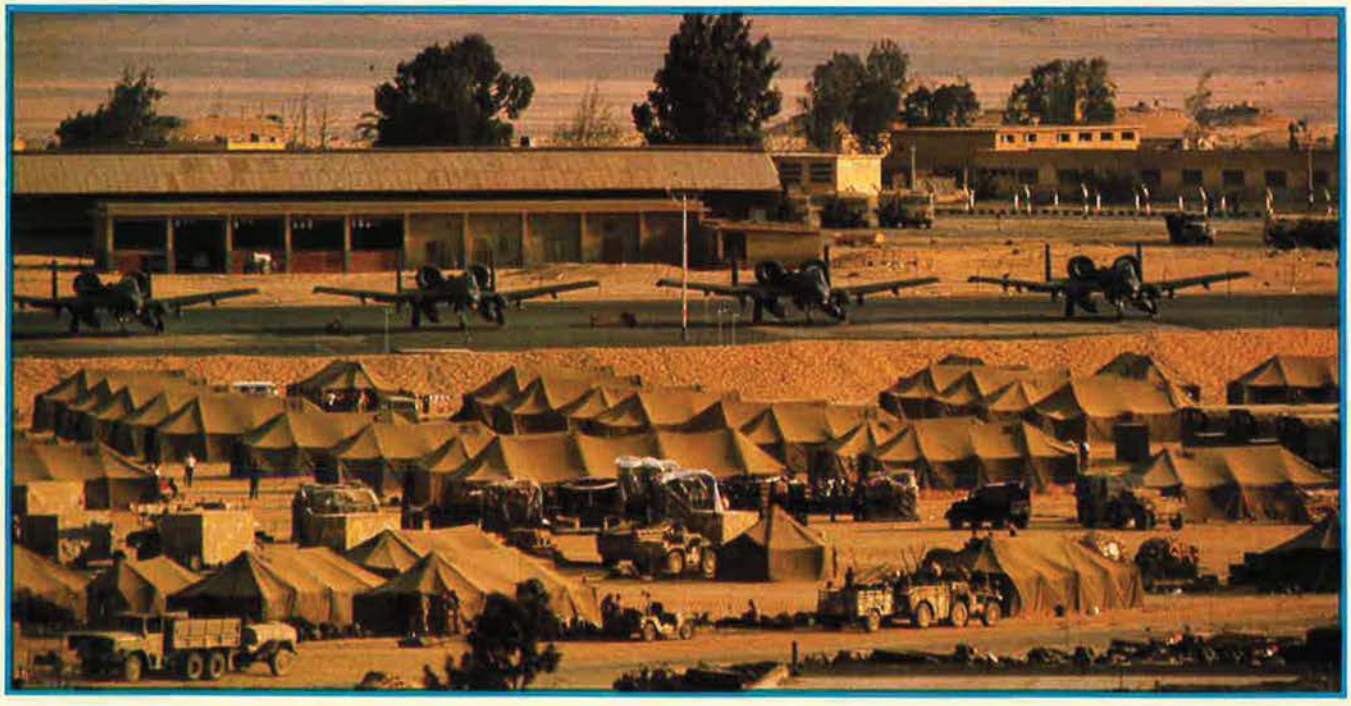
There is one unique facility for this project. That is the 220-foot-tall and 170-foot by 180-foot Shuttle assembly building. The $40 million structure provides a facility to erect, mate, service, and hoist the Space Shuttle on the launch pad. The Shuttle mating procedure must be protected from local fifteen- to twenty-knot wind gusts as tolerances of one thirty-second of an inch are necessary. The payload change-out room, the equivalent of a twenty-story building, will roll in and out of the Shuttle assembly building. IOC at Vandenberg, with a capacity of six launches a year, is scheduled for October of 1985. Later construction will boost mission capability to the maximum planned ten launches per year.

Not space-related but at the frontier of technology is the Aero Propulsion Systems Test Facility (ASTF) currently under construction at the Arnold Engineering Development Center in Tennessee. When completed, ASTF will be a unique facility that will give the United States the free world's only laboratory in which atmospheric propulsion engines can be tested in environments accurately duplicating the envelope of all operational conditions that engines might encounter. This will make possible the design of aircraft or engine systems ideally tailored to proposed mission performance, without the previous need for expensive prototyping, at significantly less cost.

Our installations and facilities worldwide are absorbing only about six percent of the total Air Force budget for both new construction plus upgrading and preservation of present facilities. That is extremely cost-effective and is a tribute to the conscientiousness of our engineering and services people all over the world.

Our facilities are crucial to the role of our modern Air Force. Without the highly trained, experienced, and motivated people, there is no mission capability. Without the supporting facilities there would be no people. All around the world, twenty-four-hours a day, seven days a week, Air Force installations hum and roar with activity providing for the continual security of our nation. Great challenges face us in the future.

First-class facilities must be there to support and sustain our people as they continue to provide for our defense and to push outward the frontiers of technology. ■



Temporary facilities at Bright Star 82 in Egypt. Whether permanent or not, our facilities must be able to sustain USAF people as they work.

THE 4449th MOBSS: BARE-BASE MOBILITY

The one-of-a-kind squadron at Holloman AFB, N. M., has had an evolutionary past and faces a challenging future, responsible as it is directly to Hq. USAF.

BY WILLIAM P. SCHLITZ, SENIOR EDITOR

THE motto of the 4449th Mobility Support Squadron at Holloman AFB, N. M., is undemonstrative but to the point:

"Unique, Flexible, Mobile."

But these three little words, while fitting, barely sum up the missions of the 4449th. An unwitting visitor can be misled in that at first appearance the 4449th Squadron seems to be the epitome of a "warehouse" Air Force unit, consigned as it is to a remote area of a desert air base in the sparsely populated Southwest.

Hardly correcting the image is that the 4449th's "warehouses"—two converted hangars used for storage, administration, and training—are surrounded by acres of row upon row of forest-green shipping-crate-like "pallets" of various sizes.

What a visitor learns, though, is that even the 4449th's designation as a "squadron" is a misnomer. One hint that the unit is distinctive is that it is commanded by a full colonel.

The organization chart is equally deceptive. It lists the 4449th as a Tactical Air Command squadron that reports up the chain of command to Twelfth Air Force and eventually to Hq. TAC. What is unique about the 4449th is that it is tasked directly by Hq. USAF—that is, the unit's equipment may not be used for routine functions or exercises without the explicit approval of the Air Staff.

What's more, with its $2 billion inventory—and more allocated—the 4449th Mobility Support Squadron (MOBSS for short) is the richest "squadron" in the Air Force. And that, indeed, is unique.

Mobility Mission

The Air Staff's interest in MOBSS stems from the fact that the unit is the focal point of a major initiative to create "bare-base" capabilities to meet not only its Air Force contingency responsibilities but those of the Rapid Deployment Joint Task Force as well.

Already at hand in the 4449th's warehouses and on its sunbaked acres are enough expandable structures and support facilities to erect two complete 4,500-person Air Force bases almost anywhere in the world. "All we need," said MOBSS Commander Col. Richard A. Carroll, "is a usable runway, a taxiway, and a source of water." And that source of water can be as distant as five miles and the water need not be potable.

The vision of such a base as a primitive tent city can be dismissed. The expandable buildings are custom-tailored to meet air base requirements—hangars, personnel billets, maintenance structures, hospitals, squadron operations housing, even a chapel. The buildings, in their pallet form, have also been designed to mesh with MAC transport 463-L rail-loading and tie-down systems.

The structures' walls are of an aluminum honeycomb material constructed very much like an aircraft wing and provide both the strength and light weight required for air mobility. The living and work shelters are designed with both heating and air-conditioning for operations in temperatures ranging from -25°F to 125°F. "And while shirt-sleeve comfort isn't totally attainable in those extremes, a satisfactory working environment is," commented Colonel Carroll. For example, in desert terrain the outside temperature may hit a brutal 135°F while inside a MOBSS shelter airmen could contend with an environment of eighty-five degrees.

Evolution of Bare-Basing

Dedicated to support rapid deployment of tactical, strategic, and airlift air forces, USAF's bare-base concept dates back to the Cuban missile crisis when the need for such a capability first surfaced. Then, some limited assets—prepackaged tent cities and the like—were allocated. In the intervening period, the idea was mostly put on the back burner until the emergence of the Rapid Deployment Joint Task Force and the related requirement by the Air Force to support deploying airpower that may have to operate from remote sites situated in undeveloped regions.

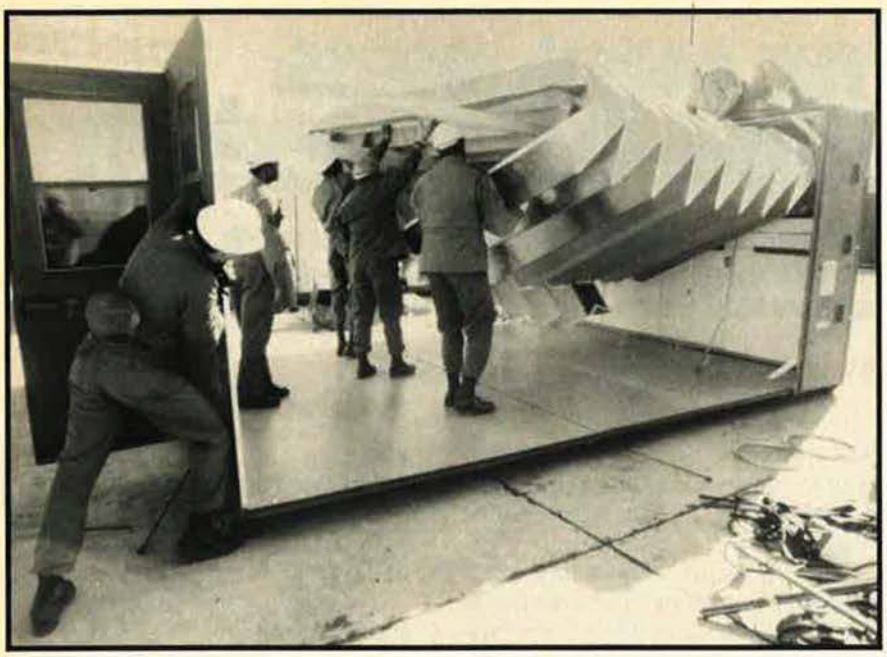
The bare-base inventory has evolved from the first-generation canvas shelters to a virtual catalog of equipment numbering thousands of items. The 4449th was first activated as a MOBSS in March 1972 with the first-generation equipment, and has since continued to improve.

"It is certainly hindsight," commented Colonel Carroll, "but if we had pressed on with the early development of bare-base capability we could have put 'temporary'—and much more economical—bases in Southeast Asia. These we could have folded up and extracted instead of leaving behind the costly permanent bases we built there."

With much of the equipment stored outdoors for easy access under rapid loading requirements, it was no accident that Holloman was chosen as the MOBSS site. The base's mostly bone-dry desert air was a key factor in its choice. The 4449th is situated on the Holloman runway so that MAC transports can land and taxi right up to the unit's loading ramps.

Close coordination is important for the development of special air mission (SAM) requirements. In requesting the SAMs, the MOBSS interacts with the 833d Air Division's logistics branch to determine needed airframe and air flow requirements. To support the airlift, MAC deploys an airlift control element (ALCE) to the MOBSS compound to provide the latest in loading expertise.

While the capability exists to establish two major Air Force bases within ninety days of the green light,



ABOVE: Rows of pallets stand sentinel at the 4449th Mobility Support Squadron, Holloman AFB, N. M. These are expandable into every type of structure required for the operation of a complete tactical air base in a remote area. They have been designed to mesh with MAC transport loading and tie-down systems. LEFT: Hard-wall, temperature-controlled shelter being erected from palletized form.

current planning centers on the second word in the MOBSS motto: "Flexible."

The squadron has its own computer capability for conducting contingency planning. MOBSS planners are asking—and answering—the "what if" questions. These include tailoring specific modules of equipment to address a particular size scenario up to planning for a full base. Wing planners are also aware that, in a major emergency, MAC's airlift resources would be stretched to the limit. So equipment has been put on an airlift priority basis. The squadron's logistics planning section undertakes its own packaging and loading planning to make use of every square inch of cargo space aboard a transport. Taken into consideration must be such essential factors as an aircraft's center of gravity, cargo size, and floor-loading limitations.

Manning and Training

In terms of personnel Air Force Specialty Codes, MOBSS is as diversified as any wing in the Air Force. Tallied among the enlisted force alone are thirty-three AFSCs. These run the gamut from machinist to food service specialist to airframe structural repairman. All wear at least two hats. For example, a cook instructor in the training program, Sgt. John Lee, has the added responsibility of being capable of erecting any number of the varied expandable structures.

Further, there are four different types of vehicle maintenance specialist and three types of electrician. (In dealing with the high voltage—and highly dangerous—electrical power that MOBSS equipment can generate, the "exterior" electricians must demonstrate an extra level of caution.)

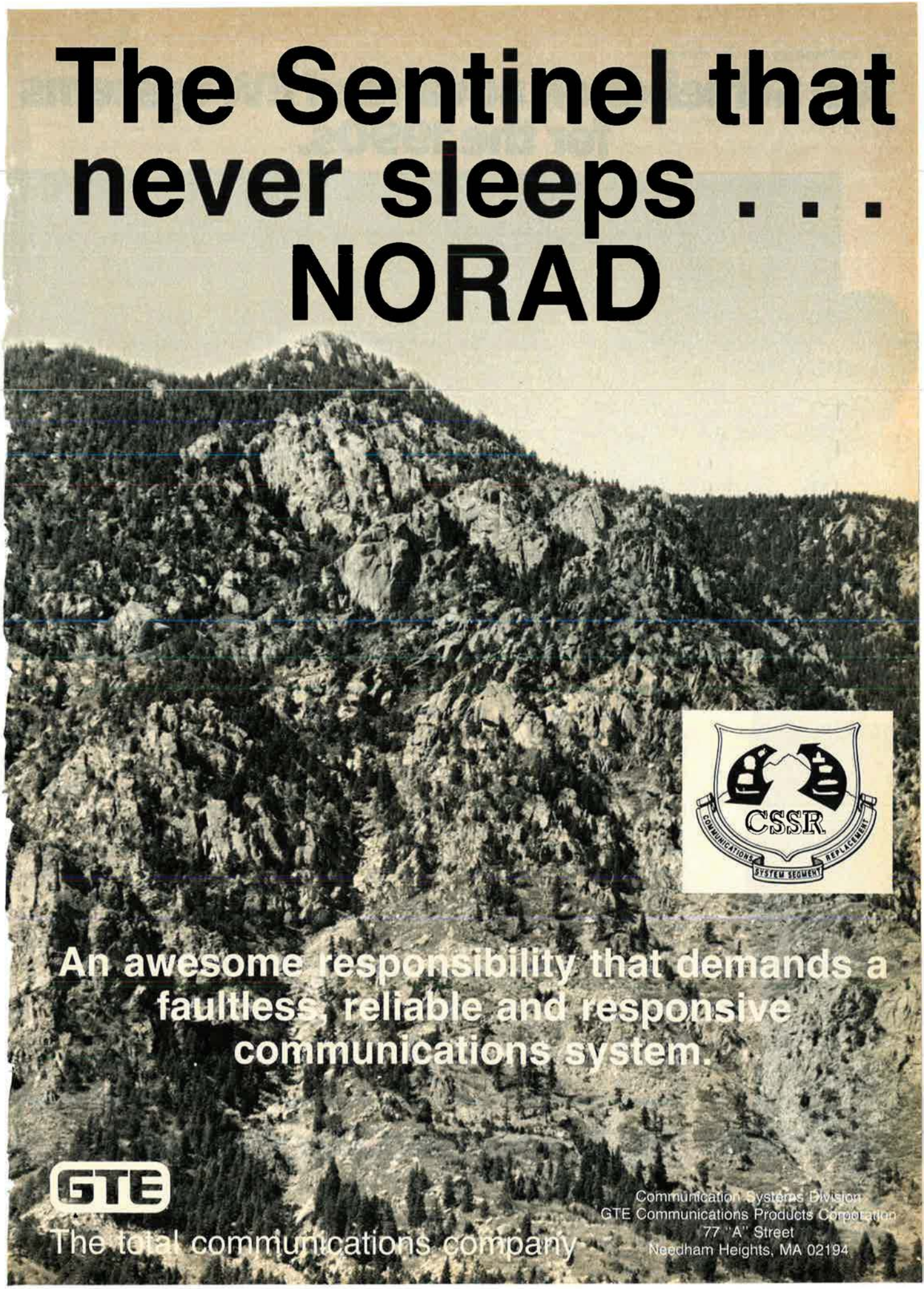
Not surprisingly, engineers figure prominently among MOBSS officers, but they do not dominate. Though only twelve officers are assigned, the MOBSS also has logisticians, supply administrators, as well as the Commander and his Deputy, who are rated pilots.

As with any Air Force organization, training is an essential function. MOBSS is again unique in that there is not only an on-going program to train replacement personnel in the unit's own highly specialized activities, but the unit must schedule training for some 360 user unit civil engineering technicians per year. These people are selected from civil engineer squadrons, Red Horse teams, and Prime BEEF/RIB, and are sent TDY to Holloman for the Harvest Bare training. They must have a five-level AFSC, a "secret" security clearance, and two years of retainability. At Holloman, "they'll receive instruction to qualify in the skills, knowledge, and techniques necessary to erect, operate, maintain, and control Harvest Bare equipment," commented Colonel Carroll.

Under the currently conceived scenario, MOBSS personnel are too few to be able to perform all aspects of their mission in the field. Therefore, the Harvest Bare graduate is identified by a special experience identifier and is on call to assist if the need ever arises.

Deployment concepts, as currently envisioned, will see a cadre of MOBSS specialists headed by an experienced team leader making up an advance party. They will deploy with whatever support assets the situation requires, to include such essential equipment as forklifts. The team would be joined at the deployment site by MOBSS-trained civil engineering technicians of the user unit, who would provide labor as well as know-how in erecting facilities. The number of supplemental MOBSS personnel and additional equipment would depend on the size of the operation.

"We might be tasked to erect ten, twenty, fifty air base elements. We just can't shred out that many people. That's why we have the 'Harvest Bare' program to train user unit personnel," noted SMSgt. Benjamin King, MOBSS Bare Base Superintendent. "Backing us up also could be experienced reservists who might no longer be in uniform but are identified in the computer and who can be called up via the Reserve Personnel Center mobilization system," Sergeant King said. He added that "through the use of expandable structures, we can begin tactical operations seventy-two hours after the MOBSS people and equipment have been deployed to a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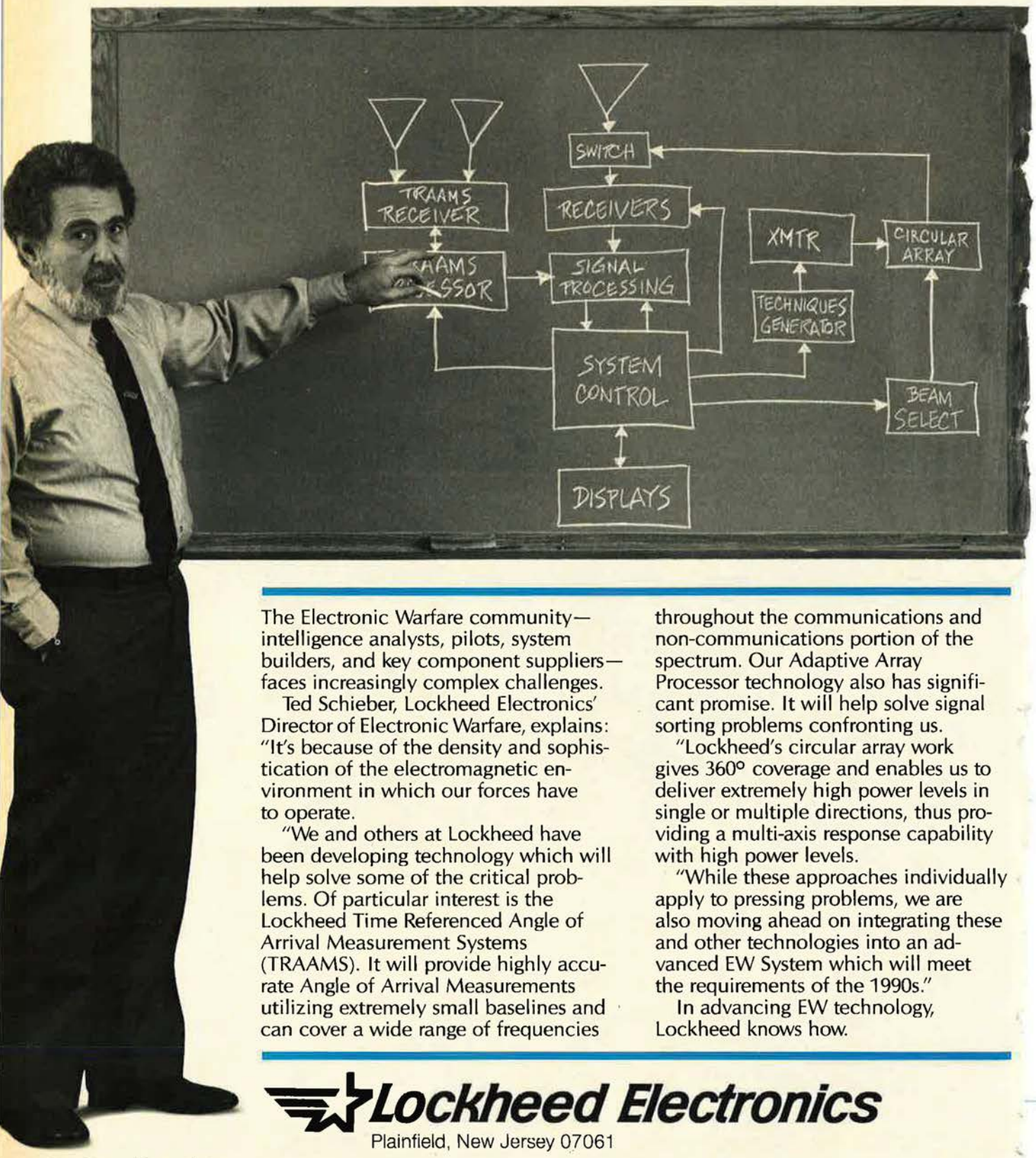
EW Technology on the move.

Ted Schieber on advanced EW systems for the 1990s.



The Electronic Warfare community—intelligence analysts, pilots, system builders, and key component suppliers—faces increasingly complex challenges.

Ted Schieber, Lockheed Electronics' Director of Electronic Warfare, explains: "It's because of the density and sophistication of the electromagnetic environment in which our forces have to operate.

"We and others at Lockheed have been developing technology which will help solve some of the critical problems. Of particular interest is the Lockheed Time Referenced Angle of Arrival Measurement Systems (TRAAMS). It will provide highly accurate Angle of Arrival Measurements utilizing extremely small baselines and can cover a wide range of frequencies throughout the communications and non-communications portion of the spectrum. Our Adaptive Array Processor technology also has significant promise. It will help solve signal sorting problems confronting us.

"Lockheed's circular array work gives 360° coverage and enables us to deliver extremely high power levels in single or multiple directions, thus providing a multi-axis response capability with high power levels.

"While these approaches individually apply to pressing problems, we are also moving ahead on integrating these and other technologies into an advanced EW System which will meet the requirements of the 1990s."

In advancing EW technology, Lockheed knows how.

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Engineers interested in contributing to advanced electronic systems are invited to write Professional Employment at the address at right.

TOP: Expandable housing has been designed for strength and light weight in air-mobility role. ABOVE: Aircraft hangar, when erected, will permit entry from either end. Equipped with telephone and power outlets, it is large enough to service two F-15s or F-4s simultaneously.

remote site. It will be austere at first but will permit effective combat operations."

Besides the supervisory function, that team would also be held responsible for maintaining and/or transferring control of the equipment.

It is important to note that not all the MOBSS equipment is stored at Holloman. Essential caches have been prepositioned strategically around the globe. "Equipment is arriving at Holloman and being prepositioned on a daily basis," noted Colonel Carroll. "Our shopping list reads like a Sears catalog. For example, already on that list is water well-drilling equipment and revetment rapid-repair kits, among other things." An additional $2 billion worth of equipment will be added to the inventory in the next three years.

The MOBSS currently maintains a roster of some 325 personnel of all ranks. It has recently been authorized manning strength allowing growth to 441 starting in July of this year. Within this squadron is the equivalent of three "squadrons"—supply, maintenance, and transportation, as well as a training division.

Equipment and Capabilities

MOBSS has thousands of individual pieces of equipment in its inventory. Here is just a small sample to indicate variety and capabilities.

- Ninety-two heavy-duty generators. Twenty-six are turbine-powered and run on almost any type of liquid fuel, from diesel to JP-4 aviation fuel.
- Thirty miles of insulated pipe that features especially designed connect/disconnect devices. MOBSS high-pressure pumps can draw water from any supply—lake bed, storage tank, etc.
- Two complete airfield lighting systems.
- Twenty-six kitchen/dining hall complexes that each seat 200. The dining halls can routinely serve Class A meals and are equipped with such amenities as walk-in refrigerators, pressure cookers, ovens, and steam tables. The halls are equipped right down to eating utensils.
- Equipment to purify the most brackish water.
- One sixteen-bed hospital that has operating rooms, intensive-care units, and the like. The hospital is maintained by the MOBSS but is under the control of the Surgeon General of the Air Force.
- Twenty-six aircraft hangars, designed for entry from either end. These are already equipped with telephone and electrical outlets and are big enough to service two F-15s or F-4s simultaneously, or four F-5s.
- Some 1,100 ten-person billets.
- Hundreds of workshops and office shelter containers. The heavy-duty maintenance shops are equipped with drill presses and lathes; the offices with typewriters and supplies.

"Thus, the primary task of the 4449th is to maintain this gigantic inventory of war reserve material in a constant state of readiness to deploy anywhere in the world on short notice," commented Sergeant King. But one very important factor must be pointed out: During a deployment, MOBSS does not provide the user unit with either food or fuel. Conventional logistics channels must supply those items.

To fill out the equipment picture, MOBSS maintains its own vehicle pool—refuelers, forklifts, tractor-trailer rigs, runway sweepers, flatbed trucks—any vehicle, in fact, found on a conventional air base.

Military, Peacetime Missions

MOBSS people and equipment have deployed overseas on several occasions, but the first real test came in 1980 during an exercise dubbed Proud Phantom and held at Cairo West in Egypt. Then, a 700-member Air Force contingent set up shop in the Egyptian desert. MOBSS provided support for them and for twelve F-4s from Moody AFB, Ga., in the form of personnel billets, two kitchen-equipped dining halls, and a clinic. MOBSS generators supplied essential electrical power to the entire encampment as well as to a communications unit and a tactical air control unit.

When authorized by the Air Staff, MOBSS can also assume peacetime missions in providing power generation and emergency shelters in civil disaster relief. In one case, MOBSS equipment was airlifted to Alaska to supply power to the township of Bethel for several months until its diesel generator could be repaired.

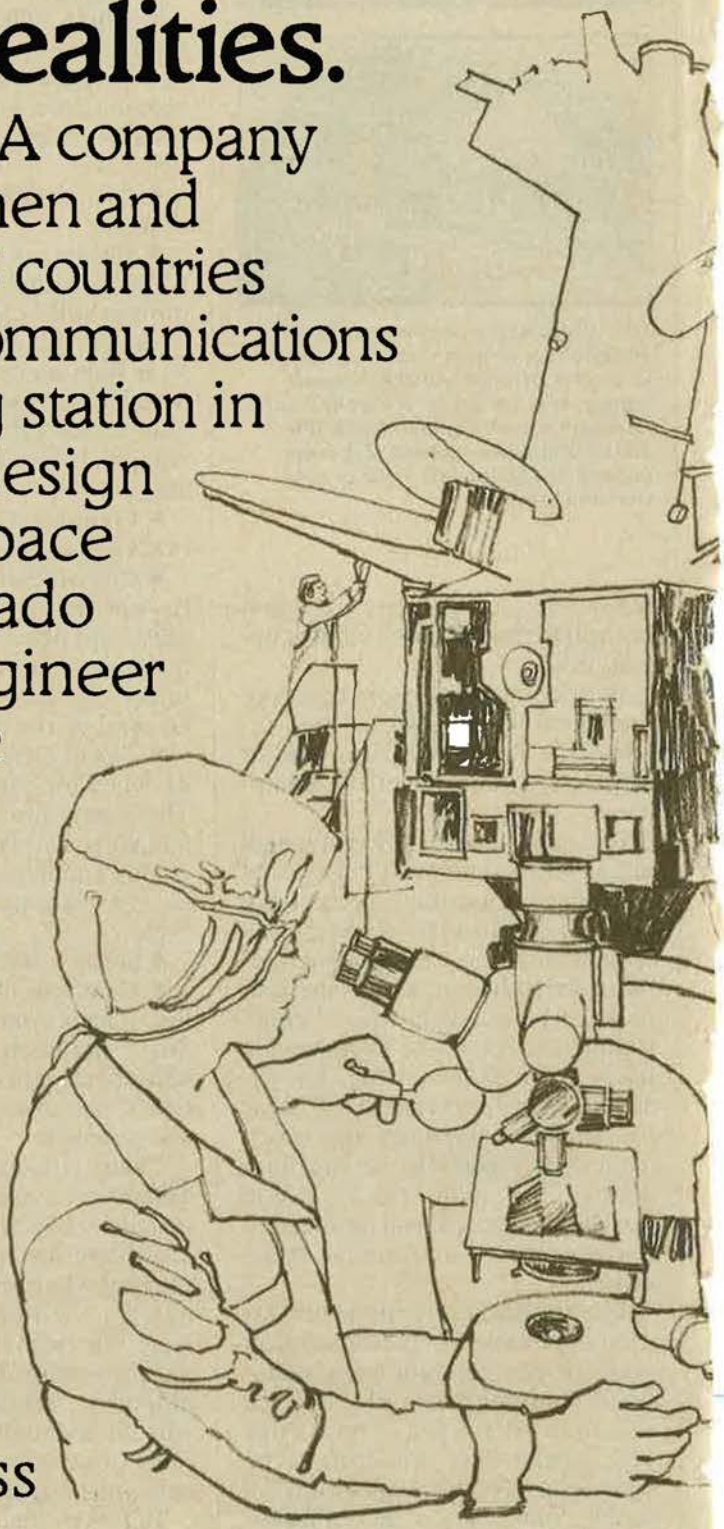
During the third Space Shuttle flight in March 1982, the Orbiter was forced by poor landing conditions at Edwards AFB, Calif., to land at an alternate site at White Sands Missile Range in New Mexico. MOBSS was tapped to provide a temporary hangar and several other support structures. Unit personnel worked around the clock to meet the deadline to accomplish the task in two and a half days that under ordinary conditions would have taken six. They provided NASA with a favorable working environment in the hostile desert of southern New Mexico.

The 4449th has also erected "secure" structures at the construction sites of US embassies and at military installations where renovations were in progress. MOBSS has also been designated to provide backup power to the Air Force's Cheyenne Mountain complex should the need arise.

Finally, since 1981 several Harvest Bare shelters and electrical equipment have been used to support AWACS operations in Saudi Arabia. ■

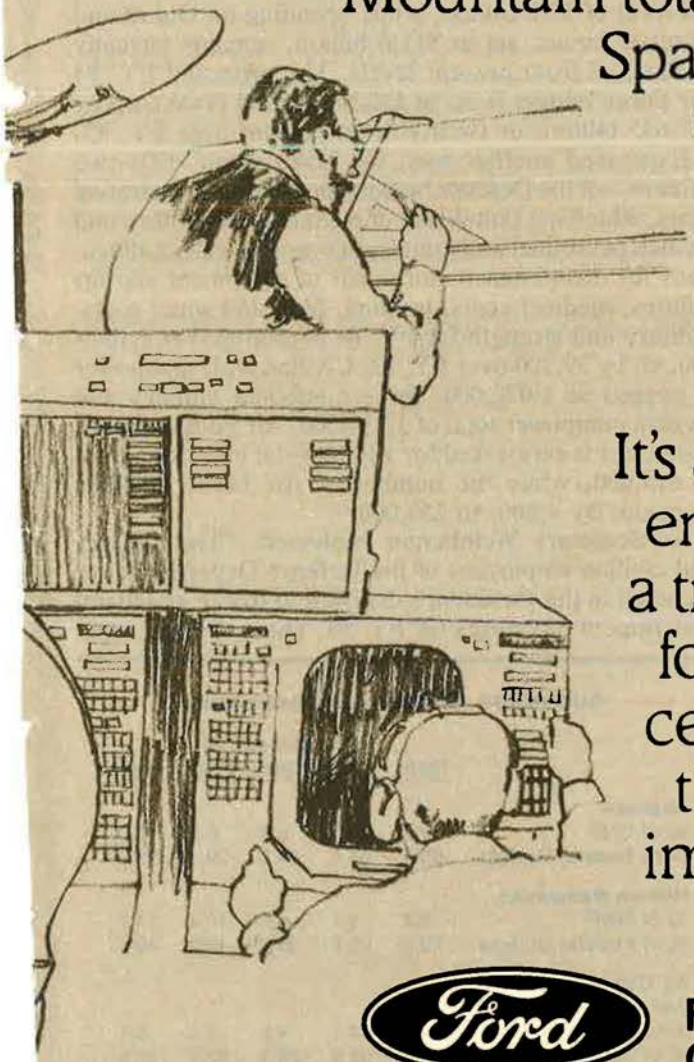
Our People Make Impossible Dreams Successful Realities.

We're Ford Aerospace. A company of more than 11,000 men and women working in 25 countries around the world: A communications technician at a tracking station in Greenland, a satellite design expert in Palo Alto, a space orbital analyst in Colorado Springs, a software engineer in Sunnyvale, a missile guidance electronics assembler in Newport Beach, a Space Shuttle flight controller in Houston–these and all the rest of our people have a very special on-the-job attitude, an extraordinary commitment to success



which has helped to make Ford Aerospace & Communications Corporation one of the largest companies of its kind in the world.

Our accomplishments in satellite communications (INTELSAT V prime contractor), Defense (NORAD Cheyenne Mountain total system support), and Space Mission Support (NASA & DOD Space Shuttle and Satellite engineering and support services) reflect this attitude.



It's an attitude that has enabled us to establish a tradition of success for a quarter of a century; an attitude that does, in fact, make impossible dreams successful realities.

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An In-depth Look at the New Defens

The FY '84 defense budget is oriented toward the twin goals of increasing the readiness and combat-effectiveness of the forces in being as well as picking up the pace of the long overdue modernization programs.

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

THE Administration's Defense budget package presented to Congress on January 31 of this year centers on requests pegged at almost $1.8 trillion in total obligational authority (TOA), or about $1.5 trillion in outlays, over the next five years (FY '84–88). The FY '84 request is for $274.1 billion in TOA and $238.6 billion in outlays, reflecting a boost of $33.6 billion in spending authority over the current year. About twenty-five percent of the increase will go to pay for inflation, while the remainder is sought to fund strategic force modernization, readiness and sustainability measures, airlift and sealift enhancements, and tactical force expansion.

The package, which drew a markedly unenthusiastic response on Capitol Hill, also includes a supplemental request of $1.6 billion for FY '83 coupled to a proposed rescission—meaning the intent not to spend appropriated funds—of $650 million in the current year. Included in the supplemental are funds for initial MX Peacekeeper production and for the Pershing II and ground-launched cruise missile programs.

At the same time, the Defense Department requested authority to allocate appropriated FY '83 funds to multi-year procurement of the B-1B, which "will ultimately yield a lower program cost for this aircraft." While DoD did not provide details concerning the rescission request, there were hints that this move aims mainly at overturning appropriations that were added unilaterally by the lame-duck session of the Ninety-seventh Congress, such as for continued procurement of the A-10 and C-130.

In presenting the new budget, Secretary of Defense Caspar W. Weinberger described it as the product of two converging imperatives: assuring the combat effectiveness of the forces in being while making up for "lost years of investment by undertaking the research and development and the force modernization needed to meet threats that may arise in the future." The Secretary's principal message to Congress was that "we can't avoid performing this double duty short of endangering our immediate security or passing on to future administrations and future generations the legacy of neglect that we inherited."

R&D is earmarked for a twenty-nine percent increase over the current level and, combined with the Department of Energy's defense-related activities, will absorb slightly more than $30 billion. Spending on general-purpose forces is to increase to almost $110 billion, up by about $9 billion over FY '83, while the proposed allocations for strategic forces total $28.2 billion, reflecting a boost of $7.5 billion over the current level. Funding of the airlift/sealift account is up by $1 billion for an FY '84 level of $5.2 billion, while spending on Guard and Reserve forces, set at $11.6 billion, remains virtually unchanged from present levels. The proposed FY '84 Air Force budget is set at $92.884 billion (TOA), up by $17.635 billion, or twenty-three percent over FY '83.

Expressed another way, the lion's share—fifty-two percent—of the Defense budget goes to defray operating costs, which are composed of payments to military and civilian personnel and military retirees as well as allocations for maintenance and repair of equipment and for utilities, medical costs, training, fuel, and spare parts. Military end strength for FY '84 is proposed at 2,165,000, up by 37,300 over FY '83. Civilian DoD manpower is pegged at 1,072,000, for a combined military and civilian manpower total of 3,237,000. Air Force military manpower is earmarked for a 10,000-slot hike, for a total of 613,000, while the number of Air Force civilians increases by 4,000, to 250,000.

As Secretary Weinberger explained, "The military and civilian employees of the Defense Department are included in the President's decision to freeze all federal government pay raises for FY '84. These savings, com-

Allocation of Federal Resources

	The Decade of				
	1940s	1950s	1960s	1970s	1980s
Defense					
% of GNP	17.2	10.1	8.6	6.0	6.9
% of Federal Budget	55.4	54.5	44.3	29.1	29.0
Human Resources					
% of GNP	3.4	4.1	6.0	10.4	11.7
% of Federal Budget	19.2	22.6	30.2	48.2	49.5
All Other Functions of Federal Government					
% of GNP	4.4	4.1	4.8	4.4	5.1
% of Federal Budget	25.4	22.9	25.5	22.7	21.5

Budget

bined with those proposed for military retired pay, will amount to $4.9 billion for that year. However, we are providing a pay raise in FY '85 as well as contingency for military pay and benefits, should additional measures be necessary to ensure that critical manpower requirements are met."

The mood in both Houses of Congress is to override the Administration on the military pay freeze and to provide at least a partial pay boost, if not full comparability.

Defense Policy Objectives

Like every preceding post-World War II government, the Reagan Administration believes that the Soviet Union poses, and will continue to pose, the most formidable military threat to the United States and its interests. That threat, then, becomes the primary circumstance shaping the US defense budget. In his Annual Report to Congress, Secretary Weinberger did not mince words in assessing the Soviet threat:

"As a result of the twenty-year Soviet arms buildup . . . and the collective failure of the United States and our allies to make a sufficient response, the global military balance has been shifting steadily against us; local threats against our allies and friends have increased as well. The deterrent strength of the Atlantic Alliance is increasingly threatened, offering opportunities for Soviet coercion in the event of crisis.

"Moreover, regions that once were free from the threat of Soviet armed forces have now come under the shadow of Soviet military power. Indeed, the Soviet empire has expanded through a chain of military outposts that threaten to outflank our traditional alliances. If these trends are allowed to continue unchecked, the result would be a fatal weakening of the Western alliances and a drastic deterioration in the security of the United States."

Certain trends cited by Secretary Weinberger presage further deterioration: "Despite their sluggish economic situation and nationwide food shortages, the Soviets currently allocate an estimated fifteen percent of their GNP to defense. If the annual growth rate of their economy slows, as expected, their defense allotment could reach as much as twenty percent of GNP in the not-so-distant future. The United States, on the other hand, annually spent an average of 5.9 percent of GNP on defense during the 1970s. Even with the defense program proposed by the Reagan Administration, we will still spend less than eight percent of our GNP on defense."

Over the past two years, the Secretary reported, the Soviet military investment in the aggregate was nearly double that of the US. In the strategic sector the Soviet investment was three times that of this country, in general-purpose forces it was fifty percent higher, and in research and development it was double the US investment.

Pointing out that this country's containment policy that proved so successful in the period following World War II is no longer viable—mainly because of growing Soviet force projection capabilities and shifts in the military balance—Secretary Weinberger warned that the long-term consequences to the US of unchecked Soviet expansionism "would be disastrous. The further spread of Soviet military outposts throughout the world would increasingly threaten to cut into our lifelines of the Western alliances and make it more difficult and costly to defend essential US national interests."

The US grand strategy that the Administration has refined and modernized since assuming office is designed to cope with the growing threat not through preemption but by deterrence. Unambiguously defensive in nature, US strategy, according to Secretary Weinberger's comprehensive report to Congress, "excludes the possibility that the United States would initiate a war or launch a preemptive strike against the forces or territories of other nations." The pivot of US strategy is

FY '84 Budget TOA by Program

(Constant FY '84 $ Billions)

	FY '82	FY '83	FY '84	$ Change FY '83–84
Strategic Forces	$16.7	$21.6	$28.1	$6.5
General-Purpose Forces	96.3	105.1	109.7	4.6
Intelligence and Communications	15.2	17.7	20.8	3.1
Airlift/Sealift	4.3	4.3	5.2	0.8
Guard and Reserve Forces	11.0	11.6	11.6	—
Research and Development	18.5	19.5	23.5	3.9
Central Supply and Maintenance	20.0	22.0	24.1	2.1
Training, Medical, and Other General Personnel Activities	42.3	43.4	45.6	2.2
Administration and Associated Activities	3.9	3.2	4.8	1.7
Support of Other Nations	1.0	0.8	0.7	−0.1
TOTAL	$229.2	$249.3	$274.1	$24.8

(Based on Preliminary Data)

deterrence. The concomitant is the need to "maintain a nuclear and conventional force posture [that will] convince any potential adversary that the cost of aggression would be too high to justify an attack."

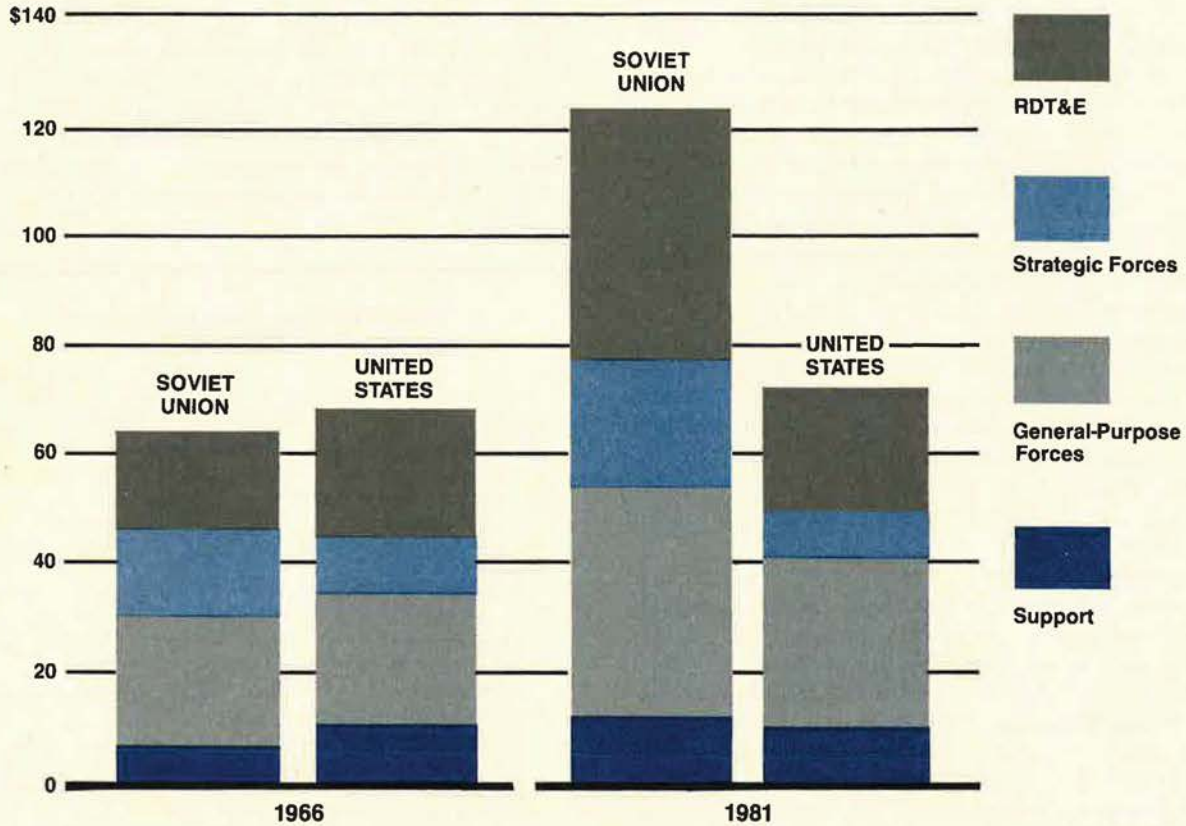
The third pillar of the US strategy is to restore peace on favorable terms if deterrence fails: "In response to an enemy attack, we must defeat the attack and achieve our national objectives while limiting—to the extent possible and practicable—the scope of the conflict. We would seek to deny the enemy his political and military goals and to counterattack with sufficient strength to terminate hostilities at the lowest possible level of damage to the United States and its allies." This phrasing and other formulations in the new Defense report suggest that the Administration is backing away from—or at least is playing down—its policy of "horizontal escalation" that in the past had been featured as the cornerstone of this Administration's global strategy.

Instead of stressing that the US would respond to aggression not only at the point of attack but at other places where the chances for successful retaliations might appear to be good, the FY '84 Defense Report acknowledges that, "given our defensive orientation, we inevitably cede several advantages to a potential aggressor. He will have the choice of time, place, and method of attack. He can have a detailed plan for his operations, designed to culminate in a politically decisive outcome." Taking an almost fatalistic stance, the Secretary then concedes that "we may suffer the disadvantage of surprise, with all the attendant difficulties of carrying out a response coordinated with our allies. The aggressor may attempt the destruction of our forces and quick seizure of critical territory, so as to present us with a *fait accompli*."

The defensive orientation of US strategy, the Defense Report points out, dictates that "our forces must be maintained in a high state of readiness; our command control communications and intelligence (C^3I) capabilities must be flexible and enduring so as to improve our warning and response to an attack; and our reserve forces must have the capability to mobilize rapidly." In turn, there is special emphasis on "forward deployments that, combined with the forces of our allies, provide the first line of defense in Western Europe, Japan, and Korea. In the event of war, we would reinforce these forward-deployed units, using forces capable of rapid deployment [over] long distances."

The US commitment to deterrence and defense is admittedly neither easy nor inexpensive. There are also political pitfalls: "When deterrence succeeds, it is easy

US and Soviet Military Investment by Mission Area
(In Billions of FY '84 Dollars)



NOTES: Mission area totals include outlays for procurement and military construction.
RDT&E is for all mission areas.
US investments for the Vietnam War are excluded.
Soviet investment is an estimate of what it would cost the US to duplicate Soviet investment activities.

to attribute the maintenance of peace not to the contributions of the defense that enforces the deterrent but to a host of facile assumptions—some imagined new-found 'peaceful intent' of the opponent, the spirit of détente, growing economic interdependence, and so forth. When deterrence fails, however, and the opponent has . . . weighed the risks and still decides to attack, the dividends of a viable warfighting defense are unquestionable."

For deterrence to be unquestionable, three conditions must be met under the current US strategy, according to Secretary Weinberger:

"First, our forces must demonstrate that they could survive a first strike with sufficient strength to threaten losses that would outweigh any gains a potential adversary might expect from an attack.

"Second, our threatened response to the attack must be credible, that is, of such a nature that the potential aggressor believes we would carry it out.

"Third, the boundary between peace and aggression must be sharp and clear. Formal treaties and agreements between allies serve an important function of clearly defining those limits."

US Nuclear Policy

At this time, the Administration reports, "the Soviets could envision a potential nuclear confrontation in which they would threaten to destroy a very large part of our force in a first strike, while retaining overwhelming nuclear force to deter any retaliation we could carry out."

If, as a result, deterrence should fail, the US, according to the new Defense Report, "cannot predict the nature of a Soviet nuclear strike nor assure with any certainty that what may have started out as a limited Soviet attack would remain confined at that level." Nevertheless, the Secretary of Defense argues that the US "must plan for the flexibility in [its] forces and in its response so that there will be the possibility of terminating the conflict and reestablishing deterrence at the lowest possible level of violence, thus avoiding further destruction."

The Joint Chiefs of Staff, in their Military Posture Statement to the new Congress, warn that "the imbalance in the relative survivability and composite force effectiveness between US and Soviet nuclear weapons presents a grave threat to the United States and to all people. Fear of nuclear war has given birth to a popular movement in the West to freeze the number of nuclear weapons at the present levels."

The Soviet Union, the Joint Chiefs point out, is "exploiting these legitimate concerns about the nature of nuclear war because there are significant advantages to the Soviets in freezing the current elements of imbalance. They have modernized much of their nuclear force, giving them a position of advantage, while the United States is just beginning a modernization program." This imbalance, rather than the US catch-up program, the Joint Chiefs assert, "represents the real danger to the world and reduces the Soviet incentive to negotiate mutual weapons reductions."

As a corollary, the Joint Chiefs point out that "modernization of US strategic nuclear forces to counter the growing nuclear warfighting potential of the USSR is the highest priority in upgrading the US security posture." This position does not militate, however, against "sensible" arms-control agreements that help reduce the danger of nuclear war: "The Joint Chiefs of Staff support the President's proposals for substantial reductions in nuclear weapons. But there should be no misunderstanding—concomitant modernization of the US strategic nuclear forces is essential for deterrence and security."

In this context, the Annual Report clears up a widely misunderstood point by asserting that "this Administration is not developing a Peacekeeper MX or any other weapon as a 'bargaining chip!' In the current loose usage, the term 'bargaining chip' weapon has come to mean a weapon that is developed—often at great cost—for the sole purpose of then negotiating away that very weapon." Acknowledging that such a procedure would be "absurd" indeed, Secretary Weinberger argues that the introduction of some newer weapons does not preclude logically the withdrawal of older weapons as the result of arms-reduction accords: "But that is not at all the same as to build costly new weapons as expendable arms-control chips. Rather, we seek to have the proper mix of modern forces to ensure a stable deterrence at reduced levels and permit arms control to complement and enhance national security."

The Administration's approach to nuclear strategy and to the ensuing force structure requirements is markedly cautious and devoid of stridency. As the Defense Department's report to Congress avers, "We, for our part, are under no illusions about the dangers of nuclear war between the major powers; we believe that neither side could win such a war. But this recognition on our part is not sufficient to prevent the outbreak of nuclear war; it is essential that the Soviet leadership understand this as well. We must make sure that the Soviet leadership, in calculating the risks of aggression, recognizes that because of our retaliatory capability, there can be no circumstance in which it could benefit by beginning a nuclear war at any level or of any duration."

In the Administration's view, deterrence will work and the risk of war can be diminished if the Soviets understand without ambiguity "that our forces can and will deny them their objectives at whatever level of nuclear conflict they contemplate, and, in addition, that such a conflict could lead to the destruction of those political, military, and economic assets that they value most highly."

The twin pillars of the Administration's nuclear strategy, Secretary Weinberger and the Joint Chiefs underscored, are "flexible response" and the "multiplicity of survivable strategic forces" derived from the triad of land-based ICBMs, manned bombers, and submarine-launched ballistic missiles. Explaining that "flexible response" is rooted in policies adopted by the US and the NATO allies in the 1960s, Secretary Weinberger said this concept had two interlinked goals: "First, US nuclear planning was modified in order to provide the President with the option of using nuclear forces selectively—rather than massively—thereby restoring credibility and stability to our nuclear deterrent. Additionally, the US and the allies hoped that by improving conventional forces, they would reduce reliance on nuclear weapons to deter or cope with nonnuclear attack."

He conceded, however, that "neither we nor our allies ever fully met this key goal. Thus, with our present effort to increase our conventional strength, the Reagan Administration is essentially trying to secure a long-established but elusive goal of American policy."

In reiterating the close linkage between strategic and nonstrategic theater nuclear forces, the new Defense Report points out that the purpose of this fusion is "to dissuade the Soviets from believing that they might be able to conduct a nuclear war in Europe from a sanctuary in the USSR." One of the principal ploys used by the Soviets in their propaganda campaign aimed at driving a wedge between this country and the European NATO powers, Secretary Weinberger told Congress, is "turning facts on their head and asserting that the US intends to fight a 'limited nuclear war' in Europe. Nothing could be further from the truth. We recognize that the use of any nuclear weapon—whether tactical or intercontinental—would represent a most fundamental change in the nature of warfare."

Nuclear Force Planning

Over the short term, the US strategic nuclear arsenal remains relatively static under the proposed Defense budget. The ICBM force drops off to thirty-four Titan ICBMs by the end of FY '84, down from fifty-two Titans at present, while the Minuteman inventory remains unchanged at 1,000. With the C, F, and D models of the B-52 decommissioned, only 241 B-52Gs and Hs, along with fifty-six FB-111s, will make up the strategic bomber arsenal.

The number of Fleet Ballistic Missile launchers remains unchanged at 496 in the Poseidon SSBN class, but is boosted from seventy-two SLBMs to 120 in the Trident SSBN category, reflecting the commissioning of two additional subs. There is also little change in strategic defensive force levels, except for upgrading of the active-duty force with F-15s and of the Air National Guard with F-4s. Actual force levels remain static at fifteen squadrons.

Subject to congressional approval, the Administration plans to allocate about $17.65 billion to the MX Peacekeeper program in development, construction, and procurement money over the period FY '83–85. The FY '84 total in these three categories comes to about $6.6 billion. The current program envisions the acquisition of five MX Peacekeepers in FY '83, twenty-seven in FY '84, and thirty-seven in FY '85.

Allocations for the strategic bomber force, including cruise missiles and KC-135 reengining, total $8.69 billion for FY '84 and provide for the procurement of ten B-1Bs and the reengining of thirty KC-135s. With the termination of the current air-launched cruise missile program—pending source selection and program start for a second-generation, "stealthy" design—no ALCMs will be acquired either in FY '84 or '85. By the end of FY '84 about 1,000 ALCMs will be deployed on ninety B-52Gs. According to the new Military Posture, a combined total of 3,000 ALCMs is to be procured "eventually," suggesting that there has been a significant scaling back of the original plan that envisioned the acquisition of more than 4,000 of these missiles.

The new Defense budget provides for the acquisition of ten B-1Bs in FY '84 and thirty-four in FY '85. A total of about $6.9 billion is sought for FY '84 and $8.5 billion in the following year, covering procurement as well as R&D. Delivery of the first B-1B is scheduled for 1985, with the last of the planned force of 100 aircraft scheduled for deployment in FY '88.

Neither the Secretary of Defense nor the Joint Chiefs provide any information about the funds that are being sought for the development of ATB, the Advanced Technology (or "Stealth") Bomber, but there is the assertion that it is "proceeding at a vigorous but prudent pace toward a planned initial deployment date in the early 1990s. We expect that the ATB will be capable of penetrating all existing and projected Soviet air defenses well into the next century." Once ATB is deployed in significant numbers, "the B-1 will continue selected penetration missions and assume a greater portion of the conventional weapons bombing mission," according to the Military Posture Statement.

The new Air Force Report to the Ninety-eighth Congress stresses that the service is "proceeding with development of the ATB at the fastest reasonable pace to deploy a bomber that is effective across a range of combat applications and that is durable and maintainable as well. The ATB requires an orderly and logical development pattern to capitalize on new 'stealth' technology and to avoid costly redesigns."

The new budget calls for a halt in the production of Trident I (or C-4) SLBMs after the acquisition of forty-three missiles in FY '84. This means that sixty missiles were dropped from the original acquisition program. On the other hand, the D-5, or Trident II, program is to be accelerated, starting with a five-year full-scale development phase that is geared toward initial deployment by 1990 or earlier. All Trident SSBNs, the Defense Department announced, will be equipped—or retrofitted—with D-5 SLBMs, while the C-4 missile is to be phased out. The new budget also provides for the deployment of "sea-launched cruise missiles with nuclear warheads on attack submarines and surface ships [to strengthen] our nuclear capabilities by providing survivable forces that can strike the full range of enemy targets."

Strategic Defense

The central challenge to US defense systems is obviously a Soviet nuclear attack. The new budget and the associated Five-Year Defense Plan (FYDP) stress the resultant requirements for warning, attack assessment, and defensive systems. Ballistic Missile Defense (BMD) R&D is to be funded to the tune of about $710 million in FY '84, and $1.564 billion in FY '85, to "sustain our understanding of this technology so that we could field an advanced and highly effective BMD system quickly, should the need arise." According to the Joint Chiefs, such a system could be available by the early 1990s to provide defense for such strategic assets as ICBM launch sites, SAC bases, command and control facilities, and the National Command Authorities (NCA). Associated advanced technology efforts include research on high-energy lasers, data processors, and advanced missiles and sensors.

The Defense Support Program's early warning satellites that provide information on ICBM and SLBM launches are scheduled for replacement by improved spacecraft in the mid-to-late 1990s. These replacement

"We recognize that the use of any nuclear weapon—whether tactical or intercontinental—would present a most fundamental change in the nature of warfare."

satellites will reportedly be more survivable. Warning data from early warning satellites is to be transmitted to six mobile ground terminals to reduce dependence on fixed ground-based data-processing stations that an attacker would presumably consider high-priority targets.

Because of the vulnerability of ground-based facilities and uncertainties about satellite performance following a nuclear attack, the Defense Report disclosed that "we are funding research on an Advanced Warning System (AWS). Building on technologies now under development, the system would be designed to ensure continued operation throughout a nuclear conflict. Such a system would incorporate more comprehensive on-board data processing so that messages could be transmitted directly to users." The current research program should make it possible for AWS to enter full-scale engineering in FY '87 and to achieve initial deployment of an operational system in the 1990s.

Strategic command and control "connectivity," meaning the ability of a variety of C^3I systems to function in concert with one another during a series of nuclear exchanges, according to the Military Posture Statement, has "the highest priority within the strategic modernization program." These systems will be subjected to "power outages, deception, jamming, nuclear effects, atmospheric disruptions, and physical damage" at a time when they are crucial to this country's ability to retaliate after an attack, control escalation, and reconstitute its strategic forces. As a result, "increased attention is being given to improving the timeliness and accuracy of tactical warning and attack assessment and enhancing communications between the NCA and the strategic forces," according to the Joint Chiefs' report.

Specific steps include "development of a proliferated ground-wave radio system with multiple overlapping stations, enhanced satellite communications, and hardening of strategic bombers and C^3 relay aircraft to resist the EMP [electromagnetic pulse] effects of nuclear detonations. The MILSTAR satellite program will provide reliable EMP-hardened communications for all strategic forces. In addition, the extremely low frequency (ELF) communications relay system, which will be operational in FY '85, will allow SSBNs and [nuclear-powered attack] submarines to maintain communications while operating at greater depths and increased speeds. This improved system will reduce the submarines' risk of detection despite the improved capability of the USSR to monitor US submarine operations."

Communications links between Minuteman launch-control centers and the NCA continue to be upgraded under the new budget request and include the Emergency Rocket Communications System (ERCS). ERCS is launched by modified Minuteman missiles at the White Sands, N. M., missile range to provide alternative communications with the nuclear force under surprise attack conditions.

Centerpiece of the Defense Department's multifaceted space defense program is the Air Force's ASAT (antisatellite weapon) program that is meant to "negate Soviet space systems that threaten the effectiveness of our sea, land, and acrospace forces and to deter Soviet first use of their demonstrated ASAT capability." The Air Force, in its FY '84 budget, seeks $205.6 million for the development and test of ASAT, and about $108 million for associated command and control and surveillance functions.

Mobility Forces

The FY '84 budget calls for significant improvements in sealift, including a broad expansion of the Ready Reserve Fleet from twenty-seven to seventy-seven modern, militarily usable ships. These vessels will include sixty-one cargo ships and sixteen tankers and are designated for activation within five to ten days.

The current airlift inventory, the Department of the Air Force reported to Congress, shows a "major mobility deficiency." Seventy C-5As, 234 C-141s, 512 C-130s, and twenty-four KC-10As make up the active-force inventory at present. In addition, the Civil Reserve Air Fleet (CRAF) provides about thirty-eight percent of the passenger capability under contingency conditions. The combined capacity of the active force and CRAF elements of the US intertheater airlift forces is less than 30,000,000 ton-miles per day, compared to the 66,000,000 ton-mile capacity deemed essential by the so-called Congressionally Mandated Mobility Study.

The new budget and associated Five-Year Defense Plan fund a 50,000,000-ton-miles-per-day force by the end of FY '88 and eventually would attain the full capacity by future airlift enhancements, such as wholesale acquisition of the C-17, according to the Air Force's Annual Report.

The Air Force's new acquisition program calls for a mix of KC-10s, C-5Bs, and CRAF-enhanced aircraft in the near term, and the purchase of C-17s for the long-term modernization and expansion of the airlift force.

Because of its long range and large fuel capacity, the KC-10 need not rely on en route basing, making it invaluable for worldwide force deployments. When used as a cargo carrier, the KC-10 will alleviate the airlift shortfall. The FY '84 budget requests $813 million for the purchase of eight KC-10s, spares, and long-lead items.

Acquiring fifty C-5Bs over the next five years will

increase the intertheater outsize and oversize capability. The C-5B is the C-5A design updated with engineering changes that include a 30,000-hour wing, GE TF39-1C engines, improved avionics, and the use of more durable, corrosion-resistant alloys. Since the C-5B will be built primarily with the existing C-5A production base, no investment is required in RDT&E. The FY '84 budget requests $1,316.6 million for the purchase of four aircraft.

The next-generation airlifter, the C-17, is a long-range, air-refuelable, all-weather, four-engine, turbofan aircraft designed for the wartime airlift mission. In addition to outsize intertheater capability, the C-17 will be an efficient outsize intratheater airlifter capable of various delivery modes: airland, airdrop (including outsize), low-altitude parachute extraction (also outsize), and rapid combat off-load. This capability, along with direct delivery from the US to forward locations, will give considerable flexibility to theater commanders and will reduce congestion at the main operating bases intheater. The C-5B and C-17 schedules mesh, with C-17 deliveries directly following the last C-5B. This plan will continue the uninterrupted buildup of airlift capability toward the goal of 66,000,000 ton-miles-per-day capacity.

The eleven aging C-140B transport aircraft are costly, have high fuel consumption, and require expensive maintenance. Congress has directed the phaseout of the C-140B fleet, and USAF is selecting a replacement aircraft. Funds for a replacement are included in the FY '84 request.

The Operational Support Airlift fleet of CT-39s also was acquired in the late 1950s and 1960s, is difficult and expensive to support, and requires replacement. USAF's proposed replacement strategy is to contract competitively for a five-year lease of a fleet of up to 120 jet or combination jet/turboprop aircraft. This contract will contain three additional lease option years, and the Air Force has the right of first refusal to acquire the aircraft at the end of the lease period.

The new Air Force budget emphasizes "special operations forces," explaining that these units "may be employed under circumstances where the use of conventional forces would be premature, inappropriate, or infeasible in theater conflict. In peacetime, they can play a key role in assisting friendly nations that confront externally supported, low-level subversion or insurgency. In conflict, special operations forces must be capable of conducting the full range of [missions], including precise strategic operations and the destruction of key military targets."

The new budget includes plans to consolidate USAF's Special Operations and Combat Rescue forces under the Military Airlift Command. In terms of associated equipment, the Air Force plans to acquire two technically advanced Combat Talon MC-130Hs and to modify HC-130, AC-130H, and MC-130E aircraft for special operations. In addition, twenty-four HH-60D helicopters are being acquired for this mission, with the total long-term purchase of these aircraft set at 243 units. The Air Force is also asking for funds toward the development of the Joint Service Advanced Vertical Lift Aircraft (JVX), whose longer range and higher speed will be needed to augment the HH-60Ds.

Modernizing the Tactical Air Force

The new Five-Year Defense Plan (FYDP) is meant to increase USAF's tactical forces—consisting now of twenty-five wing equivalents in the active force and the equivalent of almost twelve Air National Guard and Air Force Reserve wings—by slightly better than four wings by FY '88. These new forces, Secretary Weinberger reported to Congress, will consist of one defense suppression squadron, six reconnaissance squadrons, and two tactical command and control squadrons. In addition, the quality of the Air Force's eight special operations squadrons is to be improved over this five-year period.

The goal for FY '84 is to procure forty-eight F-15s and 120 F-16s. The Defense Department admits that "we would prefer to procure F-15s and F-16s at higher, more efficient rates in FY '84 to accelerate the modernization plan . . . but cannot do so because of current fiscal constraints." The F-15 buy rate is to be increased to ninety-six aircraft per year by FY '86, while the acquisition of F-16s is to reach an annual level of 180 aircraft by that time, according to the Defense Department. Overall, 408 additional F-15s are to be bought by FY '88, with additional quantities to be acquired thereafter "into the early 1990s."

The Air Force's Annual Report terms USAF's limited ability to operate under adverse weather conditions, day or night, as "our most serious tactical force deficiency," and explains that the acquisition of derivatives of the F-15 and F-16 ought to correct this problem "partially."

The Air Force, therefore, is in the process of "evaluating potential improvements to the F-15 and F-16 to alleviate these pressing deficiencies. As a result of flight testing and analysis, we will determine the scope of modifications necessary based on criteria of combat capability and affordability."

Results of the comparative flight-test program and appropriate recommendations will be presented to congressional committees beginning in the summer of 1983 to support the FY '84 budget request of $126.1 million, according to the Air Force Report.

In terms of engines, the Report disclosed that "over the next few years, while our F-15 and F-16 fighter force is expanding, we have an opportunity to improve the durability, reliability, and life-cycle costs of our fighter engines. Since there is currently only one manufacturer of high-thrust fighter engines for the Air Force—Pratt & Whitney—our program to achieve these objectives is based on introducing competition by qualifying another manufacturer, General Electric.

"The engines that will compete are the F110, a General Electric engine derived from the F101 (B-1 engine), and the F100, the engine used in the F-15 and F-16. In addition to funding full-scale development of the F110 to qualify General Electric ($45.5 million in FY '83 and $68.5 million in FY '84), the Air Force is developing a digital electronic engine control, a new main fuel pump, and an increased life core to improve the Pratt & Whitney F100 ($70 million in FY '83 and $56 million in FY '84).

"The engine competition is not being conducted because of any requirement for increased thrust. The thrust-to-weight ratio of each engine is roughly equivalent. The competition is based on durability, reliability,

maintainability, life-cycle costs, and operability characteristics as demonstrated in tests and supported by contractor warranties."

Over the long term, the Air Force seeks funds for the exploration and eventual development and deployment of the Advanced Tactical Fighter (ATF). The FY '84 ATF request is for $37.4 million, which is to pave the way for formulation of a specific design concept by FY '87.

In the field of munitions, the new Air Force budget request calls for a "complementary mix of direct delivery and standoff weapons [that] offers flexibility in attacking a variety of fixed and moving targets and facilitates adjustment to enemy tactics. Standoff systems must have the capability to strike with a high degree of accuracy and destructiveness while offering the additional advantage of reduced exposure to enemy defenses. Direct delivery weapons provide high accuracy, direct man-in-the-loop employment, and relatively greater affordability. A proper mix of these systems gives us a broader envelope of lethality and greater force survivability."

In FY '84, USAF plans to buy the last complement of AIM-7 radar-guided air-to-air missiles: "This will be the last year we procure the AIM-7 missile, as the AIM-120, or Advanced Medium-Range Air-to-Air Missile (AMRAAM), is being developed to augment it and counter Soviet force improvements.

"AMRAAM bolsters the effectiveness of our air-to-air inventory because of its greater envelope, increased velocity, launch and maneuver employment capability, and capacity for multiple target attack. Our analyses show that AMRAAM will greatly increase our lethality against a numerically superior threat and reduce the vulnerability of our crews. FY '84 funding of $188.6 million will support continued AMRAAM development, including captive-carry testing and initial test firings from the F-16, tooling test equipment, and advance procurement money for an FY '85 production start."

So far as infrared guided air-to-air missiles are concerned, "the Advanced Short-Range Air-to-Air Missile (ASRAAM) will provide a next-generation missile designed to augment the AIM-9L/M in the 1990s. Our recommendation on ASRAAM, which is being developed by the United Kingdom and the Federal Republic of Germany, will be made after a complete review of missile cost, schedule, and performance," according to USAF's Annual Report.

The Air Force's offensive air support capabilities also gain support in the new budget through accelerated acquisition of munitions tailored for use against massed Soviet armored forces. These requests include procurement of almost 9,500 IIR (imaging infrared) Mavericks over the period FY '82 to FY '85, of significant numbers of GPU-5 30-mm gun pods and ammunition, of a new cluster munition known as the Combined Effects Munition (CEM), and of Gator, an antiarmor mine. Additionally, development of newer, potentially more effective antiarmor weapons is under way. The Sensor Fused Weapon, a "smart" antiarmor submunition, and WASP, a minimissile, will be put into full-scale development in FY '84.

To overcome deficiencies in airfield attack and interdiction of fixed targets, the Air Force, in FY '84, is acquiring Durandal, a French-built, rocket-assisted, runway-cratering munition: "We are procuring Durandal, initiating development of a new generation of weapons and submunitions, and studying various means of airfield attack.

"Runway-cratering submunitions are the most cost-effective means of closing takeoff and landing surfaces. Once these submunitions are developed and proven, they can be employed by a variety of delivery platforms—aircraft in direct attack; powered or freeflight dispensers which avoid point defenses; and long-range, standoff weapons like the Medium-Range Air-to-Surface Missile (MRASM). MRASM continues in full-scale development in FY '84.

"Airfields contain a number of other fixed-point targets which, if destroyed, could degrade enemy sortie production. The first generation of precision-guided munitions greatly improved our ability to attack point targets both on airfields and throughout the enemy's rear area. In FY '84 we will increase our inventory of newer, more effective precision weapons with the procurement of the GBU-15 and the Low-Level Laser-Guided Bomb. We will also initiate development of the Standoff Attack Weapon to provide greater standoff range."

Chemical Warfare

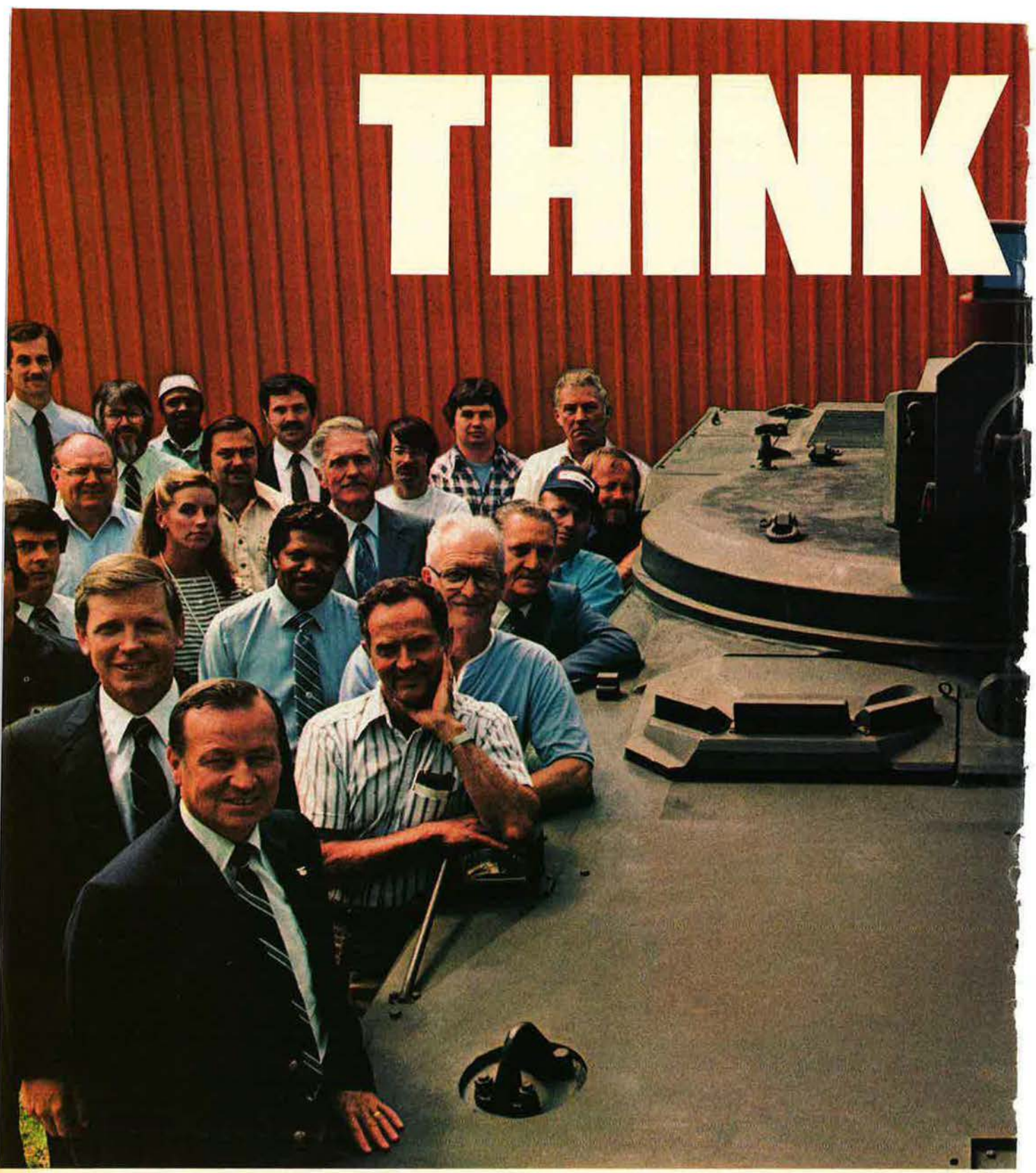
The United States, Secretary Weinberger stressed in his report to Congress, continues to seek a "complete and verifiable ban on chemical weapons [and] does not and will not possess biological or toxin weapons." He added that "efforts to achieve bilateral arms-control agreements between 1977 and 1980 were unsuccessful in spite of US unilateral restraint since 1969.

"Current efforts to obtain a verifiable ban are centered in the multilateral Committee on Disarmament at Geneva, where increased pressure can be exerted on the Soviet position on verification. Achieving a ban will not come easily, not only because the verification and compliance problems are so formidable, but also because the Soviets have little incentive to negotiate seriously so long as they perceive they have a significant advantage in CW capabilities.

"Until we can achieve a verifiable ban, we must reduce the Soviet Union's incentive to use chemical weapons against us or our allies by rebuilding and maintaining an adequate CW posture of our own. Our program is structured and sized to do this and no more. Consequently, most of the resources in this program are devoted to improving the ability of our forces to survive and operate under chemical attack.

"Our goal is to be able to sustain combat operations in a chemical conflict while minimizing the performance [losses] associated with operating in a protective posture. However, significant degradation is unavoidable. Therefore, improving our protective posture will not by itself provide an adequate deterrent because the Soviet Union would enjoy a significant military advantage if they could force us to operate in protective equipment in a contaminated environment while their troops remained relatively unencumbered.

"To complete our deterrent posture, we must eliminate the prospects for such a Soviet advantage by reestablishing a retaliatory capability sufficient to make them recognize that they, too, would be forced to operate with similar encumbrances." ■



When it comes to modernizing today's combat forces, AAI is right on track with innovative weapon systems like the Rapid Deployment Force Light Tank.

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And the RDF/LT is one smart tank. With high-caliber technologies like computerized fire-control systems, weapon stabilization, thermal imaging, and a laser rangefinder for improved lethality.

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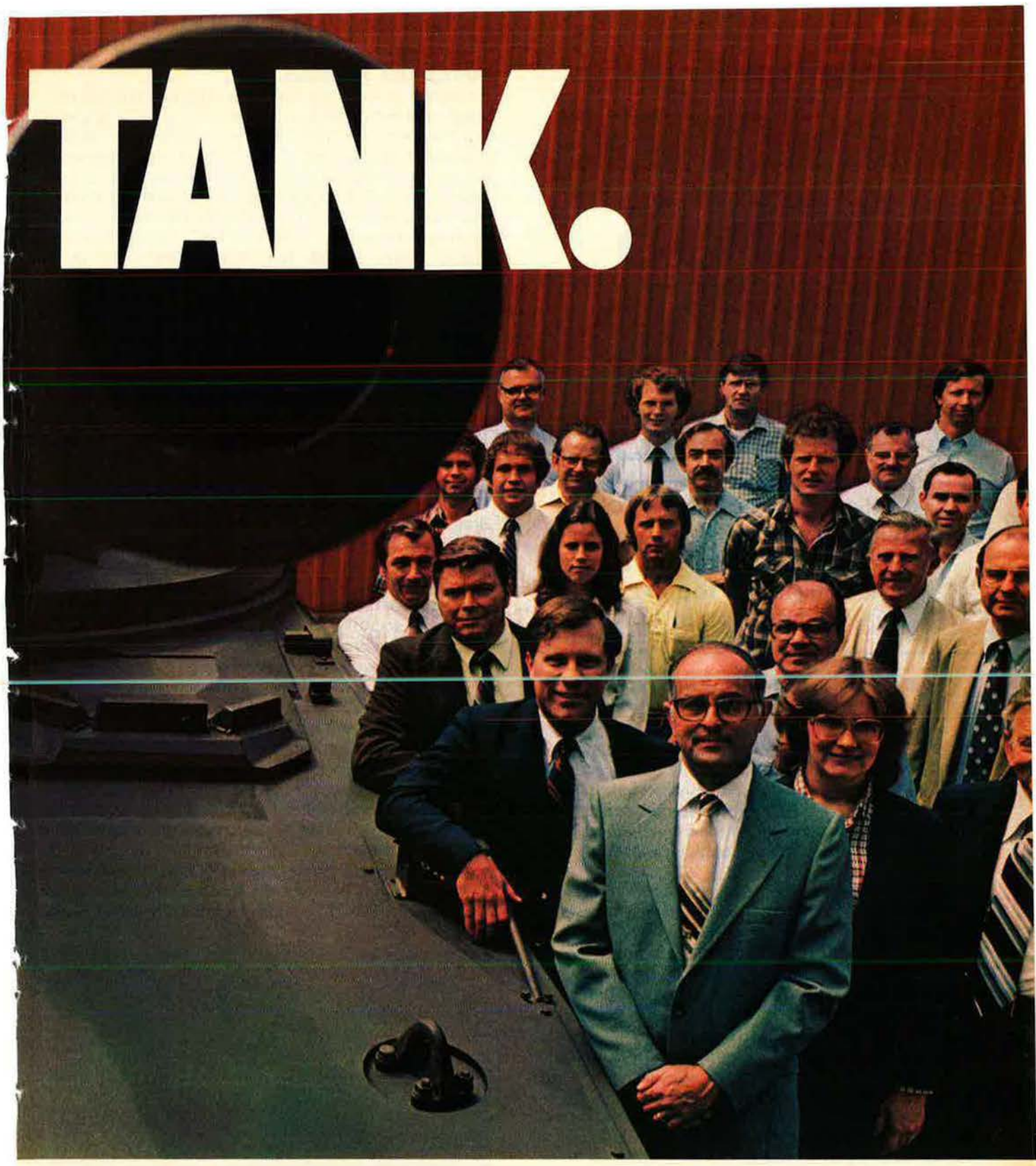
AAI ordnance experts have even developed "telescopic" rounds for

TANK.



improved munitions storage within the RDF/LT; projectiles are actually contained within the propellant envelope of the cartridge.

In ordnance systems, AAI is also committed to the full-scale production of proximity-fuze components, smoke screen systems, and the development of APFSDS munitions for both 75MM and 90MM calibers.

AAI's defense system capabilities include the production of turrets for the Army's 40MM DIVAD system, munitions lift trailers for loading Air Force cruise missiles onto the B-52, and the development of special handling equipment for the MX missile program.

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Restoring NATO's Flexible Response

The Alliance must have stronger conventional forces to raise the nuclear threshold, but this will not eliminate the need for a nuclear deterrent in Europe.

BY JOHN T. CORRELL, SENIOR EDITOR

NATO's strategy of Flexible Response is no longer as flexible as it used to be. Over the past decade, the conventional military balance in Europe has tipped in favor of the Warsaw Pact. There is real concern that NATO would have to resort to the use of nuclear weapons early in the event of any conflict, or else risk being overrun.

"There is an urgent need to raise the nuclear threshold to lessen our dependence on early use of nuclear weapons," says West German General Franz-Joseph Schulze, Commander in Chief of Allied Forces Central Europe from 1977 to 1979. General Schulze remains active in Alliance matters, and his counsel is highly respected by political leaders and defense planners on both sides of the Atlantic.

"The nuclear threshold is not a function, as some people seem to believe, of the availability and usability of any nuclear weapon," General Schulze says. "It is a function, first and foremost, of the conventional capability. Neither an aggressor nor a defender is going to use nuclear weapons if he can achieve his aims by conventional forces alone."

While NATO must give high priority to improving its conventional posture—and must develop a capability to extend the battlefield into enemy territory—that alone is not adequate for the defense of Europe, he says.

"Improved conventional forces can never be an alternate for nuclear forces," General Schulze says. "Our deterrence depends on the close and indivisible linkage of conventional forces, nuclear forces on European soil, and American strategic nuclear forces."

No-First-Use Proposals

General Schulze has been an outspoken critic of proposals that NATO pledge no first use of nuclear weapons in a European war. The Alliance has, of course, already renounced the first use of *any* weapon, but keeps open the option of escalation to nuclear weapons as a final measure to defeat a large-scale attack should the other side start a war. That is the gist of the Flexible Response strategy adopted by NATO in 1967. In addition, the United States extends the "nuclear umbrella" of its strategic forces to the protection of Europe.

"By forgoing the option of first use of nuclear weapons, we would lessen the linkage between the defense capability in Europe and the strategic arsenal in the United States," General Schulze says. "And that would be the end of our deterrence."

The issue goes well beyond comparative conventional force levels, in which NATO is at a disadvantage.

"The main point is that the Soviets would be liberated from any existential risks for their own country, and that makes the conventional war more calculable for them," General Schulze says. "The same applies to the United States. Even if they would still share the risks and burdens of the conventional defense of Europe, the American homeland would be relieved of the decisive nuclear risk. What binds NATO together is the greatest possible realization of the principle of equal risks, equal burdens, and equal security."

Without the presence of NATO nuclear weapons, the Warsaw Pact would be freer to mass its forces instead of dispersing them. Countering this would require a NATO conventional force of a size the member nations are unlikely to fund and field. The elimination of risk to the existence of the homelands of the superpowers, General Schulze says, makes conventional war in Europe once again possible. That, in turn, makes the overall probability of nuclear war higher than it is now because of the likelihood of escalation in any armed conflict involving the superpowers.

"The key to preventing the use of nuclear weapons is to deter conflict between the East and the West at *any* level," Gen. David C. Jones, former Chairman of the

Photo by William A. Ford

General Schulze talks with AFA Executive Director Russell E. Dougherty during a recent visit to Washington.

Joint Chiefs of Staff, said last year. "The critical threshold is the beginning of combat."

The value of an improved NATO conventional capability and the inherent raising of the nuclear threshold, General Schulze believes, is that it will restore the credibility of the Flexible Response strategy.

Dual Track

The nuclear balance in Europe, already unfavorable to the West, is constantly deteriorating as the Russians field triple-warhead SS-20 medium-range missiles at the rate of one a week. The Soviets decided to develop the SS-20 in the early 1970s, when the diplomacy of détente was supposedly in full sway, and began deploying it in 1976. They now have more than 300 of these missiles with more than 900 warheads, two-thirds of them targeted against NATO, with enough range to cover the entire European theater.

NATO has no medium-range nuclear weapons at all, and in fact has reduced the number of its shorter-range nuclear systems. In 1979, Alliance ministers agreed to pursue a "dual-track" initiative: unless the Soviets agreed to reductions in intermediate-range nuclear forces (INF), NATO would deploy 108 Pershing IIs and 464 ground-launched cruise missiles (GLCMs) in Europe, beginning in December 1983. Both Pershing II and GLCM are single-warhead systems.

INF talks between the United States and the Soviet Union began in 1981. At that time, President Reagan proposed that both the US and the USSR forgo medium-range nuclear missiles worldwide. The Soviets turned down this "zero-zero" solution. Last year, NATO reconfirmed its dual-track policy decision.

With the date for NATO deployments approaching, the Soviets stepped up their propaganda barrage. Secretary General Yuri Andropov offered to reduce SS-20s in Europe to 162, a number equal to French and British strategic nuclear systems. It was not clear, however, whether he was offering to destroy those missiles or merely to pull them back beyond the Urals, available for redeployment against Europe at some later time. Either way, the remaining SS-20s east of the Urals threaten US interests and allies in the Pacific. The United States refused the proposal.

"Nor is it quite clear whether Andropov meant 162 launchers or 162 warheads," General Schulze points out. Each SS-20 carries three warheads.

The French and British nuclear weapons are assets of those nations, and are not controlled by the United States. They are not committed to use by the Alliance as a whole. Neither France or Britain is agreeable to their last lines of national defense becoming bargaining chips in bilateral US-USSR negotiations.

A day before the NATO Defense Ministers' conference last winter, the Russians announced they would consider a launch-on-warning strategy if NATO deploys Pershing II and GLCM.

Propaganda and Confidence

Meanwhile, the Soviet propaganda blitz has been scoring heavily with scared citizens in the West. A powerful antinuclear movement has been gathering steam in Europe and threatens to block deployment of the NATO missiles, regardless of what happens in the INF talks and no matter how many SS-20s the Soviets choose to field.

One possibility for attacking enemy runways is the Durandal missile, shown here on the F-15 for a form and fit compatibility evaluation. The crater is from Durandal tests at Eglin AFB, Fla.

"We have to proceed with the Pershing II and the GLCM," General Schulze says. "We can hope for arms reductions only if the Russians see that we are definitely determined to install these weapons. The double-track decision was an innovative approach to arms control. We clearly stated that in four years time, we would begin with the implementation. We gave the Russians four years to think about it. What leads us to hope that they would be more forthcoming in the fifth year or in the sixth year unless they are convinced we will go ahead with it?"

The USSR, which had previously resisted entry into INF negotiations, came to the bargaining table within two years of NATO's double-track decision. "We wouldn't have negotiations in Geneva without that double-track decision in 1979," General Schulze says. "And we won't have reductions in nuclear weaponry unless we stand firm."

What the Russians are really after is decoupling of the

United States from the defense of Europe, General Schulze says. If the USSR can engineer such a split and then intimidate Europe with its military superiority, the Soviets will have achieved their objective without firing a shot.

"The Soviets want to avoid war," General Schulze says. "They believe in what the Chinese philosopher and strategist Sun Tze put so well in the sixth century before Christ. The great strategist is not the one who wins one battle after another. The great strategist is the one who wins the war without having to fight any battle.

"The danger is that the erosion of the confidence of our people and the feeling of inferiority may lead to an attitude of accommodation and appeasement with the Russians. That is what the Soviets are really up to and what their force buildup really means."

The Russians have always been skillful in exploiting their military might for political purposes. Their propaganda has been successful largely because the way for it was paved with superior power, General Schulze believes. The solution, then, may be an improved NATO military posture, against which the Soviets will loom less large.

"The Americans in their history have never experienced such a situation, where they had to preserve their free society and to protect themselves from political pressure of a superior neighbor," General Schulze says. "We have different historical experiences, and that makes the transatlantic dialogue sometimes more difficult. The European history is full of precedents where small countries had to give in to political blackmail and try to accommodate.

"We already see that weakening in the attitude of European populations and European politicians. A feeling that you shouldn't provoke the Russian bear. Some of the warfighting rhetoric we have heard from your side of the Atlantic adds to feeling of vulnerability of the Europeans. The real problem is the erosion of confidence of our people. We must upgrade our conventional and nuclear capabilities and, thus, give a new reassurance to our population. We have to better understand the real nature of the threat and keep in mind that our main aim must be restoring the confidence in our ability to deter and defend."

Extending the Conventional Battlefield

The prospect for improved NATO nuclear capability—or else redress of the nuclear balance in Europe through arms control—lies with the INF talks and with the double-track policy.

The approach to improving conventional forces is less focused. "Currently, we must measure our ability to sustain combat in Europe in days, whereas we estimate the Warsaw Pact's sustainability in weeks or months," Gen. Bernard W. Rogers, Supreme Allied Commander in Europe, wrote last summer in a *Foreign Affairs* article. In its conventional forces, NATO is left with what General Rogers calls a "delayed tripwire" that would trigger early use of nuclear weapons unless the Alliance chose to accept defeat.

The Soviets and the Pact are well ahead in conventional numbers, and they long ago moved out of the "cheap junk" category with their equipment. It is axiomatic that stronger force is required to attack than to

Among the conventional weapons of mass destruction now coming along is the MW-1 system, seen here on a Luftwaffe Tornado. The cluster dispenser ejects a large number of submunitions to either side of the aircraft.

defend. This is some advantage to NATO, being a defensive alliance, but it is offset by requirements for a forward defense. The traditional option in warfare of falling back to trade space for time is not available, because that would mean sacrifice of West Germany's territory.

Within the NATO strategy of Forward Defense, however, new options are being explored for extending the battlefield in the *other* direction—not only blunting the enemy's first wave at the point of attack, but also going after his airfields and rear echelons as well. *(Elsewhere in this issue, a leading US military analyst, Col. Trevor N. Dupuy, USA [Ret.], takes exception to current emphasis on this approach. See p. 80.)*

Interdiction is a standard Air Force mission, but in actual wartime it has mostly concentrated on such targets as enemy bridges, depots, and supply lines. By the 1970s, new sensors and smart weapons had led to other possibilities. In his classical "Tactical Counterforce" article (AIR FORCE *Magazine, June 1974*), Maj. Gen. Leslie W. Bray, Jr., described the emerging concept of using airpower to attack mobile Warsaw Pact armor before it could close with NATO ground forces.

"Since we don't have enough forces for major counterattacks, we just have to extend the fire into enemy territory," General Schulze says. "We cannot put ourselves into a position where the victims of aggression bear all the devastation and destruction of war. We cannot win without a great degradation of Soviet tactical airpower. And we cannot win if we are not going for the follow-on formations."

Soviet doctrine would point toward successive echelons of armor and mobile forces attempting to blast through several broad invasion corridors with the aim of quick victory. Operational Maneuver Groups of armor would probably seek to disrupt the NATO rear. The Pact would likely put 2,000 aircraft into the attack, penetrators coming in low with electronic jamming and combat air patrol protection. Allied air bases, nuclear capabilities, and command control and communications centers

would be high-priority targets for Pact airpower. The Soviets might or might not refrain from early use of chemical weapons—in which they have a decisive advantage—because it could be seen as an escalation from conventional capability and thus elicit a nuclear response.

"The enemy can bring in fresh forces when the first attacking formations have been attrited," General Schulze says. "The force ratio will constantly be shifting to our disadvantage, so we cannot focus improvement of our conventional defenses totally on how to counter the first attacking formations. We must make sure that the follow-on formations will be delayed, disrupted, and attrited before they enter the close-in battle."

He says that improvements must come in stages, geared partly to what new technologies might offer over the next decade.

"But if we want to improve our capability as quickly as possible, then we have to use what is available," he says. "There is a great opportunity to convert moving targets into stationary targets. In this context, field fortifications and antitank ditches seem to gain a new fascination for some people. However, we have the most effective antitank ditches provided by nature—the river Elbe, the Saale, and the Moldau. We know where these rivers can be crossed, where they can be bridged or forded. These crossing sites are fixed targets. We have to keep this interdiction line under close surveillance to deny the crossing of the rivers as soon as it starts, and let the moving formations bump up behind the crossing sites. There we will find the richest targets of the war worth taking the risk to use manned aircraft."

General Schulze does not, however, think manned aircraft are the answer for all rear echelon targets.

"The best way of degrading enemy airpower is to attack them on their bases, and we have to do that from the outset of hostilities," he says. "We have to force them to go to dispersal operating bases, which are less protected, and where dispersal alone would degrade their sortie rates.

"We get the best results if we are able to attack their main operating bases while the first wave of attacking aircraft is still in the air, so it has to be diverted. That requires weapon systems with very short reaction time. Furthermore, going after main operating bases by manned aircraft will be a very costly affair—very high attrition rates. We need to develop the capability of attacking the main operating bases by missiles—ballistic missiles, in fact—and then use our air forces to attack the dispersal operating bases where the enemy air is so much more vulnerable."

He acknowledges that such ideas generate roles-and-missions controversy, but says that vital capabilities may not be developed "if we continue to think in 'successor' terms. By that, I mean having a new tank for every outgoing tank, having a new aircraft for every outdated aircraft, and so on. There has to be some rearrangement in that thinking."

General Schulze favors use of drones for target acquisition, which he says is one of NATO's greatest weaknesses at present. He supports the ongoing development of such target acquisition systems as the Pave Mover radar, but says that RPVs with a real-time capability to downlink target data offer a simpler, more economical way to direct firepower.

He has also been critical of Alliance munitions, saying that NATO has modern airplanes but loads them with eighteenth century bombs.

"We have the most sophisticated aircraft and we are still loading them with iron bombs," he says. "What we need is the capability to lay down a huge amount of fire on chokepoints. We need conventional weapons of mass destruction. I'm speaking about a whole series of submunitions being developed for such purposes. The principle must be that if you have masses of armor, you should kill that armor by a weapon system which has a mass effect and not an effect only against a single tank."

Command and Control

General Schulze applauds deployment by the Alliance of the E-3A AWACS but questions whether NATO is fully exploiting its potential.

"There is still too much stress on the early warning capability," he says. "I don't want to denigrate that, but AWACS can do much more than provide additional warning time. AWACS could be an excellent means for command control of our air defenses. We need to pass target data in real time to fire units. If we increase our battle management, we can better exploit the available firepower."

For years, critics have pointed to NATO's lack of standardization and to its interoperability shortcomings, particularly in command control and communications.

"I believe that our failure to achieve interoperability in the field of command and control would have much more disastrous results than all of our previous sins against standardization of equipment," General Schulze says. "We have done quite well in the Central Region as to the command and control of our air forces.

"The situation is much worse as far as the land forces are concerned. If we don't solve that problem, I sometimes fear that the land battle in the Central Region could fall apart into the more or less independent battles of eight different corps, or ten if the American reinforcements arrive, or twelve if the French participate."

The Elements of Deterrence

Armed attack on Western Europe remains highly improbable, but is not inconceivable, especially should the Soviets conclude that the Alliance had split, was too weak, or was unwilling to resist by either conventional or nuclear means. More likely is that the Soviet Union will further attempt to exploit fear of its military superiority for political advantage.

"We cannot counter Russia's military power and the element of fear by military means alone," General Schulze says. "We must have a cohesive, overall policy—encompassing military security, economic issues, psychological issues, and political issues.

"Deterrence is not the sum of weapon systems, formations, and military capabilities, It is first and foremost a function of the political cohesion of the Alliance and of our resolve.

"If we are lacking in that, our deterrent capability is degraded without anything having changed within our forces." ■

STRATEGY FOR VICTORY OR DEFEAT?

A leading military analyst says the new concept of overemphasis on attacking the enemy's rear areas is wrong.

BY COL. TREVOR N. DUPUY, USA (RET.)

THE North Atlantic Treaty Organization has been a functioning military alliance for more than thirty-two years. In those three decades NATO has had its share of strategic and doctrinal controversies.

First there was the debate about "filling the gap" between what SHAPE planners thought was an appropriate force level for the defense of Western Europe and the much smaller forces that the NATO countries seemed willing to provide. Then, when it became obvious that the "gap" would *not* be filled, came the question of whether the Warsaw Pact could be deterred if SHAPE adopted the unambiguous strategy of meeting any attack from the East with tactical nuclear weapons. This strategy, of course, became unconvincing when the USSR overcame America's early lead in both tactical nuclear weapons deployed in Europe and strategic nuclear weapons poised to devastate the hostile homeland.

In recent years the debates have focused on the military logic and viability—should a war break out—of the so-called "Forward Defense" strategy in combination with another strategy called "Flexible Response." These debates took place in the context of the fairly self-evident fact that the Warsaw Pact had not only overcome its tactical nuclear inferiority, but had maintained, and was perhaps widening, the same old "gap" in conventional forces.

A relatively recent, widely read fictionalized forecast of such a war, *The Third World War: August 1985,* by General Sir John Hackett and some other eminent military specialists, suggested that NATO probably could win such a war—but only if it had about five years to devote intensive efforts to the adoption of a number of measures to improve the forces and their readiness, and to improve overall political, strategic, and tactical coordination among the governments and forces of the NATO allies. In the two years since the publication of that book it has become evident that the NATO governments are not only still failing to close the "gap," they are not initiating the measures that General Hackett and his colleagues thought essential if NATO were to have a chance to defeat a Warsaw Pact attack on the West.

New Concept Emerges

By now, however, a new strategy has emerged—although some claim it is merely a new emphasis on existing strategy. With considerable fanfare we are told that through modern technology—where the West has a great lead over the USSR and its allies—we can stop a Warsaw Pact offensive at the frontiers and carry the war back into Eastern Europe. We can do this, we are told, by attacking the rear areas of the Warsaw Pact forces with a number of new, remarkable, long-range, highly accurate weapons, thus preventing the Soviets and East Europeans from reinforcing, supplying, or controlling the first wave—or echelon—of attacking forces. As a result, the Warsaw Pact's first echelon will run out of steam, be halted, and then be thrown back before it has had a chance to penetrate the Forward Defense forces holding the frontiers.

Before examining the rear area attack strategy, it will be helpful to set the stage by reviewing quickly some significant background facts, including the essential nature of the component Forward Defense.

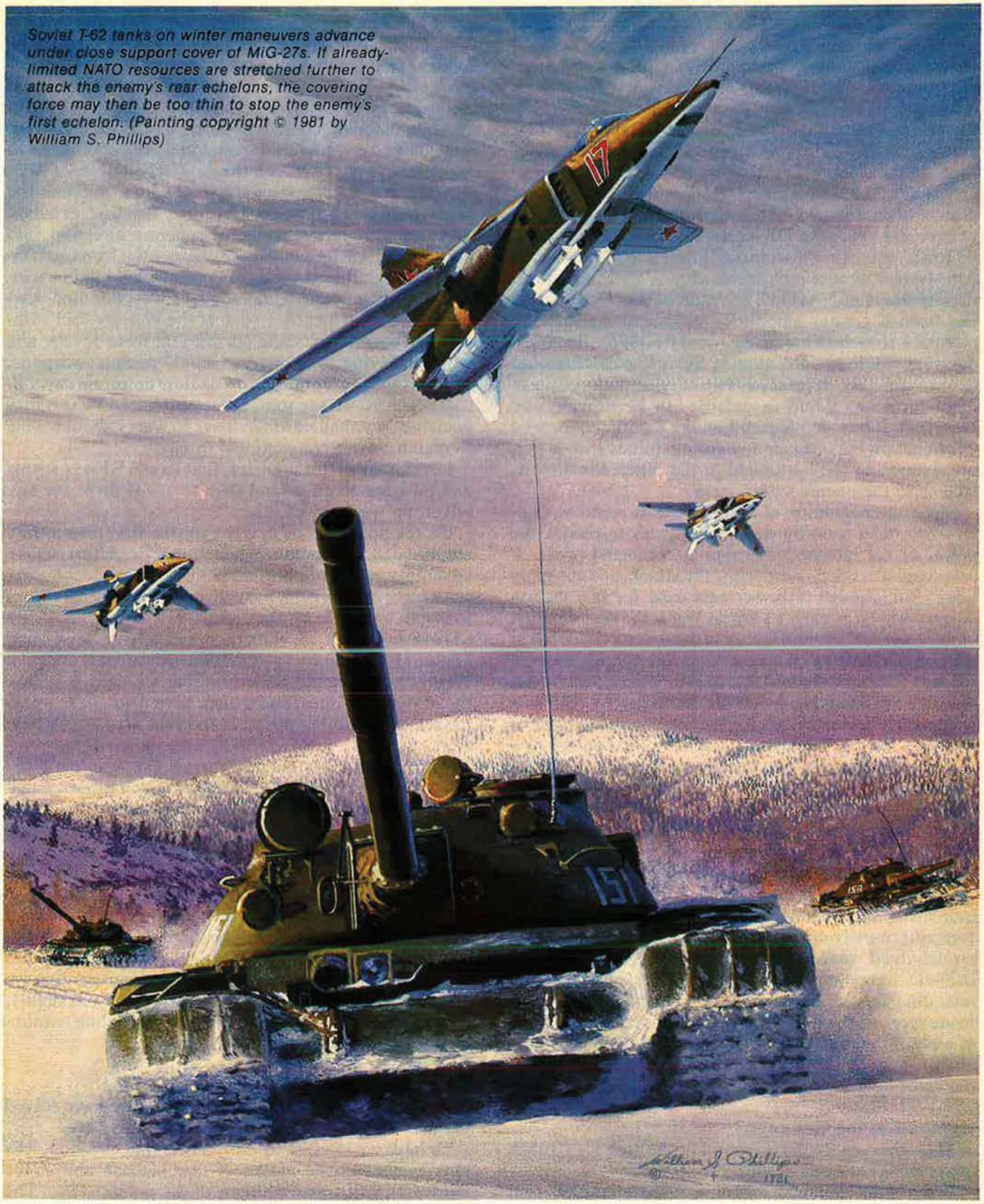
The Forward Defense (sometimes called Forward Strategy) is based on three important arguments, one political, two military.

The political argument is that the West German government cannot subscribe to any strategy that would sacrifice any portion of West Germany in the traditional defensive process of trading space for time, or space for military advantage. This political argument is reinforced by the military argument that the distance between the West German frontiers with East Germany and the Rhine River (or Germany's western borders) is too short to permit the traditional military defensive maneuvers of defense in depth.

The second military argument is that such maneuvers are no longer necessary since armored forces, because of their relative invulnerability to hostile firepower, can carry out an "active defense" by shifting forces rapidly under fire in such a way that reserves in depth are no longer needed. Furthermore, because of the Warsaw Pact's numerical superiority, NATO can't afford the luxury of holding out reserves from the front line. So this second military argument provides some justification for not trying to increase NATO's conventional force strength.

Criticisms of Forward Strategy

These arguments have been attacked by some people, including this writer, as being unrealistic. The Forward Strategy is merely a modern version of what military men call a "linear defense" or "cordon defense." Such a defense has always been vulnerable to any reasonable and determined offensive strategy, which will always be able to punch a hole someplace in any defensive line. This is particularly true if the defensive line has neither fortifications to stiffen the surface of the defense nor reserves to move up to block the inevitable breakthrough. Fortifications would permit economies in the front-line troops, thus permitting the deployment of reserves in the rear.



Soviet T-62 tanks on winter maneuvers advance under close support cover of MiG-27s. If already-limited NATO resources are stretched further to attack the enemy's rear echelons, the covering force may then be too thin to stop the enemy's first echelon. (Painting copyright © 1981 by William S. Phillips)

Critics of Forward Defense assert that the depth of West Germany is adequate for a defense in depth and that politicians—particularly the West Germans—must realize that the issue is not one of holding as much of Germany as possible, but is rather a choice between holding as much as possible with a flexible military strategy or holding it with a brittle strategy that will lose all of West Germany once the cordon defense is broken.

There have been other critics of NATO strategy—a group who call themselves "reformers"—who are less concerned about a fortified surface or the depth of defenses than they are about their perception of a NATO overemphasis on defeating the Warsaw Pact by attrition through firepower rather than by skill, flexibility, and

maneuver. The only problem about the reformers' arguments is that they insist that "maneuver warfare" is cheaper than "attrition warfare," and that if the plodding military planners and leaders would only think imaginatively and flexibly they could defeat the East European hordes easily, and without heavy loss of life. Unfortunately, history has proved that such ideas of "war on the cheap"—even when offered by the reformers' own oracle, the late Sir Basil Liddell Hart—have always been doomed to bloody failure.

In recent years the US Army has been reconsidering its 1970s' doctrine of essentially linear defense (to which it had been almost ineluctably drawn by the political requirements of NATO). The result of this reevaluation has been a greater emphasis on tactical maneuver—offensive as well as defensive—and flexibility. This new doctrine, while not abandoning the active defense concept completely, at least pays lip service to the requirement for some depth in defense (to be provided by reserves). It has also focused on the fact that improved coordination between air and ground forces should permit deepening the battlefield in the other direction as well: into the enemy's rear areas.

Since the beginning of the nineteenth century, artillery has been used by defending forces to reduce the power of the offense by hitting at command posts, at reserves, at artillery supporting the attack, and at supply lines. But, though airpower was used for interdiction purposes even as early as World War I, the coordination of airpower and ground forces in deepening the depth of the combat zone has not kept pace with the advances of modern weapons technology. And the traditional Soviet doctrine of attacking in waves, or echelons, offers a particularly important reason for relating the struggle at the front lines to long-range attacks to hold off the new waves of the Warsaw Pact hordes approaching the front-line struggle.

The Air Force and the Army have just agreed on a new operational concept called "Joint Attack of the Second Echelon." In fact, however, this new concept is not as new as it might seem; it is merely adapting combat-proven concepts of ground and air-ground warfare to the increasing ranges and capabilities of surface-to-surface weapons (mostly missiles, with precision-guidance) and air-delivered weapons (bombs, missiles, and improved ballistic weapons). Most of the earlier critics—again including this author—applaud the new emphasis on maneuver, on flexibility, and on improved coordination of weapons in offensive-defensive tactics, which avoids, and to some extent answers, the unrealistic concepts of the reformers.

Essence of the Concept

This, then, is the background of the rear area attack concept. What is its essence?

From what we read in unclassified literature, that concept has the following characteristics:

- With the possible modification of permitting a bit more depth in reserves, the Forward Defense is basic to the new NATO strategy.
- NATO ground forces, in their forward positions, will be able to halt the Warsaw Pact's first echelon at the border (because the battlefield has been deepened on the enemy side).
- Simultaneously, long-range surface-to-surface missiles (SSMs), in coordination with NATO tactical air forces—both employing new, and improved, and precision-guided conventional munitions—will be used against vulnerable Soviet rear area chokepoints, lines of communications, command posts, and particularly advancing second- and third-echelon forces coming up to support and pass through the first echelon.
- These accurate, long-range attacks will defeat the Warsaw Pact on its own territory; the first echelon, deprived of reinforcements, of coherent direction, and of supplies, will be thrown back across the Iron Curtain.
- Through this strategy of coordinated and imaginative use of modern technology in weapons and warheads, we shall be able to defeat the Warsaw Pact without any need to increase our present force levels, and without having to resort to tactical nuclear weapons. Thus, as long as we maintain a nuclear deterrent capability (which is, we are told, in fact enhanced by this new doctrine), we shall no longer have to worry about having to match Soviet conventional forces.

Let's analyze this concept, first to see what is strong and positive about it, and then to see if there are any offsetting weaknesses.

On the positive side, we see for the first time a truly coordinated international and interservice effort to take advantage of the opportunities that modern technology gives us to integrate, on the battlefield, the combat means available to us.

There are a lot of vulnerabilities in the Soviet and Warsaw Pact military systems and operational concepts. We certainly should do everything we can to exploit those vulnerabilities, and to take advantage of the weaknesses, as is contemplated in the rear area attack concept.

At the outset of a NATO-Warsaw Pact war, the other side will certainly have the initiative, which carries with it some substantial advantages. Anything we can do to slow the momentum of the attacking forces and to interfere with their command systems, their means of control, and their logistic support should be done, and should contribute to our chances of success.

Obviously it is important to limit the effectiveness of their long-range capabilities to do damage to us and to our basic defensive capability.

Any capability that we have, any advantage that we enjoy should be exploited to the utmost of our ability, recognizing that there will always be competing requirements for our resources.

What of the Enemy?

So it seems that by this new concept we have solved the problem of dealing with the Soviet menace!

Or have we? Before we can answer that question, let's look further at the nature of that menace and at the strategy, tactics, and doctrine of the potential foe: The Soviet armed forces and their Warsaw Pact allies.

From time to time we need to remind ourselves that the Soviet armed forces today are the direct descendants of the Red Army of World War II. That Red Army was far less efficient and less technologically developed than the German Army to which it was opposed. Yet it won the war, by a combination of grim determination and concentration of overwhelming strength against the

outnumbered Germans. Nevertheless, its inefficiencies were very evident to the leaders of the Red Army, and they and their successors have devoted much historical study to that war, combined with modern research and analysis for the purpose of overcoming those deficiencies, and keeping abreast of modern military technology.

It is true that in World War II the Soviets had a doctrine of deploying forces in echelon, to which they adhered rather faithfully, although they did modify that doctrine when circumstances demanded different deployments. It is equally true that the Soviets have adapted that two-echelon (and sometimes three-echelon) concept to new weapons and circumstances. But they have done so quite flexibly, and there is reason to believe they will not employ the concept as rigidly as they did in World War II, and may not employ it at all except where fronts are too narrow for them to mass their forces effectively in any other manner. In this case they will, of course, hold out substantial reserves.

Whether the Soviets use echelons or employ reserves, they will do so at all levels, through army group (or front) and theater. The rear area attack concept appears to be related to echelonment at the army group level; in other words, with respect to the reserve or second-echelon armies within the attacking army groups, some fifty to ninety kilometers behind the leading elements of the front-line armies. And obviously the concept is related to subsequent waves or echelons of armies in the second echelon army groups, or theater reserves, 150 kilometers and more behind the front.

The Soviet Army today has probably inherited some of the old rigidity of the Red Army, but it is led by professionals who have studied their profession perhaps more diligently than the average officer in NATO forces. And they are not more stupid, nor less determined, than their fathers who beat the Germans. Let us not forget that these were the people who were defeated by a technologically superior army in 1941, but who nevertheless won at Moscow, Stalingrad, Kursk, and Berlin.

This summary survey of how the Soviet armed forces today have developed from the Red Army of 1945 has a direct bearing on a critical examination of the rear area attack concept.

Shortcomings of Rear Area Attack

Now for the evident shortcomings of that concept.

First and foremost, it is based on several arrogant and extremely dubious assumptions with respect to the Soviet armed forces.

We are assuming that our weapons will be much more advanced than theirs. Despite our vaunted technological lead (which is unquestionable, but not dramatic, as the history of space exploration demonstrates), the Soviets have usually been ahead of us in the military application of modern technology. Maybe they have stolen most of the ideas from us, but they have almost invariably been able to convert the ideas into large numbers of effective weapons in the hands of troops before we have been able to do so. There is no reason to believe this will change in the future. Our weapons will probably usually be marginally better than theirs, but theirs will be in greater numbers, probably simpler, probably highly effective.

We are assuming that they will go to war under circumstances in which we can employ our doctrine and weapons effectively, while they cannot so employ theirs. I am convinced, however, that they will not go to war except in circumstances where they will be able to achieve some sort of surprise, and with deployments and objectives designed to avoid making themselves vulnerable to our doctrines and capabilities.

We are assuming that we will have nearly total air superiority. Otherwise we will not be able to carry out those aspects of the rear echelon attacks to be performed by aircraft—whether reconnaissance, acquisition, or attack—nor will we be in a position to use our SSMs effectively, if indeed a significant portion can survive in a hostile air-superiority environment.

And we are assuming that, if we are able to carry out those long-range attacks essentially as planned, they will have a really decisive effect on the capability of the Warsaw Pact to provide support, supplies, and reinforcements to its first echelon forces engaged along our front. Even if there were some certainty with regard to all of the previous assumptions, this one is even more dubious. All previous versions of attacks into an enemy's rear area—whether by long-range artillery or by some version of long-range penetration—have historically had only limited success. These historical examples should encourage us to believe that we can cause some damage, and add considerably to the enemy's problems, but should also make it clear that the contribution to overall battle success has been, and is likely to be, marginal at best.

Above all, we are assuming that our foes are stupid, and we are smart; that they will be rigid, and we shall be flexible; that we know all about how to take advantage of their doctrine, but that they will be unable to take advantage of ours.

In other words, we are deluding ourselves.

First Things First

Part of that delusion affects our ability to do the damage in the enemy's rear areas that we tell ourselves we can do. We do not yet have the means to acquire and hit targets deep in the enemy rear effectively. And, if by very expensive research and development—to the neglect of other development—we do create the assuredly very costly means to hit these targets, we have no assurance that the enemy will not, in the meantime, develop equally effective means to hamper or interfere with our new long-range gadgetry. And simultaneously devel-

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Col. Trevor N. Dupuy, USA (Ret.), has for the past twenty years been President and Executive Director of the Historical Evaluation and Research Organization (HERO). An artillery officer during World War II, Colonel Dupuy saw combat in the China-Burma-India theater, commanding a US artillery battalion, a Chinese artillery group, and the artillery of a British division. He served later as a member of the original SHAPE staff in Paris, on General Staff duty at the Pentagon, and as Professor of Military Science and Tactics at Harvard University. The most recent of Colonel Dupuy's more than eighty books—most of them on military topics—is Great Battles on the Eastern Front, *a detailed analysis of World War II battles between Soviet and German forces, co-authored with Paul Martell.* (See "Airman's Bookshelf," p. 117, November '82.)

op the means to play equal hob in *our own* rear areas.

In more specific terms, we are assuming that if we devote a substantial proportion of our relatively meager military resources to dealing with the Soviets' second echelon, and with their rear area system of reinforcement, control, and resupply, we don't need to worry about a Soviet breakthrough of our vulnerable cordon defense. Since these targets in the enemy rear are undeniably valuable targets, what does it matter if we are not so effective as we might be? We are still doing some good by inflicting damage on the enemy. The only thing is that by such a conversion of peacetime efforts to developing the means to carry out our new concept, and by employing a substantial proportion of our outnumbered battlefield resources for this purpose, we are diverting resources from the already all-too-thin force capability to hold the line.

Unless our long-range attack capability should be more certain and more effective than we have any right to hope, the Soviets are likely still to be able to muster a powerful first-echelon effort against us, and to sustain and maintain that effort. This means that they are likely to break through our brittle Forward Defense; probably more likely than they are now. And without substantial reserves in depth, one breakthrough will probably mean that we shall have lost the war.

In other words, we are likely to lose the war quickly because we have tried to win it quickly, in defiance of fundamental principles and verities of war throughout history. I am convinced that, to a greater extent than ever before in NATO's thirty-two-year history, this is a strategy for defeat.

Before we can afford the luxury of trying to win the war quickly, we need to put first things first. We need to be sure that we won't lose the war before we can win it. There is no sense in trying to defeat the second echelon on enemy territory if the first echelon can defeat us on ours.

The new concept is self-defeating in at least two other ways.

First, if the Soviets read it in anything like the way I do, and if they respond to it in the way that would seem to make the most military sense and logic, it should increase their confidence in victory. Thus we are destabilizing the situation, and encouraging Soviet adventurism.

But it is destabilizing in another, very serious, fashion, although perhaps no more so than with any other successful NATO defense. If the rear area attack concept should prove to be at all effective, it would put, for the Soviets, a premium on moving to tactical nuclear preemption. They are not going to embark on such a war unless they are determined to win. If their timetable is slowed down by conventional weapons that are much more effective than conventional weapons of the past and that approach nuclear weapons in their lethality (which is one of the arguments in favor of the potential effectiveness of rear area attack), then the line between conventional war and nuclear war has been blurred. This automatically lowers the nuclear threshold, and gives them added incentive to start using tactical nuclear weapons. And if they do, it will be a massive use, which should assure a breakthrough of the brittle Forward Defense strategy.

What, then, should we do about the situation?

Whatever we do, it has to be something that we know is reasonable and acceptable to the NATO countries. Since they have not yet been frightened enough to raise either their force levels or their expenditure levels to any great degree, these realities must be recognized. Here, however, are some things that *can* be done within existing force and budget levels.

The Alternatives

First, it is essential that we abandon the Forward Defense, and adopt a more traditional defense in depth. Only in that way can we have any confidence that we shall not necessarily lose the war at the outset if the Soviets are able to surprise us, or if they make a quick and unexpected breakthrough for other reasons we cannot now foresee. The case must be presented to German political leaders—and to the political leaders of the other NATO countries—that this issue is not a military intellectual exercise in how to defend in a fashion most satisfying to military theorists; it is a practical issue of whether we are likely to be able to hold more of Germany with a flexible defense or with a brittle defense.

Second, something needs to be done to reinforce the defense in depth concept, and to give it the best chance of success by assuring the availability of fortifications along the forward edge of the defensive positions, whether we are surprised or not. This also is a thorny political issue for West German politicians. But one possible way of doing it would be to construct a new autobahn just inside the eastern frontier, and build it in such a way that it will assuredly be convertible to a physical obstacle even if the warning is less than an hour.

Third, we should plan to enhance the effectiveness of the defensive positions with as much long-range attack capability as we can afford without jeopardizing the ability of the defense to deal with the enemy's first echelon. This requires a careful and comprehensive assessment of all conceivable ways in which the war might break out—with emphasis on the situations that could be most dangerous to NATO. In other words, using simulations and war games in which we have reasonable confidence, we should assess what the effect would be if the Soviets were able to launch a surprise attack, or if they were to combine a surprise frontal attack with a deep paratroop or heliborne strike inside our lines, or if they were able to mass unexpectedly strong forces against one sector of the NATO front—or some combination of these. There is reason to believe that even though some such assessments have been made, they have not been done in the comprehensive and systematic manner that is essential for us to know what we could do in one of a number of possible "worst cases."

Finally, with such assessments behind us, we can prepare contingency plans for any of a number of different situations. In this way we can assure the optimum use of any long-range ground and air force resources to disrupt the Warsaw Pact attacks as early as possible by actions of the sort envisaged by advocates of the new concept, all such actions being coordinated with the basic ground defense plan.

There is no reason whatsoever to assume that the Warsaw Pact will inevitably defeat us—unless we hand them the opportunity on a platter. ■

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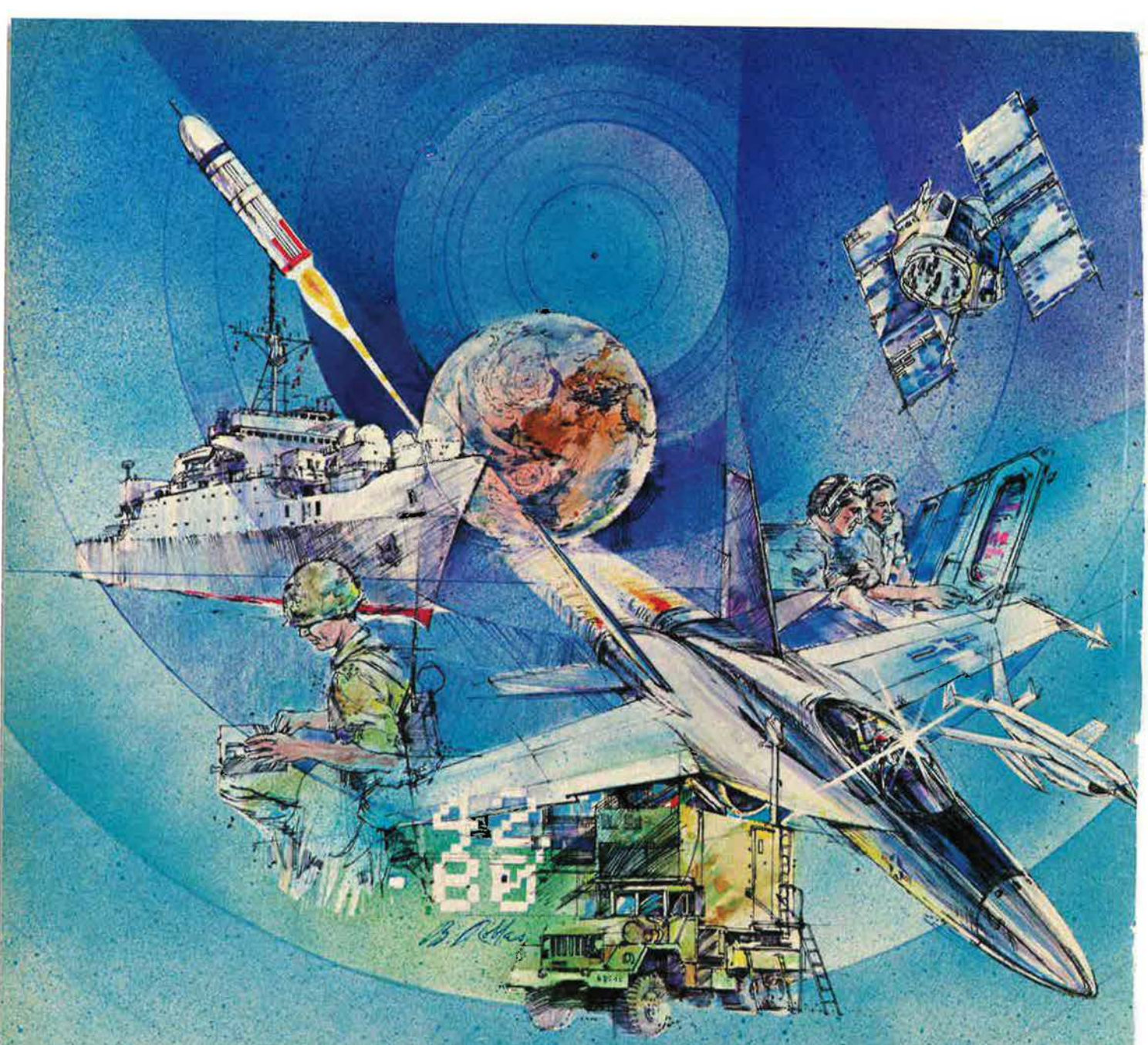

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HUGHES MODEL 77 APACHE

US Army designation: AH-64A

The Model 77 was designed by Hughes to meet the US Army's requirement for an Advanced Attack Helicopter (AAH) capable of undertaking a full day/night/adverse weather anti-armour mission, and of fighting, surviving, and 'living with' troops in a front-line environment. Two flight test prototypes (AV02 and AV03) were built for competitive evaluation against Bell's YAH-63, and these made their initial flights on September 30, 1975, and November 22, 1975, respectively. A ground test vehicle (AV01) was also completed. The Hughes contract covered, in addition, development of the M230 Chain Gun helicopter weapon for installation in the Model 77 prototypes, which had the US Army designation YAH-64. Rockwell's Hellfire missile was chosen to replace the Hughes TOW as the primary anti-tank weapon in February 1976.

Selection of the YAH-64 was announced on December 10, 1976. This was followed by Phase 2, a 56-month full-scale engineering development programme which involved fitting the prototypes with advanced avionics, electro-optical equipment, and weapon fire control systems, for further evaluation; continued development of the airframe; and the manufacture of three more flying prototypes, identified as AV04 to 06. These made their initial flights in October 1979, December 1979, and March 1980. The name Apache was adopted for the AH-64 in late 1981.

In early 1978 the AV02 and 03 prototypes began a series of tests to evaluate planned design modifications known as Mod 1. These included swept tips on the main rotor blades; a Hughes-developed 'Black Hole' infra-red suppressor for each engine exhaust; a redesigned, fixed-incidence T tailplane; and a 76 mm (3 in) increase in tail rotor diameter. A Mod 2 programme, started later in that year, introduced further airframe improvements, as well as all mission equipment including armament, fire control, and nav/com systems. Airframe changes included

An Apache in typical nap-of-the-earth flight, armed with eight Hellfire missiles, 38 rockets, and a 30 mm Chain Gun automatic cannon

cockpit windows of modified shape, with single curvature side panels; and extending aft, to a point below the wing leading-edges, the fuselage side fairings over the forward avionics bays. The AV02 and 03 then completed a programme to confirm the airworthiness of the Mod 2 airframe changes and initial tests of the weapon system, including the Hellfire missile, 2.75 in rocket, 30 mm Chain Gun automatic cannon, and the fire control system. Details of these trials were given in the 1981–82 and earlier editions of *Jane's*. All flying YAH-64s were eventually converted to Mod 2 configuration. Further airframe changes were introduced by AV04 (replacing the fixed T tail by a low-set all-moving tailplane and 76 cm; 30 in taller fin) and AV06 (smaller-area tailplane and 25 cm; 10 in increase in tail rotor diameter).

Teledyne Ryan is responsible for building the AH-64 fuselage, wings, engine nacelles, avionics bays, canopy, and tail unit. A key subsystem is the target acquisition and designation sight/pilot's night vision sensor (TADS/PNVS), for which Martin Marietta and Northrop developed competitive equipment. An initial production contract for 13 TADS/PNVS systems was awarded to Martin Marietta on April 30, 1982, after lengthy fly-off testing in AV02, against the competing system in AV03. Prototype AV06 will serve as flying testbed for the production TADS/PNVS, the first of which is due to be delivered in July 1983.

In July 1981 Hughes selected Mesa, Arizona, as the site for the company's new AH-64A production and flight test facility. This comprises a 22,575 m² (243,000 sq ft) main assembly building and a 2,135 m² (23,000 sq ft) central services building at Falcon Field, both opened two months ahead of schedule on December 16, 1982; and (for completion in July 1983) a further 24,710 m² (266,000 sq ft) complex of hangars, paint shops, and warehouses. The Mesa workforce (approx 400 in 1982) is due to increase to about 1,100 by the end of 1983, and to 1,800 by the time peak production is reached in mid-1985.

In September 1980 prototype AV04 was flown at a speed of almost 206 knots (382 km/h; 237 mph) during the flight envelope expansion testing, and during that year also demonstrated manoeuvring capability of more than 3*g* at speeds from 80 to 164 knots (148 to 304 km/h; 92 to 189 mph). It was lost in a mid-air collision later that year. Armament and fire control survey (AFCS) Part 3 was initiated by AV06, and joined later by AV02. This extended the test firings of 30 mm Chain Gun ammunition, 2.75 in air-to-ground rockets, and Hellfire missiles, as in AFCS Part 2, but covered all regimes and night operations, requiring use of the PNVS. During AFCS Part 2, AV02 established a record for the longest-range hit on a tank, scored by a Hellfire missile.

By early June 1981, YAH-64 prototypes had fired more than 50 Hellfire missiles, nearly three thousand 2.75 in rockets, and more than 25,000 rounds of 30 mm ammunition. Three YAH-64s then began a three-month Army exercise called OT-II (Operational Test II), in which all major weapons and systems, including the Martin Marietta TADS/PNVS and the Honeywell IHADSS (integrated helmet and display sighting system), were field tested under operational conditions. The OT-II test area closely resembles the kind of terrain to be found in Western Europe, with low, tree-covered hills and gently rolling countryside. During these tests the 3,000th flight hour of the Apache was recorded, in August 1981.

Ferry range of the Apache permits deployment from the USA to Europe via a northern Atlantic route, with stops at Goose Bay, Frobisher Bay, Sondrestrom, Reykjavik, and Prestwick. If the required deployment is farther than ferry range the Apache can be carried in C-130 Hercules, C-141B StarLifter, and C-5A Galaxy transports (one, two, and six Apaches respectively). In November 1981 two Apache prototypes, their removed components, and associated support equipment were loaded on board a C-141B to demonstrate this capability.

In December 1981 prototype AV05 began a 100-hour company test programme fitted with 1,265 kW (1,696 shp) T700-GE-701 engines, to evaluate expected improvement in 'hot and high' performance compared with the 1,145 kW (1,536 shp) T700-GE-700 engines which powered the prototypes initially. By May 1982, when this testing was completed, the Apache prototypes had logged more than 6,300 operating hours. AV05 is currently continuing in use as a testbed for composite main rotor blades.

Hughes Helicopters announced in March 1981 the receipt of a $25.1 million initial contract for the procurement of long-lead items, and in August the 56-month AAH development contract period came to an end. On December 29, 1981, President Reagan gave approval to the FY 1982 Defense Bill which included $537.5 million for the first year's procurement of the AH-64A. However, the anticipated end-of-year decision to authorise full production was postponed, while revised costings were prepared and analysed, and it was not until March 26, 1982, that the Defense Systems Acquisition Review Council gave approval for the production programme to be initiated. This resulted, on April 15, 1982, in a Lot I production contract for 11 Apaches, the first of which is due for completion in the Autumn of 1983 and delivery in February 1984. Planned procurement for FY 1983 is 48 aircraft, to be followed by 112 in FY 1984. The US Army's original requirement was for 472 AH-64As; this was subsequently raised to 536, then cut to 446, and increased again (in late 1982) to 515, at an estimated unit cost of $15.1 million.

Current plans call for initial operational capability with 1/6 Cav, 6th Air Cavalry Combat Brigade, at Fort Hood, Texas, in FY 1985, by which time Apache production should have reached a peak rate of 12 per month. Deliveries are scheduled to continue until 1989. Starting in mid-1983, prototype AV03 will be employed in training Hughes Helicopters Apache test pilots and US Army acceptance pilots and instructors.

Two other services which have evaluated the Apache are the US Marine Corps and the West German Army, the former in September 1981 and the latter in June/July 1982. Main differences in any USMC version would include the addition of wingtip Sidewinder missiles for air-to-air defence, modifications necessary to provide shipboard capability, and an increase in max take-off weight to 9,117 kg (20,100 lb). In Germany, the Apache is one of several contenders being examined to fulfil the Army's PAH-2 attack helicopter requirement.

The following description applies to the standard production AH-64A for the US Army:

TYPE: Twin-engined attack helicopter.

ROTOR SYSTEM: Four-blade fully articulated main rotor and four-blade tail rotor; all blades manufactured by Tool Research and Engineering Corp (Advanced Structures Division). Main rotor blades are of high-camber aerofoil section and broad chord, with sweptback tips, and can be folded or removed for air transportation. Each blade has five stainless steel spars lined with structural glassfibre tubes, a laminated stainless steel skin, and a composite aft section, bonded together. Blades are attached to hub by a laminated strap retention system similar to that of the OH-6A, and are fitted with elastomeric lead/lag dampers and offset flapping hinges. Tail rotor comprises two pairs of blades, mounted on port side of pylon/fin support structure at optimum quiet setting of approx 55°/125° to each other. Main and tail rotor blades de-iced by Sierracin Corp heater blankets. Main rotor driveshaft rotates within a fixed, hollow outer shaft, permitting removal of main transmission without dismantling main rotor. This results in improved drive system reliability, as flight loads are transmitted to airframe via static mast instead of through main transmission. Entire system is capable of flight in negative *g* conditions.

ROTOR DRIVE: Litton (Precision Gear Division) main transmission and engine nose gearboxes; transmission to tail rotor via Aircraft Gear Corp grease-lubricated intermediate and tail rotor gearboxes, with Bendix driveshafts and couplings. AiResearch cooling fan for tail rotor gearbox. Main transmission designed to operate for 30 min after loss of oil; gearboxes can tolerate

ballistic damage and continue to operate for up to one hour without failure. Redundant flight control system for both rotors. Selected dynamic components constructed of 70/49 aluminium and electro-slag remelt (ESR) steel; critical parts of transmission (*e.g.*, bearings) have ESR collars for protection against hits by 12.7 mm ammunition. Rotor/engine rpm ratios approx 1:72.4 for main rotor, approx 1:14.9 for tail rotor.

WINGS: Cantilever mid-mounted wings of low aspect ratio, built by Teledyne Ryan Aeronautical and located aft of cockpit. Wings are removable, and attach to sides of fuselage for transportation and storage. Two hardpoints beneath each wing for the carriage of mixed ordnance or ferry tanks.

FUSELAGE: Conventional semi-monocoque structure of aluminium alloy longerons, frames, and skins, built by Teledyne Ryan Aeronautical. Use of fracture-tough materials, redundant load paths, and structural members sized to survive hits by 12.7 mm and 23 mm ammunition, is designed to minimise effects of battle damage and individual structural component failures.

TAIL UNIT: Bolted pylon structure, built by Teledyne Ryan Aeronautical, with tail rotor mounted on port side. Low-mounted all-moving tailplane, with Simmonds actuators and Hamilton Standard control electronics.

LANDING GEAR: Menasco trailing-arm type, with single mainwheels and fully castoring, self-centering and lockable tailwheel. Mainwheel tyres size 8.50-10; tailwheel tyre size 5.00-4. Hydraulic brakes on main units. Main gear is non-retractable, but legs fold rearward to reduce overall height for storage and transportation. Energy-absorbing main gear is designed for normal descent rates of up to 3.05 m (10 ft)/s and to enhance crew survivability in heavy landings at up to 12.8 m (42 ft)/s. Take-offs and landings can be made at structural design gross weight on terrain slopes of up to 12° (head-on) and 15° (side-on).

POWER PLANT: Two 1,265 kW (1,696 shp) General Electric T700-GE-701 turboshaft engines, derated for normal operations to provide reserve power for combat emergencies. Engines mounted one on each side of fuselage, above wings, with key components armour-protected. Upper cowlings let down to serve as maintenance platforms. Two crash-resistant fuel cells in fuselage, combined capacity 1,419 litres (375 US gallons; 312 Imp gallons).

ACCOMMODATION: Crew of two in tandem: co-pilot/gunner in front, pilot behind on 48 cm (19 in) elevated seat. Crew seats, by Simula Inc, are of lightweight Kevlar. Teledyne Ryan canopy, with Sierracin Corp transparencies and transparent acrylic blast barrier between cockpits, is designed to provide optimum field of view. Crew stations are protected by Norton (Ceramic Division) lightweight boron armour shields in cockpit floor and sides, and between cockpits, offering protection against 23 mm high explosive and armour piercing rounds. Sierracin electrical heating of windscreen. Seats and structure designed to give crew a 95% chance of surviving ground impacts of up to 12.8 m (42 ft)/s.

SYSTEMS: Garrett totally integrated pneumatic system includes a shaft-driven compressor, air turbine starters, pneumatic valves, temperature control unit, and environmental control unit. Parker Bertea hydraulic system, with actuators ballistically tolerant to 12.7 mm direct hits. In the event of hydraulic system failure, the system adjusts to Sperry Flight Systems secondary fly-by-wire control. Bendix electrical power system, with two 35kVA fully redundant engine-driven AC generators, a 300A transformer-rectifier, and URDC standby DC battery. Garrett GTP 36–55(H) 93 kW (125 shp) APU for engine starting and maintenance checking.

AVIONICS AND EQUIPMENT: Main avionics bays are adjacent to co-pilot/gunner's position, in large fairings on sides of fuselage. Tempest Enhanced C-10414 secure UHF, VHF, AM, and FM com. Singer-Kearfott lightweight Doppler navigation system, with Litton LR-80 (AN/ASN-143) strapdown attitude and heading reference system (AHRS). Doppler system, with AHRS, permits nap-of-the-earth navigation and provides for storing target locations; it includes an ADF, VHF-FM homing, and an IFF transponder with secure encoding. Sperry Flight Systems digital automatic stabilisation equipment (DASE). Aircraft survivability equipment (ASE) consists of an Aerospace Avionics passive radar warning receiver, an infra-red jammer, Sanders chaff/flare dispensers, a radar jammer, and a laser detector. Other avionics include Astronautics Corp HSI, video display unit, and remote magnetic indicator; Bendix video display unit; and Pacer Systems omnidirectional air data system. A Sperry Flight Systems all-raster symbology generator processes TV data from IR and other sensors, superimposes symbology, and distributes the combination to CRT and helmet-mounted displays in the aircraft. Hughes Helicopters 'Black Hole' IR suppression system protects aircraft from heat-seeking missiles; this eliminates an engine bay cooling fan, by operating from engine exhaust gas through ejector nozzles to lower the gas plume and metal temperatures. BITE fault detection/location system.

ARMAMENT AND OPERATIONAL EQUIPMENT: Flexible armament consists of a Hughes Helicopters M230A1 30 mm Chain Gun automatic cannon, mounted between the mainwheel legs in an underfuselage turret with Lear Siegler electronic controls. Normal rate of fire is 625 rds/min of Honeywell TP (target practice), HE or HEDP (high explosive dual purpose) ammunition, which is interoperable with NATO Aden/DEFA 30 mm guns. Max ammunition load is 1,200 rds. Turret is designed to collapse into fuselage between pilots in the event of a crash landing. Four underwing hardpoints, with Aircraft Hydro-Forming pylons and ejector units, on which can be carried up to sixteen Rockwell Hellfire anti-tank missiles; or up to seventy-six 2.75 in FFAR (folding-fin aerial rockets) in their launchers; or a combination of Hellfires and FFAR. Bendix aerial rocket control system. Co-pilot/gunner has primary responsibility for firing gun and missiles, but pilot can override his controls to fire gun or launch missiles. Martin Marietta AAQ-11 target acquisition and designation sight and pilot's night vision sensor (TADS/PNVS) in nose-mounted turret. TADS, used primarily for target search, detection, and laser designation, consists of a day sensor and night sensor. Day sensor includes direct view optics; daylight TV with narrow and wide angle fields of view; laser spot tracker; International Laser Systems laser rangefinder/designator. Night sensor includes a forward-looking infrared (FLIR) sensor with three fields of view. Co-pilot/gunner is primary TADS operator, and can use system with either a head-down or head-up display. TADS also provides backup night vision to pilot. PNVS, in upper portion of nose turret, provides pilot with daytime adverse weather and night flying capabilities. Imagery is displayed on a single monocle positioned in front of one of pilot's eyes; flight information is superimposed on the imagery to simplify piloting task. Monocle is part of the Honeywell Avionics integrated helmet and display sighting system (IHADSS) worn by crew members to enhance speed and flexibility of target acquisition. Forward bays include avionics for missiles, and Teledyne Systems integrated fire control computer.

DIMENSIONS, EXTERNAL:

Main rotor diameter	14.63 m (48 ft 0 in)
Main rotor blade chord	0.53 m (1 ft 9 in)
Tail rotor diameter	2.79 m (9 ft 2 in)
Length overall:	
tail rotor turning	14.68 m (48 ft 2 in)
both rotors turning	17.76 m (58 ft 3⅛ in)
Wing span	5.23 m (17 ft 2 in)
Height:	
over tail fin	3.52 m (11 ft 6½ in)
over tail rotor	4.26 m (13 ft 11⅜ in)
to top of rotor head	3.84 m (12 ft 7 in)
overall (top of air data sensor)	5.12 m (16 ft 9½ in)
Distance between c/l of inboard pylons	3.20 m (10 ft 6 in)
Tailplane span	3.56 m (11 ft 8 in)
Wheel track	2.03 m (6 ft 8 in)
Wheelbase	10.59 m (34 ft 9 in)

AREAS:

Main rotor disc	168.11 m² (1,809.5 sq ft)
Tail rotor disc	6.13 m² (66.0 sq ft)

WEIGHTS:

Weight empty	4,996 kg (11,015 lb)
Primary mission gross weight	6,665 kg (14,694 lb)
Structural design gross weight	6,650 kg (14,660 lb)
Max T-O weight	8,006 kg (17,650 lb)

GENERAL PERFORMANCE (at 6,665 kg; 14,694 lb AUW, ISA, except where indicated):

Never-exceed speed
197 knots (365 km/h; 227 mph)

Low-flicker main and tail rotors, low-glint canopy, composite structural materials, IR suppression, and special paint to reduce the Apache's IR signature, cut detectability in nap-of-the-earth flight

Max level speed
162 knots (300 km/h; 186 mph)
Max cruising speed
158 knots (293 km/h; 182 mph)
Max vertical rate of climb at S/L
762 m (2,500 ft)/min
Max vertical rate of climb at 1,220 m (4,000 ft) at 35° C 253 m (830 ft)/min
Service ceiling 6,100 m (20,000 ft)
Service ceiling, one engine out
3,080 m (10,100 ft)
Hovering ceiling IGE 4,085 m (13,400 ft)
Hovering ceiling OGE 3,110 m (10,200 ft)
Max range, internal fuel
372 nm (689 km; 428 miles)
Ferry range, max internal and external fuel, still air 1,089 nm (2,018 km; 1,254 miles)
Endurance at 1,220 m (4,000 ft) at 35°C
1 h 50 min
Max endurance, internal fuel 3 h 34 min
g limits at low altitude and airspeeds up to 164 knots (304 km/h; 189 mph) +3.5/−0.5

TYPICAL MISSION PERFORMANCE (A: anti-armour at 1,220 m/4,000 ft and 35°C, 8 Hellfire and 320 rds of 30 mm ammunition; B: as A, but with 1,200 rds; C: as A, but with 12 Hellfire and 540 rds; D: anti-armour at 610 m/2,000 ft and 21°C, 16 Hellfire and 1,200 rds; E: air cover at 4,000 ft/35°C, 8 Hellfire and 1,200 rds; F: air cover at 2,000 ft/21°C with 8 Hellfire, 38 rockets and 1,200 rds; G: escort at 4,000 ft/35°C with 38 rockets and 1,200 rds; H: escort at 2,000 ft/21°C with 76 rockets and 1,200 rds):

Cruising speed at max continuous power:
A, B, F 145 knots (269 km/h; 167 mph)
C 142 knots (263 km/h; 164 mph)
D 141 knots (261 km/h; 162 mph)
E 143 knots (265 km/h; 165 mph)
G, H 147 knots (272 km/h; 169 mph)
Max vertical rate of climb at intermediate rated power:
A 366 m (1,200 ft)/min
B, C 137 m (450 ft)/min
D 230 m (755 ft)/min
E 213 m (700 ft)/min
F 198 m (650 ft)/min
G 174 m (570 ft)/min
H 167 m (550 ft)/min
Mission endurance:
A, C, E, G 1 h 50 min
B 2 h 6 min
D, F, H 2 h 30 min

SHIN MEIWA

SHIN MEIWA INDUSTRY CO LTD: Head Office: 1-5-25 Kosone-Cho, Nishinomiya-Shi, Hyogo-Ken, Japan

SHIN MEIWA SS-2A

JMSDF designations: US-1 and US-1A

The Japan Maritime Self-Defence Force has now taken delivery of all eight US-1 air/sea rescue amphibians currently on order. As indicated in the 1982–83 *Jane's*, the last two aircraft have more powerful 2,602 kW (3,490 ehp) Ishikawajima-built General Electric T64-IHI-10J turboprop engines, instead of the four 2,282 kW (3,060 ehp) T64-IHI-10s of the other six aircraft. They also have a 1,014 kW (1,360 shp) T58-IHI-10-M2 gas turbine to power the boundary layer control system, instead of a 932 kW (1,250 shp) T58-IHI-10-M1. Fuel capacity remains unchanged at 22,500 litres (5,944 US gallons; 4,950 Imp gallons). In this form the aircraft has the JMSDF designation **US-1A**.

The US-1/1As are in service with No. 71 search and rescue squadron of the JMSDF, based in Iwakuni and Atsugi. It is planned to retrofit the first six aircraft with the higher-rated engines in due course.

Comparative data for the US-1 and US-1A are as follows:

WEIGHTS AND LOADINGS (both):
Manufacturer's weight empty
23,300 kg (51,367 lb)
Weight empty, equipped
25,500 kg (56,218 lb)

Shin Meiwa US-1 air/sea rescue amphibian (four Ishikawajima/General Electric T-64-IHI-10 turboprop engines)

Usable fuel:
JP-4 17,518 kg (38,620 lb)
JP-5 18,397 kg (40,560 lb)
Max oversea operating weight
36,000 kg (79,365 lb)
Max T-O weight:
from water 43,000 kg (94,800 lb)
from land 45,000 kg (99,200 lb)
Max wing loading 331.4 kg/m² (67.9 lb/sq ft)
Max power loading:
US-1 4.93 kg/kW (8.11 lb/ehp)
US-1A 4.32 kg/kW (7.10 lb/ehp)

PERFORMANCE (search and rescue, at max T-O weight from land except where indicated):
Max level speed:
US-1 260 knots (481 km/h; 299 mph)
US-1A 276 knots (511 km/h; 318 mph)
Max level speed at 3,050 m (10,000 ft), AUW of 36,000 kg (79,365 lb):
US-1 268 knots (496 km/h; 308 mph)
US-1A 282 knots (522 km/h; 325 mph)
Max rate of climb at S/L:
US-1 460 m (1,510 ft)/min
US-1A 488 m (1,600 ft)/min
Max rate of climb at S/L, AUW of 36,000 kg (79,365 lb):
US-1 725 m (2,380 ft)/min
US-1A 713 m (2,340 ft)/min
Service ceiling:
US-1 6,520 m (21,400 ft)
US-1A 7,195 m (23,600 ft)
Service ceiling, AUW of 36,000 kg (79,365 lb):
US-1 8,230 m (27,000 ft)
US-1A 8,655 m (28,400 ft)
T-O to 15 m (50 ft) from land, 30° flap, BLC on:
US-1 620 m (2,035 ft)
US-1A 655 m (2,150 ft)
T-O to 15 m (50 ft) from water, AUW of 43,000 kg (94,800 lb), 40° flap, BLC on:
US-1 600 m (1,970 ft)
US-1A 555 m (1,820 ft)
Landing from 15 m (50 ft) on land, AUW of 36,000 kg (79,365 lb), 50° flap, BLC on, with reverse pitch:
US-1, US-1A 810 m (2,655 ft)
Landing from 15 m (50 ft) on water, AUW of 43,000 kg (94,800 lb), 60° flap, BLC on:
US-1, US-1A 290 m (950 ft)
Min ground turning radius (both versions):
self-powered 21.20 m (69 ft 6¾ in)
towed 18.80 m (61 ft 8¼ in)
Runway LCN requirement at AUW of 43,000 kg (94,800 lb):
US-1, US-1A 42
Max range at 230 knots (426 km/h; 265 mph) at 3,050 m (10,000 ft):
US-1 2,270 nm (4,207 km; 2,614 miles)
US-1A 2,060 nm (3,817 km; 2,372 miles)

RTAF

ROYAL THAI AIR FORCE: Aeronautical Research and Development Office, Directorate of Aeronautical Engineering (DAE), Bangkok 10300, Thailand

PRESIDENT OF AIRCRAFT DESIGN GROUP: Air Chief Marshal Arun Promthep; DIRECTOR: Air Marshal Vijit Chuangchote

Nothing is known about the RTAF-1, the first design for which engineers of the Royal Thai Air Force were responsible after the end of the second World War. The RTAF-2 is a utility aircraft, now in the RTAF Museum at Don Muang, near Bangkok. The RTAF-3 is another project of which nothing is known, except that a model underwent wind tunnel testing in Japan.

The Aeronautical Research and Development Office was set up at Bangsue Air Base in 1975, and has been responsible for all subsequent design activity.

RTAF-4 CHANDRA (MOON)

The RTAF-4 is an updated DHC-1 Chipmunk tandem two-seat training aircraft. The original 108 kW (145 hp) Gipsy Major inline piston engine is replaced by a 134 kW (180 hp) Avco Lycoming IO-360 flat-four, necessitating enlarged vertical tail surfaces. As can be seen in an accompanying illustration, these are more square-cut, with an added dorsal fin. One prototype and 14 'production' RTAF-4 conversions were delivered, and are still in use for both military and civil pilot training.

RTAF-5

Most ambitious product of the DAE to date, the RTAF-5 is a turboprop trainer and FAC aircraft of which a prototype was expected to fly for the first time in February of this year.

TYPE: Two-seat advanced trainer and forward air control aircraft.

WINGS: Cantilever mid-wing monoplane, with constant-chord centre-section and slightly tapered outer panels, with provision for small wingtip fuel tanks. Wing section NACA 63_2A415 at root, NACA 63_1A412 at tip. Dihedral 3° on outer panels only. Conventional aluminium alloy two-spar structure. Manually operated ailerons. Elec-

RTAF-4 Chandra, an updated Chipmunk training aircraft, at Don Muang *(Denis Hughes)*

trically operated slotted trailing-edge flaps, in two sections on each wing separated by tail-booms, with 40° lift-dump position.

FUSELAGE: Pod type, suspended from wing, of conventional aluminium alloy semi-monocoque construction with glassfibre nosecone. Forward section contains equipment bay and crew accommodation, under large glazed canopy. Rear section houses wing carry-through structure and power plant.

TAIL UNIT: Cantilever all-metal structure carried on twin booms of semi-monocoque construction. Horizontal surfaces mounted between tips of sweptback vertical surfaces. Manually operated rudders and elevator. Adjustable trim tabs in elevator. Tail bumper below boom under each fin.

LANDING GEAR: Electrically retractable tricycle type, with single wheel on each unit. All wheels retract forward, mainwheels into housings at front of tailbooms. Oleo-pneumatic shock absorber in nose unit. Mainwheel legs have rubber-in-compression shock absorbers. Steerable nosewheel with tyre size 5.00-5. Mainwheel tyres size 7.00-6. Hydraulic disc brakes on mainwheels.

POWER PLANT: One 313 kW (420 shp) Allison 250-C20B turboprop engine, driving a three-blade pusher-type Hartzell propeller with spinner. Integral fuel tankage in wing centre-section, capacity 284 litres (75 US gallons). Provision for wingtip tanks, total capacity 95 litres (25 US gallons). Refuelling point above each tank.

ACCOMMODATION: Pupil and instructor in tandem under large framed canopy. Instructor (at rear) is raised 7.5 cm (3 in) above level of pupil. Two upward-opening transparent door panels on each side. Dual controls standard.

AVIONICS AND EQUIPMENT: VHF nav/com, UHF, transponder, ADF, intercom, rotating beacon, navigation and position lights, instrument and warning lights are all standard. Gunsight can be installed above front instrument panel.

ARMAMENT: Four weapon attachment points under wings, with capacity of 68 kg (150 lb) on each inner hardpoint and 45 kg (100 lb) on each outer hardpoint.

DIMENSIONS, EXTERNAL:

Wing span	9.55 m (31 ft 4 in)
Length overall	9.53 m (31 ft 3 in)
Height overall	3.05 m (10 ft 0 in)
Tailplane span	3.23 m (10 ft 7 in)
Wheel track	3.20 m (10 ft 6 in)

AREAS:

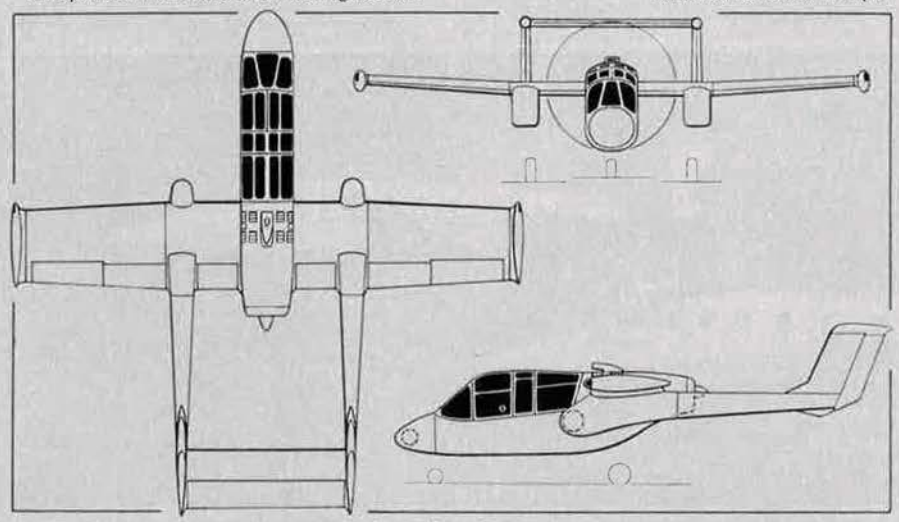
Wings, gross	15.14 m² (163 sq ft)
Ailerons (total)	2.97 m² (31.97 sq ft)
Trailing-edge flaps (total)	3.88 m² (41.75 sq ft)
Fins (total)	2.42 m² (26.03 sq ft)
Rudders (total)	0.63 m² (6.73 sq ft)
Tailplane	2.84 m² (30.6 sq ft)
Elevator	2.21 m² (23.79 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	1,645 kg (3,628 lb)
Normal T-O weight	1,847 kg (4,072 lb)
Max T-O weight	1,978 kg (4,362 lb)
Overload T-O weight	2,124 kg (4,683 lb)
Max landing weight	1,755 kg (3,869 lb)
Max wing loading (max T-O wt)	130.6 kg/m² (26.76 lb/sq ft)
Max power loading (max T-O wt)	6.32 kg/kW (10.38 lb/shp)

PERFORMANCE (estimated, at normal T-O weight):

Max level speed at S/L	182 knots (338 km/h; 210 mph)
Max cruising speed at 1,525 m (5,000 ft)	156 knots (290 km/h; 180 mph)
Stalling speed, flaps down	56 knots (105 km/h; 65 mph)
Max rate of climb at S/L	457 m (1,500 ft)/min
T-O to 15 m (50 ft)	290 m (953 ft)
Landing from 15 m (50 ft)	381 m (1,250 ft)



The Royal Thai Air Force's new RTAF-5 advanced trainer and forward air control aircraft *(Pilot Press)*

LEAR FAN

LEAR FAN LIMITED: Parent Company: Fan Holdings Inc, registered in the State of Delaware. Works: PO Box 60000, Stead Airport, Reno, Nevada 89506, USA

LEAR FAN MODEL 2100

The last aeroplane designed by Mr William P. Lear Sr, before his death on May 14, 1978, was a small twin-turbine business aircraft of advanced design, known originally as the Futura. Since that time it has undergone considerable modification and is known now as the Lear Fan 2100.

Of extremely clean appearance, the Model 2100 is built almost entirely of graphite/epoxy and Kevlar composite materials. Design began in June 1977, and construction of the first prototype (N626BL) started in November 1978. This flew for the first time on January 1, 1981; a production-configuration prototype (c/n E-003, N327ML) joined the flight test programme on June 19, 1982, and two static and fatigue test examples are being built at Reno. Certification to FAR Part 23 and BCAR Section K is scheduled for Summer 1983. Orders for 276 Lear Fan 2100s had been received by January 1, 1983.

The second flying prototype differs from the first in having a 0.305 m (1 ft) longer cabin, the passenger door farther forward, a modified engine installation, and an improved oil cooling system.

Engineering, research, and development of the Lear Fan 2100 is the responsibility of Lear Fan Ltd (USA); production aircraft will be manufactured in Northern Ireland, by Lear Fan Ltd, and transported or flown to Reno, Nevada, for finishing.

TYPE: Twin-turbine business aircraft.

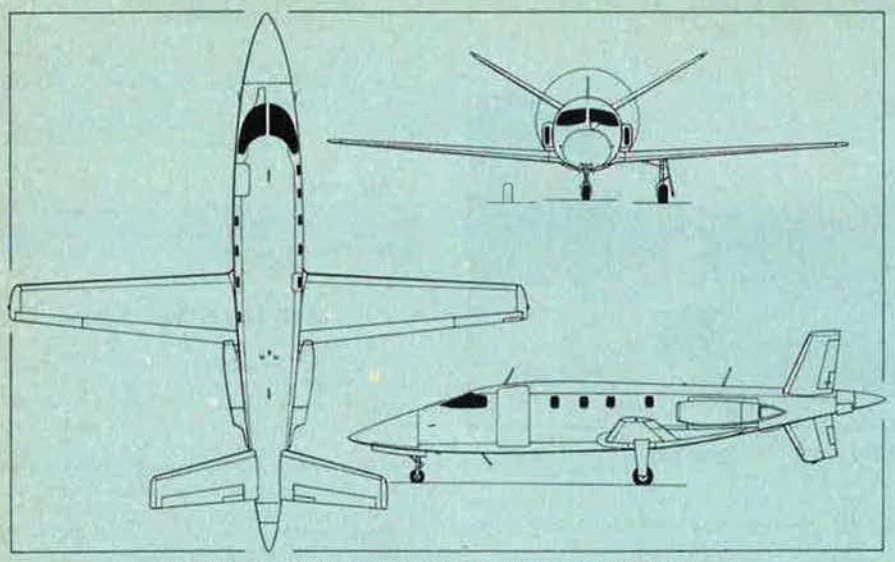
WINGS: Cantilever low-wing monoplane. Thickness/chord ratio 13.5%. Dihedral 4°. Incidence 1° 30'. No sweepback. Three-spar bonded stressed-skin fail-safe structure of advanced graphite/epoxy composite materials. Each spar is made up of two channels, back to back, separated by a layer of honeycomb. Skins and spars each made in one piece, tip to tip. Hydraulically actuated plain trailing-edge flaps, and manually operated ailerons, of Kevlar composites. Trailing-edge flaps have a 5° up setting for optimum high-speed cruising performance. Manually and electrically actuated trim tab in starboard aileron. Pneumatic de-icing boots on leading-edges.

FUSELAGE: Semi-monocoque fail-safe pressurised structure of graphite/epoxy composites, comprising frames and longerons bonded to the outer skin. Fuselage sections are made of nine shells, basically of four plies, increased to six to ten plies at cutouts for windows, etc.

TAIL UNIT: Cantilever Y-shaped structure of graphite epoxy/composites, comprising single-spar V tail and two-spar underfin, the latter stressed to withstand ground impact. Manually operated elevators, each with trim tab, in V tail; rudder with trim tab on underfin. Pneumatic de-icing boots on V tail and fin leading-edges.

LANDING GEAR: Hydraulically retractable tricycle type with single wheel on each unit; main units retract inward, nosewheel forward. Emergency extension by free-fall, with pneumatic bottle backup. Nosewheel steering from rudder pedals. Oleo-pneumatic shock absorbers. Mainwheels have Goodrich tubeless tyres size 7.80-8, 8-ply rating, pressure 4.76 bars (69 lb/sq in). Nosewheel has Goodrich tyre size 6.00-6, 4-ply rating, pressure 2.21 bars (32 lb/sq in). Goodrich hydraulically actuated brakes, with pneumatic system backup. Anti-skid system optional.

POWER PLANT: Two 634 kW (850 shp) Pratt & Whitney Aircraft of Canada PT6B-35F turboshaft engines, each flat rated to 485 kW (650 shp), mounted in rear of fuselage. These drive, via two independent driveshafts and a combining/reduction transmission (ratio 3.2:1) with separate



Lear Fan Model 2100 twin-turbine business aircraft *(Pilot Press)*

clutches, a Hartzell four-blade constant-speed slow-turning pusher propeller constructed of Kevlar composite, with stainless steel leading-edges. The blades of this propeller are of so-called 'scimitar' shape, offering reduced noise and high efficiency. The two independent driveshafts serve to cushion torsional load changes, and the transmission has sprag clutches which disengage the relative driveshaft automatically in the event of an engine failure. Fuel in integral wing tanks with a usable capacity of 908 litres (240 US gallons). Refuelling points on wing upper surface, near each wingtip. Oil capacity 8.7 litres (2.3 US gallons). No propeller de-icing system required, as efflux from the two turboshaft engines prevents ice formation on the blades.

ACCOMMODATION: One pilot and seven to nine passengers in a number of optional layouts, with a galley and toilet. All-cargo version available with a crew of two. Seat tracks on each side of cabin simplify changes of interior layout, or removal of seats for use in a cargo role. Special optional ambulance version can accommodate two stretcher cases, each with attendant, and has biomedical facilities, therapeutic oxygen, and toilet. Door with airstairs on port side immediately aft of flight deck. Emergency exit at rear on starboard side. Baggage space at rear of cabin, accessible in flight. Entire accommodation pressurised and air-conditioned. Windscreen defrosting and anti-icing by engine bleed air.

SYSTEMS: Garrett environmental control system. Cabin pressurisation by engine bleed air, with max pressure differential of 0.59 bars (8.6 lb/sq in), can maintain a 2,440 m (8,000 ft) cabin altitude to max certificated altitude. Electrical system powered by two 28V 200A starter/generators, with two 125VA 115V 400Hz solid-state inverters, and 24V nickel-cadmium battery. Hydraulic system of 103.5 bars (1,500 lb/sq in) pressure, provided by two engine-driven hydraulic pumps, either of which is capable of maintaining full system function for operation of trailing-edge flaps and landing gear. Oxygen system of 0.62 m³ (22 cu ft) capacity for emergency use by crew and passengers. Anti-icing system includes pneumatic de-icing of wing and tail unit leading-edges, and electric or bleed air anti-icing of engine inlets, pitot tubes, static ports, and windscreen. Engine fire detection and extinguishing system incorporates two Halon extinguishers.

AVIONICS AND EQUIPMENT: Various avionics packages by Collins or King available to customer's choice; aircraft can also be delivered without avionics for customised installations. Optional avionics include HF com, VLF/Omega navigation, air data command display SAT/TAS indicators, dual flight directors, TBD RMI/converter, and co-pilot slaved compass system and HSI. All passenger convenience and comfort equipment found normally in cabin class jet or turboprop aircraft are standard Lear Fan installations.

DIMENSIONS, EXTERNAL:

Wing span	11.99 m (39 ft 4 in)
Wing aspect ratio	9.5
Length overall	12.37 m (40 ft 7 in)
Height overall	3.71 m (12 ft 2 in)
Wheel track	3.56 m (11 ft 8 in)
Wheelbase	4.90 m (16 ft 1 in)
Propeller diameter	2.29 m (7 ft 6 in)
Propeller ground clearance	0.94 m (3 ft 1 in)
Passenger door (port, fwd):	
Height	1.26 m (4 ft 1½ in)
Width	0.76 m (2 ft 6 in)
Height to sill	0.38 m (1 ft 3 in)
Emergency exit (stbd, rear):	
Height	0.66 m (2 ft 2 in)
Width	0.48 m (1 ft 7 in)

DIMENSIONS, INTERNAL:

Cabin: Length, fwd to rear pressure bulkhead	5.84 m (19 ft 2 in)
Volume	7.08 m³ (250 cu ft)
Cockpit: Length	1.42 m (4 ft 8 in)
Max width	1.37 m (4 ft 6 in)
Max height	1.35 m (4 ft 5 in)
Volume	1.61 m³ (57 cu ft)
Passenger cabin: Length	2.63 m (8 ft 7¾ in)
Max width	1.45 m (4 ft 9 in)
Max height	1.42 m (4 ft 8 in)
Volume	4.22 m³ (149 cu ft)
Baggage compartment volume	1.25 m³ (44 cu ft)

AREA:

Wings, gross	15.13 m² (162.9 sq ft)

WEIGHTS AND LOADINGS (preliminary):

Weight empty	1,860 kg (4,100 lb)
Max fuel weight	729 kg (1,608 lb)
Max T-O weight	3,334 kg (7,350 lb)
Max ramp weight	3,356 kg (7,400 lb)
Max zero-fuel weight	2,925 kg (6,450 lb)
Max landing weight	3,175 kg (7,000 lb)
Max wing loading	220.36 kg/m² (45.12 lb/sq ft)
Max power loading	3.44 kg/kW (5.65 lb/shp)

PERFORMANCE (preliminary, at max T-O weight except where indicated):

Never-exceed speed	275 knots (508 km/h; 316 mph) IAS
Max level speed at 6,100 m (20,000 ft)	369 knots (684 km/h; 425 mph)
Max cruising speed at 6,100 m (20,000 ft)	363 knots (673 km/h; 418 mph)
Econ cruising speed at 12,190 m (40,000 ft)	280 knots (519 km/h; 322 mph)
Stalling speed, flaps down, power off	76 knots (141 km/h; 88 mph) IAS
Max rate of climb at S/L	1,052 m (3,450 ft)/min
Rate of climb at S/L, one engine out	396 m (1,300 ft)/min
Certification ceiling	12,500 m (41,000 ft)
Service ceiling, one engine out	10,060 m (33,000 ft)
T-O run	579 m (1,900 ft)
T-O to 15 m (50 ft)	762 m (2,500 ft)
Landing from 15 m (50 ft)	1,016 m (3,333 ft)
Landing run	725 m (2,379 ft)
Range with max fuel at 2,994 kg (6,600 lb) T-O weight, with 45 min reserves	1,740 nm (3,323 km; 2,003 miles)
Range with max payload, with 45 min reserves	1,548 nm (2,867 km; 1,782 miles)

Production-configuration prototype of the Lear Fan Model 2100 (foreground) flying alongside the original prototype. Nose probe is temporary test equipment

CESSNA

CESSNA AIRCRAFT COMPANY: Head Office and Works: Wichita, Kansas 67201, USA

In a surprise announcement on December 15, 1982, Cessna released initial information on its new Caravan, described as the first specially-designed single-engined utility aircraft produced for some years.

CESSNA CARAVAN

First flown on December 9, 1982, the engineering prototype of the Caravan (N208LP) bears little resemblance to any previous Cessna design. It is claimed by the company to be the first-ever all-new single-engined turboprop general aviation aircraft, and is intended to supplement or replace the thousands of de Havilland Canada Beavers and Otters, and Cessna 180s, 185s, and 206s now operated throughout the world in a variety of utility roles.

A basic ability to fly fast with a heavy load, to get into and out of unprepared airstrips, and to offer economy and reliability with minimum maintenance, can be extended by the addition of weather radar, air-conditioning, and oxygen systems. Other projected packages of optional equipment will enable the Caravan to perform aerial firefighting, photographic, agricultural spraying, ambulance/hearse, border patrol, parachuting and supply dropping, surveillance, and a variety of government utility duties, on wheels, floats, and skis. Such versatility is expected to attract orders from armed services, as well as from civilian operators.

FAA certification of the Caravan is anticipated during 1984, followed by the start of full production in early 1985. All available details follow:

TYPE: Single-engined turboprop utility aircraft.

WINGS: Braced high-wing monoplane, with constant-chord inner panels and tapered outer panels. Single streamline-section bracing strut each side. Wide-span flaps occupy more than 70% of wing trailing-edge, and extend to 30° setting for low landing speeds. Ailerons operate in conjunction with spoilers for positive roll control.

FUSELAGE: Conventional semi-monocoque structure.

TAIL UNIT: Cantilever structure, with long dorsal fin. All control surfaces horn-balanced.

LANDING GEAR: Non-retractable tricycle type, with single wheel on each unit. Tubular spring cantilever main units; oil-damped spring nosewheel unit. Oversize balloon tyres to be available optionally. Hydraulic brakes on mainwheels. To be certificated in amphibian and floatplane versions, with floats by Wipline, and with ski landing gear.

POWER PLANT: One Pratt & Whitney Aircraft of Canada PT6A-114 turboprop engine, flat rated to 447 kW (600 shp) to 3,800 m (12,500 ft), and driving a two-blade constant-speed propeller with spinner. Fuel capacity more than 1,249 litres (330 US gallons).

ACCOMMODATION: Pilot and up to 14 passengers or equivalent cargo. Cabin has a flat floor with attachments for a combination of two- and three-abreast seating, with an aisle between the seats. Door for pilot on each side of forward fuselage. Airstair door for passengers at rear of cabin on starboard side. Two-section cargo door at rear of cabin on port side. In a cargo role cabin will accommodate typically two D-size cargo containers or up to ten 208 litre (55 US gallon) drums.

SYSTEMS: Air-conditioning and oxygen systems optional.

AVIONICS AND EQUIPMENT: A wide range of avionics will be available to customer requirements, including weather radar in a pod on the wing leading-edge. Equipment for roles mentioned in introductory copy will be optional.

DIMENSIONS, EXTERNAL:

Wing span	15.75 m (51 ft 8 in)
Length overall	11.46 m (37 ft 7 in)
Height overall	4.32 m (14 ft 2 in)

DIMENSIONS, INTERNAL:

Cabin: Length, excl baggage area	4.57 m (15 ft 0 in)
Max width	1.57 m (5 ft 2 in)
Max height	1.30 m (4 ft 3 in)
Volume	9.63 m³ (340 cu ft)

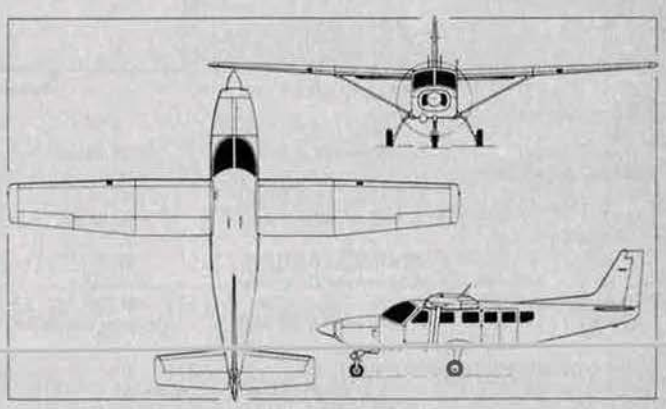
WEIGHTS:

Max useful load	1,361 kg (3,000 lb)
Max T-O weight:	
landplane	3,039 kg (6,700 lb)
floatplane, amphibian	3,198 kg (7,050 lb)

PERFORMANCE (landplane, at max T-O weight):

Max cruising speed
186 knots (344 km/h; 214 mph)
Max rate of climb at S/L
more than 457 m (1,500 ft)/min
Range with max fuel
more than 1,000 nm (1,854 km; 1,152 miles)

Prototype of the all-new 14-passenger Caravan utility aircraft, first flown last December



Cessna Caravan general aviation aircraft (P&WC PT6A-114 turboprop engine) *(Pilot Press)*

HARBIN

STATE AIRCRAFT FACTORY, HARBIN, Heilongjiang Province, People's Republic of China

China's aerospace industry continues to progress at an impressive pace. During the period of Britain's Farnborough International Air Show, in September 1982, it became known that one of China's latest products, the Y-11T twin-turboprop light transport, developed at Harbin, is to be marketed in the West as the Turbo-Panda, with Canadian engines and mainly Western avionics.

HARBIN Y-11T TURBO-PANDA

This new STOL general-purpose transport results from studies, extending over several years, of possible ways of improving the payload/range capabilities of the original nine/ten-seat Harbin Y-11 general-purpose transport. Hawker Pacific (Australia) suggested replacing the 213 kW (285 hp) Huosai-6A piston engines of the Y-11 with 298 kW (400 shp) Allison 250-B17B turboprops. Pratt & Whitney Aircraft of Canada proposed the use of its more powerful PT6A-11 engines, and these were eventually adopted for the Y-11T.

Three **Y-11T1** development aircraft have been built initially: one for structure and static testing, the second and third for flight testing. The first flight took place at Harbin on July 14, 1982, and the first flight of a production Y-11T was scheduled for the Spring of this year. Construction is to FAR Pt 23 and Pt 135 standards.

The additional engine power available has enabled the basic Y-11 airframe to be scaled up, the principal enlargement being that of the fuselage, which has an increased cross-section and is lengthened to enable up to 17 passengers to be carried in a commuter configuration. The wings, in addition to being 0.23 m (9 in) greater in span, have a new aerofoil section which is intended to afford a 3% increase in maximum speed and 10% increase in rate of climb; they also incorporate additional fuel tanks in the wing spar box.

The two flying Y-11T1s will eventually be modified for geological survey work in China, retaining the leading-edge slats, which were blanked off for the first flight. This feature will be deleted from the second batch of three aircraft (designated **Y-11T2**), which will have higher rated PT6A-27 engines.

TYPE: Twin-turboprop STOL general-purpose transport.

WINGS: Braced high-wing monoplane, with constant chord from root to tip. Wing section GA-0417, with thickness/chord ratio of 17%. No dihedral. Two-spar structure with aluminium alloy skin, bonded and riveted (Ziqiang-2 resin bonding on 70% of structure). All-metal drooping ailerons and electrically actuated, fabric-covered double-slotted flaps along full span of trailing-edges. All-metal leading-edge automatic slats (T1 only), from nacelle to tip of each wing. Trim tab in each aileron. Small stub-wings at cabin floor level support the main landing gear units; bracing strut from each stub-wing out to approx mid-span.

FUSELAGE: Conventional semi-monocoque all-metal structure of basically rectangular cross-section, swept upward at rear. Ziqiang-2 resin bonding of 40% of structure.

TAIL UNIT: Cantilever non-swept metal structure, increased in size compared with that of Y-11. Low-set tailplane, with horn-balanced elevators; trim tab in each elevator. Small dorsal fin. Horn-balanced rudder, with inset tab. Small ventral fin under tailcone.

LANDING GEAR: Non-retractable tricycle type, with oleo-pneumatic shock absorber in each unit. Single-wheel main units, attached to underside of stub-wings. Single steerable nosewheel. Pneumatic brakes.

POWER PLANT: Two Pratt & Whitney Aircraft of Canada PT6A-11 turboprop engines in Y-11T1, each flat rated to 373 kW (500 shp) and driving a Hartzell three-blade variable- and reversible-pitch propeller with spinner. (Y-11T2 will have 462 kW; 620 shp PT6A-27 turboprops.) All fuel in tanks in wing spar box, total capacity 1,600 litres (352 Imp gallons; 423 US gallons).

ACCOMMODATION: Crew of two on flight deck, access to which is via a forward-opening door on the port side. Dual controls. Main cabin can accommodate up to 17 passengers in commuter

configuration, in three-abreast layout (with aisle), at seat pitch of 80 cm (31.5 in). Alternative layouts for up to 14 parachutists, or an all-cargo configuration with 11 tiedown rings. Passenger/cargo double door (larger than that of Y-11) on port side at rear; foldout steps in passenger entrance. Emergency exit opposite passenger door on starboard side. Baggage compartments in nose and at rear of passenger cabin, for 80 kg (176 lb) and 220 kg (485 lb) respectively.

AVIONICS: Generally upgraded from those in Y-11 and more Western in origin; will include Doppler radar.

DIMENSIONS, EXTERNAL (A: Y-11, B: Y-11T):

Wing span:	
A	17.00 m (55 ft 9¼ in)
B	17.235 m (56 ft 6½ in)
Wing chord (constant):	
A, B	2.00 m (6 ft 6¾ in)
Wing aspect ratio:	
A	8.50
B	8.67
Length overall:	
A	12.017 m (39 ft 5⅛ in)
B	14.86 m (48 ft 9 in)
Height overall:	
A	4.64 m (15 ft 2¾ in)
B	5.275 m (17 ft 3¾ in)
Width of stub-wings:	
A	3.612 m (11 ft 10¼ in)
Elevator span:	
A	5.10 m (16 ft 8¾ in)
B	5.265 m (17 ft 3¼ in)
Wheel track:	
A	3.45 m (11 ft 3¾ in)
B	3.60 m (11 ft 9¾ in)
Wheelbase:	
A	3.642 m (11 ft 11½ in)
B	4.557 m (14 ft 11½ in)
Propeller diameter:	
A	2.40 m (7 ft 10½ in)
B	2.36 m (7 ft 9 in)
Distance between propeller centres:	
A	4.27 m (14 ft 0 in)
B	4.934 m (16 ft 2¼ in)
Fuselage/ground clearance:	
B	0.65 m (2 ft 1½ in)
Passenger/cargo door (B):	
Height	1.38 m (4 ft 6¼ in)
Width (passenger door only)	0.65 m (2 ft 1½ in)
Width (double door)	1.45 m (4 ft 9 in)
Cargo door (A):	
Height	1.22 m (4 ft 0 in)
Width	0.988 m (3 ft 3 in)
Emergency exit (B) (starboard, rear):	
Height	0.66 m (2 ft 2 in)
Width	0.68 m (2 ft 2¾ in)
Baggage door (B) (nose, port):	
Max height	0.56 m (1 ft 10 in)
Width	0.75 m (2 ft 5½ in)

DIMENSIONS, INTERNAL:

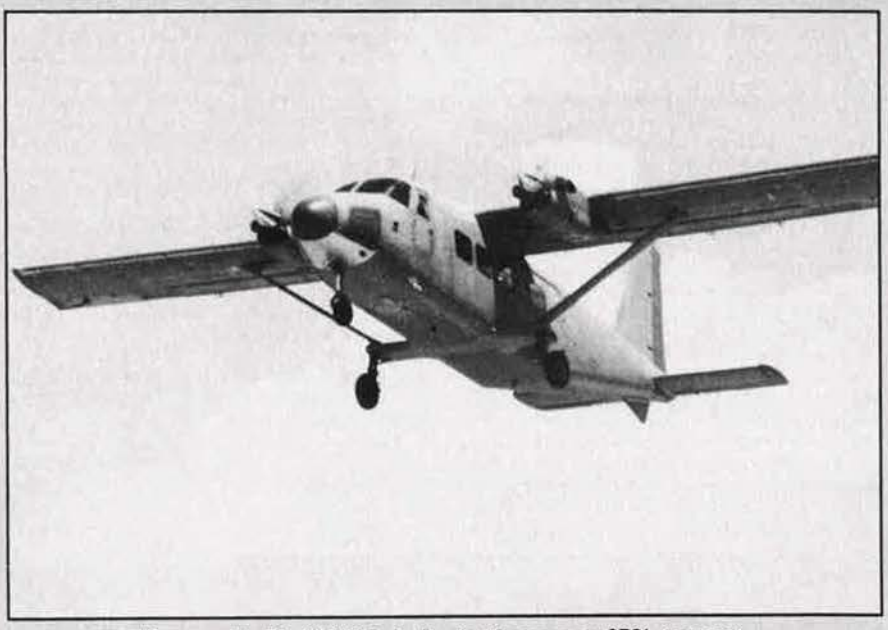
Cabin, excl flight deck:	
Length:	
A	3.58 m (11 ft 9 in)
B	4.90 m (16 ft 1 in)
Max width:	
A	1.27 m (4 ft 2 in)
B	1.46 m (4 ft 9½ in)
Max height:	
A	1.48 m (4 ft 10¼ in)
B	1.70 m (5 ft 7 in)
Volume:	
B	12.912 m³ (456.0 cu ft)
Baggage compartment volume (B):	
nose	0.77 m³ (27.20 cu ft)
rear	1.89 m³ (66.75 cu ft)

AREAS:

Wings, gross:	
A	34.00 m² (365.97 sq ft)
B	34.27 m² (368.88 sq ft)
Vertical tail surfaces (total):	
B	5.064 m² (54.51 sq ft)
Horizontal tail surfaces (total):	
B	7.024 m² (75.61 sq ft)

WEIGHTS AND LOADINGS (Y-11T):

Basic weight empty	2,800 kg (6,173 lb)
Operating weight empty	3,000 kg (6,614 lb)
Max fuel load (usable)	1,200 kg (2,645 lb)
Max payload	1,700 kg (3,748 lb)
T-O weight for agricultural operation	4,500 kg (9,921 lb)
Design T-O and landing weight	5,000 kg (11,023 lb)
Max T-O weight	5,500 kg (12,125 lb)
Max zero-fuel weight	4,700 kg (10,362 lb)
Max cabin floor loading (cargo)	750 kg/m² (153.7 lb/sq ft)
Max wing loading	160.5 kg/m² (32.88 lb/sq ft)
Max power loading	7.76 kg/kW (12.76 lb/shp)



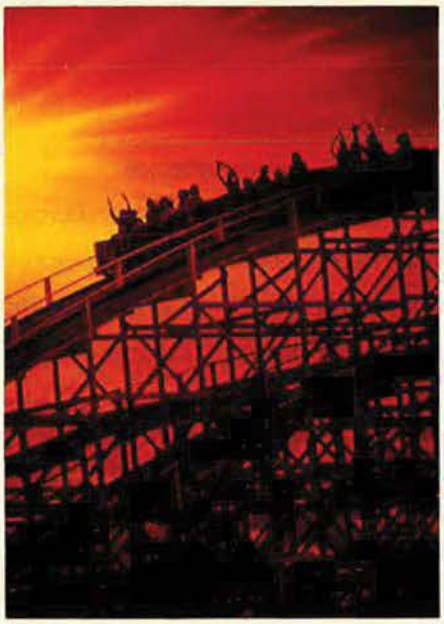
Prototype Harbin Y-11T1 Turbo-Panda 17-passenger STOL transport, photographed during first flight *(David Ward)*

PERFORMANCE (Y-11T, estimated at 5,000 kg; 11,023 lb T-O weight, ISA):

Max level speed:	
T1	152 knots (282 km/h; 175 mph)
T2	163 knots (302 km/h; 187 mph)
Speed for agricultural operation:	
T1	86–97 knots (160–180 km/h; 99–112 mph)
Max rate of climb at S/L:	
T1	378 m (1,240 ft)/min
T2	480 m (1,575 ft)/min
Cruising altitude:	
T1, T2	3,000 m (9,840 ft)
Service ceiling:	
T1	7,000 m (22,960 ft)
Service ceiling, one engine out:	
T1	1,750 m (5,740 ft)
T2	3,000 m (9,840 ft)
STOL T-O run:	
T1	220 m (722 ft)
T-O to 15 m (50 ft):	
T1	547 m (1,795 ft)
T2	391 m (1,283 ft)
Landing from 15 m (50 ft):	
T1, T2	651 m (2,136 ft)
STOL landing run:	
T1	210 m (689 ft)
Range with 1,445 kg (3,185 lb) payload (17 passengers and baggage), 45 min reserves:	
T1, T2	221 nm (410 km; 255 miles)
Range at 3,000 m (9,840 ft) with max fuel:	
T1, 45 min reserves	691 nm (1,280 km; 795 miles)
T1, no reserves	761 nm (1,410 km; 876 miles)

Subsequent photograph of Harbin Y-11T1, taken during flight testing *(Anna Hogg)*

OVER HERE & OVER THERE



By Lucy Post-Frisbee

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TRAVEL ENE: 1983

How the USAF Community Can Get the Most Trip for Its Time and Money

That's what 1983 travel is all about—the most of the best for the least. Whether you go around the world or around the block, whether your holiday is for a month or a weekend or an afternoon, this special section can help you discover when and why to go where, and at what cost.

The much-traveled Air Force community, with its thousands of active-duty, retired, Air National Guard, and AFRES members, is far more aware than the average American of how important travel can be. Along with their colleagues in the aerospace industry, they have learned that travel, whether for business or pleasure, can add new dimensions to their lives, broader horizons to their world.

According to travel authority Dr. B. Robert Sarich, a former executive with the State Department and Department of Commerce, "The experienced traveler knows, as few others do, that as our world grows smaller yet still more complex, one way to keep it alive and well is to understand its people, to know and enjoy its places. Travel, in the most meaningful sense, does exactly that."

Over Here? Over There? Whatever is going on in the world, any happening over there has its counterpart over here in America. Don't knock it because it's a day away instead of a world apart.

Whether you want to take on Disney World or do a class act R&R at Dromoland Castle in Ireland; whether you opt for exotic Hong Kong or prefer the wonders of our own Washington, D. C.; whether you wish to explore those captivating capitals of Brazil—Bahia, Rio, and Brasilia, or would just like to rock on the porch of the Trapp Family Lodge in Vermont, somewhere there's a part of the world that's meant for you. The search for the right place at the right time can mean exciting adventures, delightful experiences, and never-to-be forgotten memories.

For example: "When It's Springtime in the Rockies" used to be just an old song title. This year, it's an invitation to Vail where the Colorado ski paradise is still celebrating a twentieth birthday—with golf, tennis, fishing, horseback riding, and mountain climbing. For off-season rates, call Vail's Lion Square Lodge toll-free: (800) 525-5788.

A boating party from Hickam AFB gets a fine view of Diamond Head.

Over there in Switzerland, Vail's sister city is St. Moritz, and the summer scene in this Alpine mecca is a ditto of Vail's with the added attraction of sailing. Contact Swissair at 608 Fifth Ave., New York, N. Y. 10020.

Tennis anyone? Wimbledon anyone? The 1983 championships at Wimbledon take place from June 20 to July 3. British Airways makes it all yours in a package tour with American Express. Dial British Air toll-free: (800) 221-7120.

And over here, All American Sports has a tennis vacation to improve your tennis, your tan, and your life-style. To name a few of the scenic spots: Top-notch in Stowe, Vt., Florida's Amelia Island Plantation, or the Half Moon at Montego Bay in Jamaica. Details toll-free: (800) 223-2442.

France will be celebrating the Bicentennial of Ballooning all year long. The wild blue yonder has been considerably revamped since 1783 but, appropriately enough, this 200th birthday of ballooning coincides with the 35th Paris Air/Space Show (May 26–June 5 at Le Bourget Airport). Fly over on the Concorde? Let Air France bring on the champagne, but celebrate, either over there or over here.

Tabs On Travel/Tourism. Statistics from Pat Duricka of the Travel Industry Association of America show travel/tourism as the second largest industry in the USA, accounting for six percent of the GNP. In 1981, more than 112,000,000 US adults spent $179 billion traveling here in America. They took 559,000,000 trips with the average covering 740 miles for the round trip and lasting 4.6 nights.

THE RACK RATE & How to Beat It!

Defining the rack rate is like trying to pin jelly to the wall. Neither rule nor regulation, the rack rate is the price offered in lobby rack brochures. It can be a basis from which to start negotiations.

For a hypothetical but realistic example: Airlines flying coast to coast have several different fares on the same plane out of the same airport to the same destination. Yet, if you call the airline direct and ask for the fare from A to B, you get the "rack rate," even though there may be five different discount fares. Think you the airline will volunteer information on these lower fares? The same applies to hotels, cruises, and tours.

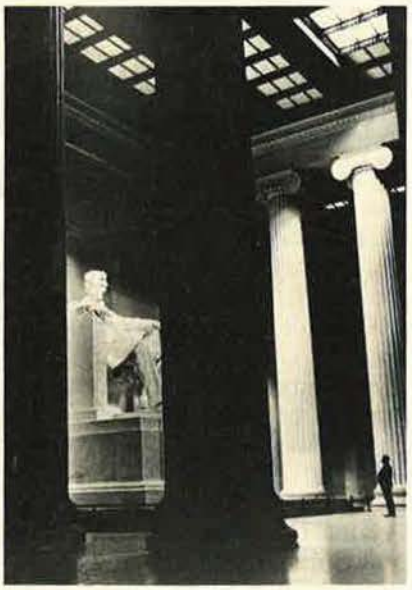
Perhaps the *numero uno* way to beat the rack rate is to heed those four words of advice that appear under almost every travel ad—"See Your Travel Agent."

Whether you're traveling for business or pleasure or a combination of both, a good travel agent can save you time, money, and worry. It's a jungle out there! Airlines with their ever-changing fares and schedules. Hotels with their special discounts and seasonal deals. Cruise lines with their off-season, in-season rates. Car-rental agencies with the fine, fine print syndrome, and tour operators with their alphabet soup of APEX, APEC, GIT, FIT, TBA, MAP . . .

You name it. The travel agent has it or can get it by friendly neighborhood computer. And at zero charge to you.

One of the big misconceptions about a travel agent is that such services cost a bundle. Not so. Because the agent officially represents airlines, hotels, tour operators, cruise lines, car-rental services, and railroads, these companies farm out part of their business to agents, rather than hiring in-house staff. The company pays a percentage commission for the agent's services, but at no extra cost to the client.

Another misconception: that the travel agent handles only corporate flights on the Concorde, incentive programs to Jamaica's Tryall Golf and Beach Club, jet-set tours to Shanghai, and around-the-world cruises on the *QE II*. Again, not so. Obviously, any agency enjoys handling a twice-around-the-globe itinerary, but a flight across the nation is also commissioned. Enough of these pay the rent.



Trips to historic sights needn't always be at the rack rate.

How to find the right travel agent? Recommendations from friends and colleagues whose judgment you trust . . . intelligent homework on your own . . . plus professional advice, such as these comments from a former Assistant Secretary of Commerce for Tourism, the Hon. Jeanne Westphal:

"Searching for a good travel agent requires the same care and concern as finding a good doctor or lawyer," Ms. Westphal says. "Look for the agent who is a member of one of the recognized professional associations such as ASTA [American Society of Travel Agents]. CTC [Certified Travel Counselor] indicates at least five years of experience. Travel can be a most enriching experience, whether for business or pleasure, but a professional travel agent can make it a real joy."

When you are ready to choose your travel counselor, think doctor. Think lawyer. Think travel agent. Just as you outline your symptoms to the doctor, your problems to your lawyer, tell the travel agent what you like and don't like, how much or how little you can spend, and a general idea of where and when you'd like to spend it. Once you're happy with your travel consultant, start consulting!

Author and editor Lucy Post-Frisbee has written several biographies published by Bobbs-Merrill in their COFAS series. (Follett Library has just bought subsidiary rights to her book on President Kennedy, first published in hard cover by Bobbs-Merrill.) She was also one of forty authors selected as contributors to the twenty-volume Funk and Wagnall Student Encyclopedia. Since she sold her first article to the New York Herald Tribune *in 1952, her travel features have appeared in such major newspapers as the New York* Times, *the Denver* Post, *and the* Christian Science Monitor. *Specializing in regional history and travel, she has been associate editor of* Colorado Wonderland, *contributing editor to* Commonwealth, *and has written about the Caribbean for* Washingtonian Magazine. *She also authored the regional Delmarva tours for Shell Oil Co. guides. As associate editor of the former Globe chain of suburban newspapers, her editorials on voting took second place in the nation, winning the Herrick award of the National Newspaper Association. A member of the Author's Guild, Ms. Frisbee is on the board of directors of the National Society of Arts and Letters.*

NATIONAL NEWS

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April 28–29, 1983

An authoritative overview of the importance of electronics to the Air Force with special emphasis on the opportunities and problems in the evolution of command control communications and intelligence (C^3I) and electronic warfare for coalition warfare in concert with allied forces. Participants will include senior officials and advisors from the White House, allied countries, the Defense Department, and the Air Force. The Symposium will be held in conjunction with the Air Force Systems Command. Recognizing that command control communications and intelligence systems are essential to the implementation of allied strategy, control of forces, and optimum use of weapons in modern warfare, the program will focus on the fact that coalition warfare requires coalition C^3I. Presentations will examine how and where we can link the command and control systems of all the services and those of our allies, thereby making them increasingly interoperable and effective.

SPEAKERS INCLUDE:

Keynoter
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Commander, AFSC's Electronic Systems Division

Dinner Speaker
The Hon. Walter J. Stoessel, Jr.
Former Deputy Secretary of State and Ambassador to Moscow and Bonn

Dr. Victor H. Reis
Assistant Director, National Security and Space, White House Office of Science and Technology Policy

Lt. Gen. Robert T. Herres
Director for C^3 Systems/OJCS

Lt. Gen. Thomas H. McMullen
Commander, AFSC's Aeronautical Systems Division

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Maj. Gen. Thomas S. Swalm
Commander, Tactical Air Warfare Center

Registration fee for all Symposium events is $195. This fee includes all presentation sessions, coffee breaks, continental breakfast, lunch, and a dinner with a major speaker. For information and registration, call Jim McDonnell or Dottie Flanagan at (202) 637-3300, Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006.

You Can Get There From Here

Whether by land, sea, or air, "getting there" has both a plus and minus touch. Here's a mini-list.

Concorde? PEOPLExpress? Airlines run the gamut in service, comfort, and expense all the way from the Concorde (if you've got more money than time, take Air France to Paris or British Airways to London in three-plus hours for approximately $1,000 per hour) to PEOPLExpress, that no-frills, no-food air bargain of America.

Discount fares and off-season rates can make the airways the best possible value if you can choose your own date to travel. If not, here's another zone of action for a travel agent's expertise.

"Leave the Driving to Us." Going the length and breadth of the nation is not only a joy and challenge, but by bus, it's also economical.

The two major buslines of the US, Greyhound and Trailways, both have coast-to-coast, border-to-border fares on comfortable cruisers with stopovers possible in major cities. (The big minus for bus travel is the deplorable state of most bus stations.)

Steer It Yourself. If you can steer through all that fine print on the contract, a car rental can be a real bargain in convenience, and sometimes in comfort. The Big Three of the car rental services are Avis, Hertz, and National, followed by Budget and Dollar Rent-a-Car.

Discount cards with the Big Three have been arranged as a special service for Air Force Association members, and are available upon request from AFA. If you'd like an Avis, Hertz, or National discount card, send a stamped, self-addressed envelope with your request to Car Card Services, AFA, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D. C. 20006.

Driving Abroad: Some countries do not recognize a US driver's license. The international driver's license is acceptable in most countries. You can get one at your local AAA office; take along two passport-size photos and a valid US license.

Ride the Rails Again. There's a sassy slogan at Amtrak: Discover America at See-level. For family vacation travel and for the business traveler with time as well as money, there's no better advice. Whether you're eighteen or eighty, the train gives you room to roam and relax. (Amtrak Information, Box 2209, Washington, D. C. 20013.)

Run Away to Sea. Nearly 2,000,000 people took cruises last year. They learned the easy way that a cruise can be the best money value of any vacation package. Why is cruise travel so special? The brochures tell you that a ship at sea is exciting, romantic, and a fantasy world. All true. It's also hassle-free. One payment covers almost everything you need from the time you leave home until you return. Unpack once. The ship is your floating hotel with fabulous food served on a twenty-four-hour basis, every kind of sports and entertainment, and no extra charge. Many steamship companies have "fly-free" programs to port of embarkation. Check first.

Any question about cruise travel is answered in *The Total Traveler by Ship,* a definitive volume by lecturer and columnist Ethel Blum. The 1983 edition is now in bookstores or available at $12.95 through Travel Publications, One Lincoln Rd., Suite 214, Miami, Fla. 33139. Your travel agent should have the reference, *Profiles of Ships,* with your ship's history, layout, and opinions on service.

SPACE A Is It Available?

If you are planning Space A travel, the first step is toward your phone. Call the Space A section at Charleston, Dover, or McGuire AFBs for Atlantic travel and Travis AFB for Pacific. (Those numbers are listed here and, hopefully, haven't been changed in the last twenty-four hours.)

If Space A is actually available, the rules say everyone must register in person at the passenger terminal, be prepared to depart on registration, and possess these documents: Leave authorization and ID card (retired members—gray ID); current immunization record; valid passport; valid visa if required; and sufficient funds for commercial backup, *i.e.*, traveler's checks or cash.

Clip and Save: Space A Phones

Charleston AFB, Charleston, S. C.:
A/C (803) 554-0230; Space A ext. 2347.

Dover AFB, Dover, Del.:
A/C (302) 678-7011; Space A ext. 6212.
Hint: Because Dover is a cargo base, many Space Aers forget that the planes have fifty to seventy passenger seats.

McGuire AFB, Wrightstown, N. J.:
A/C (609) 724-1100; Space A ext. 2864.

Travis AFB, Fairfield, Calif.:
A/C (707) 438-4011; Space A ext. 3269.

Andrews AFB, Camp Springs, Md.:
A/C (301) 981-9111; Space A ext. 3528.

MONEY: Don't Leave Home Without It

But don't leave China with it. Or India. Or Russia. Or Bulgaria. Et cetera. Before traveling to another country, we all spend considerable time and thought on planning the itinerary, but not much attention to that vital item without which the trip can't happen—money. The next time you go overseas, give yourself an advance briefing on the coin of the realm—the "funny money."

The Bureau of Consular Affairs at the State Department has a pip of a tip: "Before you leave the States, purchase small amounts of foreign currency to use for incidentals when you arrive, *i.e.*, tips, phone calls, taxis."

Buy at least $20 worth of the currency of the country you will visit first. (Most foreign currency can be purchased from metropolitan banks or such exchange firms as Deak-Perera.) Another safety net is a small stack of US dollar bills, perhaps $20 to $50 worth. The dollar is recognized almost anywhere in the world and can be used as a tip in an emergency, but US coins are not acceptable.

Just Checking. Consular Affairs also repeats that advice we all know, whether traveling over there or here: "Don't carry large amounts of cash. Traveler's checks, in either US dollars or foreign currency, are preferable."

Experienced travelers usually carry a few traveler's checks in small denominations. Two reasons: Almost any proprietor will risk cashing a check for $10 or $20, but not so many wish to gamble on $50 or $100. Also, at the end of your vacation, you don't want to be stuck with a large amount of foreign money. (Some countries don't allow you to take currency out of the country.)

Several kinds of traveler's checks are available in foreign currency as well as in US dollars. Deak-Perera has commission-free traveler's checks with a minimum purchase of $100 in each currency of your choice. Deak has offices in most major cities. Call toll-free (800) 424-1186.

The Street Corner Exchange. Black markets for US dollars flourish in many parts of the world. The "street corner exchange" offers more for your dollars than the official rate allows. Don't be tempted. The penalty if you are caught or even suspected can be severe. Expulsion from the country? Instant jail? Whatever country you're in, the best legal rate for exchange may be found at the local bank. Hotels and shops give the worst.

Plastic Money. Credit cards are convenient, useful, and, in some instances, necessary. (Car rentals require a credit card for identification and security deposit.) The major credit cards are American Express, Visa, and MasterCard, followed by Diner's Club and Carte Blanche. Of the three major cards, MasterCard and Visa have a slight edge over American Express.

In some areas, credit cards are not always accepted by local shops, hotels, or restaurants. That includes some extremely sophisticated places. This past winter, a charming French restaurant in Vail's plush Beaver Creek complex did not accept credit cards. (A shattering blow with a dinner check of $200.) An antique shop in Ireland's picturesque Adare felt the same way about plastic money. But both establishments were willing to take personal checks. (Most places won't.)

"US Embassies and Consulates Cannot Cash Personal Checks for US Citizens."

That's another tip from the Bureau of Consular Affairs. Still, smart travelers always carry a few personal checks for emergency use. Some purchases can be paid for by personal check, especially if shipped to your US address. Customs allows you to pay duty with a personal check, yet refuses to accept credit cards. Some credit card companies, such as American Express or Visa, have limited check-cashing privileges for card-carrying members.

DISCOUNT DATA

Travel sense for over there as well as over here means prepaying as much of your trip as possible. The group tour or package deal is popular with the knowledgeable traveler as well as with the novice. Why? Because the package sometimes saves money over the price that your airfare, ground transportation, and hotel accommodations would cost if sold separately. They certainly save time and worry.

For example: one of the great

savings for 1983 is the "Rare Gems of Spain" tour offered by Entursa Hotels. The "rare gems" are the one-of-a-kind museum hotels restored and managed by Entursa. Would you believe a double room of $150-a-night quality for $37? A suite for $47? From now through October 31, the package includes accommodations at these historic landmarks in Madrid, Rascafria, León, and Santiago with an Avis rental car, sightseeing, and numerous extras for eight days, six nights, starting at $170 per person. Iberia Air is extra. Details from Reservations Systems, Inc., at (800) 223-1558.

And Then There's the Military Discount. Like the weather and politics, "subject to change without notice," so it is with the military discount.

Some helpful advice from a friendly hotel manager: "The military discount is a VIP perk. Ask for it. Every hotel manager has a bottom line, and if the military discount means good business, that discount is going to be available. But you must ask for it. Ask when you make your reservation, always before you register."

Among the hotels that give discounts in selected areas are Sheraton, Westin, and Marriott. Also, Holiday Inns, Hilton, and Stouffer's give discounts in certain areas.

Magic Initials? USAF (Ret.). Every day an estimated 7,000 people have a sixtieth birthday—a growing market that the travel industry has noticed and is accommodating. For the more than 42,000 retired officers who are AFA members, (and any others who admit their age), there are substantial savings in the discount rates for being sixty-plus.

The key word is ASK. Ask before you pay, before you register, before you sign. Card-carrying proof of age is often necessary to qualify for senior discounts.

ASK the airlines: Some airlines offer one-third off regular economy fare if the flight is not full. You'll never know if you don't ask. ASK Amtrak: The sixty-five-plus traveler gets a twenty-five percent discount if the one-way fare amounts to more than $40. ASK the buslines: Greyhound and Trailways give a ten percent discount for the sixty-five-year-old. ASK at hotels: Discounts up to twenty-five percent at selected Sheratons. Most Scottish Inns give twenty percent; ten percent at Rodeway Inns and at many Ramada, Holiday, and Quality Inns, and at Howard Johnson's Motor Lodges. ASK at the national parks: If you are sixty-two or older, you can get a lifetime Golden Age pass to enter all national parks free. ASK your travel agent about special programs for a low budget in your age bracket.

The Entursa Hotel Santa Maria de el Paular near Madrid was created from part of an old monastery.

THE TRAVELER'S RIGHTS... And Rites

The rights of the traveler are well defined in a tiny classic handbook, "Your Trip Abroad," available from the Bureau of Consular Affairs (Department of State, Washington, D. C. 20520). Read and remember. The information is practical, the advice invaluable.

What Uncle Sam Can—and Can't—Do. The State Department issues travel advisories and warnings about specific countries or areas. If you are concerned about an area on your travel itinerary, contact the State Department's Citizens Emergency Center at (202) 632-5225.

The American consul is available to advise and help you, especially if you are in any kind of serious trouble abroad. According to the Bureau, register with the nearest US embassy or consulate if you plan to stay in one country any length of time. It makes it easier to help you in an emergency or to replace a lost or stolen passport. If you plan to travel in Eastern Europe, leave a copy of your itinerary with the consul.

Safety Nets: Good For Over Here/Over There. Always leave a detailed itinerary (names, addresses, and phone numbers of

persons or places to be visited) with relatives or friends so you can be reached in an emergency or receive mail or money in a hurry. Include passport number if traveling overseas.

Mail. US embassies and consulates do not handle private mail. General Delivery *(Poste Restante)* service at post offices in most countries will hold your mail for you.

Lodging. If money gets tight before your plane ticket takes you back home, alternative lodging can be found in the hostel system that offers travelers of all ages clean, inexpensive overnight accommodations. For additional information on 4,500 locations in more than fifty countries, write American Youth Hostels, Delaplane, Va. 22025.

Out of Money? If you become destitute abroad (and it has happened), the American consul will help you get in touch with family, friends, bank, or employer to arrange for transfer of funds.

Injured? Ill? If you are injured or become seriously ill abroad, the consul will help you find medical aid if military facilities are not available and will inform family or friends upon your request.

Death Abroad. When an American dies abroad, the consular officer reports the death to the next of kin or legal representative, obtains instructions from the family, and necessary private funds to arrange local burial or return of the body to the US.

How to Avoid Instant Jail. When you exchange money or traveler's checks, deal only with authorized outlets, *i.e.*, banks, hotels, and commercial establishments. Shun street corner exchanges, no matter how tempting.

Some countries, especially those in Eastern Europe, take a dim view of photographers. Don't photograph any police or military installations, border areas, or harbor, rail, or airport facilities.

A year ago, more than 3,200 Americans were imprisoned in foreign countries. More than half were arrested on drug charges. If you are caught with drugs overseas, you are subject to the local law of the country, not US law. Penalties for possession and trafficking are often the same. Arrested? Instant jail! Convicted? Up to ten years of hard labor or even death (in Algeria, Iran, Thailand, or Turkey).

Where's Uncle Sam? If you do have difficulties with local authorities, remember that you are subject to local law. What American officials can do is limited by foreign law, by US law, and by geography itself. *Consular officers cannot get you out of jail.* If you are arrested, ask permission to notify the nearest US embassy or consulate. International agreements give you this right. When alerted, American officials will visit you, advise you, and contact your family or friends at your request.

YOU CAN'T *(always)* TAKE IT WITH YOU

Thinking "Customs" Before You Go

Your passport," according to the Bureau of Consular Affairs, "is the most valuable document you will carry abroad. It guarantees you are an American citizen. Guard it carefully."

Today, more than 20,000,000 Americans hold valid passports with nearly 4,000,000 issued each year. Be sure to memorize your passport number and also to keep a record of it in a safe place in case your passport is lost or stolen. (If

such a loss happens in the US, report it immediately to Passport Services, Department of State, Washington, D. C. 20520. If it is lost or stolen abroad, report at once to the nearest US embassy or consulate and to local police authorities.)

Beginning in 1983, fees for a passport more than tripled. Now a passport valid for ten years costs $35, with one exception: Children and young people up to the age of eighteen qualify for a $20 passport, good for five years.

Applying for your first passport? Add a $7 charge, sort of an initiation fee. But that $7 becomes a penalty if you forget to bring your old passport when you make application for a new one. Clear, concise instructions for obtaining a new or renewed passport are listed in that classic handbook, "Your Trip Abroad"—it's available free from the Bureau of Consular Affairs, Department of State, Rm. 6811, Washington, D. C. 20520.

Customs in a Capsule. The right time to start thinking about Customs is before you even begin a trip. Register any foreign-made items, such as watches and cameras or furs, at the airport Customs before your flight. The certificate will provide easy proof of previous ownership on your return.

As of 1983, one person can now bring in $400 worth of goods duty-free, up from $100 four years ago. Returning from the US Virgin Islands? From Guam or American Samoa? The exemption is now $800, increased from $600.

Customs says you can bring into the US one liter or 33.8 fluid ounces of liquor, wine, or beer if you are twenty-one years or older. That's duty-free, and so are 100 cigars and 200 cigarettes. (Cuban tobacco products may be brought in only if acquired in Cuba.)

Keep all your receipts from shopping sprees. They'll jog your memory for Customs declaration and add proof of purchase if needed. While you hurry-up-and-wait in the Customs queue, have these documents handy: passport, your certificate of registration for personal articles, a medical certificate for prescription drugs if you carry any, and your vehicle registration if you are returning by car from Canada or Mexico. And if you played the right cards and broke the banque at Monte Carlo, don't forget to declare the money you bring back if it's more than $5,000. You won't owe any duty on it. Just income tax!

For an essential listing of what you can and can't take with you, send for the free leaflet, "Know Before You Go," US Customs, P. O. Box 7118, Washington, D. C. 20044. (Another essential: A good guidebook is as necessary as a passport and toothbrush.) ●

AIRMAN'S BOOKSHELF

Destruction From the Air

A History of Strategic Bombing, by Lee Kennett. Charles Scribner's Sons, New York, N. Y., 1983. 222 pages with photographs, notes, bibliography, and index. $15.95.

In his Foreword, Mr. Kennett states that he has tried to produce a "broad-stroke history intended for general readers." He has succeeded, and the result is a book that is both informative and entertaining.

In 1784, J. C. G. Hayne, a Prussian lieutenant, wrote a book in which he proposed that "grenades and other harmful things" be dropped from balloons onto enemy troops and positions. Although bombs, bombers, and bombardiers have changed considerably over the years, the debate about the morality and military effectiveness of strategic bombing has continued.

Mr. Kennett has enlivened this history with many interesting, and sometimes amusing, anecdotes. When fighting broke out between Italy and Turkey in 1911, Italian aviators "often suspended a pair of bombs around their necks with a cord." To further illustrate the makeshift character of early aerial bombardment, the author has included a photograph of a German pilot preparing to hurl a small bomb over the side of his open cockpit. In the mid-1930s, the need to protect citizens from enemy bombers spawned such inventions as gas masks for dogs and gas-proof baby carriages.

The author traces the history of the strategic bombing debate from the days of Douhet to the bombings of Hiroshima and Nagasaki. His main interest, however, lies in the events surrounding the two World Wars.

World War I proved to be a fertile laboratory for the application of different bombing strategies. The author points out that technological advances, and limitations, were the main factors affecting the implementation of airpower. Although the theoreticians postulated the bombing of only battlefield targets and *points sensibles* (railroad yards, factories, etc.), extremely poor accuracy prevented such limited use of this new weapon. The number of targets increased throughout the war until, by war's end, they included all of the enemy's territory.

In the period between the wars, there was a backlash against the unrestricted use of aerial bombardment. The clamor to ban the bomber, intensified by the terrifying forecasts in the popular press of the bomber's potential for mass destruction, reached its peak with the issuance of the Hague Draft Rules in 1923. "Aerial bombardment for the purpose of terrorizing the civilian population" was prohibited, as was "blackmail" bombing. The temper of the times was such that Gen. Douglas MacArthur, then US Army Chief of Staff, supported President Hoover's proposal to dismantle military aviation entirely.

The bomber's potential for destruction was fully realized during World War II. The introduction of faster aircraft capable of carrying heavier and more destructive bombs placed aerial bombardment at the heart of military strategy. The tactic of dividing major Japanese cities into sections that were to be destroyed one by one was employed with devastating efficiency. The final blow was delivered by the *Enola Gay.* The subsequent surrender of Japan "while its shores were still inviolate brought triumphant affirmation of the doctrine and the dream. The air weapon had become the supreme weapon—or so it seemed."

The major flaw in this book is that it ends with the surrender of Japan. The history of strategic bombing in the last forty years is completely ignored. One can only hope that Mr. Kennett plans a sequel.

—Reviewed by Edward J. McBride, Jr., Editorial Assistant.

Sailor and Pilot

Solo to Sydney, by Sir Francis Chichester, Stein & Day Publishers, New York, N. Y., 1982. 208 pages with photographs. $13.95.

"It intensifies life to be living it to the full."

This view by Sir Francis Chichester was widely quoted in the press in 1967 when he completed his solo ocean voyage around the globe—at age sixty-five. It fairly well sums up his attitude towards life. It could equally have applied to his amazing solo flight in a Gipsy Moth plane from Croydon, England, to Sydney, Australia in 1930. That saga forms the basis of this book.

In today's world, air travel is too frequently taken for granted. Even when one is gazing in wonderment at the venerable aircraft in the National Air and Space Museum, it is difficult to comprehend the hardships and obstacles faced by the pioneer flyers. This book serves admirably to remind us all that flying fifty years ago was a very chancy business at best. A trip frequently consisted of short hops between what amounted to controlled crash landings.

This book is essentially a journal of Sir Francis's flight training and the Sydney trip, first published in 1930 and just reissued. Although initially Sir Francis (knighted in 1967) hoped to better the fifteen-day record of Bert Winkler for that same journey, he ended up taking about a week longer. Nonetheless, he covered the same 14,500 miles in about 182 hours' flying time, including several stretches of nonstop flight in excess of ten hours and 600 miles. That he broke no records is understandable, for this was his first long-distance solo flight—and it came right after he had spent four months learning to fly. This feat has been likened by one observer to "a novice mountaineer tackling Everest."

Press accounts of Chichester's 1967 107-day global voyage from Plymouth, England, consistently mention his sense of humor and dogged determination. These traits also are quite evident in this 1930 account, the first of about a dozen books he authored. Written shortly after he

completed his trip, it offers a unique insight into the state of the world at that time. It also affords a glimpse of how people learned to fly in those days.

Sir Francis notes, "Flying is an art, like writing or making love. If you can't do it, nobody will ever teach you, and if you can, nobody will ever stop you." Putting this into practice and being a follower of the method he calls "try and try again," he confides that he "drove eight instructors to lifting the bowl of wine oftener than usual." But eventually he soloed, driven by his desire to buy and deliver an airplane to New Zealand for a business he and a partner had started there, without paying expensive shipping freight. Determined indeed!

Of note is that Sir Francis had to work out his own navigational techniques for the flight. As perfected, these eventually were used by the RAF in World War II. Chichester, rejected for active duty during that war because of his age, taught the techniques he had developed and refined on this and subsequent flights to RAF fighter pilots. He also authored a book on navigation.

These techniques he learned the hard way. Some of the most fascinating accounts in *Solo to Sydney* concern the times he got lost—or thought he was. Much of his later skill as a navigator came from a truth hard-won. As he put it, "I recalled the dozens of occasions upon which I had argued with my compass, only to lose the argument every time . . . good compasses never lie."

This book, an adventure to read, is a legacy from Sir Francis, who died in 1972.

—Reviewed by James A. McDonnell, Jr., Military Relations Editor.

New Books in Brief

Air War Over Southeast Asia, by Lou Drendel. Volume 2 of the three-volume pictorial record being assembled by author Drendel, this booklet covers the years 1967–70. As one has come to expect from any Squadron/Signal publication, *Air War* abounds with excellent operational photographs, here of aircraft that saw action in the Vietnam War. In addition to many photos, and paintings by the author, the booklet contains a brief text to help keep the photos in perspective. Squadron/Signal Publications, Inc., 1115 Crowley Dr., Carrollton, Tex. 75011, 1983. 80 pages. $8.95.

The Development of Strategic Air Command, 1946–1981, by J. C. Hopkins. A year-by-year account covering the assigned resources, command leadership, organization, operations, bombing competitions, missiles and missile competitions, and annual budgets of the Air Force's strategic strike force, this book is a rich lode of facts and figures on Strategic Air Command. Though it is an excellent reference for the scholar, the book should also delight the SAC veteran or enthusiast with its documentation of "firsts" and other assorted SAC trivia. This edition is updated from the 1976 version. With photos. Available from the Office of the Historian, Hq. SAC, Offutt AFB, Neb. 68113, 1982. 241 pages. $5.30.

F-105 Thunderchief and *F-14A & B Tomcat,* by Bert Kinzey. Volumes 8 and 9, respectively, of the Detail & Scale series, these booklets maintain the high standards of previous volumes. As with preceding entries in the series, the emphasis is on the physical details and markings of the aircraft as seen through close-up color and black-and-white photographs, line drawings, and three-view and cutaway drawings. The booklets conclude with a section rating available model kits of the aircraft. (A special highlight in the F-14 booklet is an account by Navy Tomcat pilot Lt. Larry Muczynski of the 1981 air battle above the Gulf of Sidra in which he and Cmdr. Hank Kleemann shot down two Libyan Su-22 aircraft after an attack by the Libyans.) With reference listings. Available from Aero Publishers, Inc., 329 Aviation Rd., Fallbrook, Calif. 92028, 1982. 72 pages. $6.95.

The First of the Few, by Denis Winter. Subtitled *Fighter Pilots of the First World War,* this book is a comprehensive, in-depth study of the life of the average British pilot in that war. The author addresses such subjects as how pilots were enlisted, standards for acceptance, training, life in combat, technical aspects, and pilot morale. The author concludes by examining the significance of the air war, suggesting that air combat killed as many, proportionately, as were killed in combat on the ground. With illustrations, notes, and index. University of Georgia Press, Athens, Ga. 30602, 1983. 223 pages. $17.50.

Re-entry: Turning Military Experience into Civilian Success, by Keith O. Nyman. The many job-hunting manuals that have appeared in recent years usually overlook the special problems facing the newly separated military member in his or her efforts to reenter the civilian job market. Perhaps the most difficult task confronting new civilians is learning how to market themselves in today's tight economy after years of being told where to go and what to do. Author Nyman, a twenty-five-year Navy veteran who is now a partner in a professional recruiting agency, has produced a manual full of commonsense pointers aimed specifically at ex-military people entering the civilian job market. This book's pragmatic approach probably ensures that it will have many gratefully employed readers. Stackpole Books, P. O. Box 1831, Harrisburg, Pa. 17105, 1981. 164 pages. $9.95.

Thinking About National Security, by Harold Brown. Harold Brown's career in this nation's defense establishment spans more than two decades; he has served as, among other things, Director of the Lawrence Livermore Laboratory, Secretary of the Air Force, member of the US SALT delegation, and Secretary of Defense. The depth and breadth of his experience is brought to bear in this book, which, as the author states, is "a consideration of the critical issues that affect U. S. national security policy." Dr. Brown stresses the essential consistency of US defense policy since World War II and its foundation in political, economic, and social realities. His prescription for the future is that we recognize that seemingly antithetical goals are actually mutually supportive, and that flexibility in pursuit of fundamental principles is necessary if we are to last out this turbulent century. With index. Published by Westview Press, Boulder, Colo. (distributed by Hearst Books), 1983. 290 pages. $16.95.

This Is the SAS, by Tony Geraghty. A history of Britain's famed Special Air Service Regiment, this pictorial record features more than 400 photographs (many published here for the first time) of the elite antiguerrilla unit in action, from its early days in World War II up to the recent fighting in the Falklands. While not purporting to be a definitive history, this illustrated record captures the flavor of both everyday life and nerve-wracking moments of action for the highly trained members of the SAS. Viewed together, the photos reveal clearly the unique personality and philosophy of this unusual organization. Arco Publishing, Inc., New York, N. Y., 1983. 156 pages. $16.95.

—Reviewed by Hugh Winkler, Ass't Managing Editor.

The Lukewaffe Winds It Up

A lone Starfighter stands as a reminder of the 1,574 German pilots who trained there.

BY COL. BARNEY OLDFIELD, USAF (RET.)

THE Iron Cross insignia serves as a reminder on the fuselage of a lone F-104G Starfighter on display just inside the main gate at Luke AFB, Ariz.

Something with great international security implications came to a halt there on March 16 of this year. Called the German Pilot Training Program, it had made Luke "the largest Luftwaffe base in the world," with more than 100 F-104Gs on the flight line at the peak period of instruction.

A total of 1,574 young men from the Federal Republic came to know Luke as a second home. Some 1,025 of them undertook basic flying training in that capricious, demanding, and jealous aircraft, which, if taken casually, could be lethal. Another 246 graduated from the updating fighter weapons instruction course, 189 from the advanced fighter-bomber tactical course, and 114 from advanced fighter weapons tactics.

Between 1964 and 1966, about 300 were "upgraded" into the F-104G from the older F-84Es, -Fs, and F-86s. All this took place above the sun-baked air base named for Lt. Frank Luke, the balloon-busting nemesis of their grandfathers in World War I.

The history of the program at Luke dates back to October 1950 and a discussion in the White House between President Harry S. Truman and the then President of Columbia University, Dwight D. Eisenhower. Returning to military service as NATO Supreme Allied Commander, Eisenhower was to form an operational military force with contributions from all of the Alliance signatories. The big question in that White House conversation was what part would be played by West Germany, then under occupation by US, British, and French forces.

Some way, Eisenhower said, must be found to include the Germans in the defense of Western Europe. In his view it didn't "make sense to attempt such a thing without them."

The Scene Shifts

On November 8, 1950, while flying above Korea in an F-80C, Air Force 1st Lt. Russell J. Brown spotted an aircraft of unknown type with North Korean markings. He shot it down. Only afterward did he learn how lucky he had been. This was the first recorded encounter with the highly maneuverable Soviet-designed MiG-15. Intelligence reports later indicated that the MiG-15 was also being deployed to Warsaw Pact nations.

No matter that the more sluggish US F-86s were running up a fifteen-to-one kill ratio against the MiG-15. Then Air Force Chief of Staff Gen. Hoyt S. Vandenberg put Lockheed's C. L. "Kelly" Johnson and a team of aeronautical engineers on a project to develop, as he put it, " . . . a plane that will go like hell, and yo-yo up and down like crazy." That led to the aircraft that was to be designated the F-104 Starfighter.

When the Germans signed the peace treaty with the Western Allies on May 9, 1955, they undertook the rebirth of a military force that would become a key element in the Alliance.

Later, on August 23, 1957, a mufti-clad contingent of fifteen veteran Luftwaffe pilots arrived at Sky Harbor Airport in Phoenix, Ariz. They were en route to Luke for jet training.

This was a spectacular group. Among them, they had tallied 1,000 aerial combat victories in World War II. Erich Hartmann alone was credited with 352. Hartmann had survived 1,405 missions, 825 dogfights, and had been shot down sixteen times. Of the fifteen, Guenther Rall (275 victories) had been given the responsibility for the selection of a US-built aircraft that would become the reborn Luftwaffe's main fighter-bomber. In that class, called 57-T, were four future Luftwaffe chiefs—Johannes Steinhoff, Rall, Fritz Obleser, and Fritz Wegner.

F-104G Starfighters sit on the Luke flight line under an Arizona sunset after a day of flying. Sunset for the German Pilot Training Program itself came on March 16.

Instruction of the German pilots in the F-104G began in June 1965. In small groups, a new class began every six weeks. Germany's use of US Air Force training facilities saved it money and pumped about $600,000 a year into Luke's surrounding community. Furthermore, the Federal Republic paid $250,000 per graduated pilot into the US Treasury. Maintenance costs to the Luftwaffe totaled $310 million, the beneficiaries being Lockheed, GE, Autonetics, Litton Industries, and others. Operational costs ran to more than $155 million.

Community Activities

The Germans were also invited to become involved in many off-base activities. This community spirit was not totally altruistic. With a complicated aircraft and its avionics requiring intense concentration, a special effort was made to put the German pilots at ease. The effect was to demonstrate the lack of community hostility and alleviate homesickness. For their part, the young Germans responded in kind to become a valuable cultural extension of their homeland.

A former Air Force chief master sergeant and aerospace industry employee, Thomas Rhone, was especially effective in cementing relations between the visitors and their hosts. Rhone encouraged former Arizona Gov. Jack Williams to charter an "Honorary Cactus Starfighter Squadron," whose membership would include any German who had logged flying time in the American Southwest. On graduation, Governor Williams gave each pilot a certificate of "Honorary Citizenship in the State of Arizona for Life." Accompanying this was a deed to a one-inch square of Arizona public land, so each pilot could claim he had a "second home as well as a homeland."

In return, Arizona governors since then have asked only that members of the Cactus Starfighter Squadron hold a reunion every two years. This event takes place at the Hannover Air Show in Germany. On that occasion it is customary for the German pilots to wear Western US costumes. Citizens of conservative old Hannover are startled to see Apaches a long way off the reservation and cowboys out on the town, all with attendant exuberance.

Involved American pilots have come to value this special bond between the two countries, deeper and stronger than mere diplomacy.

American Hospitality

The only head of state ever to visit Luke's training program was President Gerald R. Ford. When he was greeted on November 14, 1974, on the flight line by Leutnant Juergen Dessau and his wife, Beate, the young officer said:

"Mr. President, it is a great honor to meet you, but besides that, for me to be able to tell you in person for all of us in the Luftwaffe who have enjoyed the hospitality of this America, that through you we wish to thank the American people for having made this our second home—and such a well-remembered one!"

Reflecting this mutual admiration, an aerospace industry executive, Litton Industries former President and current Board Chairman Fred O'Green, agreed to underwrite a book documenting this extraordinary program. *Those Wonderful Men in the Cactus Starfighter Squadron (Die aussergewöhnlichen Männer der Kaktus Starfighter Staffel)* is published in both German and English. All proceeds from the book's sale go into the Luftwaffe/USAF International Friendship Foundation, an endowment that has now grown to more than $46,000. Disbursements are made each year to local Boys and Girls Clubs and various Arizona charities.

The German and American media have always held a morbid fascination for F-104G crashes—some 250 with more than eighty fatalities. Not much is said of the courage of the new Federal Republic in taking on a forefront technology with all the inherent risks. Seldom mentioned also is what German military strength, including the Luftwaffe honed and whetted at Luke, has contributed to NATO and to keeping the peace in Europe. ■

Veteran newspaperman, radio commentator, Hollywood publicist, and longtime USAF public affairs officer, Barney Oldfield is now Corporate Director, Special Missions and Projects, for Litton Industries. Among his recent exploits was persuading Ronald Reagan to search through his closets and deliver his World War II Army Air Forces overcoat to the USAF Museum for display.

A month before the Luke progam ended, Tom Rhone of Litton Industries received the German Federal Distinguished Service Cross. For eighteen years, Rhone has been extraordinarily active in promoting good relations between the German pilots and the Americans. (USAF photo by Sgt. Greg Pritchard)

THE BULLETIN BOARD

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Pay Freeze Draws Fire

The announced freeze on military and federal pay for FY '84 in the President's State of the Union Address *(see March '83 "Editorial," p. 8)* elicited a cacophony of criticism from varied sources. Speaking to the civilian cuts, Rep. Mary Rose Oakar (D-Ohio) said, "What this Administration has proposed . . . affecting federal employees and retirees is a brazen effort to overturn the entire structure of federal pay, health insurance, and retirement benefits." Characterizing the health of the Civil Service system as "rapidly deteriorating," she added, "I sometimes wonder whether all the lights are turned on either at the White House or at OPM."

Secretary of Defense Caspar W. Weinberger put the Administration's case for a military pay freeze to Congress this way: "This year we have asked our military personnel to join all other recipients of government payment in a common sacrifice by forgoing a pay raise in FY '84. By doing so they contribute, along with all other government employees and beneficiaries, to the important national goal of reducing near-term deficits." He added that if recruiting or retention suffered, a turnaround of this action would be sought from Congress. He also included a promise that a catch-up "substantial pay raise" would be included in the Administration's FY '85 budget.

The reaction from across a broad spectrum was instantaneous and, in the main, censorious. Some representative comments included this by Rep. Marjorie S. Holt (R-Md.), who said that the military had just started "regaining their confidence," and felt this action would weaken that condition. Sen. Gary Hart (D-Colo.) said that "even if there is a pay raise in FY '85, many of those with critical—and marketable—skills will feel they cannot plan on a secure financial future in the military. And they will leave."

Sen. Pete Domenici (R-N. M.) averred that freezing active-duty pay is not the way to cut the Pentagon's budget. Sen. Nancy Kassebaum (R-Kan.) dispatched a missive to OMB Director David Stockman asking for review and reconsideration of the proposal. Taking immediate steps, Sens. John Tower (R-Tex.), Roger Jepsen (R-Iowa), and Strom Thurmond (R-S. C.) introduced legislation providing for a four percent cost-of-living increase in 1984.

One of the more interesting statements came from the Disabled American Veterans. In congressional testimony, that organization's National Commander, Edward G. Galian, said he believed that America's disabled veterans would accept a temporary freeze in their benefits if the cutback "applied equally across the board to beneficiaries of all federal entitlement programs."But he warned that if other groups weren't asked to share a like burden, the DAV would "go to the mat immediately." Significantly, however, he asked specifically that Congress grant "a full cost-of-living increase—on time—to the men and women serving in the armed forces."

Not doing his cause much good, Secretary Weinberger, at a news conference for AIR FORCE Magazine and other military-oriented publications, tried to make a case that the Administration had achieved "pay comparability" sometime in 1982, and that it would be maintained "all through 1983 in spite of last year's four percent pay cap." He clung tenaciously to this position despite repeated questioning from the amazed correspondents.

While debates of this nature frequently degenerate into a case of "you cite your economist and I'll cite mine," a well-informed source who has been following the military pay situation for many years tells AIR FORCE Magazine that it's generally agreed that the demonstrated pay comparability gap in 1983 is at least ten to fifteen percent.

There's no question—this issue will not go away.

Senior Civilians Honored

Nine senior civilian Department of the Air Force employees have been named either Distinguished or Meritorious Senior Executives, in recognition of their sustained contributions to the Air Force.

These Presidential Rank Awards are presented annually to outstanding members of the Senior Executive Service, a gradeless element of Civil Service, in which pay is based on personal and organizational performance.

The Air Force recipients joined other SES recipients—a total of thirty-eight "Distinguished" and 161 "Meritorious"—at two ceremonies. Distinguished Executive Rank winners Janusz S. Przemieniecki, Dean of the

Seven senior Air Force civilian executives recently received Meritorious Presidential Rank Awards. They are (from left): J. Craig Cumbey, Ferdinand Maese, Lloyd Mosemann, George Peterson, Ralph Johnston, John Scott, and Willard Mitchell. See item.

School of Engineering at AFIT, Wright-Patterson, AFB, Ohio, and James E. Williams, Jr., Deputy Assistant Secretary of the Air Force for Acquisition Management in the Office of the Assistant Secretary of the Air Force for Research, Development and Logistics, were honored by President Reagan in a White House ceremony. Mr. Reagan noted, "You we're honoring today are . . . the people who assure the success of the day-to-day operations of all those we call the United States government."

The seven Meritorious Presidential Rank Award recipients *(see photo)* were honored at a ceremony at the State Department. On hand was Donald J. Devine, Director of the Office of Personnel Management, and the Hon. Tidal W. McCoy, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations. The Hon. Edwin Meese III, Counselor to the President, praised the recipients for their dedication.

Air Force executives receiving the Meritorious honor this year were J. Craig Cumbey, Deputy Assistant Secretary (Civilian Personnel Policy and Equal Employment Opportunity) and Director of Civilian Personnel, Washington, D. C.; Ralph C. Johnston, Assistant for Acquisition Management, Aeronautical Systems Division, Wright-Patterson AFB, Ohio; Ferdinand E. Maese, Deputy Director of Material Management, San Antonio Air Logistics Center, Kelly AFB, Tex.; and Willard H. Mitchell, Principal Deputy Assistant Secretary of the Air Force for Financial Management, Washington, D. C.

Also, Lloyd K. Mosemann II, Deputy Assistant Secretary of the Air Force for Logistics and Communications, Washington, D. C.; George P. Peterson, Director, Air Force Materials Laboratory, Air Force Wright Aeronautical Laboratories, Wright-Patterson, AFB, Ohio; and John K. Scott, Deputy Assistant Comptroller of the Air Force for Accounting and Finance, Denver, Colo.

Selectees receive a cash award and a Presidential citation.

Commissioning Source Cooperation

The Air Force Academy, the USAF Recruiting Service (which brings in the bulk of OTS applicants), and AFROTC are cooperating to an unprecedented and welcome degree to ensure that the Air Force is getting top-quality officer candidates in all programs. Meetings among the three organizations, during which mutually supportive strategy is developed, take place regularly.

Lt. Col. Dan C. McNamara, Commander of the Security Police Squadron at Eglin AFB, Fla., shows off the squadron's new jeep. The jeep was confiscated from its original owner when he was apprehended transporting several pounds of marijuana in it across the base. (USAF photo)

Brig. Gen. Winfield S. Harpe, Commander of the US Air Force Recruiting Service and Deputy Chief of Staff for Recruiting, Hq. ATC, told AIR FORCE Magazine that "this is no paper program." He noted that Air Force recruiters are contacting Academy aspirants to assist them in completing their applications; more than 4,500 eligible young people were referred to AFROTC last year by Air Force recruiters; and local recruiting squadron advertising people are helping increase AFROTC campus awareness.

Conversely, AFROTC detachment officers are easing the way for Air Force recruiters on campus—especially in the critical engineering area. As a direct result, the College Senior Engineer Program has increased 450 percent over last year, a prime reason why Recruiting Service believes it may make its goal of 663 engineers in FY '83.

We'll keep our fingers crossed!

VA Budget $26 Billion

Continuing a trend, VA's projected budget for FY '84 shows an increase of about $1.1 billion, for a total of $26.1 billion. This will fund a variety of services and pay for benefits for some 28,500,000 veterans—down about a million from this year—and eligible members of their families and survivors.

The increases are due primarily to increased funding for medical and construction programs. Agency employment is expected to increase by almost 2,000 spaces—to a level of 220,785—with most of this increase attributed to staffing of new medical facilities and allowing a higher staff-to-patient ratio at existing VA centers.

The budget does call for a 5.1 percent cost-of-living increase in compensation and pension payments. However, in line with Administration policy, the effective dates would be delayed—to December 1, 1983, for pensions, and to April 1, 1984, for compensation increases. Both actions require congressional approval. Some $21 million in projected savings is budgeted, based on proposals that Congress abolish correspondence training and cut back educational assistance to vets.

The 1984 plan would provide for a record high construction program of $868 million, with a proposed Minneapolis hospital, incorporating a 120-bed nursing home, the largest single item at $254 million. Other large construction projects include extensive renovation at the Biloxi, Miss., Medical Center; and construction of nursing-home care units in Loma Linda, Calif., Lyons, N. J., Miami, Fla., Northport, N. Y., Providence, R. I., San Francisco, Calif., and West Los Angeles, Calif.

Other construction and renovation projects span the country. Also requested are 78,000 gravesites at the Calverton National Cemetery on Long Island, N. Y.

VA projects that 1,250,000 patients will be treated in VA hospitals during FY '84, about the same number estimated for the current year. However, outpatient visits are programmed to grow by some 124,000, to 18,214,000. VA hospitals will maintain 79,000 operating beds in FY '84, yet they will treat 205,000 more patients than they did ten years ago. This is attributed to an ability to move patients home sooner through increased staff-to-patient ratios, generally shorter lengths of recommended stay, and the availability of alternative care in nursing homes and outpatient clinics.

CHAMPUS Changes

CHAMPUS has now become "second pay" to all other health insurance plans for active-duty families, as it has long been for all other CHAMPUS beneficiaries. This is another attempt to bring down CHAMPUS costs.

Second pay means that a CHAMPUS-eligible person who has other health insurance coverage must first file a claim with that provider, and a copy of the paid claim must accompany the CHAMPUS submission. Once the other plan has paid, CHAMPUS will then pay up to the amount it would have paid had there been no

other coverage or the remaining balance, whichever is less. The other plan's payment may be counted toward the annual CHAMPUS outpatient deductible.

CHAMPUS officials stress that this new approach in no case changes CHAMPUS rules for care it will pay for. Even if another company pays a portion of some treatment, CHAMPUS will not cost-share if the procedure is not one ordinarily covered by CHAMPUS.

In other CHAMPUS news, the program has relaxed the requirement for physicians to get a patient's signature on claim forms in cases where doctors have limited contact—or no contact at all—with the patient.

The signature obtained by the hospital for inpatient care reimbursement by CHAMPUS will also suffice when certain specialists bill separately for services during the hospital stay. The new rule applies to radiologists, pathologists, neurologists, cardiologists, and anesthesiologists who accept CHAMPUS assignment of costs. If they *don't* accept the assignment, then individual signatures will still be required.

CHAMPUS officials claim this procedure will avoid delays in claims by as much as thirty days and also save CHAMPUS up to $150,000 annually in administrative costs from claims returned because of signature problems.

THE BULLETIN BOARD

First Enlisted Commandant

CMSgt. Bobby G. Renfroe (*see photo*) will become the first enlisted commandant of the USAF Senior NCO Academy at Gunter AFS, Ala., next month. (*See related item, October '82 "Bulletin Board."*)

The twenty-four-year-service veteran has been Commandant of Air Training Command's NCO Academy at Lackland AFB, Tex. He has spent much of his career in the civil engineering field, but in 1973 was a member of the original group that established the ATC NCO Academy. He later became the first commandant of the Seventeenth Air Force Leadership School at Kapaun, Germany, in 1978. He returned to the ATC NCO Academy in 1980 and became Commandant in October 1981.

Chief Renfroe succeeds Col. Eddie C. Norrell. The USAF Senior NCO Academy graduates about 1,250 each year. In addition to establishing policy for curriculum for the Academy, Chief Renfroe will serve as the principal advisor to the Commander of Air University on senior NCO professional military education.

CMSgt. Bobby G. Renfroe, standing, is the first enlisted Commandant of the USAF Senior NCO Academy. See item. (USAF photo)

SENIOR STAFF CHANGES

PROMOTIONS: To be **Major General (Air Force Reserve):** William L. **Copeland;** Gerald E. **Marsh;** Edward L. **McFarland;** John D. **Moore;** Jerome N. **Waldor.**

To be **Brigadier General (Air Force Reserve):** Norman J. **Deback,** Jr.; Ira **De Ment** III; Ralph D. **Erwin;** Walter **Jajko;** Simeon **Kobrinetz;** Frances I. **Mossman;** Thomas R. **Pochari;** William C. **Roxby,** Jr.; Rocco S. **Sgarro,** John G. **Sullivan.**

RETIREMENTS: M/G Patrick J. **Halloran;** L/G Richard C. **Henry;** M/G William J. **Kelly;** L/G Paul W. **Myers;** B/G Dennis B.**Sullivan.**

CHANGES: B/G (M/G selectee) William P. Bowden, from Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., to DCS/Log. Ops., Hq. AFLC, Wright-Patterson AFB, Ohio, replacing M/G Charles McCausland . . . **Col. (B/G selectee) Richard F. Gillis,** from Dir. of Maintenance, Warner Robins ALC, AFLC, Robins AFB, Ga., to Vice Cmdr., Warner Robins ALC, AFLC, Robins AFB, Ga., replacing B/G William M. Shaw, Jr. . . . **Col. (B/G selectee) Samuel J. Greene,** from Vice Dir., Joint Tac Comm. Office (TRI-TAC), Ft. Monmouth, N. J., to Dir., J-6, Hq. USCENTCOM, MacDill AFB, Fla.

B/G (M/G selectee) Alfred G. Hansen, from DCS/Log., Hq. MAC, Scott AFB, Ill., to Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., replacing B/G (M/G selectee) William P. Bowden . . . **B/G Thomas A. LaPlante,** from Vice Cmdr., Acquisition Log. Div., Hq. AFLC, Wright-Patterson AFB, Ohio, to Dep. Dir., Log. Ops., Hq. AFLC, Wright-Patterson AFB, Ohio . . . **M/G Keith D. McCartney,** from Dir., Manpower & Org., DCS/M&P, Hq. USAF, Washington, D. C., to Ass't DCS/M&P, Hq. USAF, Washington, D. C., replacing retired M/G Mele Vojvodich, Jr.

M/G Charles McCausland, from DCS/Log. Ops., Hq. AFLC, Wright-Patterson AFB, Ohio, to C/S, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing retired M/G William J. Kelly . . . **B/G Marc M. McClelland,** from Cmdr., 433d TAW (AFRES), Kelly AFB, Tex., to Vice Cmdr., 4th AF (AFRES), McClellan AFB, Calif. . . . **Col. (B/G selectee) Robert P. McCoy,** from Dir. of Maintenance, Sacramento ALC, AFLC, McClellan AFB, Calif., to DCS/M&P, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing B/G Larry N. Tibbetts.

Col. (B/G selectee) Richard L. Stoner, from Dir. of Maintenance, Oklahoma City ALC, AFLC, Tinker AFB, Okla., to Dep. Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C. . . . **B/G Larry N. Tibbetts,** from DCS/M&P, Hq. AFLC, Wright-Patterson AFB, Ohio, to Dir., Manpower & Org., DCS/M&P, Hq. USAF, Washington, D. C., replacing M/G Keith D. McCartney . . . **Col. (B/G selectee) Larry D. Wright,** from Cmdr., 438th MAW, MAC, McGuire AFB, N. J., to DCS/Log., Hq. MAC, Scott AFB, Ill., replacing B/G (M/G selectee) Alfred G. Hansen. ■

Air Force Space Badge Due

Long-awaited recognition of people performing in space system duties will be possible this summer when AFR 35-10 is changed to allow wearing of a "space badge." At the same time—hopefully—the badge will be available in clothing sales stores.

Air Force headquarters has told the field in no uncertain terms that, as an inducement to approval, the Air Force Uniform Board received "repeated assurances that proliferation" would be precluded. Accordingly, only those who launch, control after launch, operate, attack, maintain, develop, test, or evaluate a space system; command space units; plan for future space systems; or train or evaluate those who do perform such duties, are eligible for the new recognition.

Specifically excluded are those who perform "support duties in space organizations that are indistinguishable from duties performed in non-space units." Headquarters guidance stresses that wearers of the space badge should have daily application of specialized knowledge unique to space systems. If in doubt, the direction is firm—"resolve in favor of non-award."

Short Bursts

Some interesting figures surfaced from congressional review of the **FY '84 DoD Budget.** Forty-one percent of the total request is earmarked for the **Air Force**. The share for "people," including pay, health care, construction, retirees, but excluding training, is **forty-four percent.** With training costs added, it's fifty-five to fifty-seven percent.

Veterans who already receive compensation for a **service-connected disability** may be eligible for **vocational counseling** aimed at helping them overcome any employment handicap that resulted from the disability. Local VA contacts, listed in the phone book, will answer questions about this program.

Last year, Air Force members and civilian employees had **137 inventions adopted by the Air Force.** Inventors can earn up to $300 if patenting results, plus cash awards from the Suggestion Program. Inventions in 1982 included the **"maintenance lock for aircraft speed brakes,"** as well as the **"volleyball net foul detector and in-bound/out-of-bounds system."**

CHAMPUS is now providing limited coverage for certain treatments for **morbid obesity,** an overweight condition that can be life-threatening. Covered, under certain conditions, are gastric bypass, gastric stapling, and gastroplasty. Jaw-wiring or special diets are not covered.

A recent Air Force survey showed that for every $3 a blue-suiter spends on a **PCS move,** only **$1** is reimbursed. In short, it's costing Air Force people money to make government-directed moves.

With the **GLCM buildup at Comiso AB, Sicily,** under way, the Air Force has put out a call for enlisted volunteers in nearly every career field. Slated for activation this year, this second European GLCM site will eventually host close to 300 people. It's a one-year, remote tour.

The **"Honorman"** of the fiftieth class of the USAF Senior NCO Academy wears blue—Navy blue, that is. He's **CTMCS Serio J. Rossi, Jr.,** Rota, Spain. The first Navy type to win this distinction, Rossi also received the Air Force Commandant's Award for the student who best exemplifies the "whole person."

Early outs of up to three years are being offered to **some first-term airmen** who will then agree to serve twice their remaining active-duty commitment with a **Guard or Reserve unit.** Those interested should see their local CBPO.

The upcoming **AFROTC summer encampments** will see **more emphasis on physical training,** a more military environment, and increased drill and ceremony. Weekend training will be added and a new area of instruction called "Officership" will be introduced. Changes generally reflect tougher Air Force-wide emphasis on standards. ■

Dr. A. Martin Eldersveld, Dean of the Community College of the Air Force, has retired. Dr. Eldersveld was successful during his tenure in attaining two important goals for the CCAF: attainment of degree-granting authority and accreditation by the Southern Association of Colleges and Schools. (USAF photo)

VALOR

Uncommon Gallantry

He couldn't just leave the downed airman in the middle of the fierce battle for A Shau.

BY CAPT. MICHAEL B. PERINI
CONTRIBUTING EDITOR

THE US Special Forces operated an outpost near A Shau, on the Vietnamese border. The camp, near a primary enemy infiltration route, was surrounded by 1,500-foot mountains. The triangular outpost depended heavily on air support for food, fuel, ammunition—everything to keep the camp going.

During a fierce, bloody two-day battle in March 1966, some 2,000 North Vietnamese (NVN) troops fought twenty Green Berets and 375 South Vietnamese defenders for control of the border camp. During the attack, low clouds hampered air support missions, even though 213 close air support sorties were flown by US and South Vietnamese Air Force pilots. The camp finally had to be evacuated on March 10.

Acts of bravery came in many ways during the final struggle for A Shau. One man's uncommon gallantry, however, stands out among the others.

On the morning of the second day of battle, A Shau defenders had been driven into a single bunker in the northern corner of the fort. They needed air strikes badly to slow the enemy advance. Maj. Bernard F. Fisher, an A-1E Skyraider pilot stationed at Pleiku, was among the airmen who were diverted from other missions and ordered to make strafing runs along one wall of the fort in a final attempt to stop the NVN troops.

The enemy had lined the mountain valley with twenty antiaircraft artillery pieces and hundreds of automatic weapons, making it a deadly flak trap for the slow-moving A-1Es. Fisher knew of the dangers, as he had directed air strikes on enemy positions the day before. During the battle, Major Fisher heard a fellow airman, Maj. Dafford W. "Jump" Myers, radio a call for help: "I've been hit and hit hard."

Myers's Skyraider had caught fire as a result of hits by .50-caliber machine-gun bullets. He was too low to bail out, so he decided to try landing on the A Shau runway even though his vision was blocked by smoke and flame. Fisher followed alongside Myers, giving directions. Deep ruts had been cut in the 2,500-foot debris-covered field, so Myers, still following flight directions from Fisher, retracted his gear and made a wheels-up landing. "He had tried to release his belly tank, but couldn't, so it blew as soon as he touched," Fisher remembered. The plane slid off the side of the runway nearest the enemy.

Fisher called for a rescue helicopter, then circled Myers's burning A-1E. He saw Myers run from the aircraft, his clothes smoking, and then jump into a small ditch. Believing that Myers had been seriously injured, Fisher decided that the rescue helicopter might not arrive in time to save the Major from capture.

"I'm going in," he radioed. The other A-1E pilots followed Fisher to cover his landing. One pilot said later, "It was like flying inside Yankee Stadium with the people in the bleachers firing at you with machine guns."

Fisher (left) and Myers after the dramatic rescue on the strip at A Shau.

Fisher tried a northern approach, but came in too fast. He couldn't stop in time, so he took off again. The enemy fired at him as he made a 180-degree turn and landed again. He turned the aircraft around and taxied back down the obstacle course of fifty-five-gallon oil drums, gaping holes from mortar blasts, and debris from Myers's A-1E.

Streams of tracers from enemy machine guns whipped around him as he looked out his window in search of Myers. Spotting Myers running and waving, he stopped and started to unstrap to get the Major. Just as he was getting out, Myers reached the aircraft. Fisher pulled him head first into the Skyraider. "It was hard on his head, but he didn't complain," Fisher recalled.

Jamming the throttle forward to the wall, Fisher took off and flew at treetop level until he had gained enough speed to climb out of the valley and safely above the clouds. Minutes later, they landed at Pleiku. Except for singed hair and eyebrows, Myers was unhurt. Maintenance crews later found nineteen bullet holes in Fisher's A-1E.

On January 19, 1967, President Lyndon B. Johnson presented Major Fisher the first Medal of Honor to be awarded to an Air Force officer during the Vietnam War. In an interview with AIR FORCE Magazine, Fisher said he does not regret his decision to risk his life to rescue Myers. "I just felt so strong about it, and still do. You just can't leave a guy there," he explained.

Fisher, a retired Air Force colonel, resides with his family in Kuna, Idaho. He serves as a member of the state's Commission for Pardons and Parole, farms sweet corn and lima beans and raises cattle, and is a part-time pilot for a regional freight airline.

Fisher still keeps in touch with Myers, who is also retired and lives in Newport, Wash. ■

INDUSTRIAL ASSOCIATES OF THE AIR FORCE ASSOCIATION

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Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society, and the maintenance of adequate aerospace power as a requisite of national security and international amity.

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Howell Instruments, Inc.
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Hughes Helicopters
HR Textron, Inc.
IBM Corp., Federal Systems Div.
IBM National Accounts Div.
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Intermetrics, Inc.
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Itek Optical Systems, a Division of Itek Corp.
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ITT Federal Electric Corp.
Jane's Publishing
Kelsey-Hayes Co.
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King Radio Corp.
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Litton Industries Guidance & Control Systems Div.
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Lockheed Electronics Co.
Lockheed Engineering & Management Services Co., Inc.
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Magnavox Government & Industrial Electronics Co.
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Martin Marietta Denver Aerospace
Martin Marietta Orlando Aerospace
MBB
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United Technologies Corp.
UTC, Chemical Systems Div.
UTC, Hamilton Standard Div.
UTC, Norden Systems, Inc.
UTC, Pratt & Whitney Aircraft Group
UTC, Research Center
UTC, Sikorsky Aircraft Div.
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As part of its fund-raising to support aerospace education in this nation, the Aerospace Education Foundation has been offering to the public the three items shown below for tax-deductible contributions of $1,000 each.

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For tax-deductible contributions of only $125 per quarter over a two-year period or $250 per quarter over a year, you could be added to the Honor Rolls of Doolittle or Eaker Fellows or receive a leather-bound copy of *Crusade for Airpower,* the story of AFA and the Aerospace Education Foundation.

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For more information, or to place an order, please contact Foundation Managing Director Michael J. Nisos at 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006, or phone (202) 637-3370.

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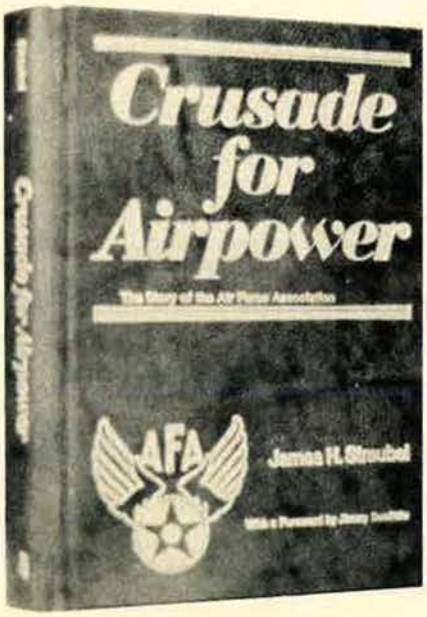


Left: The leather-bound collector's copy of *Crusade for Airpower,* signed by all living former Air Force Secretaries and Chiefs of Staff. Above: The General Jimmy Doolittle Educational Fellow plaque. Right: The General Ira Eaker Historical Fellow medallion.

AFA Intercom

AFA's Enlisted Council And JOAC Hold First Meetings of New Year

In mid-February, concurrent with one of Washington, D. C.'s worst snowstorms of the century, AFA's Enlisted Council and Junior Officer Advisory Council Executive Committee held their initial meeting of the new AFA year. AFA's Board of Directors and other committees met at the same time, and the Enlisted Council and JOAC Executive Committee shared many social activities with the other groups.

AFA's active-duty councils advise the AFA President on matters affecting their constituencies. Also, they serve the Air Force as a resource group for exploration of various personnel matters. For example, each of last year's councils researched and wrote a study of leadership expectations of their peers *(see February '83 "Intercom")*. These studies have been well received and are being reviewed by Air University for possible inclusion in Professional Military Education courses.

The councils were welcomed on behalf of AFA by Deputy Executive Director Andrew B. Anderson. They also heard from CMSAF Arthur L. (Bud) Andrews, advisor to the Enlisted Council. A keynote address was delivered to the groups by Maj. Gen. Kenneth L. Peek, Jr., Director of Personnel Plans from the Office of the Deputy Chief of Staff for Manpower and Personnel, and advisor to the JOAC.

Briefings for the first day of the two-day meeting included updates on AFA organization as well as a discussion of the Air Force's concern with scientific and technological literacy as embodied in its "Project Technological 2000." Maj. Roger Bossart, Deputy Chief of the Leadership and Motivation Branch at the Pentagon, gave the presentation on "Tech-2000."

At lunch, AFA President David L. Blankenship charged both groups with articulating the concerns of their peers for possible support by AFA in its national policy. He told them, "You are important to AFA and to me, and I am interested in your thoughts." He encouraged them to become active in local AFA groups in appointed positions. He also said, "We want you to tell us what burning issues affect your constituencies that AFA should be addressing."

During the meetings, the councils also had the opportunity to meet Russell E. Dougherty, AFA's Executive Director, and many AFA elected and appointed leaders.

While agenda plans for 1983 are not yet firm, it is anticipated that both councils will be pursuing means of supporting the Air Force (and AFA) emphasis on combating scientific and technological illiteracy. Both groups plan to meet during the summer and at the AFA National Convention in September.

Enlisted Council

This Council, which includes a majority of the Air Force's Outstanding Airmen for 1982, advises the AFA National President on matters concerning the enlisted force. CMSgt. James C. Binnicker of Randolph AFB, Tex., is Council Chairman. The Vice Chairman is CMSgt. Richard J. Tinneny, Maxwell AFB, Ala. SMSgt. David W. Lepori, Kirtland AFB, N. M., is Recorder.

Members are MSgt. Ronald J. Auspelmyer, Minot AFB, N. D.; SSgt. Brian A. Bell, Bradley ANGB, Conn.; SMSgt. Charles R. Brown, Clark AB, R. P.; MSgt. George F. Cruz, Portland IAP, Ore.; TSgt. Dennis A. Eibe, Randolph AFB, Tex.; MSgt. Robert E. Flanagan, Patrick AFB, Fla.; SMSgt. Richard L. Hall, Hurlburt Field, Fla.; MSgt. Pauline Humphries, Andrews AFB, Md.; SSgt. Michael S. Jaques, Elmendorf AFB, Alaska; MSgt. Bobby K. Jordan, Offutt AFB, Neb.; SSgt. Tracy Y. Little, Howard AB, Panama; MSgt. James E. McAuley, Tempelhof Central Airport, Germany; CMSgt. Richard C. Schneider, Washington, D. C.; and Sgt. Gary J. Turner, Fairchild AFB, Wash.

Chief Master Sergeant of the Air Force Arthur L. Andrews is Council Advisor.

ENLISTED COUNCIL

Binnicker *Tinneny* *Lepori* *Auspelmyer* *Bell* *Brown*

Cruz *Eibe* *Flanagan* *Hall* *Humphries* *Jaques*

Jordan *Little* *McAuley* *Schneider* *Turner* *Andrews*

JUNIOR OFFICER ADVISORY COUNCIL


Loucks


Houser


Basile


Aguirre


DeLuca


Patterson


Petrilla


Scott


Sebree


Seibel


Sweeney


Wilson


Vendlinski


Peek

Junior Officer Advisory Council

This Council advises the AFA National President on matters affecting junior officers, and includes at least one representative from each Air Force major command and separate operating agency. The Council's Executive Committee is chaired by Capt. John A. Loucks, USAF Academy, Colo. Capt. Jack L. Houser, Offutt AFB, Neb., is Vice Chairman. The Recorder is Capt. Michael J. Basile, Niagara Falls IAP, N. Y.

Other JOAC Executive Committee members are Capt. Ralph L. Aguirre, Langley AFB, Va.; Capt. Frank J. DeLuca, Jr., Wright-Patterson AFB, Ohio; Capt. Vincent I. Patterson, Gunter AFS, Ala.; Capt. John D. Petrilla, Washington, D. C.; Capt. Lynn M. Scott, Randolph AFB, Tex.; Capt. James H. Sebree, Jr., Randolph AFB, Tex.; Capt. Mary Ann Seibel, St. Louis, Mo.; Capt. Lawrence E. Sweeney, Andrews AFB, Md.; Capt. William M. Wilson, Jr., Scott AFB, Ill.; and 1st Lt. Terry P. Vendlinski, Kelly AFB, Tex.

Maj. Gen. Kenneth L. Peek, Jr., USAF Director of Personnel Plans, is Council Advisor.

AFA POLICY ADVISORS


Binnicker


Echevarria


Flynn


Hefton


Loucks


Murrell


McFarland


Potter


Reese


Rowe


Scott


Tucker

AFA Policy Advisors

The Air Force Association's Policy Advisors, all volunteers, counsel the National President on policies and developments pertinent to their fields of expertise.

The following Policy Advisors were selected by the National President to serve during 1983 because of their expertise in areas vital to AFA's mission: CMSgt. James C. Binnicker, AFA Enlisted Council Chairman, Randolph AFB, Tex., Enlisted Advisor; Lt. Col. Ramon L. Echevarria, USAF (Ret.), Medford, N. Y., Junior AFROTC Advisor; Lt. Gen. John P. Flynn, USAF (Ret.), San Antonio, Tex., Veterans Advisor; and Col. Richard R. Hefton, Midwest City, Okla., Air National Guard Advisor.

Also, Capt. John A. Loucks, AFA Junior Officer Advisory Council Chairman, USAF Academy, Colo., Junior Officer Advisor; Jack P. Murrell, Burke, Va., Civilian Personnel Advisor; Brig. Gen. Edward L. McFarland, Tulsa, Okla., Air Force Reserve Advisor; Maj. Diana J. Potter, Norman, Okla., Senior AFROTC Advisor; Dr. Bruce A. Reese, Tullahoma, Tenn., Science Advisor; Kenneth A. Rowe, Richmond, Va., Civil Air Patrol Advisor; CMSgt. Walter E. Scott, USAF (Ret.), Dixon, Calif., Retiree Advisor; and Brig. Gen. James L. Tucker, Jr., USAFR, MC, Abilene, Tex., Medical Advisor.

—By James A. McDonnell, Jr.

Front Range Chapter Honors Two, Hears Program on Aggressors

During a recent meeting of AFA's Front Range Chapter at Lowry AFB, Colo., Col. Charles L. "Chick" Henn, Assistant Chief of Staff at the USAF Academy and a former commander of the 64th Aggressor Squadron at Nellis AFB, Nev., briefed the assembled AFAers on the background and development of the aggressor concept. The meeting also provided the occasion for the presentation of two AFA awards.

Colonel Henn's briefing on the Aggressor Squadron included information on the organization and current mission of the Aggressors. A highlight of his presentation was the showing of slides and gun-camera films of the Aggressor Squadron in action.

During the Chapter meeting, AFA Vice President for the Rocky Mountain Region Karen Kyritz presented an AFA citation to CMSgt. George B. Heimrich for his high professionalism and dedicated service and support of AFA. Sergeant Heimrich, Senior Enlisted Advisor at Lowry AFB, has served AFA as

AFA Vice President for the Hocky Mountain Region Karen Kyritz presents an AFA Citation to George B. Heimrich for his outstanding contributions to AFA. See item.

the designated Air Force national liaison to AFA's Enlisted Council and Senior Enlisted Advisor Conference.

Front Range Chapter President Jim Clark also presented an AFA plaque of appreciation to Colorado ANG Col. Bill Morris in recognition of his accomplishments while serving as Front Range Chapter president. Colonel Morris is currently Colorado State AFA President.

Anonymous Donor Helps AEF to Disseminate Aerospace History

As part of its goal to perpetuate knowledge of the rich military aerospace history of this nation, AFA's educational affiliate, the Aerospace Education Foundation, has been making available to future aerospace leaders publications that will enhance their awareness of American airpower pioneers and leaders.

For instance, in 1982 copies of the book *A Few Great Captains*—DeWitt S. Copp's account of the formative years of American airpower—were donated to all Air Force Junior and Senior ROTC units, NCO Academies, Civil Air Patrol regions, and the Officer Training School. Part of the cost of these books was deferred by AFAers who endorsed their AFA insurance dividend checks to the Foundation for this purpose.

This year, the Foundation plans to make available to the organizations listed above the book *Forged in Fire* (sequel to *A Few Great Captains*), as well as the Foundation's own publication of the story of AFA and AEF, *Crusade for Airpower.*

A donor, who wishes to remain anonymous, has given $3,000 to the Foundation to help defray the expense of distributing copies of *Forged in Fire.* The Foundation wishes to express deep gratitude to this generous individual, and suggests that other AFAers might like to make tax-deductible contributions to the Foundation to help finance efforts to ensure that this nation's aerospace heritage is not forgotten by future generations. —*By Michael J. Nisos*

Unit Reunions

American Defenders of Bataan and Corregidor
The thirty-eighth annual convention will be held May 1–8, 1983, at the Carillon Hotel in Miami Beach, Fla. **Contact:** Joe Vater, 18 Warbler Dr., McKees Rocks, Pa. 15136. Austin Patrizio, 414 Richmond Pl., Leonia, N. J. 07605. Ralph Levenberg, P. O. Box 337, Henderson, Nev. 89015.

American Fighter Aces Ass'n
The American Fighter Aces reunion will be held on May 26–29, 1983, at the Camelback Inn in Phoenix, Ariz. **Contact:** Col. Gerald Brown, 6227 N. 22d Dr., Phoenix, Ariz. 85015. Phone: (602) 249-3802.

Jolly Green Rescue Forces
Members of the Jolly Green Rescue Forces will hold their reunion on April 22–23, 1983, at the Ramada Inn in Fort Walton Beach, Fla. **Contact:** Ed Modica, 222 Sotir Ave., Fort Walton Beach, Fla. 32548. Phone: (904) 863-1959.

River Rats
The Red River Valley Fighter Pilots Association "River Rats" will hold its annual reunion on April 27–May 1, 1983, at the Sahara Hotel in Las Vegas, Nev. **Contact:** Red River Valley Fighter Pilots Association, 8612 Tamarac Lane, Wichita, Kan. 67206. Phone: (316) 685-2915. Albert R. Krisch, 3135 Palora Ave., Las Vegas, Nev. 89121. Phone: (702) 457-2797.

5th Bomb Group
A reunion of the 5th Bomb Group will be held June 1–3, 1983, at the Henry VIII Inn and Lodge in St. Louis, Mo. **Contact:** Floyd L. Streeper, Rte. 5, 104 Cedar St., Gulfport, Miss. 39503.

9th Bomb Wing
The 9th Bomb Wing and all attached units that were stationed at Mountain Home AFB, Idaho (1952–66), will hold a reunion June 10–12, 1983, in Boise, Idaho. **Contact:** Harvey R. McAtee, 10140 Saranac Dr., Boise, Idaho 83709. Phone: (208) 376-3489.

13th Bomb Sqdn.
Former members of the 13th Bomb Squadron, 3d Bomb Group, Fifth Air Force, will hold their first reunion on April 8–10, 1983, at the Holiday Inn in Panama City, Fla. **Contact:** J. Randy Forrester, 8275 Jaffy Dr., West Chester, Ohio 45069. Phone: (513) 477-6657.

17th Troop Carrier Sqdn.
Members of the 17th Troop Carrier Squadron "Firebirds" will hold their second annual reunion in Abilene, Tex., on June 10–12, 1983. **Contact:** Walt Ott, 3837 Concord, Abilene, Tex. 79603. Phone: (915) 677-1593.

19th Bombardment Ass'n
The 19th Bomb Group and Wing will hold three regional reunions on the following dates: April 29–May 1, 1983, at Reno, Nev.; July 8–10, 1983, at Carlisle, Pa.; and October 13–16, 1983, at Jackson, Miss. **Contact:** Herbert A. Frank, 90-13 201st St., Hollis, N. Y. 11423. Phone: (212) 465-5740.

20th Fighter Group Ass'n
Veterans of the 20th Fighter Group will return to England on August 25, 1983, to celebrate the fortieth anniversary of their arrival there and to dedicate a monument to all who served. **Contact:** Jack Ilfrey, 20th Fighter Group Association, 1847 Kuehler, New Braunfels, Tex. 78130. Phone: (512) 629-0391.

26th Fighter Sqdn.
The 26th Fighter Squadron, 51st Fighter Group "China Blitzers" will hold a reunion on June 23–25, 1983, at the Woodlake Inn in Sacramento, Calif. **Contact:** Gordon V. Sortomme, 1206 41st St., Sacramento, Calif. 95819. Phone: (916) 452-2621. Roy R. Santin, 5420 Marmith Ave., Sacramento, Calif. 95841. Phone: (916) 334-3400.

Class 43-E
Pilot Class 43-E (Gulf Coast Training Command) will hold a reunion on May 6–8, 1983. **Contact:** K. C. Growe, 508 S. Ogden Dr., Los Angeles, Calif. 90036.

44th Bomb Group/Wing/SMW
The second annual reunion for the 44th Bomb Group, the 44th Bomb Wing, and the 44th Strategic Missile Wing is scheduled for May 26–29, 1983, in Rapid City, S. D. **Contact:** Col. Thomas J. Pfeiffer, USAF, 68th Strategic Missile Squadron, Ellsworth AFB, S. D. 57706. Phone: (605) 399-2742.

56th Fighter Group
Members of the 56th Fighter Group will hold their reunion on June 25–26, 1983, in Nashville, Tenn. A special welcome is extended to the men of Fox Able One (the first transatlantic jet deployment). **Contact:** Leo Lester, 56th Fighter Group Asso-

AFA State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Don Krekelberg,** 904 Delcris Drive, Birmingham, Ala. 35226 (phone 205-942-0784).

ALASKA (Anchorage, Fairbanks): **William M. Mack,** 610 McKay Bldg., 338 Denali St., Anchorage, Alaska 99501 (phone 907-266-1253).

ARIZONA (Phoenix, Sun City, Tucson): **Thomas W. Henderson,** 4820 N. Camino Real, Tucson, Ariz. 85718 (phone 602-299-6467).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Little Rock): **Charles E. Hoffman,** 1041 Rockwood Trail, Fayetteville, Ark. 72701 (phone 501-521-7614).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hermosa Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Vandenberg AFB, Yuba City): **B. J. Scott Norwood,** 19561 Moray Court, Saratoga, Calif. 95070 (phone 408-867-9466).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **William R. Morris,** 5521 S. Telluride Court, Aurora, Colo. 80015 (phone 303-693-4464).

CONNECTICUT (East Hartford, North Haven, Storrs, Stratford, Westport, Windsor Locks): **Raymond E. Choquette,** 16 Tonica Springs Trail, Manchester, Conn. 06040 (phone 203-646-4818).

DELAWARE (Dover, Wilmington): **Joseph H. Allen, Jr.,** 537 Roberta Ave., Dover, Del. 19901 (phone 302-674-3472).

DISTRICT OF COLUMBIA (Washington, D. C.): **A. B. Outlaw,** 1750 Pa. Ave., N. W., Suite 400, Washington, D. C. 20006 (phone 202-637-3346).

FLORIDA (Broward, Cape Coral, Fort Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach, Winter Haven): **Morgan S. Tyler, Jr.,** 1776 6th St., N. W., Apt. 606, Winter Haven, Fla. 33880 (phone 813-299-2773).

GEORGIA (Athens, Atlanta, Columbus, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Edward I. Wexler,** 8 E. Back St., Savannah, Ga. 31406 (phone 912-964-1941, Ext. 253).

GUAM (Agana): **Joe Gyulavics,** P. O. Box 21543, Guam 96921 (phone 671-477-9711).

HAWAII (Honolulu): **Don J. Daley,** P. O. Box 3200, Honolulu, Hawaii 96847 (phone 808-525-6296).

IDAHO (Boise, Mountain Home, Twin Falls): **John W. Logan,** 3131 Malad St., Boise, Idaho 83705 (phone 208-385-5475).

ILLINOIS (Belleville, Champaign, Chicago, Decatur, Elmhurst, Peoria): **Richard H. Becker,** 7 Devonshire Drive, Oak Brook, Ill. 60521 (phone 312-654-3938).

INDIANA (Bloomfield, Fort Wayne, Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **John Kagel,** 1029 Riverside Drive, South Bend, Ind. 46616 (phone 219-234-8855).

IOWA (Des Moines): **Carl B. Zimmerman,** 608 Waterloo Bldg., Waterloo, Iowa 50701 (phone 319-232-2650).

KANSAS (Topeka, Wichita): **Cletus J. Pottebaum,** 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-683-3963).

KENTUCKY (Louisville): **Elmo C. Burgess,** 116 S. 5th St., Louisville, Ky. 40202 (phone 502-585-5169).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **James S. Kendall,** 4428 Parkridge Drive, Benton, La. 71006 (phone 318-965-9164).

MAINE (Limestone, N. Berwick): **Arley McQueen, Jr.,** Route 1, Box 215, Wells, Me. 04090 (phone 207-676-9511, ext. 2354).

MARYLAND (Andrews AFB, Baltimore): **William L. Ryon, Jr.,** 8711 Liberty Lane, Potomac, Md. 20854 (phone 301-299-8787).

MASSACHUSETTS (Bedford, Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Zaven Kaprielian,** 428 Mt. Auburn St., Watertown, Mass. 02172 (phone 617-924-5010).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Jeryl L. Marlatt,** 740 S. Cranbrook Rd., Birmingham, Mich. 48009 (phone 313-362-0511).

MINNESOTA (Duluth): **Edward A. Orman,** 368 Pike Lake, Duluth, Minn. 55811 (phone 218-727-8381).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Clarence Ball, Jr.,** 5813 David Davis Pl., Ocean Springs, Miss. 39564 (phone 601-875-5883).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **James R. Hopkins,** 316 Hillcrest Drive, Warrensburg, Mo. 64093 (phone 816-747-6087).

MONTANA (Great Falls): **Dick Barnes,** P. O. Box 685, Great Falls, Mont. 59403 (phone 406-727-3807).

NEBRASKA (Lincoln, Omaha): **Edward A. Crouchley,** 1314 Douglas On the Mall, Omaha, Neb. 68102 (phone 402-633-2125).

NEVADA (Las Vegas, Reno): **William J. Becker,** 1709 Valmora, Las Vegas, Nev. 89102 (phone 702-873-5945).

NEW HAMPSHIRE (Manchester, Pease AFB): **Charles J. Sattan,** 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Middlesex County, Newark, Trenton, Wallington, West Orange): **Frank Kula,** 264 Edgewood Drive, Toms River, N. J. 08753 (phone 201-244-2491).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Louie T. Evers,** P. O. Box 1946, Clovis, N. M. 88101 (phone 505-762-1798).

NEW YORK (Albany, Brooklyn, Buffalo, Chautauqua, Garden City, Hempstead, Hudson Valley, New York City, Niagara Falls, Plattsburgh, Queens, Rochester, Rome/Utica, Southern Tier, Staten Island, Suffolk County, Syosset, Syracuse, Westchester): **Robert E. Holland,** 750-75A Lido Blvd., Lido Beach, N. Y. 11561 (phone 516-889-1571).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **Hal Davis,** 1034 Manchester Drive, Cary, N. C. 27511 (phone 919-467-6511).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **Maurice M. Rothkopf,** 3210 Cherry St., Grand Forks, N. D. 58201 (phone 701-746-5493).

OHIO (Cincinnati, Cleveland, Columbus, Dayton, Newark, Youngstown): **Charles B. Spencer,** 333 West 1st St., Suite 252, Dayton, Ohio 45402 (phone 513-228-1175).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Aaron C. Burleson,** P. O. Box 757, Altus, Okla. 73522 (phone 405-482-0005).

OREGON (Eugene, Portland): **William Gleaves,** 2353 Oakway Terrace, Eugene, Ore. 97401 (phone 503-687-2269).

PENNSYLVANIA (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Lewistown, Philadelphia, Pittsburgh, Scranton, State College, Washington, Willow Grove, York): **Tillie Metzger,** 2285 Valera Ave., Pittsburgh, Pa. 15210 (phone 412-881-1991).

PUERTO RICO (San Juan): **Fred Brown,** 1991 Jose F. Diaz, Rio Piedras, P. R. 00928 (phone 809-790-5288).

RHODE ISLAND (Warwick): **King Odell,** 413 Atlantic Ave., Warwick, R. I. 02888 (phone 401-941-5472).

SOUTH CAROLINA (Charleston, Columbia, Myrtle Beach, Sumter): **William B. Gemmill,** 11 Victoria Ave., Myrtle Beach, S. C. 29577 (phone 803-626-9628).

SOUTH DAKOTA (Rapid City, Sioux Falls): **Duane L. Corning,** Box 901 RR 4, Rapid City, S. D. 57701.

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Arthur MacFadden,** 4501 Amnicola Highway, Chattanooga, Tenn. 37406 (phone 615-622-6262).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **John Sparks,** P. O. Box 360, San Antonio, Tex. 78292 (phone 817-723-2741).

UTAH (Brigham City, Cedar City, Clearfield, Ogden, Provo, Salt Lake City): **Nuel Sanders,** 370 S. 500 East —Suite 120, Clearfield, Utah 84015 (phone 801-776-2101).

VERMONT (Burlington): **John D. Navin,** 350 Spear St., Unit 64, South Burlington, Vt. 05401 (phone 802-863-1510).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Ivan R. Frey,** 73 James Landing Rd., Newport News, Va. 23606 (phone 804-595-5617).

WASHINGTON (Seattle, Spokane, Tacoma): **E. A. Kees, Jr.,** 7710 Ruby Drive, S. W., Tacoma, Wash. 98498.

WEST VIRGINIA (Huntington): **David Bush,** 2317 S. Walnut Drive, St. Albans, W. Va. 25177 (phone 304-722-3583).

WISCONSIN (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 414-871-3766).

WYOMING (Cheyenne): **Al Guidotti,** P. O. Box 811, Cheyenne, Wyo. 82001 (phone 307-638-3361).

ciation, 600 E. Prospect St., Kewanee, Ill. 61443.

58th Bomb Wing Ass'n
The 58th Bomb Wing (40th, 444th, 462d, and 468th Groups) will hold a reunion on April 22–26, 1983, in Shreveport, La. **Contact:** Dale Bozman, 407 Plaza Circle, Bossier City, La. 71111. Phone: (318) 746-8760.

65th Fighter Sqdn.
The 65th Fighter Squadron will hold its reunion on May 13–15, 1983, at the Sheraton-Lancaster Resort in Lancaster, Pa. **Contact:** Evelyn Linder, 5 Candle Rd., Levittown, Pa. 19057. Phone: (215) 945-1685.

78th Fighter Group Ass'n
The 78th Fighter Group of the Eighth Air Force will hold its ninth annual national convention on June 10–12, 1983, at the Clarksville Marriott Inn in Louisville, Ky. **Contact:** Albert Wendt, P. O. Box 24, Arlington Heights, Ill. 60006. Phone: (312) 255-3733.

79th Airdrome Sqdn.
Members of the 79th Airdrome Squadron, Fifth Air Force, will hold their reunion on June 3–5, 1983, at the Daytonian Hotel in Dayton, Ohio. **Contact:** Fred Hitchcock, 29 Blueberry Hill Lane, Sudbury, Mass. 01776. Phone: (617) 443-8879.

109th Tac. Recon. Sqdn.
A reunion for the 109th Tactical Reconnaissance Squadron will be held on June 3–5, 1983, at the Contact Club at Minneapolis-St. Paul IAP, Minn. **Contact:** Ed Bossard, 1738 W. Skillman Ave., St. Paul, Minn. 55113. Phone: (612) 631-0169.

308th Bomb Wing
The 308th Bomb Wing will hold its third reunion on April 15–17, 1983, in Savannah, Ga. **Contact:** Col. Emmett Prow, USAF (Ret.), 10 Stillwood Circle East, Savannah, Ga. 31406.

320th Air Refueling Sqdn.
Members of the 320th Air Refueling Squadron (1953–62) will hold their thirtieth anniversary reunion on May 19–21, 1983, at March AFB, Calif. **Contact:** Herman G. Benton, 6252 Hamilton Ct., Chino, Calif. 91710. Phone: (714) 628-8681.

385th Bomb Group Memorial Ass'n
The 385th Bomb Group will hold its fortieth anniversary and ninth reunion in Colorado Springs, Colo., on June 1–5, 1983. **Contact:** Sam E. Lyke, 4992 Princeton Dr., Bartlesville, Okla. 74003. Phone: (918) 333-4939.

388th Bomb Group Ass'n
The 388th Bomb Group will be holding a minireunion trip to England on June 1–19, 1983, and will hold its thirty-fourth annual reunion in Sioux City, Iowa, during the first week of August 1983. **Contact:** Ed Huntzinger, P. O. Box 965, Cape Coral, Fla. 33910.

At a joint meeting of AFA's Cleveland Chapter and the local section of the American Institute of Aeronautics and Astronautics held last January at NASA's Lewis Research Center, Lt. Gen. James V. Hartinger (right), CINC SPACECOM, welcomes three honorary recruits with the presentation of SPACECOM caps. The new "recruits" are (from left): Joe Joyce, Chairman of AIAA's Northern Ohio Section; John Boeman, Cleveland Chapter President; and Andrew Stofan, Lewis Director.

442d Military Airlift Wing
Members of the 442d Military or Tactical Airlift Wing will hold their annual reunion at Richards-Gebaur AFB, Mo., on June 18, 1983. **Contact:** Joe F. Montanaro, 447 S. Montgall St., Kansas City, Mo. 64124. Phone: (816) 231-6164.

444th Fighter Interceptor Sqdn.
The 444th Fighter Interceptor Squadron reunion will be held June 17–19, 1983, at the Airport Holiday Inn near Charleston AFB, S. C. **Contact:** Lt. Col. Wallace E. Mitchell, USAF (Ret.), 535 Mimosa Rd., Sumter, S. C. 29150. Phone: (803) 469-3297.

456th Bomb Group Ass'n
The 456th Bomb Group, Fifteenth Air Force, will celebrate its fortieth anniversary at Edwards AFB, Calif., on April 11–14, 1983. **Contact:** James Watkins, 11415 Minor Dr., Kansas City, Mo. 64114. Phone: (816) 942-5594.

461st/484th Bomb Groups
Members of the 461st and 484th Groups and all personnel based at Torretta, Italy, will hold a reunion on June 3–5, 1983, at Williamsburg, Va. **Contact:** Bud Markel, 1122 Ysabel St., Redondo Beach, Calif. 90277. Phone: (213) 316-3330. Frank O'Bannon, 137 Via La Soledad, Redondo Beach, Calif. 90277. Phone: (213) 375-1747.

474th Fighter Group Ass'n
The 474th Fighter Group will hold a reunion at the Sheraton Plaza Hotel in St. Louis, Mo., on May 13–15, 1983. **Contact:** Robert D. Hanson, 7515 Wayzata Blvd., Suite 226, Minneapolis, Minn. 55426.

510th Fighter Sqdn. Ass'n
Veterans of the 510th Fighter Squadron and the 405th Fighter Group (Ninth Air Force) will hold their reunion in April 1983 in Sun City, Ariz. **Contact:** William A. Simpkins, 2318 Mt. Royal Terrace, Baltimore, Md. 21217.

525th/526th/527th FBS
Members of the 525th, 526th, and 527th Fighter-Bomber Squadrons of the 86th Fighter-Bomber Group will hold a reunion on June 9–11, 1983, at the Holiday Inn in Dayton, Ohio. **Contact:** Sid Howard, P. O. Box 40129, Houston, Tex. 77240.

Judge Advocates
I am collecting names and addresses of Air Force judge advocates who served in Vietnam in order to organize a bar association and a reunion.

Please contact me at the address below.

Ed Rodriguez
Boothe, Prichard & Dudley
P. O. Box 338
Fairfax, Va. 22030

Phone: (703) 273-4600

Mesa Del Rey
The Mesa Del Rey reunion group asks that all those who were assigned at Mesa Del Rey during World War II to contact them for the purpose of planning a reunion.

Please contact the address below.

Mesa Del Rey Committee
331 Canal St.
King City, Calif. 93930

Phone: (408) 385-5678

AFA Intercom

Gen. Charles A. Gabriel, USAF Chief of Staff, is awarded an Honorary Doctorate in Aeronautical Science by Brig. Gen. William W. Spruance, USAF (Ret.), left, Chairman of the Board of Trustees of Embry-Riddle Aeronautical University and AFA National Director. The degree was conferred after General Gabriel gave the commencement speech to 300 graduates of Embry-Riddle's Daytona Beach campus. Assisting with the doctoral hood are Mrs. Gabriel (second from left) and Sara Fogle, Dean of Academic Affairs.

Hq. WESTAF

I am putting together a reunion of former staff personnel of Headquarters, Western Transport Air Force (WESTAF) of the former Military Air Transport Service (MATS). Officers, airmen, and civilians assigned to Hq. WESTAF from July 1958 to June 1966 are invited. This reunion is being planned for July 1–3, 1983.

Interested persons should contact the address below.

Col. Jerry Miller, USAF (Ret.)
660 Alamo Dr.
Vacaville, Calif. 95688

8th Fighter Group

I would like to locate former World War II members of the 8th Fighter Group for a reunion to be held in Las Vegas, Nev., in September 1983.

Please contact me for additional information.

Vincent Steffanic
21 Curson St.
West Warwick, R. I. 02893

Class 53-G

I am interested in getting Pilot Class 53-G together for a thirtieth year reunion in 1983.

I would like to hear from all former students, instructors, and ground support personnel.

Several members of AFA's Tokyo Chapter "get the dirt off" as they wash an F-86 on display at Yokota AB, Japan. The clean-up is one of many community involvement projects sponsored by the Chapter. The Tokyo Chapter celebrates its first birthday on April 5. (USAF photo by Sgt. Jerardo Medina)

Please contact me at the address below for more details.

Maj. Jerry D. Byers, USAF (Ret.)
2740 Fire Station Rd.
Martinsville, Ind. 46151
Phone: (317) 342-8054

315th Bomb Wing

I would like to hear from former members of the 315th Bomb Wing, and from veterans of the following B-29 Groups: 16th, 331st, 501st, and 502d; and also from former members of Service Groups 24th, 73d, 75th, and 76th, plus those from attached and assigned units on Guam during World War II.

The purpose is to gather information for a history and to determine the possibilities for a reunion.

Please contact the address below.

Col. George E. Harrington, USAF (Ret.)
4600 Ocean Beach Blvd.
Apt. 505
Cocoa Beach, Fla. 32931

1141st SPACTY Sqdn.

Members of USAF Flight Section, Detachment 4, 1141st SPACTY Squadron (stationed in Naples, Italy) are interested in holding a reunion in June 1983 in the Dallas/Fort Worth, Tex., area.

Dan Benstrom
Box 825
Gwinn, Mich. 49841
or
Del Mills
P. O. Box 61
Hydro, Okla. 73048
Phone: (906) 346-3567
(405) 663-2700

Coming Events

April 8–9, **South Dakota State Convention,** Sioux Falls . . . April 22–24, **Northeast Regional Meeting,** Corning, N. Y. . . . April 30, **South Carolina State Convention,** Columbia . . . June 3–4, **Arkansas State Convention,** Little Rock . . . June 3–4, **Ohio State Convention,** Newark . . . June 10–11, **Oklahoma State Convention,** Tulsa . . . June 11, **Illinois State Convention,** Scott AFB . . . June 17–19, **Texas State Convention,** Bryan/College Station . . . June 24–26, **New Jersey State Convention,** Cape May . . . June 25, **Louisiana State Convention,** Barksdale AFB . . . July 15–17, **Pennsylvania State Convention,** Philadelphia . . . July 22–24, **Georgia State Convention,** Athens . . . July 29–31, **Florida State Convention,** Orlando . . . August 11–13, **California State Convention,** Sunnyvale . . . August 12–13, **Missouri State Convention,** Whiteman AFB . . . August 12–14, **New York State Convention,** Rome . . . August 18–20, **Utah State Convention,** Ogden . . . August 26–28, **Oregon State Convention,** Portland . . . September 11–15, **AFA National Convention and Aerospace Development Briefings and Displays,** Washington, D. C . . . . October 20–22, **Aerospace Education Symposium,** Montgomery, Ala.

All members under age 65 now eligible to apply

NEW, RECORD BENEFIT.

CURRENT BENEFIT TABLES

Including Substantial Benefit Increases for Policyholders Under Age 65

(effective May 31, 1982)

Member's Attained Age	STANDARD Premium: $10 per month Basic Benefit*		HIGH OPTION Premium: $15 per month Basic Benefit*		HIGH OPTION PLUS PLAN Premium: $20 per month Basic Benefit*	
	Former Coverage	New Coverage	Former Coverage	New Coverage	Former Coverage	New Coverage
20-24	$85,000	**$100,000**	$127,500	**$150,000**	$170,000	**$200,000**
25-29	85,000	**95,000**	127,500	**142,500**	170,000	**190,000**
30-34	65,000	**70,000**	97,500	**105,000**	130,000	**140,000**
35-39	50,000	**55,000**	75,000	**82,500**	100,000	**110,000**
40-44	35,000	**37,500**	52,500	**56,250**	70,000	**75,000**
45-49	20,000	**22,500**	30,000	**33,750**	40,000	**45,000**
50-54	12,500	**15,000**	18,750	**22,500**	25,000	**30,000**
55-59	10,000	**11,000**	15,000	**16,500**	20,000	**22,000**
60-64	7,500	**8,000**	11,250	**12,000**	15,000	**16,000**
65-69	4,000	**4,000**	6,000	**6,000**	8,000	**8,000**
70-74	2,500	**2,500**	3,750	**3,750**	5,000	**5,000**

AVIATION DEATH BENEFIT* (for pilots and crew members)

Non-war related: Ages 20-34—Payment of ½ the scheduled benefit. (Applies to Standard, High Option and High Option Plus Plans)
Ages 35-74—Payment of the full scheduled benefit. (Applies to Standard, High Option and High Option Plus Plans)

War related:	$15,000	$22,500	$30,000
EXTRA ACCIDENTAL DEATH BENEFIT**	$12,500	$15,000	$17,500

***AVIATION DEATH BENEFIT:** The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore, the non-war related benefit will be paid in all cases where the death does not result from war or act of war, whether declared or undeclared.

****EXTRA ACCIDENTAL DEATH BENEFIT:** In the event of an accidental death occurring within 13 weeks of the accident, these AFA plans pay an additional lump sum benefit as shown in the tables, except as noted under AVIATION DEATH BENEFIT above.

OTHER IMPORTANT BENEFITS

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 65 (See "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year-end dividends in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on seven separate occasions.

ADDITIONAL INFORMATION

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

ELIGIBILITY

All members of the Air Force Association are eligible to apply for this coverage provided they are under age 65 at the time application for coverage is made.

*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in New York.

OPTIONAL FAMILY COVERAGE

PREMIUM: $2.50 per month

Member's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each child*
20-39	$20,000.00	$4,000.00
40-44	15,000.00	4,000.00
45-49	10,000.00	4,000.00
50-54	7,000.00	4,000.00
55-59	5,000.00	4,000.00
60-64	3,000.00	4,000.00
65-69	2,000.00	4,000.00
70-75	1,000.00	4,000.00

*Children under six months are provided with $250 coverage once they are 15 days old and discharged from the hospital.
Upon attaining age 21, and upon submission of satisfactory evidence of insurability, insured dependent children may replace this $4,000 group coverage (in most states) with a $10,000 permanent individual life insurance policy with guaranteed purchase options.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United of Omaha Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United of Omaha Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

IOW AVAILABLE (30% Dividend—1981)

APPLICATION FOR
AFA GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United of Omaha Life 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 (Mo. Day Yr.)	Height	Weight	Social Security Number

This insurance is available only to AFA members

☐ I enclose $15 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).

☐ I am an AFA member.

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

Please indicate below the Mode of Payment and the Plan you elect:

Mode of Payment	Plan of Insurance: Standard Plan		High Option Plan		High Option PLUS Plan	
	Member Only	Member And Dependents	Member Only	Member And Dependents	Member Only	Member And Dependents
Monthly government allotment (only for military personnel). I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	☐ $ 10.00	☐ $ 12.50	☐ $ 15.00	☐ $ 17.50	☐ $ 20.00	☐ $ 22.50
Quarterly. I enclose amount checked.	☐ $ 30.00	☐ $ 37.50	☐ $ 45.00	☐ $ 52.50	☐ $ 60.00	☐ $ 67.50
Semi-Annually. I enclose amount checked.	☐ $ 60.00	☐ $ 75.00	☐ $ 90.00	☐ $105.00	☐ $120.00	☐ $135.00
Annually. I enclose amount checked.	☐ $120.00	☐ $150.00	☐ $180.00	☐ $210.00	☐ $240.00	☐ $270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanatorium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

If YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United of Omaha Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United of Omaha Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ___ _____
Member's Signature

FORM 3767GL App REV. 10-79

Application must be accompanied by a check or money order. Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

4/83

Bob Stevens'

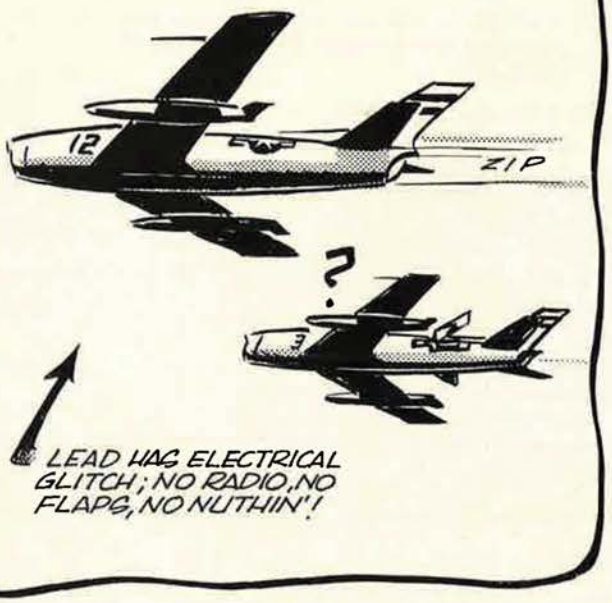
"There I was..."

IN OUR LAST EPISODE WE LEARNED HOW FIGHTER PILOTS SIGNAL TO ONE ANOTHER IN SILENCE USING BODY and AIRCRAFT MOVEMENTS. THE FOLLOWING TRUE STORY IS A PERFECT EXAMPLE OF MURPHY'S LAW IN ACTION ONLY THE AIRCRAFT FLOWN and NAMES HAVE BEEN CHANGED TO PROTECT THE INNOCENT—

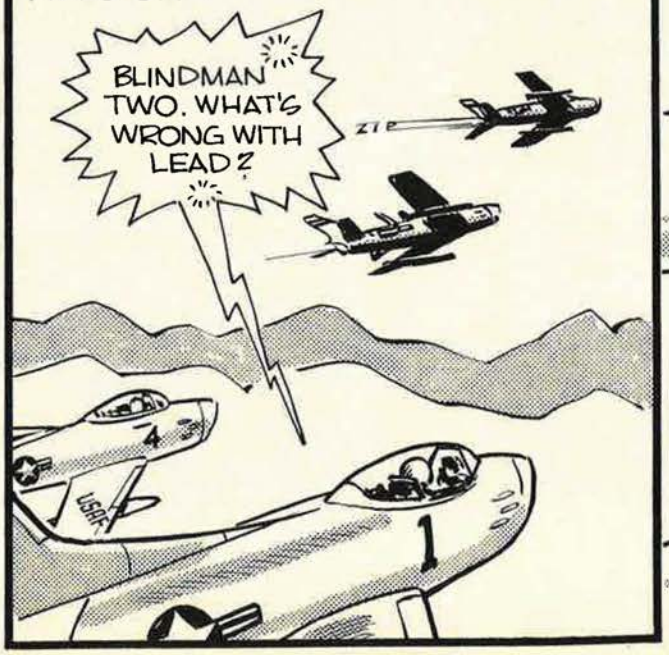
COMMUNICATING WITHOUT TALKING, PT. II

LARGE LOOSE FORMATION OF F-86s MAINTAINING RADIO SILENCE. LEAD SIGNALS TO WINGMAN—

WING TAKES LEAD, SIGNALS, "SPEED BRAKES OUT" (PREP FOR LETDOWN). FORMER LEAD ZIPS BACK INTO LEAD, SPEED BRAKES IN.



THIS AERIAL ALPHONSE and GASTON ACT TAKES PLACE SEVERAL TIMES BEFORE THE C.O.—WATCHING THINGS FROM THE REAR—FIRES OFF:



THANKS TO BILL HAYES, BELLEVUE, WASH.

Bob Stevens

ELECTRONIC WARFARE SYSTEMS ARE NOW MORE TACTICAL AND PRACTICAL...

BECAUSE SPERRY KNOWS HOW TO LISTEN.

Helping to maintain our operational edge with systems for defensive countermeasures, signal intelligence, and EW simulation and training, Sperry is keeping a technological step ahead.

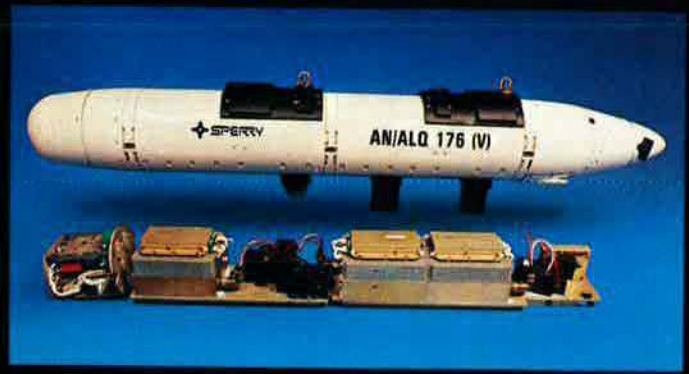
Our AN/ALQ-176(V) pod jammer mounts on standard aircraft stores/munitions stations, and provides generic, multimission capabilities in ECM support, standoff jamming, combat evaluation and training capabilities for a wide range of aircraft. Operating on either aircraft power or its own ram-air, turbine generator, this slim pod can accommodate up to five transmitters in variable ECM configurations—depending upon the threat and the mission. And our unique technology, design and packaging within the pod allow the AN/ALQ-176(V) to be modified quickly in response to new threats.

Successfully tested and evaluated by both the United States Air Force and the Royal Norwegian Air Force, this versatile system provides multi-band frequency ECM capabilities for fighter attack, transport and training aircraft.

For NATO's TRACS VANS Program, Sperry is developing a transportable radar, ECM, and communications simulator for realistic, at-sea combat training. Capable of simulating dense threat environments under high-speed computer control, TRACS VANS will help to evaluate and improve the NATO force readiness capability.

For more information on what we're up to in electronic warfare, just ask us...we understand how important it is to listen.

Write to Sperry Corporation, Electronic Systems, Great Neck, NY 11020. Attention: Marketing Department.



SPERRY

EAGLES SWEEP THE SKIES WITH FIVE OUT OF SIX TOP SPOTS IN AIR FORCE "WILLIAM TELL" MEET.

F-15 pilots demonstrated eagle-eye marksmanship in William Tell '82, an Air Force fighter competition. Thirteen top U. S. and Canadian fighter-interceptor teams met in an air defense test in the Florida skies. Eagle squadrons swept the top four slots and picked up sixth for good measure. A team flying F-4 Phantoms took fifth.

Winning with the best combined score in a wide range of operational tests was the 18th Tactical Fighter Wing, Kadena, led by Lt. Col. Jere Wallace. The Kadena team was the only competitor to achieve a perfect score in the massed bomber raid event with simulated kills of all hostile targets in the raid.

Today more than 700 Eagles, serving the air forces of four nations, are on duty throughout the world. With their demonstrated all-weather air defense capability, they provide a new level of security for the borders and shores they patrol.

F-15 from the 48th Fighter-Interceptor Squadron, ADTAC, Langley AFB, Va. firing a radar-guided Sparrow missile at a target drone many miles distant. The shot was a hit.

MCDONNELL DOUGLAS